PROCEEDINGS
ONE HUNDRED AND SIXTH ANNUAL MEETING

of the

UNITED STATES ANIMAL HEALTH ASSOCIATION

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The Millennium Hotel
St. Louis, Missouri
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Ms. Jill Bryar Wood, TX
Dr. Tracey S. McNamara, NY
Dr. Leslie W. Woods, CA
Dr. Robert W. Mead, WA
Dr. Taylor Woods, MO.
Dr. Carol U. Meteyer, WI
II. 2002 Annual Meeting
Proceedings
A. USAHA/AAVLD General Session
B. USAHA Business Session, USAHA/AAVLD Plenary Session
C. Workshop—Chronic Wasting Disease
D. USAHA Scientific Session and Business Session
E. Committee Reports and Related Papers
F. Scheduled Committee Meeting Papers
Shall we bow our head in an attitude of prayer for this prayer. Our Father in Heaven, we humbly come before you with thanksgiving in our hearts. Father, we thank you for this day and for the privilege to come before you in prayer, asking for your continued blessing on all of us. Father, we ask for you to bless our national leaders, giving them knowledge and wisdom to protect us. We pray, Father, for knowledge and wisdom for the leaders of USAHA to continue to work in the direction you guide us. We you ask Father to bless those that develop tests and to bless those, Father, that carry out the work of implementation and enforcement of laws; to provide, Father, for the humane care and treatment of the animals entrusted to us; and to provide, Father, for a safe and plentiful food source. Father, we pray for our men and women in the military who are protecting our country. And Father, we thank you for our colleagues and members that have labored so diligently and have gone before us.

Father, we now silently remember those that, this past year, have gone to their heavenly home:

- **Dr. Tom S. Maddox**  
  Former State Veterinarian of Kentucky  
  Greenville, Kentucky  
  Died August 5, 2001

- **Ms. Wendy Siroky**  
  Daughter of Dr. Clarence Siroky  
  State Veterinarian of Wisconsin  
  Died November 10, 2001

- **Mr. Frank Harding**  
  Life Member  
  Geneva, Illinois  
  Died January 12, 2002

- **Mrs. Harriet P. Omohundro**  
  Wife of Dr. R. E. Omohundro  
  Montgomery, Alabama  
  Died July 7, 2002
USAHA/AAAVLD GENERAL SESSION

Dr. Harless McDaniel
Life Member
Silver Spring, Maryland
Died August 31, 2002

Dr. Robert Hogue
Life Member
Austin, Texas
Died in 2002

Finally, Father, we again ask for your continued blessing on this organization, and we pray all these things in Jesus’ name, Amen.
It's a great honor for us to host the annual meeting of the U. S. Animal Health Association and the American Association of Veterinary Laboratory Diagnosticians.

We hope you get to see all our beautiful state has to offer while you’re here in St. Louis, and are pleased you chose the Gateway to the West for this year’s meeting.

St. Louis is an exciting city, offering something for everyone. St. Louis is not only known for the Arch, Anheuser-Busch Brewery, the Missouri Botanical Garden and Grants Farm, but for its art and entertainment venues and its sports teams.

My hope was for you to be able to attend a World Series playoff game, but the Cardinals just didn’t make it that far!

It’s a pleasure for me to bring greetings from our governor, Bob Holden. Gov. Holden is a strong advocate for agriculture, and realizes how important the livestock and animal health industries are to our nation’s health and welfare.

Missouri Agriculture

- In Missouri, agriculture is estimated to impact the state’s economy by $17 billion a year.
- One out of every six workers is employed in an agriculture-related job.
- Missouri ranks second in the nation in the number of farms with 108,000, and 15th in cash receipts.
- In 2001, the state's farms produced and sold about $4.82 billion worth of crops, livestock, poultry and aquaculture, a three percent increase from 2000.
- About $1.1 billion of our goods is exported.
- Livestock and poultry accounts for about 56 percent of cash receipts.
- Crops account for 44 percent of cash receipts.
- Missouri is headquarters to a number of national and international agribusinesses, including Farmland Industries, Monsanto, Dairy Farmers of America, Purina Mills, Ralston Purina, the national corn and soybean associations, Anheuser-Busch, etc.
- Missouri is known for its leadership and progress in agricultural research, education, technology and production.
Agribusiness is big business in Missouri
  − 50+ organized commodity groups
  − Farmland, Monsanto, Purina Mills, Dairy Farmers of America, etc.
  − Farmers’ markets
  − Livestock auctions
  − Nurseries and landscaping businesses
  − Grain elevators
  − Wineries
  − Aquaculture

Missouri Department of Agriculture - Overview
  • The Missouri Department of Agriculture works to enhance profitability for Missouri farmers through a variety of regulatory, marketing and financial assistance programs.
  • Mission Statement - To serve, promote and protect the agricultural producers, processors and consumers of Missouri’s food, fuel and fiber products.
  • Established in the mid-1800s.
  • Dual responsibilities: regulating and promoting.
  • Main offices in Jefferson City; personnel located throughout the state.
  • One of the smallest state agencies - $33 million annual administrative budget and approximately 462 employees.
  • Funding sources: general revenue, federal taxes and fees collected.

Partners in Missouri Agriculture
  • The department works cooperatively with state and federal agencies:
    − Natural Resources—water quality and animal waste regulations.
    − Economic Development—trade promotion offices.
    − Health—WIC/Seniors Program coupons for farmers’ markets, food safety initiatives.
    − Conservation— joint efforts to protect wildlife, fisheries, and forests.
    − SEMA—emergency preparedness.
    − University Extension—coordinated outreach efforts
    − USDA—umbrella agency for many cooperative programs.
    − EPA— jointly administer pesticide use regulations.
    − University Extension—coordinated outreach efforts.
    − Commodity Groups—check-off funds, incentives (such as Ethanol Incentive Fund), legislation, policy.

Department Divisions
  • Animal Health
  • Agriculture Business Development
  • Grain Inspection and Warehousing
  • Market Information and Outreach
• Office of the Director
• Plant Industries
• Weights and Measures

Animal Health
• Under the direction of the state veterinarian, Dr. Taylor Woods. Taylor does a great job for us, and I’d like to thank him and his staff who worked so hard on this annual meeting, as well as for their everyday efforts to protect the health of Missouri’s livestock industry.
• Protects and promotes Missouri’s livestock industry.
• Partners with U.S. Department of Agriculture
  – Animal and Plant Health Inspection Services
  – Food Safety and Inspection Services
  – National Poultry Improvement Plan

The nation’s livestock production and processing industries have been in the limelight like never before.

Food safety issues—recent massive meat recalls
  West Nile Virus
  Foot and Mouth Disease
  Chronic Wasting Disease
  New Castle Disease

Bioterrorism
State and federal agriculture officials agree that an outbreak of foreign animal disease could be a very real possibility whether introduced as an act of terrorism or by natural means.

Foreign animal diseases or other mass-produced animal pathogens intentionally targeted against the nation’s livestock industries could economically devastate entire segments of the U.S. economy.

Although most foreign animal diseases would have little impact on human lives, the effect on the animal industry would be severe due to the control measures that would be necessary to contain them.

Here are some steps the Missouri Department of Agriculture is taking to prepare for an outbreak of foreign animal disease:
• The department’s Animal Health Division has provided information to veterinarians, livestock producers and associations and other state and federal agencies on foot-and-mouth disease and other foreign animal diseases. Livestock producers and private veterinary practitioners would be the first line of defense in spotting and diagnosing any foreign animal disease and preventing its spread, so they have been reminded to be on the lookout for any unusual occurrences or changes in their livestock herds.
• The department has developed a protocol for handling foreign animal diseases and other animal health emergencies, which has been shared with veterinarians statewide.
• The Animal Health Division, in coordination with the State Emergency Management Agency, has conducted two training sessions for those associated with the livestock industry.
• The department continues to work closely with the State Emergency Management Agency, the Missouri Department of Health, the State Milk Board, the University of Missouri College of Veterinary Medicine and the U.S. Department of Agriculture (USDA) to prevent agricultural bioterrorism and safeguard the integrity of our livestock and food industries.
• The department also recently received a $50,000 USDA grant to fund equipment and supplies for “A Livestock Emergency Response Transportable System (ALERTS),” a mobile unit that will allow the department to respond immediately to disease emergencies. The funding also will be used to train state and private veterinarians in the diagnosis of foreign animal diseases and emergency management.
• The department will use additional federal funds in the fight against bioterrorism to develop a global imaging system that will map the location of the state’s meat processing plants.

Closing
You play an important role in keeping our livestock and food industries safe and healthy.
This meeting provides an excellent opportunity to work together to protect the health of our livestock industry and ensure a quality, safe food supply for the American public.
Thank you Director Mohler for that gracious welcome to Missouri. We are pleased to be in your wonderful state for this important meeting. The city of St. Louis provides a superb setting for all of us to enjoy.

It is my pleasure to take this opportunity to welcome all members and quests to California for the 107th annual meeting of USAHA and the 46th annual meeting of AAVLD. The meeting will again be held in the beautiful city of San Diego, at the Town and Country Hotel, the same site we had in 1999.

If you were with us in 1999, you will recall that the weather was outstanding, sunny and warm, which is typical throughout the year in this beautiful Southern California city. This hotel location also provides many opportunities to get outside and enjoy the weather throughout the day, a nice break from the hectic pace of a busy meeting. I’m sure you will enjoy your stay. In addition, the city of San Diego has breathtaking beaches and harbors, great restaurants and many family attractions. We are also very please that our own Mr. Bob Frost will be presiding over the USAHA meeting.

Despite continuing challenges of population growth, water availability and environmental issues, agriculture remains strong and continues to grow in California. Our $27 billion dollar industry produces more than 350 crop and livestock commodities and generates more than $100 billion in related economic activity for the state.

For over 50 years, California has been the leading agricultural state in the nation, both in production and exports. In fact, ten California counties produce over $1 billion of agricultural products, with three of these approaching $3 billion or more. And providing a very positive boost to trade, $6.5 billion in food and agriculture commodities from California are exported around the world each year.

Is it coincidence that our two leading commodities go especially well together? As the nation’s number one dairy state, at a value of almost $4 billion, cheese production is continuing to expand. Couple that with our grape industry at a value of almost $3 billion, with tremendous expansion in our many highly acclaimed wine regions, and you have a great pairing of some of the best wines and cheeses available anywhere in the world. I encourage you to extend your stay in California to enjoy our state’s diverse bounty of food and agriculture.

Again thank you for this opportunity to extend our welcome to California. We look forward to hosting this meeting. Please come early and stay as long as you can. I know you will enjoy your stay.
Thank you, Director Mohler for having us; we’re really glad to be here. Good evening; Welcome to USAHA; Welcome to AAVLD and Welcome to St. Louis. We are glad you’re here. We are in the middle of an extraordinary meeting. There is more to participate in and more to learn than we can get around to. The program is excellent. My sincere thanks and gratitude to Bob Frost and Terry McElwain for all the hard work they have done these past months in putting this program together.

We have record attendance at this meeting. Over 1,000 people are registered. That’s super! It is a tribute to your interest and concern and to the program being presented.

We are honored to have with us the USDA Undersecretary for Marketing and Regulatory Programs, Mr. Bill Hawks, Deputy Under Secretary Dr. Jim Butler and Special Guest commissioner Gus Douglass. Thank you all for being here. We are most appreciative.

I need to begin my remarks by thanking a lot of people for a lot of help this past year. First of all, my wife Sharon and the rest of my family for their support and patience. The USAHA Executive committee— these gentlemen have devoted a great amount of time and effort to the organization this year. Our staff, Linda and Hilary, thank you for another year of hard work and for keeping things running smoothly. I must extend a special thanks to my boss, Bob Odom, Louisiana Commissioner of Agriculture and Forestry. He has enthusiastically approved and supported my involvement in the activities of USAHA for the past four years and especially this year. In addition, he has provided the resources for a great deal of travel. My thanks, too, to my staff at home who have gone way beyond their responsibilities to help me. Last, but certainly not least, thanks to all of you—committee chairs, members, APHIS folks, state veterinarians, the animal agriculture industry, university teachers and researchers for giving me the opportunity to serve as president of USAHA.

I have had the opportunity to meet many people, to travel frequently and to be intimately involved in animal agriculture health issues. I am fortunate enough to have attended all four regional animal health association meetings, the NIAA annual meeting, the USAHA Government Relations Committee meeting, the Greater Yellowstone brucellosis symposium, the NASDA annual meeting, NIAA Identification Symposium and the OIE meeting in Paris. For all of these great opportunities, I am most grateful.

USAHA has had a busy year. It seems that the animal health issues just keep coming and keep coming. We have been very involved in the Homeland Security efforts that were initiated in the spring and are continuing on to completion and implementation. Many Homeland Security issues are unresolved therefore a great deal of work is still to be done. These efforts will lead...
to enormous changes in the way we do things. Coincidentally, but in harmony with the Homeland Security issues, the Safeguarding Review, which many members of both of these organization were a critical part, is being actively implemented.

Many states have seen their first cases of West Nile virus this summer, and have experienced very significant outbreaks in people and animals. Some areas did not see their first cases but saw large outbreaks, severe illness and a number of human deaths. I have had first hand experience with this situation.

Avian Influenza and now Newcastle Disease have had devastating effects on the poultry industry in some parts of the country. Trade restrictions due to these diseases have had adverse economic effects on all of animal agriculture.

Tuberculosis and brucellosis, the old stand-bys, are still around. We can’t afford to quit on these issues just because we are near the point of eradication. We have got to finish the job. In addition to these two “normal” diseases, the great strides that have been made in the eradication of pseudorabies must be continued through to completion.

And then there are the TSE’s, Gee Whiz, who would have thought it? Diseases for which there are no live animals tests. Diseases whose transmission is unknown; diseases that have proven to be indestructible by all the usual methods of sterilization. Diseases for which there is no treatment. Diseases for which there is no prevention. Diseases for which there is no cure. Diseases for which there are so many unanswered questions.

Folks, we have had a lot of “opportunities” this year. There are days when these “opportunities” would rather be called “train wrecks” and we seem to move from one to the next; but they are, in fact, opportunities. Opportunities to do what everyone here tonight does and that is to take care of the health of the animals of this country so that the citizens of the United States can continue to have the best, and the cheapest food in the world, produced in safe and healthy surroundings and to help insure the health of the people of this nation.

We all have a lot to do. Things are not slowing down. They move faster and faster every day. But I think we are moving with them. We have readied ourselves for emergencies—accidental, intentional, and natural disasters. We are establishing a nationwide diagnostic laboratory network. The Master Plan for the rebuilding of NVSL and NADC is underway. It is absolutely critical that we all continue to keep this project on the front burner and not let it get side tracked. Above all, however, is the ability and commitment of this diverse group of people to work together to get our job done. In the face of fewer people, less money and more work, working together is a must. Actually, that is why we are all here—to work together to get it done.

Again, my sincerest thanks to all of you for all that you have done for me and thank you for being here and doing a very good job.
This past year has been a very busy year for both AAVLD and USAHA as you heard from USAHA President Lea’s speech. Our organizations have many issues in common including topics like Chronic Wasting Disease, Foot and Mouth Disease, laboratory and state emergency preparedness, Ames Modernization Plan, Animal Health Protection Act which passed in 2002, select agent rules, interstate transport of pathogens, the National Animal Health Laboratory Network (NAHLN) and the Department of Transportation regulations. Our organizations have worked closely together to move forward our joint concerns and suggestions on these issues.

We have learned a great deal about how federal agencies work, how Congress functions, and I have been very fortunate to be able to develop excellent relationships and work with some wonderful people at USDA, including deputyAPHIS administrator Dr. Ron DeHaven, Dr. Randall Levings, NVSL director, NVSL section chiefs and Dr. Bill Wagner with CSREES. Dr. Levings has been accessible, open to suggestions and helpful as we worked together on many issues including our joint AAVLD-NVSL MOU meetings. The relationships AAVLD has developed with USDA and other agencies have lead to excellent dialogue on topics of ongoing and upcoming mutual interest.

I have also been fortunate to be able to work with an outstanding group of people on National Animal Health Emergency Management Steering Committee as the first AAVLD representative on that committee. The individuals on the committee have been a rich source of ideas and new initiatives for AAVLD related to emergency preparedness of laboratories.

I particularly want to acknowledge the communication efforts and support of our USAHA counterparts, particular Mr. Bob Frost, President-Elect of USAHA, who has done an outstanding job in championing our National Animal Health Lab Network concept and helping us get the word to the right people in Washington. Bob and I have had many late night discussions on issues of mutual concern and how to advance our joint organizational position. This has been invaluable to me as President.

I wish to acknowledge the tremendous efforts of Dr. Dave Zeman, immediate past-President, and Dr. Terry McElwain, incoming President, who were instrumental in bringing the NAHLN concept to the necessary congressional contacts that helped our organization put it on the map and obtain language to support the involvement of veterinary diagnostic labs in the Agricultural Bioterrorism Act of 2002. USAHA, members of the Animal Ag Coalition, AVMA Government Relations and AAVLD members and laboratory directors were very helpful in advancing the NAHLN concept to their
congressional contacts.

Finally I would like to acknowledge the accessible, straightforward and no-hold’s barred advice and opinions that I could always count on from Dr. Alex Ardans, my boss in my regular job and Secretary/Treasurer of AAVLD. His wife, Janice guaranteed his accessibility by making sure he called me back when I called him at home in the evenings on last minute issue. As he has said a number of times of late: “We live in interesting times”. We do indeed! As I leave the presidency, I turn over more issues to our incoming President McElwain than I was faced on my first day as President. Some of them are moving toward implementation; while others are new on the agenda. Having worked with Terry for the past, year, I cannot think of anyone who is more qualified, networked and knowledgeable to have as our President in 2003 and I wish him well.
SPECIAL RECOGNITION OF MR. MAJON HUFF

Maxwell A. Lea, Jr.
President

We need to recognize a very special person tonight. It is a privilege for me to be able to do that on behalf of USAHA.

Mr. Majon Huff was born in Sioux City, Iowa, in 1912. His father, Dr. J. N. Huff, founded the Colorado Serum Company in 1923. Mr. Huff has worked there ever since. He took over management of the company in 1933.

The first product produced by Colorado Serum Company was Hog Cholera Antiserum. Since that first product the company has expanded its line to include twenty-three (23) products for sheep, twenty (20) for cattle, fifteen (15) for goats, eleven (11) for swine and seven (7) for horses. Today they are the sole producer of RB51 Brucella abortus vaccine.

Mr. Huff attended his first USAHA meeting in 1931. With the exception of military service during WWII and his grandson’s wedding, he has been to every meeting since then. That makes sixty-eight (68) annual USAHA meetings.

Mr. Huff, thank you for all these years of support that you and the Colorado Serum Company have given USAHA. We appreciate you being here and being a part of this association.

In recognition of this great support we would like to present you with a memento of our appreciation.

Special recognition to Majon Huff by Maxwell Lea
Every year, APHIS honors one individual who has made a significant difference in protecting and improving the health of animal agriculture in the United States.

Sometimes, we have a particularly hard time making this selection. In any given year, there are a number of extremely dedicated and skilled individuals in the veterinary health and livestock industry fields from whom we must choose. Consider all of the accomplished members of USAHA, for example.

However, Gus Douglass—with his 45-year record and innumerable achievements—stands out even among this outstanding field of professionals. He has made significant and lasting contributions to promoting livestock health and strengthening the institutions that carry out this important mission. It is my distinct pleasure to honor Gus Douglass, Commissioner of Agriculture for the great State of West Virginia.

Gus has dedicated his life to championing the causes and concerns of American farmers. He began his illustrious career with the West Virginia Department of Agriculture in 1957 and was first elected Commissioner in 1964. He has been elected to a total of 9, 4-year terms as West Virginia Agriculture Commissioner—an extraordinary achievement.

In addition to his years of service to West Virginia, Gus has also held many agricultural leadership positions of regional and national importance. He has served as president of the National Association of State Departments of Agriculture (NASDA) and the Southern Association of State Departments of Agriculture. Currently, he serves on three NASDA committees, including the International Marketing and Trade Committee, the Food Regulations and Nutrition Committee, and the Animal Industries Committee, which he chairs.

Gus also chairs the Secretary of Agriculture’s Advisory Committee on Foreign Animal and Poultry Diseases. The recommendations from this important advisory committee help steer APHIS’ efforts to protect our Nation’s animal and poultry resources. Gus represents the State departments of agriculture on the committee. Under his leadership, the Committee provided great advice and support in the face of significant threats like the foot-and-mouth disease outbreak in Great Britain and agricultural biosecurity concerns following the September 11 attacks.

Earlier this year, I had heard that Gus had plans to leave the Committee. I understand he thought that he had served the maximum three terms allowed. When Secretary Veneman got wind of Gus’ plan to step down, she told me frankly that, “we need Gus Douglass’ leadership on that committee.” I’m happy to see him now serving an unprecedented fourth term.

Gus has had a longstanding cooperative relationship with USDA and has been a strong supporter and ally of APHIS. He has also been a persistent
and instrumental force for ensuring that the States and the Federal Government work in close partnership to address threats to domestic agricultural resources.

Recently, Gus provided crucial leadership as co-chair of NASDA’s Animal Health Safeguarding Review. This comprehensive and farsighted review confirmed that APHIS has been successful in preventing, detecting, and eradicating animal diseases, but that we need to do more to keep pace with new challenges to agricultural biosecurity. The review validated several initiatives that USDA has already undertaken, and we are implementing a number of other improvements to our domestic animal safeguarding system recommended by the review. Gus’ advice, insight, and other valuable contributions to this effort will help APHIS’ Veterinary Services program effectively safeguard U.S. animal health for many years to come.

Throughout his extensive career as an agriculture advocate, Gus has served on and often chaired more than 25 boards, commissions, and committees. He has also frequently been asked to testify before Congress on national agriculture policy and has received numerous awards for his leadership in the agricultural sector. All the while, he has still managed to operate his 400-acre family farm back in Mason County, West Virginia. This man is truly an institution in American agriculture.

We at APHIS are very grateful for his steadfast support over the years. For this reason, we take the utmost pleasure in presenting Mr. Gus Reuben Douglass with the 2002 APHIS Administrator’s Reward. Congratulations, Gus.

Bobby Acord, Administrator, APHIS, USDA presents the APHIS Administrator’s Award to Gus Douglas, Commissioner of Agriculture, West Virginia.
USAHA/AAAVLD GENERAL SESSION

AAVLD E. POPE AWARD

Dave Zeman
Brookings, SD

The E. P. Pope Memorial Award is presented in memory of Dr. Edward P. Pope, one of the founders of AALVD, and is given annually to a person who has made noteworthy contributions to AAVLD and to the specialty of veterinary diagnostic medicine. The 2002 Pope Memorial Award was presented to Dr. Gavin L. Meerdink at the joint banquet held with the USAHA during the 45th Annual Meeting of the AAVLD in St. Louis.

Dr. Meerdink is a nationally recognized expert in veterinary toxicology and currently is Clinical Professor and the Head of Clinical Toxicology at the University Of Illinois Laboratories Of Diagnostic Medicine.

Dr. Meerdink has had a distinguished career in service and leadership with professional organizations. Within the AAVLD, he has served in the House of Delegates (1984-89), as Vice President (1988), President Elect (1989), and President (1990). He has served as Chairman of the following AAVLD committees: Membership, Program, Laboratory Safety, Informatics, Publications and the AAVLD Foundation. He was also Editor of the AAVLD Newsletter from 1991-1998. Congratulations Dr. Meerdink!
The following are some of the issues that Dr. Zirkle has been involved with over the past several years:

- **Low Pathogenic Avian Influenza.** Leader in regional efforts, among states and USDA, to address Low Pathogenic Avian Influenza in live market poultry in the northeast region.

- **West Nile Virus.** New Jersey led efforts to effectively address the disease in horses and developed an effective surveillance mechanism for the disease.

- **International Animal Health Issues.** Dr. Zirkle recognized the threat of animal health events in other countries to the health of animals in the United States. He also recognized the need for state animal health officials and animal industry leaders to have input in development of national rules for importation of animals and products into the United States. He participated in a number of international forums on animal health in efforts to foster understanding of international animal health issues, forge relationships with animal health officials in other countries and to improve the ability of the United States to prevent introduction of devastating diseases into our country. Created an International Issues Committee in USAHA.

- **Safeguarding Review of USDA.** After seeing the report of the Plant Safeguarding Review, Dr. Zirkle recognized the need for a similar review of animal health programs. He along with other members of the USAHA Executive Committee discussed this need with APHIS leadership and recommended that an animal health program review be conducted. USDA subsequently contracted with NASDA to conduct the Safeguarding Review. Dr. Zirkle served with distinction on one of the Safeguarding Review committees.

- **Animal Health Protection Act.** The need for revision of USDA authority to address animal health issues was recognized a number of years ago. A proposed revision was developed and presented to congress during 2000. A number of the provisions of this proposed revision were not acceptable to some industry groups and almost all of the state animal health agencies. Dr. Zirkle led efforts at the National Assembly and USAHA to make modifications to the proposal. These efforts were not successful and the proposal did not receive legislative approval. Dr. Zirkle was instrumental in bipartisan efforts to achieve modification of the original proposal. These efforts paved the way for joint discussions with industries, state animal health
officials and USDA to develop the version of the AHPA that was approved by Congress in 2002.

- Master Plan for Animal Health Laboratories at Ames, Iowa. Dr. Zirkle, through his leadership in USAHA was instrumental in achieving support for new joint ARS/USDA laboratories at Ames. He promoted the need for the laboratories, coordinated USAHA support of the laboratories and participated in a number of meetings on our needs for a state of the art laboratory system for the United States.

- Wildlife Tuberculosis Working Group. During his presidency of USAHA, tuberculosis in wildlife and livestock in Michigan was recognized as a major animal health issue. In an effort to assist USDA and Michigan animal health and wildlife officials in development of an effective strategy that would address the tuberculosis problem, he formed a joint wildlife- animal health tuberculosis working-group. The working-group was charged to compile available data and make recommendations that could be implemented in the wildlife, livestock tuberculosis program in the state.

In addition to these specific issues, Dr. Zirkle served as a member of the Government Relations Committee, Infectious Diseases of Horses Committee, Public Relations and Information Technology Committee, Board of Directors and Executive Committee of USAHA. He served for several years as USAHA representative on the Animal Agriculture Coalition and was an active member of the National Assembly of Chief Livestock Health Officials. He was elected to the position of Third Vice President of USAHA in 1995 and moved through the Chairs to serve as President of USAHA in 2000.

Throughout his career as a state animal health official, Dr. Zirkle has supported and promoted strong, effective state and national animal health programs. He has been a very effective leader on animal health issues.

Dr. Ernie Zirkle served as president of the United States Animal Health Association (USAHA) from October 199[9] until October 2000. During his year as president of USAHA, Dr. Zirkle made thirty-one out of state and overseas trips to various meetings to sustain, foster and promote the goals of the organization. He guided the USAHA through a major change of its constitution and by-laws to streamline and improve the efficiency of the organization. He recommended and promoted the development of an Executive Director’s position so the Association could maintain a constant presence in the every day ever changing issues that surround animal agriculture. He established a Committee on International Issues and in conjunction with his predecessor completed a series of Standard Operating Procedures for the thirty-three standing committees of the USAHA.

Dr. Zirkle was a major role in the Safeguarding Review. He was also a member of the Exclusion Team (Spring 2001) during the animal health safeguarding review done by NASDA and as such he played a big role in
helping USDA move forward. He kept very open communication lines. He has been a supporter of the waste feeding industry over the years. He runs a really tough CEM quarantine and has good oversight of these.

Dr. John Enck, President of the National Assembly of Chief Livestock Health Officials, presented the thirteenth National Assembly Award to Dr. Ernest W. Zirkle, State Veterinarian of New Jersey. The award is given to an active
USAHA BUSINESS SESSION
Monday, October 21, 2002, 8:00 to 8:30 AM

THE STATE OF THE ASSOCIATION

M. A. Lea, Jr.

As we end a year and begin a year, I think that the USAHA is in excellent shape. Our membership is at 1003, which is an all time high. The last three (3) annual meetings have been very well attended and successful. This meeting is a record setter in attendance, program, and opportunities.

Our committees continue to be the backbone of the organization. Our way of doing business through the work of strong committees has proven time and again the best way to get the correct answers and provide the best recommendations and policies. During the past year we were asked to form a Working Group to provide recommendations on Avian Influenza eradication. USAHA members were asked to be part of a Working Group to formulate a national plan for control of CWD. At this meeting, you have seen those groups’ results at the Transmissible Diseases of Poultry Committee and at the Diseases of Wildlife Committee. The Infectious Diseases of Horses Committee named an EIA subcommittee to evaluate and recommend a national EIA program and policy. That subcommittee has been very active and produced numerous recommendations to be considered. The Johne’s Working Group continues to function through the Johne’s Committee. As traditional and time proven as the committee structure is, it is still a dynamic concept and can adapt to needs as they arise. This year several standing committees were combined. This allows for time to be used more efficiently at the annual meeting.

The Executive Committee has continued to meet via conference call on a monthly basis. Members of the Executive committee have attended many, many meetings this year that were of interest to USAHA.

We have seen implementation of the Safeguarding Review. We made recommendations for Homeland Security initiative and policy. USAHA has continued to make the Master Plan the priority issue for the protection of health of this nation’s animal population. We must continue to support and push this important project to completion lest it get sidetracked and lose momentum.

This meeting in St. Louis is extraordinary. Attendance is at an all time high; interest is keen and the program outstanding. Financially the organization is in good shape. Membership is up. I think USAHA has a bright future.

Even though there have been many projects and problems both old and
new, we should not expect things to change. In fact, in my very humble opinion, the pace will pick up. We are all going to be asked to do whatever that is, more and more. As I mentioned, we can’t let the Master Plan project stop or even slow down and we need to see our eradication program completed as well as the new issues that we have yet to think of.

Several years ago the Board of Directors instructed the Executive Committee to move forward with plans to increase this organization’s presence in Washington, D.C.

The need for the increased presence was never greater than this spring and summer as bioterrorism and Homeland Security issues generated so much talk, concern, plans and changes to the current structure of things. We have reached a point that it is very difficult for the president and the other members of the Executive Committee to keep up with the ever-changing issues from a long distance and while having other full time responsibilities.

The method by which we enhance our everyday presence in developments that concern animal health issues need to be considered carefully and chosen wisely. There are a number of options. There are a number of stumbling blocks. Financial resources is a serious one, but I believe we have reached a point both economically and of necessity that we should begin making the move. It will not happen in a day, a month or a year and the first steps may not be exactly what we want or what we end up with but, we need to start if USAHA is to maintain its role as the preeminent animal health organization in the country.

These are my thoughts and opinions on what has happened this year and some directions in which we need to move in the future.

My sincere thanks to all the members of USAHA for the opportunity to have served as president during 2002.

Thank you.
Dr. Towers was not able to attend this meeting and asked Bob Frost to give the Treasurer’s report.

I am pleased to report that USAHA remaining on a sound financial basis. We ended the year 2001 with a net income over expenses of $18,245.48. The association operated within the 2001 budget approved by the Executive Committee.

Several years ago the Board of Directors recommended that the association make every effort to increase our cash reserves to equal at least one year’s operating expenses. Currently USAHA has $250,000 in Certificates of Deposit and $100,167.16 in a savings account. I am happy to report that this cash reserve gives the association a cash reserve equal to the budgeted operating expenses for 2002.

So far the association is operating within the 2002 budget approved by the Executive Committee. Your association should end the current fiscal year with a small net income.
REPORT OF COMMITTEE ON NOMINATIONS

B. R. Hillman, et. al.

PRESIDENT........................................Robert Frost, California
PRESIDENT-ELECT............................Donald H. Lein, New York
FIRST VICE-PRESIDENT.......................Richard D. Willer, Arizona
SECOND VICE-PRESIDENT.....................Bret D. Marsh, Indiana
THIRD VICE-PRESIDENT.......................Lee M. Myers, Georgia
TREASURER........................................J. Lee Alley, Alabama

REGIONAL DELEGATES

NORTHEAST.................................R. J. Eckroade, Pennsylvania
...........................................V. P. LaBranche, Massachusetts
NORTHCENTRAL...............................C. W. Geary, Wisconsin
..............................................J. W. Leafstedt, South Dakota
SOUTH...........................................R. E. Good, Arkansas
..............................................L. Wayne Godwin, Florida
WEST............................................J. F. Wortman, New Mexico
.....................................................C. W. Lum, Hawaii
In order to properly address the role international animal health standards developed by the World Organization for Animal Health, Office International des Epizooties (OIE) in trade we must first make reference to the World Trade Organization (WTO). Historically, the WTO has worked on the reduction and elimination of tariffs and subsidies in trade. During the Uruguay Round of the 80s and early 90s, the WTO turned its attention to agriculture and particularly the sanitary aspects of agricultural trade. One of the most significant outcomes of the Uruguay Round was the signing in 1994 of the “Agreement on the Application of Sanitary and Phytosanitary Measures” (SPS) [see http://www.wto.org ]. This Agreement is essential for the international trade in animals and animal products as it provides the legal framework for the application of OIE standards, guidelines and recommendations.

In the structure of the SPS Agreement we recognize rights, obligations, special provisions as well as dispute settlement procedures. Under rights, the WTO recognizes that each country has the sovereign right to determine its own level of protection when establishing sanitary measures on imports. However, these rights are accompanied by clear obligations. The importing country if it chooses to deviate from existing international standards and recommendations when establishing its sanitary measures, it has to justify these actions through a transparent and scientifically-based risk analysis process. Countries adhering to international standards and recommendations when developing their import policies don’t have to justify these through a risk analysis. Countries must also ensure that the sanitary measures are applied only to the extent necessary to protect animal health and do not constitute arbitrary or unjustified discrimination between Members.

Among the more important special provision of the SPS Agreement, we recognize those on harmonization; equivalence; assessment of risk and appropriate level of protection; regionalization; transparency and notification.

Possibly the most important of all special provisions of the Agreement is the one on harmonization. Under harmonization the Agreement encourages its Members to harmonize their sanitary measures on as wide a basis as possible, by basing them on international standards, guidelines and
recommendations, where they exist. As relevant standard-setting organizations, the SPS Agreement recognizes the OIE for the development of standards, guidelines and recommendations on animal health and zoonoses. Thereby conferring extreme importance to the standards set by the OIE. For food safety standards it recognizes the Codex Alimentarius and for plant health the International Plant Protection Organization.

Sanitary measures that conform to international standards shall be deemed to be necessary to protect public, animal or plant health or life and are presumed to be consistent with other relevant provisions of the Agreement. This means that countries basing their import decisions or their sanitary measures on existing international standards are not required to provide any additional justification. However, countries can introduce sanitary measures that result in higher level of protection than those achieved by applying international standards, as long as they can provide scientific justification through a scientific risk assessment process.

Under equivalence the Agreement indicates that countries shall accept the measures of other Members as equivalent, even if these differ from their own and from those applied by others trading in the same product. For this purpose the exporting country must objectively demonstrate to the importing country that the proposed measures achieve its level of protection. The intent of this provision is to encourage trading partners to focus their attention on the desired objectives of the measure rather than comparing measures for sameness.

Under the assessment of risk and the determination of the appropriate level of sanitary protection the Agreement indicates that Members must ensure that their sanitary measures are based on an assessment, appropriate for the circumstances, taking into account the risk assessment techniques developed by the relevant standard setting organizations, the OIE in this case. This process is aimed at minimizing negative trade effects, it has to utilize all available scientific evidence and it must be done in a consistent manner. Members shall take into account as relevant economic factors the potential damage in terms of loss of production or sale in the event of the entry, establishment and spread of disease; the cost of control or eradication; and the relative cost-effectiveness of alternative approaches to limiting risks. However, the economic impact on national producers such as loss of revenue resulting from competition by the imports cannot be considered in the risk determination.

Under regionalization the Agreement indicates that sanitary measures must be adapted to the geographical and ecological characteristics of an area or region, taking into account the level of prevalence of a disease. It specifies that Members shall recognize disease-free areas and areas of low prevalence within the territory of a country. However, it is the responsibility of the exporting country to provide the necessary evidence in order to objectively demonstrate to the importing country that such area is free, and is likely to
remain free. For this purpose, reasonable access shall be given to the importing country for inspection, and testing.

Under transparency and notification the Agreement indicates that Members are required to notify changes in their sanitary measures, such as changes in import regulations, in a timely manner. For this purpose, each country has to notify the WTO with enough time prior to these entering into force, except for urgent circumstances, so that exporting countries can adapt their products to the new requirements. Each country must also establish a single enquiry point which is responsible for providing answers to all reasonable questions regarding regulatory changes and specific sanitary requirements.

The WTO—SPS Agreement also called for the formation of an SPS Committee charged with assisting and monitoring the implementation of the Agreement. This SPS Committee was established in 1995 and meets regularly three to four times per year. The work of this committee has included the development of guidelines for a better interpretation of certain aspects of the Agreement, such as consistency, equivalence, and notification. The meetings also become an excellent venue for countries to report on trade disruptions, giving the opportunity to the accused country to explain its decision and to reconsider the trade-restrictive actions taken. Often these trade restrictions are resolved between meetings and have as an outcome the report of a successful resolution by both parties at a subsequent meeting. The SPS Committee meeting also serves as a venue for the identification deficiencies in international standards, or for areas where the absence of specific standards is causing significant trade disruptions. This information is taken up by the standard-setting organizations and used when setting priorities in the future work programs.

One additional aspect of this SPS Committee worth mentioning is the consultation or mediation under the so called Article 12:2. The Agreement provides for the SPS Secretariat or the Chairman of the Committee to serve as a mediator in a case of trade dispute, provided that this mediation is requested by all affected parties. This is a voluntary process, it is not legally binding and the outcome of the mediation is strictly confidential. This process has the advantage that it is not as resource-demanding as the formal dispute resolution process, it does not require of a complicated legal argument and it encourages parties to examine options which may have not been fully considered. It often results in adjustments to existing requirements and providing for a win-win outcome. Should an agreement not be reached by the countries under this mediation, the affected country can then proceed with the formal dispute resolution process by requesting the formation of a panel by the WTO.

When turning to the risk posed by animal diseases in trade, we have to first recognize that there are legitimate animal health risks and there are also fabricated sanitary risks. The latter are no more than politically motivated
protectionists measures and unjustified trade restrictions hidden behind the pretexts of protecting the health of the national animal population. Among the legitimate animal health risks there are those that are trade related, and there are others, while being legitimate, they don’t pose a risk as a result of trade in animals or some of their products. In order to be able to address these risks to trade in a transparent and scientific manner, and in accordance with the provisions of the SPS Agreement, the WTO recognizes the OIE as the relevant international standard-setting body for animal health and zoonoses. Therefore, when establishing sanitary measures for the protection of animal health, countries are required to take into consideration the standards, guidelines and recommendations set up by the OIE. Also, in cases of disputes, it is the standards of the OIE, and if necessary the experts provided by the OIE, that become the scientific instrument for resolving a dispute under the legal framework of the WTO.

The OIE was created in 1924 and since then it has been headquartered in Paris, France. Today, it is made up of 162 Member countries, which are represented by one delegate, the Chief Veterinary Officer of the country. This is a very important aspect of the make-up of the organization, when compared to others. As in this case, the delegate who is responsible for participating in the standard-setting process and for adopting the standards, is the same person who has to eventually implement and enforce the these international standards at a national level.

The OIE is organized into five geographical regions, each with a regional office and a regional coordinator. This regional infrastructure encourages activities such as training and capacity building on aspects of specific interest to a region, while the standard-setting process is a global one. The regional activities are coordinated in the field by the regional coordinators and centrally at headquarters, by the Regional Activities Department.

The main objectives of the OIE are: a) to ensure transparency in reporting of the animal health status worldwide; b) to safeguard world trade in animals and animal products by establishing standards and by acting as mediator within the mandate of the WTO-SPS Agreement; c) to collect, analyze and disseminate scientific veterinary information; d) to contribute to the expertise and to encourage solidarity in the control and eradication of animal diseases; and e) to improve the overall veterinary infrastructure.

The OIE has a central bureau with a limited staff of thirty, managed by a Director General, who is elected for a five year period. The staff is structured into 6 departments responding to the various OIE objectives. There is an Administrative Commission, serving as a board of directors, and four technical commissions made up of elected experts representing a rich geographical and cultural diversity. These commissions are assisted in their work by Ad hoc group and working groups of international experts who contribute with their scientific expertise in the development of standards. A great portion of
the expertise and the advice at the OIE comes from some 140 Collaborating Centers and Reference Laboratories.

The Global OIE Information System, in response to the animal health information objective, is managed by the Animal Health Information Department and is responsible for the Global OIE Database. The national information is received either regularly or as emergency notifications from the delegates, or from the Reference Laboratories. This information is processed rapidly and distributed in the form of emergency reports, as well as the weekly, monthly and annual animal health reports. This data is communicated directly to the Delegates as well as disseminated publicly in the OIE website in the form of reports, tables and maps [see http://www.oie.int].

Regarding standards set by the OIE, these are found in several official documents. The International Animal Health Code (Code) contains the standards on diseases of mammals, birds and bees. The Manual of Standards for Diagnostic Tests and Vaccines complements the Code. The International Aquatic Animal Health Code (Fish Code) contains the standards on diseases of fish, mollusks and crustaceans, and it is complemented by the Diagnostic Manual for Aquatic Animal Diseases.

The Code provides detailed recommendations on sanitary measures for the safe importation of animals and animal products, while avoiding unjustified trade restrictions. It covers recommendations on diseases of cattle, swine, horses, rabbits, poultry, dogs, cats, and bees. The Code also contains recommendations on horizontal topics such as import risk assessment, regionalization, surveillance and monitoring, evaluation of veterinary services, as well as obligations and ethics in international trade. The Code is published in English, French, Spanish and Russian, and a version in Arabic will soon be available.

The process for developing a new standard or for reviewing an existing one begins with a request from the International Committee, a Member, or one of the Commissions. The request is handed over to the Code Commission who then seeks the advice from an expert or from an Ad hoc group of experts, as well as from other Specialist Commission. The resulting draft text is then circulated for Member comments. This process is repeated once more before presenting these drafts for either comment or adoption by the International Committee in May of each year. A new chapter can be adopted within two years of its first draft and after circulating the text four times for comments from Members.

The Code Commission has identified the following priorities for this coming year: guiding principles in animal welfare, review of existing disease chapters for inclusion of food safety recommendations, continuing to update existing chapters in addition to the harmonization of the Code with the Fish Code. The review of the chapters for inclusion of animal production food safety will be coordinated by the Working Group on Food Safety and in close
collaboration with Codex Alimentarius experts.

In order for a country to benefit from the provisions of the WTO SPS Agreement and take full advantage of the OIE standards in its trade it must have a high quality veterinary service. This veterinary service must also have a robust surveillance and monitoring system in order to provide assurances of its sanitary status and to minimize and manage risks. However, recently most veterinary services have experienced decreases in their infrastructure due to budgetary cuts, shifts in priorities from animal health towards food safety, as well as suffering from the successes of eradication in those cases where the services have been funded through eradication campaigns.

The United States Animal Health Association (USAHA) and its membership can improve their participation and maximize their benefits in the international trade by working closely and more strategically with the “OIE contact point” set up by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) (usa.oie@aphis.usda.gov). As draft standards and texts are distributed by the OIE, these can be accessed by USAHA specialist interest groups through the contact point in APHIS and then provide their input to be included in the US response to OIE. The review and comment should focus on the chapters that have been identified by the OIE for comment and adoption. Careful attention must be paid to strict deadlines, as late submissions to the OIE cannot be considered by the Specialist Commissions. While standards are only adopted during the International Committee meeting in May of each year, the most effective opportunity for submission of comments is in response to the July and the December reports from the Code Commission. Only minor changes, not proposed earlier, can be considered during the May meeting, as they require the understanding and approval by all delegates. When proposing changes to chapters, interested parties should provide the OIE contact point with an appropriate scientific justification. This justification can certainly expedite the review process, as otherwise the OIE has to identify the scientific expertise and published evidence before considering the request for change. When proposing changes to OIE text being submitted for adoption, stakeholders must keep in mind that these have to be trade-neutral, meaning that these standards have to make as much sense whether one is the importer or exporter.

Timing and coordination is crucial, USAHA and American Association of Veterinary Laboratory Diagnosticians (AAVLD) are well positioned to play a key role in the development of US responses to the OIE standard-setting process. A well structured review process as well as a sound and timely coordination with the OIE contact point in APHIS will ensure that USAHA and AAVLD stakeholders have a more direct input into those essential elements for a fair and safe international trade.

In closing, while much of our effort has been on animal health issues, we need to recognize that in the meantime and for the immediate future, food safety and public opinion, and not animal health will continue to drive priorities, budgets and international trade decisions.
Chronic wasting disease (CWD) was recognized as a syndrome more than 30 year ago. Its natural hosts are in the deer family. Cattle have not been found to be naturally susceptible to CWD. Chronic wasting disease is unique among the transmissible spongiform encephalopathies due to its presence in non-domesticated animals, its occurs in free-ranging wild animals, its ready transmission among susceptible species, and the fact that environmental contamination appears to play an important role in its epidemiology. All of these factors influence approaches to study and management of the disease. Pathogenesis studies in mule deer, white-tailed deer, and elk reveal similarities and differences between deer and elk, and between sheep with scrapie and cattle with bovine spongiform encephalopathy (BSE). In general, the pathogenesis of CWD in deer is similar to the pathogenesis of scrapie in sheep. In elk, PrPSc deposition in lymphoid tissues occurs but is not detectable as early in incubation as in deer and amounts deposited do not appear to be as great. Lymphoid involvement is not a feature of BSE in cattle. Observations of deer and elk in captivity indicate that CWD is contagious though the exact mechanism(s) of transmission are not yet known. The contribution of environmental contamination to the epidemiology of CWD is not specifically known but observations of cohorts of elk and deer in captivity strongly suggest it is important in areas of high CWD prevalence and high densities of susceptible species.
Chronic wasting disease, a prion disease of deer and elk, is now reported in several non-contiguous areas of the US and Canada. The true extent of the endemic area will not be known until large scale surveillance for preclinical disease can be performed. Diagnostic testing of captive and free ranging cervids is currently performed by immunohistochemistry, a sensitive but expensive and time consuming assay, not well suited for the extremely high sample numbers needed to determine the prevalence of a relatively rare disease. A number of higher throughput assays are under development or validation. These assays are variations on ELISA formats and are suitable for laboratory robotics. Field trials performed in the summer of 2002 will be reviewed and protocols for large scale surveillance in the 2002 hunting season in several states will be presented.
CHRONIC WASTING DISEASE: CURRENT EPIDEMIOLOGY AND REGULATORY PROGRAM

L. H. Creekmore
USDA, APHIS, VS, National Animal Health Programs Staff
Fort Collins, CO

CWD was first detected in farmed animals in the U.S. in 1997 in an elk herd in South Dakota. Since then the disease has been identified in 23 additional farmed elk herds and one farmed deer herd in a total of eight States (CO, KS, MN, MT, NE, OK, SD, WI). These herds were discovered through routine surveillance, tracing, and depopulation efforts. Thirteen of these positive herds traced back to three source herds, one in SD, one in MT and one in CO. Five positive herds were located in or near endemic areas where CWD occurs in wildlife and have no known relationship to other known positive herds. Three positive herds were detected in August and September of 2002. Epidemiological investigations to understand the source of infection of the herds associated with the endemic area as well as the newly identified herds are continuing. Since 1998, twenty-one of these herds have been removed; about half of these were depopulated in the past year with the use of USDA funds. In addition to these positive herds, USDA assisted in the depopulation of elk herds within the endemic areas of Colorado and Nebraska. Of the four remaining herds, one in Nebraska has had its quarantine lifted after more than four years of surveillance with no further evidence of the disease. A second herd in Colorado is being reviewed for inclusion in a State research program. Plans for depopulation of the last two herds, one in MN and one in WI are underway.

USDA is continuing to work with the States and the farmed cervid industry to develop a CWD herd certification program in the U.S. The goal of the program is to improve surveillance for CWD in farmed cervids and eliminate the disease where it is found. The program will include farmed elk, white tailed deer, mule deer and red deer. If funding becomes available, USDA plans to implement this program in 2003. In addition, USDA is working with the Department of Interior and the States to draft and implement a National Plan to assist the States in responding to CWD.
SPECIAL MEETING—
ANIMAL HEALTH AND WORLD TRADE

Monday, 5:00-7:00PM, October 21, 2002 in the Missouri Ballroom of the Millennium Hotel in St. Louis, Missouri.

The meeting of United States and International members to discuss and debate how to best present the issues of world trade and animal health to the United States Animal Health Association (USAHA) and American Association of Veterinary Laboratory Diagnosticians (AAVLD) membership.

In attendance: Mr. Bobby Acord, DC; Dr. Alex Ardans, CA; Dr. Joan Arnoldi, MI; Dr. Derek Belton, New Zealand; Dr. Pat Blanchard, CA; Dr. Jones Bryan, SC; Dr. Michael David, MD; Dr. Ron DeHaven, DC; Dr. Peter Fernandez, DC; Dr. Murray Fowler, CA; Mr. Bob Frost, CA; Ms. Jane Galyon, IA; Dr. Bob Hillman, ID; Dr. William D. Heston, MN; Dr. Sarah Kahn, Canada; Dr. Claude Lavigne, Canada; Dr. Mack Lea, LA; Dr. Don Lein, NY; Dr. Brelt Marsh, IN; Dr. Mike Marshall, UT; Ms. Barbara Martin, IA; Dr. Terry McElwain, WA; Dr. Thomas McKenna, NY; Dr. Jim Pearson, IA; Dr. John Ragan, DC; Dr. Valerie Ragan, DC; Dr. James Roth, IA; Dr. Beverly Schmitt, IA; Dr. Alfredo Torres, NY; Dr. Lyle Vogel, IL; Dr. Rick Willer, AZ; Dr. Larry Williams, NE; Dr. Norm Willis, Canada; Dr. Ernie Zirkle, NJ;

Unable to attend: Dr. Bruce Akey, VA; Dr. J. Lee Alley, AL; Dr. Bonnie Buntain, DC; Dr. Jim Butler, DC; Dr. Brian Evans, Canada; Mr. Bill Hawkes, DC; Dr. Lonnie King, MI; Dr. Donald Lightner, AZ; Dr. Gardner Murray, Australia; Dr. Alex Theirmann, France; Dr. Wes Towers, DE.

The Importance of the Office International des Epizooties to the United States Animal Health Association

Lonnie J. King
October 21, 2002

A hallmark of the 21st century global market is the use of the free market system as the principal tool for international economic integration. International trade agreements are accelerating the global integration of agriculture. Agriculture is no longer just about farming and livestock production; it is an essential component of our national economy and global food and trade system. Similarly, the Office International des Epizooties (OIE) is no longer an isolated organization for simply exchanging information on animal diseases. As a scientific arm for the World Trade Organization (WTO), it is now linked to setting standards and rules for sanitary agreements. Thus, the OIE and its
approximately 150 member countries now have new responsibilities for animal health and trade. Understanding the operations of the OIE, its mission, functions and new role in global trade in animals and animal products is critical to all those interested and associated with animal production systems. It is vitally important for the USAHA to become more knowledgeable, influential, and strategic with regard to the OIE. If not, the agenda on international trade and animal health will be set by others at the disadvantage of United States agriculture. The United States Animal Health Association (USAHA) must become more engaged and global in its perspective and be better prepared to understand key United States policy and to work with animal health officials. An open, balanced, scientifically based, and knowledgeable committee of USAHA experts to accomplish this goal would be well received and most timely. I would encourage the USAHA to take on this new challenge. It offers a unique opportunity for the organization to continue to serve its constituents and partners by contemplating and participating in the contemporary issues of animal agriculture that will profoundly impact our future.

Summary of the 70th General Session of the Office International des Epizooties (OIE)

Bob Frost, President-Elect, was a member of the United States Delegation to the 70th General Session of the Office International des Epizooties (OIE) in Paris, France on May 26-31, 2002. The members of the United States delegation were:

- Dr. Peter Fernández, Associate Administrator, Animal and Plant Health Inspection Service (APHIS), and official delegate to the OIE.U.S. Delegate;
- Dr. Ron DeHaven, Deputy Administrator, Veterinary Services, VS;
- Dr. Alex Thiermann, Coordinator of International Organization Activities, International Services;
- Dr. Michael David, Assistant Director, Sanitary International Standards Team, VS;
- Mr. Robert Frost, President Elect, U.S. Animal Health Association;
- Dr. Bruce Akey, American Association of Veterinary Laboratory Diagnosticians;
- Dr. Lyle Vogel, Science and Technology Liaison, American Veterinary Medical Association.

Over 500 participants, representing 133 countries or territories, 26 regional and international organizations, and 7 non-member observer countries attended the 70th annual General Session of the International Committee of the OIE. The OIE has been recognized by the World Trade Organization (WTO) as the standard setting body for animal health. As such, the OIE develops and establishes the health standards for the safe trade of animals.
and animal products. A copy of the agenda outlining the issues addressed during the 70th General Session is attached as Appendix 1. Topics of note are as follows:

A. Technical Items
1. Technical Item I: The role of veterinarians in the prevention and management of food-borne diseases, in particular at the level of livestock production, presented by Dr. Andrew McKenzie, Food Assurance Authority, Ministry of Agriculture and Forestry, New Zealand.
3. Technical Item III: FMD diagnostics: requirements for demonstration of freedom from infection, presented by Dr. Paul Kitching, Canadian Food Inspection Agency.

B. Reports of the Commissions and Working Groups
1. Animal Health Code Commission—Chapters presented for adoption
   The International Committee voted to adopt the following Code Chapters:
   c. BSE: includes a change advising countries against the trading of meat-and-bone meal (MBM) with countries that have had indigenous BSE regardless of their risk level.
   d. Zoning and Regionalization: added some changes to the definition of buffer and infected zones and will add such definitions to the Definitions Chapter.
   e. Definitions: adopted suggested language to add clarity to existing definitions.
   g. Foot and mouth disease: accepted the concept of viral activity (FMD infection), but the Article describing how and when a country or zone can regain its lost free status was left for further discussion and development.
   h. Rabies: recommended changes were not adopted.
   i. Scrapie: adopted chapter with minor changes.
   j. Bovine Semen: adopted Chapter with the modification for IBR testing, thus allowing bulls from both IBR affected and IBR negative herds to be able to trade semen.
   k. Porcine Semen: the President asked the International Committee to withdraw this chapter in order that the AHC be able to further review the Chapter.
The Code Commission will work on the following issues in the coming years:
   1. Develop definitions on compartmentalization
   2. Establish Ad hoc Working Groups on Animal Welfare and Food Safety
   3. Update and/or establish guidelines for the Code Chapters on avian influenza, FMD, and bovine spongiform encephalopathy.
   4. Present a previously drafted chapter on diseases of bees.
   5. Propose a Code Chapter on BSE in small ruminants.
In addition, there was a request from Canada that the Code Commission start to look at developing a Chapter for porcine reproductive and respiratory syndrome (PRRS). A task for the United States, besides continuing to actively participate in submitting comments to the various Code Chapters under development, is to recommend experts for consideration to the Ad hoc groups on Animal Welfare and Food Safety.

3. Foot and Mouth Disease (FMD) and other Epizootics Commission
The FMD Commission will address or recommend addressing the following issues:
   a. Find alternative ways for controlling disease and carcass disposal
   b. Develop a scheme for reporting infection in the absence of clinical disease (particularly as it relates to certain diseases as avian influenza, swine vesicular disease and Rift Valley fever).
   c. Develop guidelines for submitting data for consideration of freedom from disease (FMD and BSE)
   d. Review comments from Member Countries on the newly drafted Code Chapter on Rift Valley Fever.

4. Fish Diseases Commission (FDC)
The activities of the FDC for the 2001 calendar year were presented by the FDC President. These included development and updates to the Aquatic Code Chapter, updating model health certificates, and addressing certain issues such as agreeing to align the disease reporting schemes between the Animal Health Code and Fish Diseases Commissions. Other issues the FDC agreed to address and align with the AHC are: 1) import risk analysis, 2) surveillance, 3) evaluation of official authorities, and 4) certification procedures. The International Committee voted to adopt the updates to the Code chapters of the Aquatic Animal Health Code.

5. Standards Commission.
The activities of the Standards Commission are focused on reviewing
and approving the work of the OIE Reference Laboratories, validating and approving new tests for recommended use, and support the work of the FMD and AHC commissions. Specific work done by the Standards Commission during the 2001 calendar year includes:

a. Approving tests for FMD to detect non-structural proteins
b. Developing a list of research needs for high priority diseases such as FMD, Newcastle disease, African Swine Fever, and Rift Valley Fever.
c. Updating the list of Reference laboratories and experts

C. Significant resolutions adopted by the International Committee

Resolution No. XIV: Animal Welfare — Asks the OIE to establish an Ad hoc group to develop principles that can then be applied to different animal welfare standards such as transportation, slaughter and housing.

Resolution No. XV: Food Safety and Zoonoses— Asks OIE to establish an Ad hoc group to look at reducing the public health risks in food from microbiological, chemical and other risk factors at the farm level and prior to slaughter—accomplished by working more closely (strengthening relationships) with the relevant international organizations such as Codex, FAO, and WHO. (Note: there was some discussion on where the mandate of the OIE should stop—whether it should include slaughter or not).

Resolution No. XX:

Resolution No. XXI: Outlines recommendations for OIE Reference Laboratories in the training, development and assistance for developing countries that will help improve their control programs.

Resolution No. XXII: As a result of Technical Item I, “The role of veterinarians in the prevention and management of food-borne diseases—in particular at the level of livestock producers”, the International Committee voted to several recommendations to have veterinary administrations strengthen relationships with other relevant national authorities, and that Codex and the OIE work jointly to enhance food safety, and that the OIE establish a permanent Working Group to address food safety issues.

Resolution No. XXIII: As a result of Technical Item II, “Risk Analysis—a decision support tool for the control and prevention of animal diseases”, the International Committee voted to recommend that the OIE be more involved in providing technical assistance to Member Countries, that, through its Collaborating Centers, continue to provide training in risk analysis methodologies, and that it encourage Member countries to be more transparent in its risk assessment approaches.

D. Technical Items for the 71st General Session (May 2003)

The following technical items were selected by the International Committee during the last (69th) General Session:
1. The socio-economic impact of animal diseases.
2. Regionalization as an instrument for preventing the propagation of diseases, including those of camelids.

E. Technical Items for the 72nd General Session (May 2004)
The following technical items were selected by the International Committee at this year’s (70th) General Session:
1. Emerging and re-emerging viral diseases and ways to predict, prevent and control outbreaks (with particular reference to hemorrhagic fevers, avian influenza and rabies).

F. Regional Commission Meeting of the Americas
The Regional Commission of the Americas met during the morning of May 28, 2002. The topics discussed were as follows:
1. Proposals for technical items for the 71st General Session
2. Nomination and election of Peter Fernandez (USA) to fill the vacancy of First Vice-president for the Regional Commission
3. Activities of the Regional Representation for the Americas

After much debate, it was agreed that Argentina would retain the office until 2003 to allow it to complete its 3 year commitment to funding the office. After that period, the Regional Commission would:
   i. Determine whether the office should be rotated or remain in a permanent location
   ii. Distribute summaries of the proposals made by Panama and Argentina to all Member Countries in the Region for their review and consideration
5. Request on the part of France for membership in the Regional Commission for the Americas. This request was accepted by the Americas.

G. Next Meeting of the International Committee
The dates of the 71st General Session are May 17-24, 2003.

This summary was prepared by: Michael David—June 3, 2002

USAHA feels that this was a most productive meeting with good interactions. As a result of these discussions USAHA is asking Joan Arnoldi to help establish a core working group to explore and develop a plan for the USAHA/AAVLD Presidents as to how the associations should work to effectively address today’s business of world trade, animal health and our involvement with OIE. The Presidents have asked Dr. Arnoldi to have a core working group report to them in early 2003.
A daylong special session on chronic wasting disease (CWD) was held at the annual USAHA meeting in view of the increasing concerns of animal health and wildlife management officials, producers, hunters, politicians, and the general public. Dr. Tom Thorne, Director of the Wyoming Game and Fish Department, and Dr. John Fischer, Director of the Southeastern Cooperative Wildlife Disease Study at The University of Georgia’s College of Veterinary Medicine, moderated the session. The primary purpose of the workshop was to provide an opportunity for USAHA members and others to acquire up to date information and engage in discussions with CWD experts, laboratory personnel, state and federal animal health and wildlife management authorities, regulatory officials, and others involved with the issues surrounding CWD. Of particular interest to members was the current status of the National Plan for Assisting State, Federal, and Tribal Agencies in the Management of Chronic Wasting Disease in Wild and Captive Cervids that was developed during the summer of 2002. The following report represents a summary of the presentations and discussions held at workshop.

Introduction

Moderator Dr. Tom Thorne opened the session with introductory remarks by stating that CWD is a disease of perceptions, which generally are negative and frequently are unfounded. Although the disease had been recognized as a transmissible spongiform encephalopathy since the 1970s, interest in CWD did not become significant until bovine spongiform encephalopathy was linked to human neurological disease in the United Kingdom in the 1990s. This interest continued to grow as CWD became recognized in privately owned captive elk herds in the United States and Canada. However, it was detection of CWD in Wisconsin and on Colorado’s Western Slope in early 2002 that really launched national interest in this disease.

Dr. Thorne listed a number of CWD issues from his perspective as Director of a state wildlife management agency. Surveillance of hunter-killed animals has increased markedly and at great expense to state wildlife management agencies that must redirect limited funds and personnel from other programs to accomplish this task. Concomitantly, public perceptions about potential human health threats of CWD have led to reductions in the numbers of hunters and license sales that provide significant revenue to wildlife re-
source agencies. Concerns that the movement of hunter-killed carcasses could disseminate CWD have resulted in new regulations within the endemic area as well as in states far removed from the area. These actions also may impact hunting, which is the primary management tool for wild cervid populations. In contrast to the situation with privately owned captive cervids, there are no indemnification funds available for wild deer and elk destroyed in efforts to control CWD or other diseases. Additional issues faced by wildlife management agencies include laboratory capacity for testing hunter-killed animals and concerns raised by environmental agencies regarding carcass disposal and wastewater.

NATIONAL PLAN FOR ASSISTING STATE, FEDERAL, AND TRIBAL AGENCIES IN MANAGING CWD IN WILD AND CAPTIVE CERVIDS

Mr. Bobby Acord, Administrator of USDA’s Animal and Plant Health Inspection Service (APHIS) and Co-Chair of the National CWD Task Force opened this segment of the workshop with a call for cooperation and partnerships between the many agencies involved in this complex issue. Mr. Acord insisted that agencies must work together, bury “turf battles,” and acknowledge that no single agency can successfully detect and control CWD in this country. He emphasized that the role of APHIS is to assist the states in their CWD management efforts.

Mr. Acord discussed the National Plan that was put together in 4 weeks in the early summer of 2002 by a task force comprised of state and federal animal health, wildlife management, diagnostic laboratory, administrative staff, researchers, and others. The six primary components of the National Plan are communications, scientific and technical information, diagnostics, disease management, research, and surveillance. Money continues to be a huge roadblock to making forward progress with this plan. Although a strategy for implementing the National Plan was drafted in September, funds have not been released to begin the work. APHIS has a FY03 budget request of $15,000,000 for CWD. The U.S. Congress has not passed the agriculture appropriations bills and APHIS continues to encourage the Office of Management and Budget (OMB) to release funds for CWD surveillance and management. Mr. Acord concluded by saying that the authority currently exists to deal with CWD in wild and captive cervids and there is no need for additional legislation.

Mr. Casey Stemler, Special Assistant to Dr. Steve Williams, Director of the U.S. Fish and Wildlife Service and Co-Chair of the National CWD Task Force, reiterated Mr. Acord’s call for cooperation between the many agencies involved with CWD. Mr. Stemler stated the U.S. Departments of the Interior (USDI) and Agriculture clearly recognize they can help states by
providing funding, but this is not easily obtained. The USDI can provide technical support to the states through the U.S. Geological Survey (USGS) and it continues to seek approval through the OMB for CWD funding. Personnel from the USDI served on the Task Force and Working Group to develop the National Plan as well as the Implementation Plan, respectively, and currently sit on a committee assembled to oversee the implementation of the National Plan.

Mr. Bruce Morrison, Assistant Wildlife Division Chief of the Nebraska Department of Game and Parks, represented state wildlife management agencies on the Task Force that developed the National Plan and chaired the Implementation Team. Mr. Morrison briefly covered some of the high points of the implementation plan that defines the specific objectives, agency responsibilities, timelines, and costs of the national plan for CWD management. He touched on the many issues faced by state wildlife management agencies confronted with CWD surveillance and management, stated that approximately 225,000 wild cervids will be tested for CWD this year, and emphasized the need for public education to address growing perceptions. Mr. Morrison provided sources where attendees could find additional current information on CWD including the website of the CWD Alliance (www.cwd-info.org). A summary of the National CWD Management Plan prepared by Bruce Morrison immediately follows this workshop report.

Following their remarks, Acord, Stemler, and Morrison were joined by Dr. Lynn Creekmore of APHIS, Dr. Beth Williams of the University of Wyoming, and Dr. Scott Wright of the USGS' National Wildlife Health Center for a panel discussion. Panel members responded to written questions provided by the audience. Mr. Acord stated he believes that international confidence in the captive cervid industry remains elusive and will be dependent upon future test results, and additional countries should test captive cervids. Mr. Morrison stated that the National Plan provides the flexibility to redirect resources to respond to the results of enhanced surveillance. Dr. Williams responded that more surveillance should have been done in captive cervids as well as in wildlife to possibly prevent the dissemination of CWD over the last 30 years. Regarding a question about the database management necessary to track disparate testing information, Morrison, Creekmore, and Wright responded that the National Plan calls for a user friendly database containing locations of positive wild animals, the information in the database will be a valuable resource for public education, results of captive cervid tests will be linked to the national database with a summary to the general public, and the major structure of the database will be located at the National Wildlife Health Center as part of the National Biological Information Infrastructure (NBII) wildlife health node of the USGS.

In response to questions regarding the potential discovery of CWD at additional sites, Morrison stated that it remains unknown whether CWD can be eliminated from wild cervid populations and it may become necessary to
learn to live with CWD if it is widespread. Mr. Acord indicated there is no answer regarding the costs of living with the disease although he felt it could jeopardize the future of the captive cervid industry if CWD is widespread. He felt that more information must be developed regarding the epidemiology of CWD before the costs of living with the disease can be weighed against the expense of eradicating it.

Regarding captive cervids and interstate movement of animals, Dr. Creekmore informed the crowd that the proposed APHIS program for controlling CWD in captive elk and deer is in the review process and hopefully will soon be published. This plan, under development since 1998, will continue to move along as a separate item from the National Plan with respect to regulation and funding for implementation. She stated that although the monitoring period required for herd certification as CWD-free is 5 years, one year of participation in the program may be required before interstate movement can occur, but this would be increased annually once the program is implemented. Dr. Creekmore stated that participation in this program would be mandatory for those operators wishing to ship captive cervids interstate. Mr. Morrison also stated that wild cervids should not be translocated without adequate information regarding the CWD status of the source herd.

The final subject of the discussion session concerned funding for the National Plan. Mr. Acord stated that last year’s APHIS budget request had $7,000,000 for captive cervids and an additional $7,000,000 was added for wild cervids during the debate period. It will be up to the states to make the resource issues known to Congress. Mr. Stemler informed the crowd that during FY02, funds were redirected to address CWD and that additional funds have been requested. The fate of the request remains unknown.

NATIONAL CHRONIC WASTING DISEASE SURVEILLANCE

Moderator Dr. John Fischer provided a report on nationwide CWD surveillance efforts to date and future needs. The entire report is found immediately following the workshop report in this Proceedings.

LABORATORY TESTING ISSUES

Dr. Arthur Davis, Pathology Chief of APHIS’ National Veterinary Services Laboratories (NVSL) spoke for Dr. Randall Levings, Director of NVSL. Dr. Davis stated that APHIS’ goal is to develop sufficient laboratory capacity, continue using immunohistochemical (IHC) staining for the CWD prion protein in neural and lymphoid tissues, assure sample quality, and assist in the validation of high throughput diagnostic assay. He stated that APHIS’ goal is to have 15 functional laboratories across the country by January 2003 as part of the USDA contract laboratory system for TSE testing. In addition to the 15
contract labs which can handle an estimated 150,000 samples annually, 11 “extra capacity laboratories” will be set up to test up to 200,000 samples from hunter-killed deer and elk. All laboratories will be state or federal veterinary diagnostic labs. Dr. Davis reported the numbers of tests for CWD, bovine spongiform encephalopathy, and scrapie have increased annually from 5,000 in 1999 to approximately 50,000 through 2001. The network currently being developed is designed to handle 362,000 samples anticipated from captive and wild cervids, sheep, and cattle.

Dr. Richard Hill, Director of Licensing for Veterinary Biologics provided information regarding the validation and licensing of veterinary diagnostic kits. Dr. Hill advised the audience of the protocols followed for the approval of new diagnostic tests, including those for CWD testing. Special considerations for quality control and confidence in test results included accuracy and precision, sensitivity, specificity, cross-reactions, reproducibility of results, and comparison to the “gold standard” of IHC. Experimental licensing may be used prior to full validation and licensing of test kits.

Drs. Davis and Hill responded to questions during a brief discussion period. Regarding the IHC test, Dr. Davis stated that unlike other tests, it allows microscopic examination of the sample to ascertain that it is from the correct location within the animal, and he anticipates a turn-around time on hunter-killed samples to run approximately three months. Regarding public health considerations for test results, the IHC and other tests in development are regarded as tests for disease surveillance and are not a food safety check. Results of IHC tests are reported in the context of positive or not positive because negative results do not definitely rule out infection with the CWD agent. Finally, regarding the issue of unapproved labs conducting CWD testing, Dr. Hill stated this would be regarded as a regulatory violation that would be pursued and Dr. Davis stated that private laboratories have not been issued the authority to conduct CWD tests at this time.

CARCASS DISPOSAL ISSUES

Dr. Doris Olander of APHIS in Wisconsin provided a report on deer carcass disposal concerns in the state. She stated that this issue must be on the front burner for states dealing with CWD management and the goals are to protect animal health, human health, and environmental quality. Options for disposal include burial, landfill, rendering, incineration, and tissue digestion. After weighing the various options and receiving input from multiple sources, Wisconsin officials plan to dispose of carcasses from the Eradication Zone by freezing and holding carcasses until test results are available followed by incineration of positive carcasses and burial at landfill of carcasses of animals testing negative. The entire report is found immediately following the workshop report in this Proceedings.

Dr. Geoff Letchworth of USDA’s Agricultural Research Laboratory in Laramie, Wyoming provided information regarding tissue digesters. Alkaline
digesters operate similarly to kitchen pressure cookers at relatively low pressure with the addition of sodium hydroxide. Following 3-6 hours of operation, the only surviving substance is calcium phosphonate and the product of the digester is a liquid effluent that may contain heavy metals and have a high pH. Several factors must be taken into consideration before the effluent may be discharged into a sewage system.

FREE-RANGING DEER AND ELK ISSUES

Dr. Beth Williams spoke on behalf of Dr. Mike Miller of the Colorado Division of Wildlife. Significant issues in Colorado included the initiation of high throughput testing for screening lymph nodes of wild deer and elk. Animals that test positive during the screening method are re-tested using the IHC technique. Approximately 20,000-50,000 samples are anticipated statewide in Colorado this year. Colorado management of CWD is ongoing with the goals of reducing the prevalence and keeping CWD contained within the current endemic area. Finally, the Colorado Division of Wildlife has made available all of the abstracts presented at the August CWD Symposium held in Denver and they can be accessed at the Division’s website (http://wildlife.state.co.us).

Mr. Ollie Torgerson, Special Assistant to the Director of the Missouri Department of Conservation (MDC), provided information regarding the state’s efforts to prevent CWD introduction, identify the disease if it already occurs there so it can be eradicated, and work cooperatively with agricultural interests, especially the captive cervid industry. The MDC has signed a Memorandum of Understanding with the MO Department of Agriculture to respond to the potential discovery of CWD. A CWD Task Force is comprised of any group that has a stake in the issue. The state’s borders have been closed to importation of cervids from any endemic counties in the United States, approximately 6,500 hunter-killed deer will be tested in 2002-03, and any sick deer will be tested for CWD. Tourism is Missouri’s largest state industry and wild deer generate approximately $1 billion in hunting activity. The press and politicians have taken control of the issues and state agencies often are criticized for being too lenient or too stringent. The MDC fears the potential loss of the $12,000,000 in revenue generated by deer hunting license sales as well as the ability to effectively manage the herd in the absence of adequate hunting pressure.

Mr. Bruce Morrison recounted Nebraska’s experiences in which CWD has been confirmed in wild and captive cervids. Surveillance goals for this season include testing 5,000 hunter-killed animals and any wild cervids appearing sick. His primary concern is the media-driven reaction of the public. Efforts in Nebraska are cooperative between the Game and Parks Department, APHIS, and the NE Dept. of Agriculture. Preliminary results of genetic testing of an infected herd of white-tailed deer indicate infections are distrib-
uted evenly among the six genotypes present suggesting there may not be a genetic predisposition regarding susceptibility or resistance to CWD infection among whitetails.

Dr. Sarah Shapiro Hurley of the Wisconsin Department of Natural Resources (WDNR) provided information on CWD activities and plans in the state. She began by stating the only chances for success in dealing with CWD must be grounded in extensive cooperation between several state and federal agencies. She advised the audience that information regarding the finding of CWD in Wisconsin’s wild deer, surveillance figures, maps of the Eradication and Management Zones, and other CWD-related information can be found at the WDNR website (www.dnr.state.wi.us). The current goals are to test every animal killed within the Eradication Zone as well as 500 hunter-killed deer per county statewide totally approximately 50,000 CWD tests through the 2002 hunting seasons. Baiting and supplemental feeding practices that artificially congregate wildlife and enhance the transmission of infectious agents have been banned. Computer models based on the current knowledge of CWD suggest that it recently was introduced into Wisconsin and eradication is possible. The alternative of doing nothing could drastically affect the state’s valuable deer population. The WDNR has spent more than $2,000,000 so far this year and anticipates incurring an additional $2,000,000 in expenses during the upcoming hunting season. Unfortunately, license sales, which provide significant revenues for the WDNR, are down approximately 22%. In Wisconsin, approximately 80% of the state budget for game management has been re-directed to CWD-related activities. Dr. Hurley concluded by stating that if there is any silver lining to this dark cloud, it is the relationship-building that is occurring between numerous agencies to deal with the issues that occur at the wildlife-livestock interface.

Dr. Terry Kreeger, Wyoming Game and Fish Department, briefly covered information regarding the CWD-endemic area in southeastern Wyoming and efforts to better characterize its boundaries and the prevalence of infection within the area. Wyoming also is engaged in extensive CWD research including species susceptibility (moose and pronghorn), mode of transmission, infectious dose in elk, potential transmissibility to cattle through contact or shared feed and water sources with infected experimental deer, improved CWD diagnostics, and the genetics of cervid susceptibility to CWD.

During an abbreviated question and answer session, panel members responded to an inquiry regarding the potential for CWD to spread via movement of hunter-killed carcasses by stating that to date, this is an unproven theory with no evidence that the disease has or can be spread in this way. However, agencies are addressing the issue cautiously and recommend or require that only certain portions of carcasses may be removed from endemic areas. Regarding genetic susceptibility of deer to CWD infection, considerable work with mule deer and preliminary research with white-tailed
deer suggest there is no apparent genetic resistance to CWD in the two species.

**CAPTIVE CERVID ISSUES**

Dr. Sam Holland, State Veterinarian of South Dakota, recounted the state’s experiences since the first CWD diagnosis in a herd of captive elk in 1997. He identified primary difficulties including lack of nationally accepted standards for importation of captive cervids, discord between state and federal animal health and wildlife management agencies with the failure to come together and speak with one voice based on science, and limited resources to deal with the situation. An additional problem is the contradiction regarding CWD such as agency statements that there is no evidence that CWD is a public health issue, but positive animals should not enter the food chain. Dr. Holland fears the continued erosion of public confidence in the state and federal agencies that have failed to come to clear decisions on such issues. He indicated that his direct experience showed that three years is an inadequate monitoring period to demonstrate the likelihood of freedom of a captive elk from CWD infection.

Dr. Wayne Cunningham, Colorado State Veterinarian, recounted his experiences and lessons he has learned include: CWD crosses single fences, a good control system is not flawless, the Colorado system was effective in detecting CWD, and it is prudent to error on the side of caution when it comes to CWD. Dr. Cunningham stressed the need for permanent individual animal identification and herd inventories in control programs for CWD as well as mandatory testing of deaths of all animals older than 15 months. Furthermore he stated that infected herds should be depopulated, premises treated with sodium hypochlorite, and held empty for five years before repopulating. He expressed concern that CWD surveillance of wild animals is concentrated on healthy hunter-killed animals least likely to be infected or “target” animals, most of which likely die prior to being found and tested. He indicated that the media and politicians have presented major difficulties in dealing with CWD in Colorado. For the future he sees the need for better cooperation between involved agencies, better barrier requirements between wild and captive cervids, and better diagnostic tests.

Dr. George Luterbach, Chief Veterinarian of the Western Division of the Canadian Food Inspection Agency discussed Canada’s experiences with CWD. In Saskatchewan, where CWD first was found in privately owned captive cervids in 1996, 40 infected herds have been found with 38 of the herds directly or indirectly linked epidemiologically to a single source herd that went unrecognized for 10 years. The source herd likely became infected via the importation of captive elk from South Dakota in 1989. An elk infected with CWD was imported by Korea from Saskatchewan representing the first documentation of this disease outside North America. In 2001, CWD infec-
tion was confirmed in a wild mule deer in the province. In 2002, CWD was recognized for the first time in Alberta in a captive elk herd. All 41 infected Canadian herds have been depopulated, representing approximately 8,500 elk. Canada has a national CWD program with reporting requirements for any diagnoses of CWD, an eradication strategy, and a surveillance system for farmed cervids.

Dr. Larry Williams, Nebraska State Veterinarian, provided information on CWD in captive cervids within the state. CWD first was found in captive elk received from a Colorado herd. Twenty-two captive cervid herds are present in the southern Nebraska panhandle where CWD is considered endemic in wild cervids. There has been a request for indemnification of owners in the area willing to depopulate their herds and efforts are under way to destroy the animals and test them for CWD.

Dr. Robert Ehlenfeldt, Wisconsin’s Assistant State Veterinarian, spoke on behalf of State Veterinarian Dr. Clarence Siroky. In September 2002, the first captive cervid with CWD was found in Wisconsin and a second captive cervid facility subsequently tested positive. Both positive animals were white-tailed deer representing the first instance in which CWD has been documented in privately owned captive deer. Dr. Ehlenfeldt indicated that Wisconsin has 950 captive cervid herds with 90% of them containing species affected by CWD. Currently, 160 herds are on accreditation programs with enrollment of another 100 herds pending. He indicated that major issues his agency has been dealing with are carcass disposal, disinfection, lack of national standards, and indemnity at the state and federal level. Dr. Ehlenfeldt concluded the CWD Workshop with a final question for animal health regulatory officials: “What else isn’t getting done when you spend all of your time and resources on CWD and what will be the effect on the livestock industry?”

This CWD workshop had over 400 people in attendance.
PLAN FOR ASSISTING STATES, FEDERAL AGENCIES AND TRIBES IN MANAGING CHRONIC WASTING DISEASE IN WILD AND CAPTIVE CERVIDS

Bruce Morrison
Nebraska Department of Game and Parks
Lincoln, Nebraska

Developed by a team of professionals in the fields of wildlife health, wildlife biology, wildlife management and livestock health.
Consisted of six working groups and issues.

1. **Communications**: Goals are: 1) Increase awareness of CWD, 2) Educate target audiences, 3) Provide accepted and current scientific information, 4) Provide updates on new information and 5) Provide scientific and technical training.

2. **Scientific and Technical Information Dissemination**: Goals are: 1) Provide access to scientific and technical information via data system, 2) Integrate all CWD data into Wildlife Disease Information Network, 3) Create data standards, 4) Provide wildlife managers and veterinarians with near real time access to information and 5) Provide database system that is available to all working on CWD and that can act as central repository for nationwide analysis.

3. **Diagnostics**: Goal: To provide reliable information on the disease and infection status in free-ranging and captive cervids.

4. **Disease Management**: Goals are: 1) Prevention, 2) Elimination, 3) Maintenance and 4) Containment.

5. **Research**: Goals are: 1) Rapid diagnostics, 2) Biology and pathogenesis research, 3) Management and ecology of the disease and host and 4) Human dimensions.

6. **Surveillance**: Goals are: 1) Development of scientific sampling design, 2) Early detection, 3) Determination of prevalence rates and 4) Epidemiological investigations.

The plan was released to the public on June 26, 2002. A complete copy of the plan can be downloaded from [www.cwd-info.org/index.php/fuseaction/policy.policy](http://www.cwd-info.org/index.php/fuseaction/policy.policy) Once the implementation document is approved, it will also be posted on this web site.

After the plan was released, APHIS Administrator Mr. Bobby Acord and U. S. Fish and Wildlife Service Director, Dr. Steve Williams appointed a committee to develop an implementation document for the National Plan. This committee consisted of three representatives from USDA, three from DOI and three from the states. This committee developed the what, who, when and how much scenario for each of the action items contained in the plan. The implementation document has been submitted to Mr. Acord and Dr. Wil-
liams for their approval. Once they review and approve it, it will be released to the public and to Capitol Hill.

IMPLEMENTATION DOCUMENT FOR NATIONAL CWD PLAN

COMMUNICATIONS
Development of fact sheets for public distribution
Training of state, federal and tribal employees
Development of a CWD training module by National Conservation Training Center
Establishment of a biennial CWD symposium during even numbered years

SCIENTIFIC AND TECHNICAL INFORMATION DISSEMINATION
Development of a national, user friendly data base for CWD information storage
Development of a data import system for national database
Development of data collection and management standards
Development of a data quality control and certification system
Provision of location digitization data for states, federal agencies and tribes
Distribution of subsets to contributors in usable formats, acknowledging proprietary rights.
Creation of web based system for integration of information
Maintenance of all databases and web based systems

DIAGNOSTICS
Establishment of lab capacity to conduct needed tests
Continue using IHC as “gold standard”
Assurance of sample quality through training
Validation and certification of high throughput tests
Funding for validation and certification of alternate testing methods

DISEASE MANAGEMENT
Evaluation of existing movement regulations and development of model regulations
Development of white paper on feeding and baiting and impacts on disease ecology
Conduct risk assessments for CWD
Development of model contingency and management plans for CWD
Implementation of national monitoring program for captive cervids
Development and research into carcass disposal techniques
Population restoration once CWD is controlled and/or eliminated

**RESEARCH**
- Research into new testing techniques
- Environmental contamination research
- Research into pathogenesis and course of infection in host
- Quantification of risk of exposure and transmission in free-ranging cervids
- Human dimension research

**SURVEILLANCE**
- Surveillance program and evaluation workshop
- Funding assistance for state and tribal surveillance programs
- Development of procedure to identify high risk animals
Chronic wasting disease (CWD) was recognized in the 1960s as a syndrome in captive mule deer at research facilities in Colorado and Wyoming. Subsequently it was identified as a transmissible spongiform encephalopathy (TSE; Williams and Young, 1980). By 1990, CWD had been documented in free-ranging mule deer, white-tailed deer, and Rocky Mountain elk within a limited area in northeastern Colorado and contiguous southeastern Wyoming (Miller et al., 2000). From 1996 through autumn of 2002, CWD infections were detected in privately owned captive elk herds (>60) or captive deer herds (4) in Colorado, Kansas, Minnesota, Montana, Nebraska, Oklahoma, South Dakota, Wisconsin, and the Canadian provinces of Alberta and Saskatchewan. From autumn 2000 through late 2002, CWD was detected in free-ranging deer and/or elk in Nebraska, Saskatchewan, South Dakota, Wisconsin, Colorado’s Western Slope, New Mexico, and Illinois.

Surveillance strategies for CWD in free-ranging cervids fall into two broad categories and CWD has been detected at new locations through both methods. Passive or targeted surveillance consists of testing sick animals that resemble CWD-affected deer or elk (emaciated adult animals exhibiting some combination of neurological signs). Active surveillance comprises testing of randomly sampled wild cervids killed by hunters, agency personnel, vehicle accidents, etc. The “gold standard” for CWD testing currently consists of microscopic examination of sections of brainstem and/or retropharyngeal lymph node that have been specially stained for the protease-resistant CWD prion (Sigurdson et al., 1999). This method is capable of detecting CWD infection in clinically normal animals during the prolonged incubation phase that may extend three years or longer after exposure (Miller and Williams, 2002). Standard microscopic examination of the brainstem of deer and elk with clinical CWD will reveal spongiform changes typical of the TSEs (Williams and Young, 1993).

State wildlife management agencies, with assistance from other organizations, have been conducting CWD surveillance within and outside the endemic area for several years. Since 1998, data developed by the states have been assembled annually by the Southeastern Cooperative Wildlife Disease Study (SCWDS) located at The University of Georgia’s College of Veterinary Medicine.
Medicine. This information was obtained via questionnaires distributed to wildlife management and animal health agencies, veterinary diagnostic laboratories, universities, and other organizations involved in CWD surveillance. Information obtained via the questionnaires indicates at least 29,019 wild deer and elk were tested for CWD through mid-2002 as part of active and passive surveillance programs.

The following information summarizes reports of CWD surveillance of free-ranging deer and elk outside the historical endemic area since 1997, except where noted. This is not a complete data set as extensive CWD surveillance has continued since the most recent questionnaire (mid-2002), and it is not possible to capture all of the information through the questionnaire method. It is not our purpose to provide data regarding the numbers and locations of positive animals because that information is maintained by individual state wildlife agencies, but rather to indicate the amount of past CWD testing and to identify future surveillance needs.

Since 1997, the United States Department of Agriculture’s Animal and Plant Health Inspection Service (APHIS) has provided assistance with CWD testing of wild cervids. Testing of wild deer or elk fitting the “target profile” of an animal with CWD is provided at no cost to the state wildlife agencies. Additionally, APHIS has provided assistance to selected state wildlife management agencies conducting active CWD surveillance among wild deer and elk. This assistance primarily has consisted of testing tissues submitted by state wildlife resource agencies. Five states were selected for surveillance because they contained CWD-positive captive elk herds or were adjacent to states with positive cervids (Kansas, Montana, Nebraska, Oklahoma, and South Dakota). Surveillance was conducted in Maine, Oklahoma, and Utah at the request of the Centers for Disease Control and Prevention because it was investigating potential epidemiological links between CWD and the occurrence of Creutzfeldt-Jakob disease in three unusually young patients who consumed venison (Belay et al, 2001). (Neither CWD nor evidence of an epidemiological link was found). Finally, APHIS assisted additional states (Illinois, Michigan, New Jersey, Oregon, and Wisconsin) with CWD surveillance for a variety of reasons.

From 1997 through the summer of 2002, APHIS assisted with active CWD surveillance that included the testing of 7,364 free-ranging deer or elk from 12 states. The number of samples tested per year ranged from approximately 1,000 to 2,200.

From 1997-1998, 1,049 samples were tested from Nebraska, New Jersey, and South Dakota. During 1998-1999, 1,426 samples were tested from Kansas, Michigan, Nebraska, and South Dakota. In 1999-2000, 1,472 samples were tested from Maine, Oklahoma, South Dakota, and Utah. In 2000-2001, 1,168 samples were tested from Kansas, Montana, Nebraska, Oklahoma, and Wisconsin. In 2001-2002, 2,249 samples were tested from
Illinois, Kansas, Montana, Nebraska, Oklahoma, Oregon, and Wisconsin.

Active surveillance conducted independently by state wildlife management agencies has resulted in the testing of at least 20,861 free-ranging deer and elk from 1997-mid-2002. (This number includes testing of some animals within the endemic area of Colorado and Wyoming within and prior to the study period of 1997-2002. Thus, through mid-2002, active surveillance with and without APHIS assistance has resulted in the testing of 28,225 free-ranging deer and elk from 34 states. Although requiring greater investments in labor and finances than passive surveillance programs, active surveillance has detected CWD infections in wild deer or elk at new locations in Nebraska, Saskatchewan, South Dakota, and Wisconsin.

Data regarding passive (targeted) surveillance for CWD in free-ranging cervids also was assembled for the period through mid-2002. Twenty-nine states reported testing 759 sick deer and/or elk. Four states (Colorado, Missouri, Montana, and Nebraska) reported testing more than 30 animals, four states (Kansas, North Dakota, South Carolina, and South Dakota) reported testing 10-20 animals, and 21 states did not report target profile wild cervids.

The SCWDS survey stimulated increased attention to CWD before it became a pressing national issue, and it revealed marked inconsistencies among states in the detection of target animals. The results highlight the need for more comprehensive passive surveillance under which large geographic areas can be covered at reduced cost by testing the animals most likely to be infected with the CWD agent. Targeted surveillance is economical, effective, and has detected CWD-infected wild cervids at sites in Colorado, Illinois, Nebraska, New Mexico, and Wyoming. A long-term study of CWD in wild cervid populations demonstrated the efficiency of passive surveillance (Miller et al., 2000). A crucial factor influencing surveillance is the low prevalence CWD infection found in the wild. Overall, prevalence rates in the endemic zone were 4.7% for mule deer, 2% for white-tailed deer, and 0.5% for elk, although there were “hot spots” within the study area that ranged as high as 15% for mule deer. Consequently, sample sizes may be very large and considerable expense may be incurred in active surveillance programs before positive animals are detected or much significance can be attached to negative results.

In contrast, when the effectiveness of passive surveillance was evaluated within the endemic area, researchers found the overall case rates among sampled deer to be 57% in mule deer, 35% in white-tailed deer, and 44% for elk. They concluded, “targeted surveillance appears to be an effective strategy for detecting new CWD foci.” However, it also was concluded that the first clinically ill animals were not apparent in various management units until the prevalence rate approached 1%. Furthermore, the numbers of sick deer submitted from a given management unit did not correspond with the preva-
lence rate determined by random sampling of the area: The success of targeted surveillance was tied to the amount of human activity in the area as well as the level of concern about the disease.

Results of the nationwide survey to compile surveillance data during this 4-year period indicate that approximately 29,000 free-ranging deer and elk have been tested for CWD in the United States through mid-2002. The recent identification of CWD in captive and wild cervids at new locations in the United States warrants increased monitoring for this disease. Passive surveillance programs offer the advantage of lower costs while testing the animals most likely to be infected, whereas active surveillance programs also are necessary to document the occurrence of the disease, or provide reasonable assurance that it is absent in an area. Given the expanding concern about CWD and the very real threat it poses to native cervids, wildlife managers in many states have initiated or expanded CWD surveillance programs. For the autumn 2002 sampling season alone, approximately 225,000 wild deer and elk are to be tested for CWD, representing nearly a 10-fold increase over the total number of wild animals tested to date.

Acknowledgements
This work was made possible by the assistance and cooperation of hunters, wildlife and animal health agencies, veterinary diagnostic laboratories, universities, and other organizations throughout the United States. We are especially grateful to Lynn Creekmore, Mike Miller, and Beth Williams for their assistance. Funding was provided by the wildlife management agencies of Alabama, Arkansas, Florida, Georgia, Kansas, Kentucky, Louisiana, Maryland, Mississippi, Missouri, North Carolina, Puerto Rico, South Carolina, Tennessee, Virginia, and West Virginia through the Federal Aid to Wildlife Restoration Act (50 Stat. 917). Additional funding was provided by U.S. Department of the Interior, through Grant Agreement 01ERAG0013 with the Biological Resources Division of the U.S. Geological Survey, and through Cooperative Agreement No. 01-9613-0032-CA between APHIS’ Veterinary Services and SCWDS.

References
4 Sigurdson, CJ, ES Williams, MW Miller, TR Spraker, KI O’Rourke, and


OPTIONS AND CONSIDERATIONS FOR THE DISPOSAL OF CARASSES FROM A CWD-INFECTED DEER POPULATION IN WISCONSIN

Doris Olander, USDA and Joe Brusca
Wisconsin Department of Natural Resources

The management of CWD, whether it is present in captive or free-ranging populations, requires specific plans to dispose of the carcasses generated by disease control activities. In Wisconsin, the Department of Natural Resources (WDNR) disease management plan calls for the depopulation of approximately 15,000 white-tailed deer in 2002 alone. Based on previous surveillance data, 2-3% of the targeted population will be CWD-infected. It is anticipated that a majority of the hunters in the planned eradication zone will not retain the carcasses for home consumption. Therefore, a mechanism for the disposal of these carcasses is needed. The challenges that must be addressed in designing a disposal program include the unique physical and biological properties of the CWD agent, incomplete knowledge of the specific mechanisms of CWD transmission, and the lack of practical analytical methods for sampling air, water or soil for the infective agent. Further complicating factors include the high level of public interest and concern, and the necessity for coordination and cooperation between multiple local, state, and federal agencies. In addition to the necessary coordination between governmental agencies, private entities that support disposal operations or are impacted by them must be included.

Five options for the disposal of carcasses from CWD-infected populations of deer have been considered in Wisconsin. These are landfilling in a modern engineered site, burial at an uncontrolled site, dedicated rendering and controlled disposal, incineration and “digestion” (high-temperature, high-pressure alkaline hydrolysis). Each of these options has advantages and disadvantages for given applications with no option providing “zero risk”. Landfilling and burial have excellent capacity to handle thousands of carcasses, but raises concerns about environmental contamination. Dedicated rendering and controlled disposal offers some level of agent inactivation, particularly if the disposal step includes an additional inactivation step such as incineration. Although this method of disposal of animal carcasses is used for populations of animals at higher risk for BSE in Europe, it has never been implemented in North America. Incineration, of which there are a number of methods, offers the potential for inactivation of the agent if sufficiently high temperatures are achieved. However, with the exception of air curtain destructors (ACDs), incinerators typically have low capacity and are costly. ACDs are a less controlled means of incineration. They generally have moderate capacity and can achieve and maintain (with fluctuations) tempera-
tures in excess of 600°C. ACDs, however, do require excellent operator skills, favorable weather conditions and dry fuel to maintain throughput, high temperatures, and to keep smoke to a minimum. The digestion of carcasses in the presence of high pH, temperature and pressure offers high levels of inactivation, but has low throughput capacity. In addition the resulting liquid requires specialized handling because of its chemical characteristics.

There is, in summary, no single best answer for the disposal of CWD-infected populations, nor are there any “zero-risk” options. All of the disposal options elicit considerable public concern about public, animal and environmental health. For burial, landfills, rendering and digestion, concerns about water contamination and quality are frequently raised. For incineration, the concern is generally focused on the airborne dispersal of the CWD agent. The number of animals to be disposed of, local conditions, state and local regulations and available resources will guide specific disposal options. Regardless of the disposal method(s) selected, considerable outreach to the general public and other regulatory agencies will be needed.
DEVELOPING VALIDATION CRITERIA THAT MEET OR EXCEED INTERNATIONAL STANDARDS

T. S. McKenna and B. M. Martin

The Animal Plant Health Inspection Service of the USDA is working in conjunction with the Agriculture Research Service of the USDA, academic institutions, and industry to validate rapid diagnostic tests for 8 diseases (Foot and Mouth Disease, Classical Swine Fever, Avian Influenza, Newcastle Disease, African Swine Fever, Rinderpest, Lumpy Skin Disease, and Contagious Bovine Pleuropneumonia). A committee was formed to review test validation reference materials and determine acceptable validation criteria. Criteria were determined and will be used to validate the rapid assays for Foot and Mouth Disease and Classical Swine Fever. The criteria will also be used to review the data collected on the real time PCR during the 2002 Avian Influenza outbreak. When those processes are complete, the comments of those involved in test development and validation will be used to revise the validation criteria. The criteria detail the requirements necessary for bench development and field validation.

**Bench development.** During bench development the assay is developed and initially optimized. The new assay is compared to the reference test (often referred to as the "gold standard"). The reference test must be performed according to the protocol accepted by the reference laboratory. The new assay may have better performance characteristics than the reference test. Results from an assay with improved performance characteristics should not be considered erroneous until the true status of the animal is known. If it is not possible to determine the true status of a sample, the data should be included in a separate category when estimating test accuracy. Samples negative by the new assay that are positive by the reference test may also require further evaluation. Bench development includes the following:

- Produce necessary reagents (primers, probes, positive and negative controls)
- Determine expiration dates of all reagents
- Select positive and negative samples (experimentally and naturally infected)
- Optimize the test procedure
- Determine analytical sensitivity and specificity
- Determine preliminary estimates of accuracy and precision
- Complete the standard operating procedure which should include
the following:

♦ Equipment necessary to perform the test including specifications.
♦ Appropriate sample type(s), sample collection, and sample handling/storage prior to assay.
♦ Performance limits and criteria for acceptance of a valid assay.
♦ Instructions for interpretation of assay results.
♦ Complete information on controls use and storage.
♦ Instructions for test performance including sufficient detail to establish the range of conditions under which a valid test can be performed. Only data from valid tests should be evaluated in estimating assay specificity and sensitivity.

- Conduct multi-lab evaluations.

**Field validation.** The field validation phase documents testing clinical samples and verifies detection levels. Field validation will provide sufficient data to estimate assay accuracy and ruggedness and may indicate if further test development is needed. The test must be validated in each species of animal and in each recommended sample type. The number of samples required varies, depending on the sensitivity of the test, acceptable confidence intervals, and acceptable error. The samples tested should be those that provide the most accurate assessment and can be collected quickly in a disease investigation or outbreak situation. Field validation includes the following:

- Calculate the number of samples necessary
- Process samples with both the reference test and the test being developed
- Calculate the diagnostic sensitivity and specificity
- Determine precision, repeatability, reproducibility, and accuracy

Data from bench development (including multi-lab evaluations) and field validation will be reviewed to determine assay performance characteristics including diagnostic sensitivity and specificity, repeatability, reproducibility, accuracy, and precision. A template summarizing the validation and acceptance criteria has been developed to provide guidance in the validation process, promote quality in diagnostic assays, and support the incremental process of validation.
FAILURE OF RB51 AS A CALFHOOD BISON VACCINE AGAINST BRUCELLOSIS

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2. USGS, Montana
3. South Dakota Department of Agriculture, South Dakota
4. Texas A&M University, Texas

Introduction:

_Brucella abortus_ is a Gram negative, facultative intracellular pathogen that causes disease in man and animals. The primary hosts for _B. abortus_ are cattle, bison and elk. With the eventual eradication of this disease in the U.S. domestic cattle herds, the bison and elk of the Greater Yellowstone Area (GYA) will remain the last natural reservoir of brucellosis. Interagency negotiations culminating in the revised Yellowstone Bison Management Plan and Environmental Impact Statement have identified vaccination as one of the primary means of managing brucellosis in Yellowstone National Park (YNP) bison. Vaccination will be used when a safe, effective, and deliverable _Brucella_ vaccine for bison is available. Completed research has found that _B. abortus_ strain RB51, which is the USDA/APHIS/VS licensed brucellosis vaccine for cattle, is safe in bison calves, pregnant bison, and not likely to harm non-target species. However, RB51 has not been evaluated for efficacy in significant numbers of calfhood-vaccinated bison. Since vaccination is included in several possible scenarios in management plans for the control of brucellosis in bison the Greater Yellowstone Area (GYA), data on the efficacy of RB51 is critical for wildlife managers to make appropriate decisions for managing brucellosis in YNP bison. The data generated will provide for proper estimates of the following: cost/benefit ratios of conducting various vaccination programs; an estimate of the likelihood of the reductions of risk of transmission to domestic livestock; and the amount of protection that would be provided to bison vaccinated with RB51 against exposure to virulent _B. abortus_.

Objective:

To evaluate the amount of protection provided against exposure to virulent _B. abortus_ in pregnant bison that had been vaccinated with RB51 vaccine as calves, either once or three times.

Materials and Methods:

Experimental design:

Animals: All bison were obtained from the State of South Dakota. The non-vaccinated controls and the one-time RB51 calfhood vaccinates were
obtained from a brucellosis-free certified herd. The three-time calfhood vaccinated animals (1st exposure at 6 months, 2nd at 12 months, 3rd at 18 months) were from a brucellosis-infected herd (Hawke herd). All of the bison were raised under similar field conditions and at three years of age were bred by natural service. All the bison were tested for brucellosis-specific antibodies by USDA standard diagnostic tests (Card, SPT, CF, BAPA, Riv) and were classified as “negative” according to the USDA Brucellosis Uniform method and Rules for bison and cattle.

Vaccine:
- Supplied by Colorado Serum Co., reconstituted and used according to manufacturer’s instructions, and administered by Dr. Sam Holland. RB51 was given subcutaneously at a dose of at least $1 \times 10^{10}$ colony forming units (cfu) (Range 3.3 - $1.0 \times 10^{10}$), which is the bovine calfhood dose.

Challenge: At approximately mid-gestation, all the vaccinated and control pregnant bison were challenged by exposure to virulent \textit{B. abortus} strain 2308 at a dose of $1 \times 10^7$ cfu via bilateral conjunctival inoculation. Blood samples were collected from all bison immediately prior to challenge, three weeks post challenge (to document exposure), and at the termination of pregnancy (either abortion, stillbirth, or live birth full term). At the termination of pregnancy, mammary secretions and uterine swabs were taken from the dam within 48 hours. Aborted fetuses were collected as soon as possible and frozen. Tissues from the frozen fetuses collected at necropsy were submitted for bacteriologic isolation and identification of \textit{Brucella} species. Milk and uterine swabs collected from the adult female bison were immediately submitted for bacteriologic culture and identification of \textit{Brucella}. Fetal rectal swabs collected were submitted for culture from all live born calves. Calves were humanely euthanized between 5-7 days after birth with the lungs and abomasal fluids removed and cultured.

Safety Precautions:
The animal holding and working facilities as well as the occupational safety program at Texas A&M University are USDA and AAALAC approved to work on infectious diseases. All animal research protocols involving animals, biosafety, infectious organisms, and human health are reviewed and approved by the appropriate university use committees before initiation of the investigation. Both TAMU and LSU have ongoing cooperative agreements with USDA/APHIS/VS to conduct research on brucellosis, and a license from CDC to conduct such.

Results:
Protection will be defined as a statistical difference between the control and vaccinated groups. Decreases in abortion, decreases in fetal/calf colonization and decreases in maternal colonization will be used to gauge protection.

There were no observed differences in the number of live calves or dead
calves between vaccinates and controls (Table 1).

<table>
<thead>
<tr>
<th>Group Calves</th>
<th>Live Calves</th>
<th>Abortions/Stillborns/ Dead</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-vaccinated Controls</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>1 x RB51</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>3 x RB51</td>
<td>20</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 1.
Numbers of live vs dead bison calves following 2308 challenge.

There were no differences observed between the 1x vaccinates and the controls with regards to fetal colonization. The 3 time vaccinates did have 9/28 calves which were not colonized with the virulent challenge strain (Table 2).

<table>
<thead>
<tr>
<th>Group</th>
<th>Infected Calves</th>
<th>Non-Infected Calves</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-vaccinated</td>
<td>27</td>
<td>0</td>
</tr>
<tr>
<td>1 x RB51</td>
<td>28</td>
<td>0</td>
</tr>
<tr>
<td>3 x RB51</td>
<td>19</td>
<td>9</td>
</tr>
</tbody>
</table>

Table 2.
Colonization of bison calves with strain 2308

The maternal colonization data of bison with strain 2308 is pending as of October 2002.

At least 2/3 (67%) of all offspring were infected with the virulent challenge strain. Regardless of maternal results, the disease brucellosis will be maintained through the high infection rate of the calves.

Conclusions:

This study mimics a field trial in the GYA with the vaccination of bison calves with RB51. Vaccinated animals were obtained from herds that were using RB51 in a manner similar to its proposed use in the GYA (vaccination with Colorado Serum vaccine directly from the manufacturer by licensed regulatory veterinarians). The housing of the challenged animals also mimics
bison husbandry in the GYA in that all of the bison are allowed access to delivering females and dead or live calves. The sampling of tissues from live calves also imitates the GYA conditions in that calves were allowed to live for 5-7 days before euthanasia (if Brucella pneumonia or infection from the dam’s milk were allowed to happen just like in the wild). Our delay in sampling the female bison for at least 30 days post parturition allows the bacteria time to disseminate (especially to the mammary gland) like they would in nature. Therefore, based on the high number of abortions/weak calves, high percentage of colonized calves; and due to the high number of cow/calf pairs that will still be infected with virulent brucellae, B. abortus RB51 can not be considered an efficacious calfhood vaccine in bison.

References:
9. PALMER, M. V., S. C. OLSEN, M. J. GILSDORF, L. M. PHILO, P. R. CLARKE, N. F.CHEVILLE. 1996. Abortion and placentitis in pregnant bison (Bison bison) induced by the vaccine candidate, Brucella abortus
THE BLUETONGUE SURVEILLANCE PILOT PROJECT (BSPP): A STUDY IN 3 STATES

Introduction

Bluetongue viruses (BTV) have been and continue to be a significant impediment to livestock trade. Various activities have been undertaken over the years to develop information on the risk associated with movement of animals from certain geographic areas to other areas thought to be free of the disease. With increasing demand for feeder cattle in the province of Alberta the need for information on BTV and vector ecology has become a priority. The Bluetongue Surveillance Pilot Project (BSPP) was designed and implemented to evaluate a sentinel herd surveillance system for BTV and to evaluate the ecology of BTV and the vector of BTV.

Study Methods

Cattle herds in ND, NE, and SD were selected to participate in the study. Blood samples were collected from cows in each of the herds before and after a vector season. Blood samples were tested for antibody to BTV using a commercial competitive ELISA (cELISA) test. When only a single animal on an operation had a positive cELISA test, that sample was tested by virus neutralization (VN) to five serotypes (2, 10, 11, 13, and 17) of BTV. Operations were considered positive if they had two or more cELISA positive samples or a single cELISA positive sample that was positive on the VN. Insect traps were set on approximately half of the operations to determine presence of *Culicoides sonorensis*, the primary North American vector of BTV. Data also
were collected on operation management, proximity to vector habitats, and animal characteristics.

**Results**

Overall, 146 operations initially were enrolled in the study, mostly (93%) beef cattle operations. Of the 144 operations where blood samples were collected prior to the vector season, 7,252 cattle were bled. A total of 1,019 cattle was positive by the cELISA test and 54 operations were considered positive (2 or more cELISA positives or 1 cELISA positive also positive by VN). Fewer operations were positive in the northern reaches of the study area than in southern latitudes. Of the 128 operations with blood samples collected after the vector season, 49 were classified as positive. Again, a similar geographic pattern of positives was seen as before the vector season. For the second sampling, 975 of the 5,627 animals tested were positive by the cELISA.

Insect (vector) trapping was conducted on 72 operations. Of these operations, 32 had catch samples with *C. sonorensis*. The spatial distribution of *C. sonorensis* positive catch samples was similar to that of the positive blood samples as fewer samples were positive in the most northern and eastern parts of the study area.

**Discussion**

The results of the BSPP suggest the following;

1. The prevalence of BTV infection in the more northern latitudes is very low or zero
2. The distribution of *C. sonorensis* is consistent with previously drawn maps
3. The sentinel herd system is useful to explore the spatial distribution of disease agents and vectors and to generate hypotheses regarding the ecology of animal diseases

Plans for the future include further descriptive analysis of the data and epidemiologic modeling to evaluate risk factors for BTV serostatus. In addition, the data will be analyzed for geo-spatial factors (weather and topographic) related to vector distribution.

**Acknowledgments**

This project was an extensive effort made possible by the cooperation and resources from many state and Federal agencies and groups. The collaboration of these groups, the individuals within them and the participating operation owners is gratefully acknowledged.
GENOMIC SEQUENCING FOR IMPROVED DIAGNOSTIC AND GENOTYPING TESTS FOR JOHNE’S DISEASE

Vivek Kapur*, Ling-Ling Li, Alongkorn Amonsin, and Qing Zhang
Departments of Microbiology and Veterinary Pathobiology, and Biomedical Genomics Center, University of Minnesota, St. Paul, MN; John Bannantine, National Animal Disease Center, Agricultural Research Service, Ames, IA

Summary. We have completed the genome sequencing of *Mycobacterium paratuberculosis*, the causative agent of a devastating disease (Johne’s Disease) in dairy cattle and other ruminant species. This bacterium is considered to be one of the most important threats to the health of dairy cattle worldwide, and may also represent a potential risk to the safety of the milk supply.

*M. paratuberculosis* is a slow-growing bacterium that causes a chronic gastro-intestinal infection in dairy cattle and other small ruminant species (such as sheep, goat, deer, etc.) and has both serious health and economic consequences to dairy farming throughout the world. While the bacterium has been recognized as the cause of one of the most important diseases of dairy cattle for more than one hundred years, methods for the satisfactory diagnosis, treatment and prevention of the organism are lacking.

The genome sequence sheds new light on the genes and biochemical pathways in the bacterium and the research offers “a starting point” for defining the mechanisms by which the organism causes disease and helping devise new strategies to detect infected animals and ultimately help control the spread of the organism. During the course of the sequencing project, we have discovered several genes that may help differentiate *Mycobacterium paratuberculosis* from other closely related bacterial species and therefore serve as targets for the development of new generations of diagnostic tests that are critically needed for the detection and ultimate eradication of the disease. These tests are currently being developed and validated in a collaborative research program between investigators at the University of Minnesota, the National Animal Disease Center, and the Ohio State University.

The analysis of the *M. paratuberculosis* genome found that it’s sequence contains nearly 5 million base pairs that are represented on a large circular chromosome with more than 4,000 predicted genes. We have also found that the chromosome has a large number of sequences that are repeated throughout the genome. These repeat sequences along with related genomic information is being utilized for the development of tests for the rapid and sensitive subspecific differentiation – or strain-typing – of clinical isolates of *M. paratuberculosis*.
The identification of all of the genes and key metabolic pathways in this organism may serve to explain some of the unique aspects of the biology of the pathogen, including it’s slow growth in laboratory culture. The slow-growing nature of this bacterium - it may take up to six months to identify by growth in laboratory culture - is a major impediment to the diagnosis of infected animals and has also served as a major obstacle for laboratory based research on the pathogen.

The genome project — supported by the U.S. Department of Agriculture through it’s National Research Initiative program and the Agriculture Research Service-- is also expected to provide a boost for wide-ranging research efforts for the development of the next generation of antimicrobial agents and vaccines to protect cattle against infection with the bacterium. This project represents part of a “microbial pathogenomics” research program that has been initiated at the University of Minnesota to sequence the genomes of a wide range of human and animal pathogens and use this information as a basis to understand the mechanisms by which they cause disease.

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EMERGENCE OF HIGHLY MULTIDRUG-RESISTANT SALMONELLA NEWPORT (NEWPORT MDR-AMPC) INFECTIONS

Jennifer Nunnery, Amita Gupta, Alicia Anderson, Jennifer McClellan, Fred Angulo

Highly multidrug-resistant Salmonella Newport emerged in 1999 and has spread to many parts of the United States. These isolates are characterized by decreased susceptibility or resistance to most beta-lactam antimicrobial agents including: amoxicillin/clavulanate, a penicillin-inhibitor combination; cefoxitin, a cephamycin; and ceftriaxone, a third generation cephalosporin. Resistance to these beta-lactams is attributable to a plasmid-mediated AmpC-type enzyme produced by a CMY-2 gene. This resistance plasmid is of special concern because of the importance of ceftriaxone in human medicine. We refer to these isolates as Newport MDR-AmpC.

Since 1997, the number of human S. Newport isolates reported annually has doubled. In 1997, 1,584 (4.6%) of 34,608 laboratory-confirmed Salmonella infections reported to CDC were due to S. Newport. By 2001, this number increased to 3,152 (10.0%) of the 31,607 Salmonella infections reported. This is the highest proportion of Salmonella infections due to S. Newport in more than 30 years of serotype-specific surveillance for Salmonella. The proportion of S. Newport infections that are due to Newport MDR-AmpC strains is rapidly increasing, as measured by the human arm of the National Antimicrobial Resistance Monitoring System for Enteric Bacteria (NARMS). In 1997, none of 48 S. Newport isolates were Newport MDR-AmpC. In 2001, 33 (26%) of 128 S. Newport isolates were Newport MDR-AmpC. Newport MDR-AmpC isolates are resistant to nine of the 17 agents used in the standard NARMS enteric bacteria testing: ampicillin, chloramphenicol, sulfamethoxazole, streptomycin, tetracycline (“ACSSuT”, the same profile as Salmonella Typhimurium DT104), as well as to amoxicillin/clavulanate, cephalothin, cefoxitin, and ceftiofur (a veterinary 3rd generation cephalosporin). Newport MDR-AmpC isolates also have decreased susceptibility to ceftriaxone (MIC ≥ 16µg/ml), an antimicrobial agent important in the treatment of salmonellosis, particularly in children. Although all Newport MDR-AmpC isolates show ceftriaxone MIC values that meet the criteria for intermediate or resistant, whether test results meet the criteria for resistance depends on the method of antimicrobial susceptibility testing used. In addition to the nine antimicrobial agents listed, some Newport MDR-AmpC isolates are also resistant to trimethoprim, gentamicin, and/or kanamycin. The remaining effective oral antimicrobial agents are fluoroquinolones. Newport MDR-AmpC isolates have been identified in each of the 15 states (17 sites) participating in NARMS.
The zoonotic challenge:

Colleagues at the Agricultural Research Service, U.S. Department of Agriculture, have identified Newport MDR-AmpC among isolates from ill and healthy animals in this country and from ground beef. The largest number of Newport MDR-AmpC isolates has come from bovine sources. Newport MDR-AmpC is unusual in that it can cause illness and death in both adult and young animals. Veterinarians and farmers, unaware of the resistance profile of Newport MDR-AmpC strains, may treat ill animals with antimicrobial agents to which the Newport MDR-AmpC strains are resistant. Outbreaks of animal illnesses, particularly among dairy cattle, have been identified by veterinary diagnostic laboratories and consultation services in the Northeast, the Midwest and the West. Data from the National Veterinary Services Laboratory, Ames, Iowa showing a large increase in S. Newport submissions in 2001 suggest that this has emerged as an animal health problem.

Public health investigations

Several states have investigated increases in human S. Newport infections and determined that many isolates are Newport MDR-AmpC. Epidemiological investigations indicate that the bovine reservoir is an important source for human infections. Identified risk factors associated with transmission of Newport MDR-AmpC to humans include consumption of undercooked ground beef, consumption of Mediterranean-style or Mexican-style soft cheese made from unpasteurized milk, and direct contact with cattle.

Ongoing investigations

To clarify the sources of and risk factors for sporadic human Newport MDR-AmpC infections, FoodNet began a 12-month prospective case-control study in April 2002. The National Animal Health Monitoring System of the USDA began a prospective 4-month survey of dairy farms in 2002, which includes limited sampling for Salmonella. This survey will give some information about the prevalence of Newport MDR-AmpC in dairy herds, and if the strain is sufficiently common, it may permit a preliminary analysis of risk factors for infection among the animals or among the dairy farms. However, much remains to be done to further characterize the sources and to develop definitive control measures, both for people and animals.

Guidelines for Surveillance and Prevention

1. Review veterinary diagnostic laboratory information in your state to determine whether Newport MDR-AmpC isolates are causing illness in animals. Encourage the routine referral of Salmonella isolates from ill animals for serotyping and further subtyping in a veterinary reference laboratory. It may be appropriate to characterize Salmonella isolates by susceptibility testing and PFGE.

2. Alert your human and veterinary clinical community to the presence of the epidemic, and that illness caused by Salmonella serogroup C2 might be attributed to Newport MDR-AmpC. If Newport MDR-AmpC isolates are identified in animals, then persons in contact
with those animals should be advised of the risk of illness. Patient treatment should be based on antibiotic resistance determination. The resistance complicates empiric treatment, as beta-lactam antimicrobial agents including third generation cephalosporins are unlikely to be as effective. Persons and animals infected with Newport MDR-AmpC who need therapy may be treated with trimethoprim-sulfamethoxazole, if susceptible, or with fluoroquinolones.

3. Investigate clusters of human illness and animal illness caused by S. Newport to determine whether there may be an outbreak. Investigate outbreaks aggressively to determine the vehicle, and perform susceptibility testing to determine whether it is a Newport MDR-AmpC isolate. Screening a sample of strains for resistance by testing for chloramphenicol resistance, and then comparing their PFGE patterns with posted Newport MDR-AmpC patterns would confirm the presence of cases in your state.

4. Evaluate on-farm practices to determine factors that might contribute to the emergence and spread of Newport MDR-AmpC on farms and between farms. For example: use of medicated milk replacers, which commonly contain tetracyclines or neomycin (which commonly cause cross-resistance to kanamycin) and may make calves more susceptible to infections with resistant bacteria such as Newport MDR-AmpC.
During the past year, a major outbreak of low path H7N2 Avian Influenza occurred in the intensely concentrated poultry area of the Shenandoah Valley in western Virginia.

This viral disease has a relatively short incubation period, is highly contagious, and, in this outbreak, primarily affected turkey flocks, with respiratory signs and decreased egg production in breeder flocks.

Efforts were taken to control this outbreak primarily because of the historic correlation between uncontrolled low path H5 and H7 avian influenza outbreaks in concentrated poultry areas and viral mutation into highly pathogenic strains associated with very high mortality. In addition, contrary to international standards, even low path strains of H5 and H7 result in significant international and even interstate trade restrictions.

The Outbreak

Clinical signs in the index case, a company owned turkey breeder flock just east of Harrisonburg, Virginia, were first suspected of being Avian Influenza by an astute highly trained company veterinarian called out to see the flock on March 7, 2002. A low path H7N2 virus was confirmed by the National Veterinary Services Laboratories on March 12, 2002, and this flock was euthanized and buried on site.

Within the next few days, other cases appeared. The first five affected farms, all turkey breeder flocks belonging to the same company, had at least one significant epidemiological link; a common rendering truck routinely made a circuit of these farms picking up daily mortality. On March 21st it became apparent that this was not just a localized outbreak when a turkey grow-out farm located 30 miles north of the index farm and belonging to a different company, was diagnosed as positive. By March 28th, 20 positive flocks has been identified.

By April 12th, this virus had spread to more than 60 flocks, with 30 flocks pending depopulation. The 5 major poultry companies involved requested that depopulation be required of positive flocks and the Commonwealth of Virginia began issuing 24 hour destruction orders upon positive diagnosis of disease. State officials also requested USDA assistance and on April 14th, an initial deployment of 27 USDA personnel was made to provide assistance in response to this outbreak. On April 18th, a full activation of USDA responders was initiated and a Task Force established under the Joint Command of the Virginia Department of Agriculture and Consumer Services and the USDA, APHIS, Veterinary Services. Because a “state of emergency” was never de-
clared at either the state or federal level, all of the activities of the Task Force were carried out under state authorities to quarantine and order depopulation of infected flocks, without any promise of indemnity.

Barrel or dead bird surveillance was initiated on April 25th and 12 additional positive flocks were identified in the initial round of this weekly surveillance of all of the flocks in the valley.

The poultry industries in this area overlap the West Virginia/Virginia border and a single positive flock was identified in West Virginia. Quick and decisive action by state and industry officials resulted in the rapid depopulation of this flock and intensive surveillance measures were initiated. No additional cases were found in West Virginia during this outbreak.

The last positive case in Virginia was identified on July 2 and the final quarantine of positive premises lifted on October 9, 2002. Continued enhanced surveillance of the area is planned through December.

By April 18, the date of the full activation of the Task Force, 89 positive flocks had been identified. This compares to a total of 73 total positive flocks in the 1983/1984 low path AI outbreak in this same area of Virginia. Thus, more infected flocks were found in the first 6 weeks of this outbreak than in the first 6 months of the 1983/1984 outbreak.

In total, 197 positive flocks were identified in this outbreak or approximately 20% of the 1000 area commercial poultry farms. Positive farms included 4.7 million birds or 8.4% of the estimated 56 million birds at risk. Turkeys accounted for 78% of the positive farms and included 28 breeder and

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125 commercial flocks. 29 chicken broiler breeder flocks, 13 chicken broiler flocks and 2 chicken egg layer flocks were also positive.

The source of infection for the index flock was never established. The H7N2 strain responsible for this outbreak appears to be identical to the strain that has caused recent outbreaks in Pennsylvania and has been found in the live bird markets of the northeast for the last 8-9 years. It was also identical to strains isolated from outbreaks in North Carolina and West Virginia this year. Surveillance of more than 90 backyard flocks and 300 resident Canadian geese from 23 sites in the area yielded no positive findings of H7N2, although a few of the wild geese were antibody positive to H6N2.

The epidemiological curve for this outbreak was a typical bell shaped curve with a peak weekly incidence the week of April 7-14th.

Task Force Response
A Task Force office or Incident Command Post was established as a headquarters for approximately 200 personnel. The mission of the Task Force was to control the outbreak of low path Avian Influenza by identifying and eliminating foci of infection and preventing spread of disease. Priorities included the safety of incident personnel and the involved public, as well as adherence to strict biosecurity measures by incident personnel. The Task Force concentrated on three program areas: surveillance, disposal, and biosecurity. Vaccination was not utilized in this response primarily because of company concerns related to negative impacts on trade.

Company personnel worked closely with task force members and producers throughout the valley. Confidential company GIS data was shared with Task Force personnel to expedite surveillance and other program operations. Program data was also freely shared among the various companies so that each company was apprised of program activities and flock status throughout the response.

Companies, at their own expense, disposed of dead birds by various methods. Following burial of the index flock on the farm, controlled slaughter, composting, incineration, and primarily land fill disposal were utilized. Task Force personnel monitored C&D of vehicles carrying dead birds from positive premises and prior to leaving disposal sites.

Surveillance
In addition to the presence of clinical signs, four laboratory tests were utilized for surveillance: AGID, Directigen, RT-PCR, and Virus Isolation. A drop in egg production and respiratory signs were often noted in affected turkeys but absent from most affected chickens.

Antibody testing utilizing the AGID test continued to be an important test that could be used over time while antigen testing utilizing the Directigen and RT-PCR were used for early rapid detection. HI testing was done to charac-
terize the serotype of AGID positive samples and virus isolation conducted to provide further confirmation of positive status. Generally clinical signs and positive results on at least one of the laboratory tests or positive results on at least two of the laboratory tests were used as a basis for case definition.

The following table shows required Avian Influenza testing prior to, during, and following this outbreak:

Prior to the outbreak, the Harrisonburg laboratory conducted AGID testing of blood for NPIP testing and routine slaughter blood surveillance of commercial turkeys and all breeders, turkeys and chickens. During the outbreak weekly antigen testing was done on all flocks using barrel surveillance. Additionally, testing was required prior to movement off the farm for placement or slaughter. Finally, any report of suggestive clinical signs resulted in same day investigation, sampling, and testing.

Barrel surveillance was continued until four rounds of negative test results had been completed and 30 days had passed since the last positive case. Considerable coordination was required between the Task Force, the companies, and the producers to ensure adequate sampling and testing was done to surveil all flocks.

The Harrisonburg laboratory had been conducting approximately 800 to 900 AI tests per week prior to this outbreak. At the peak of the outbreak, this laboratory was testing more than 10,000 samples per week.

Disposal

The 14,000 bird index flock was buried on the farm in a lined pit under an emergency permit. Public concerns, however, resulted in additional requirements on land owners for citations on deeds and monitoring of wells. These requirements made burial an unacceptable option as a disposal method. Requirements were late modified but were still unacceptable to growers.

Delays in local government approval to utilize landfills lasted nearly 3 weeks. During this period, controlled slaughter of infected flocks that were held until they were tested negative on the Directigen test was permitted, but extensive spread of disease occurred during this period and this practice was discontinued as soon as landfill became available. The use of one mega-landfill, more than a three hour drive away, became the primary means of disposal. Although there were concerns over spread of infection along truck routes to landfills, leak-proof trucks with double liners were utilized and equipment cleaned and disinfected, and there was no evidence of disease spread as a result of this method of disposal.

One farm attempted in-house composting as a disposal method, which was only partially successful because the pile was not properly maintained. Most producers chose not to compost because of the time requirements and the need to properly manage the pile. One producer did elect to utilize a commercial “Ag Bag” composter utilizing a plastic bag that will hold 76 tons
of material. This method appeared to be promising but did require 8-12 weeks, the addition of litter or other carbon source, and required space for laying out the bags on the farm.

Incineration utilizing air-curtain incinerators at a central location was carried out but proved to be very expensive, unable to handle the volume of disposal required, and resulted in environmental concerns related to smoke, ash, and runoff.

Biosecurity

Personnel were assigned to work with companies and producers to review and strengthen ongoing biosecurity measures at the farm and plant level. A case control study demonstrated a 7-fold increase in risk for those farms transporting daily mortality to rendering facilities. A Cleaning & Disinfection (C&D) unit comprised of Task Force personnel and equipment was assigned to ensure C&D of all vehicles exiting the one rendering plant that continued to receive birds. Poultry companies began assisting producers in establishing alternate methods of disposal on the farm and moved to prohibit the utilization of rendering plants for this purpose. Finally, efforts were made to conduct on-farm biosecurity audits of depopulated farms prior to repopulation. This was implemented on a voluntarily basis and completed for approximately half of the infected farms.

Organization

An Incident Command System (ICS) was used for the organization and functioning of the Task Force with the U.S. Forest Service providing considerable assistance in support of this system. The long used Regional Emergency Animal Disease Eradication Organization (READEO) of USDA was easily merged into the ICS, and federal and state personnel organized into this system. Under a Joint Command, the ICS was divided into Command Staff, Planning, Administration and Finance, Logistics, and Operations.

Approximately 800 people from various federal and state agencies rotated through the Task Force during the response. Volunteers under contract with Department of Health and Human Services’ VMAT and DMAT teams accounted for nearly 200 personnel, many of whom returned for several rotations. Personnel came from 46 states and several foreign countries.

The ICS utilized a series of daily meetings to ensure full communication between the command staff, individual units, and all Task Force personnel. Logistical support and warehousing proved to be a critical support function. More than 50,000 Tyvek® personal protective suits were packaged and utilized during this response.

Training was provided to every person serving on the Task Force. All members received orientation training that emphasized biosecurity measures to be taken and provided an overall understanding of the status of the out-
break and the response measures being taken. Specific units provided more specialized training to staff assigned to them.

Federal operational expenses were approximately $13.5 million and federal compensation of up to $69.2 million has now been approved for producers and companies with positive flocks.

**Lessons Learned**

A number of lessons were learned from this outbreak and response. Our findings would indicate that this outbreak was not a result of an introduction from local backyard flocks or wild birds. This virus was the same virus present in live bird markets of the northeastern United States which link suppliers from many States. Clearly more effort must be taken to reduce or control these viruses in the flocks that supply the live bird markets and to create barriers to prevent introduction into commercial production facilities.

Transport of daily mortality to rendering plants must be reexamined to minimize this risk in the spread of disease. The spread of this virus was primarily via the movement of people and equipment, with airborne spread playing little to no role. Environmental concerns were particularly critical in responding to such an outbreak.

The availability of rapid, accurate diagnostic testing physically located in close proximity to the outbreak is essential. Any additional delay due to shipping samples, even overnight, has a significant negative impact on the ability to manage the outbreak quickly and effectively.

Multiple state and federal agencies worked effectively with industry to quickly stamp out this outbreak of a highly contagious disease. The practice of sample collection, euthanasia, and disposal, carried out on the farm with proper biosecurity measures, did not appear to result in any area or other disease spread.

Finally trade considerations did, and will, play an important role in determining response policies such as stamping out, vaccination, and disposal.

Additional analyses will be carried out utilizing the large amount of data collected during this response. Diagnostic tests and surveillance methods will be subjected to further analysis. Spatial analysis will be used to further assess the effect on control efforts of early depopulation versus controlled slaughter. The impact of size and density of flocks, proximity to positive premises, and transmission, as it relates to specific types of movements, will also be examined. Reports will also be generated by the different response units of the Task Force for use in assessing such areas as disposal methods. Finally, attempts will be made to model control strategies and their effects on disease spread.

A number of factors contributed to the success of this response. Certainly much had been learned from the 1983/1984 outbreaks of AI in Pennsylvania and Virginia, as well as from more recent experience with low path AI
occurrences in the United States and other countries. The involvement and commitment of the industry was certainly a key to our success, as was the high level of cooperation between State officials, USDA, and various components of the industry. Improved technologies, particularly with respect to early detection and rapid diagnostic tests and automated data systems that utilized GIS mapping and analysis, also played a key role in early containment of this highly contagious disease. Finally a rapid and coordinated response by all those involved and the high level of support from various public and private organizations in this response were critical to its success.
EFFECTIVENESS OF \textit{BRUCELLA ABORTUS} STRAIN 19 SINGLE CALFHOOD VACCINATION IN ELK (\textit{CERVUS ELAPHUS})

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Introduction

Brucellosis in Greater Yellowstone Area (GYA) bison and elk has been a source of controversy and focus of the Greater Yellowstone Interagency Brucellosis Committee (GYIBC) for years. Brucellosis has been eradicated from cattle in the 3 states of Wyoming, Montana, and Idaho and all three states currently are classified as “brucellosis free” with regard to livestock. Yet free-ranging elk in the GYA, especially those that attend feedgrounds, and bison in Yellowstone and Grand Teton National Parks still have high seroprevalence to the disease and are viewed as a threat to the state-federal cooperative national brucellosis eradication program. Recently, cattle in eastern Idaho were found infected with brucellosis and transmission was apparently from commingling fed elk. The GYIBC, formed of state and federal agencies involved in wildlife and livestock management in the 3 states, has committed to eventual elimination of the disease from wildlife.

Management tools to control or eliminate the disease are limited; however, wildlife vaccination is one of the methods currently employed. The state of Wyoming vaccinates elk on feedgrounds using an air-powered hydroxypropylmethylcellulose biodegradable bullet containing the lyophilized vaccine, \textit{Brucella abortus} Strain 19 (S19) at a dose of $3 \times 10^9$ CFU (Thorne et al 1997). Considerable debate existed on the documented effectiveness of this vaccine in elk (Herriges et al. 1989; Smith and Roffe 1997) and eventually culminated in litigation (US District Court, No. 98CV 037B, The State of Wyoming; Jim Geringer, Governor vs USA; Bruce Babbit, Secretary Department of Interior). Previous work (e.g. Davis et al. 1991, Roffe et al. 1998) has shown that extrapolation from data in other species may lead to erroneous conclusions regarding vaccine safety and efficacy. We initiated a single-dose efficacy study of S19 in elk in 1999.

Methods

Project design was a 2 age class, controlled challenge experiment. We included a control and vaccinate group from two different year cohorts in the study design. Approximately 25 elk were in each group of control and vaccinate elk, for each year cohort, resulting in about 100 elk in the study. Elk were bred as 3.5 and 2.5 year olds for those captured in 1999 and 2000,
respectively, and pregnant elk were challenged midgestation. Evaluation criteria for vaccine efficacy were the differences in abortion and cow infection rates between control and vaccinated elk. For the purposes of this study, “abortion” is defined the sum of aborted dead fetuses, stillbirths, and weak calves that die within 5 days. In our study, the few weak calves observed were unable to rise and died within 2 days.

Elk were captured as calves by netgun during February of their respective years from southwestern Montana (75) and northeast Idaho (25) in areas previously surveyed and known Brucella free. Each was bled, ear tagged and transported to the Wildlife Health Laboratory in Caldwell, ID where they were kept in age and treatment segregated enclosures. Enclosures were separated by a minimum 10 ft gap between any enclosure and adjacent pens. Animals were allowed to acclimate for 3-5 weeks, then bled again and vaccinated intramuscularly with S19 or saline (2ml) for vaccinates and controls, respectively, in March of their capture year. Vaccine was procured from and titrated by Colorado Serum Company and consisted of 4.42 x 10⁹ colony-forming-units (CFU) and 8.58 x 10⁹ CFU per dose for 1999 and 2000 vaccinations, respectively. We conducted periodic assessments of Brucella serology throughout the study and included Card, Buffered Acidified Plate Antigen, Standard Plate, Standard Tube, Rivanol, and Complement Fixation (CF). We placed bulls with cow elk in the fall of 2001 for breeding at a rate of 12-13 cows per bull and determined successful pregnancy by pregnancy specific protein B (PSPB) and ultrasound in January 2002. PSPB and transrectal ultrasound results at challenge were used as the final determination of pregnancy status upon entering the challenge phase of the experiment. Elk were considered pregnant when both tests concurred. Based on these data, 89 elk entered the challenge phase as pregnant adults (47 3-year-olds divided into 24 controls and 23 vaccinates, and 42 2-year-olds divided into 20 controls and 22 vaccinates). One 2.5 year old control elk was later removed from the study because she gave birth to twins (one aborted, the other born live but weak) and twinning is an independent cause of abortion in elk. We challenged elk with 1 x 10⁷ CFU of pathogenic Brucella abortus strain 2308 by bilateral intraconjunctival sac instillation on February 28, 2002. Following challenge, elk were placed in 3 pens of approximately 30 elk each containing equal numbers of control, vaccinate, 2 and 3 year olds. We used this arrangement to control for any potential secondary Brucella exposure following abortions and for potential pen effects. Elk were monitored throughout daylight hours. We collected abortions daily and froze the fetuses for later Brucella culture. Following abortion or calving, cows were euthanatized, necropsied and tissues frozen for Brucella culture. Live born calves, along with their dams, were allowed to survive 5 days, then euthanatized and tissues cultured. Although we were able to visually identify the mothers of all live calves, we also identified genetic markers for cows and bulls and matched all abor-
tions and live calves to their parents.

We collected blood from all cows and bulls for genetic marker analysis. Unique cow and bull patterns were used to analyses fetal and calf tissues to assign maternity. Most fetuses could be assigned maternity based on direct observation, or presence of a retained placenta within a cow with a single fetus on the ground. Live viable births were either directly observed, or maternal attendance and nursing over several days provided conclusive evidence of maternity.

We analyzed the abortion data in a 2-step process. First, we used a Fischer Exact test to determine whether abortion and infection rates were statistically different between the controls and vaccinates, and between the 2.5 and 3.5 year olds. If a statistical significance was found, the magnitude of that difference was calculated. “Protection against abortion” is defined as the proportion of vaccinated animals that would be expected to abort that instead produced live calves. Protection against infection similarly is based on the proportion of vaccinated elk that would be expected to be infected but instead infection was not detected. These calculations maximize the measured effect of vaccine. The “expected” abortion and infection rate in vaccinates (in the absence of any protection) was estimated from the abortion and infection rate in controls.

Results

All elk were seronegative at capture and before vaccination and control elk remained seronegative the entire 3 years of the project until challenge. All vaccinates responded strongly to S19 vaccination. 100% of vaccinates seroconverted on all 6 serologic tests, with rapidly rising and high titers (geometric mean CF titers of 1:147 and 1:110 for 1999 and 2000 cohorts, respectively) within 1 month of vaccination. This titer fell rapidly over the next 2 months. By one year post-vaccination, seropositive reactions occurred in less than 15% of vaccinates and were generally negative on CF. Most positive reactors were positive on only 2 or 3 tests.

Abortions started in March (n=1), 2002, peaked during April (n=22) and May (n=29) and completed in June (n=21). Live births were all during May (n=11) and June (n=4). The proportions of abortions that occurred in June was higher for vaccinates (44%) than for controls 17%. Viable calf production was statistically lower (p=.003) for controls (2/43 = 5%) than vaccinates (13/45 = 29%). Of the 13 live calves born to vaccinates, 7 were 3 year olds and 6 were 2 year olds. No statistical difference existed in the successful calving rate of vaccinated 2 and 3 year olds and thus the data are grouped relative to age.

Bacteriology results are still incomplete. Most fetuses are completed, but cow data are pending. Of the completed fetuses, 68 of 74 samples from abortions (92%) were Brucella positive, while only 5 of 14 from viable calves were similarly infected (36%). Genetic analyses on parentage are pending.
Understanding control group abortion rate to estimate expected abortions in vaccinates if no vaccine protection existed, 42.9 (95.3% of 45) abortions would be expected. Instead, the observed abortion was 32 (74.6% of expected total) and the remainder (25.4%) of those vaccinates were protected against *Brucella*-induced abortion. Calculation on protection against infection cannot be made until bacteriology is completed. Based on data from viable calves for whom mothers are known, 1 of 2 control calves was infected, and 4 of 12 vaccinated calves were infected. Most remaining control and vaccinated fetuses were infected (see above).

**Conclusions**

The vaccine provided some protection, but the effect was minimal, with a measured efficacy of 25%. With some data still pending, preliminarily, the vaccine had even less effect on infection rates. However the overall longer gestation in vaccinated elk suggests that vaccine was having a mildly protective effect even in those elk that eventually aborted. Whether such a low efficacy would provide materially significant decreases in disease prevalence in a highly affected herd is unknown. Models are frequently used to predict likely outcomes, but are highly dependent upon estimated parameters, inputs and model construct. Peterson et al (1991), modeling brucellosis in Jackson bison, indicated that low vaccination efficacy had little impact on brucellosis prevalence, with a 24% efficacy stabilizing prevalence at 47% (starting at 61%) after 20 years of vaccinating. Gross et al (1998) modeled brucellosis prevalence change under a variety of conditions in elk. Over the 100 year time frame they modeled, this low efficacy did not eliminate brucellosis regardless of whether calves or both cows and calves were vaccinated. The model, however, predicted a reduction in disease prevalence by 40-50%. Combined with other treatments, such as test and slaughter, eradication might be achieved in 20-30 years. Others have argued that vaccination will simply not eliminate the disease and other controls will be necessary to significantly reduce prevalence (Enright and Nicoletti 1997).

Our study utilized controlled conditions to provide a uniform challenge to the animals so that vaccine effect, alone, could be examined. Such methods are routine for vaccine efficacy trials and standardized doses and methods allow comparison among different experiments. The question always arises, however, how does an experimentally measured efficacy translate into real world conditions? Real world doses are zero to billions of organisms. We used $10^7$ CFU of pathogenic *Brucella* as a standard challenge. Our challenge was not overwhelming (5% of controls did not abort). Real world challenge doses for those animals exposed could realistically be expected to be higher because aborted material typically has billions of organisms per gram of tissue. In a study of Yellowstone bison, cultures of calf, fetal and placental tissues yielded “heavy growth” from a wide variety of tissues (Rhyan et al. 2001). But, Cook (1999) suggested under natural interactions that most elk
make brief contact with an aborted fetus then depart. He calculated a 10cm
diameter area of skin contained about $4.1 \times 10^5$ organisms and suggested
this amounted to a “realistic field exposure”. How this translates into elk on
feedgrounds with feed contaminated by infected tissues and fluids is un-
known.

In addition, field challenge is received orally as compared to our
intraconjunctival route. We suggest, though, that our measured vaccine effi-
cacy is likely to be a maximum efficacy for the following reasons. Our vac-
cine was freshly obtained, reconstituted on-site, and hand-delivered by intra-
muscular injection using a 1.5 inch needle. Such methodology ensured 100% 
group vaccination and immune response with virtually no trauma and with the
best available vaccine. Ballistic delivery relies on adequate penetration of elk
hide and muscle from a remote location and results in something less than
100% successful delivery. In addition, ballistic vaccination apparently pro-
duces a decreased cell-mediated immune response as compared to hand-
jection in elk in response to Brucella immunogens (S. Olsen, USDA-ARS,
pers. comm. 2002). Our research animals were also provided ad-libitum feed
and nutritional supplementation. Our growth rates and pregnancy rates in 2
year olds suggest our nutritional plane was likely higher than that experi-
enced in the wild. Conception rates in 2.5 year old elk vary from 32% in free-
ranging conditions under poor nutrition to 93% in captive elk on high nutri-
tional planes (B. Smith, National Elk Refuge Biologist, pers. comm. 2002). In
supplementally fed elk such as in the Greater Yellowstone Area, feed is
provided at a level designed to allow some weight loss during the winter
feeding season. Our nutritional conditions are likely not realized in free-rang-
ing conditions, which would likely pose greater stress on elk and contribute
to brucellosis-induced abortion in the free-ranging situation. While it could be
argued that captivity places greater social stresses on animals, our research
animals arrived as calves and behavior suggested ready adaptation to con-
finement. Combined with objective evidence on growth rate and reproduction
we suggest physiologic stress was likely less in these animals than free-
ranging elk. We conclude that the observed efficacy of 25% in our experi-
ment is likely a maximum for real world application of single calfhood dose of
S19 in elk.

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USAHA BUSINESS SESSION  
Wednesday, October 23, 2002, 3:45-4:30 PM

REPORT ON ACTION OF  
THE NOMINATIONS COMMITTEE

B. R. Hillman, et. al.

Dr. Hillman read the report of the Nominating Committee on Monday, October 21, 2002 and posted the report on the registration bulletin board. Our nomination slate is for President — R. Frost, California; President-elect — D.H. Lein, New York; First Vice-President — R.D. Willer, Arizona; Second Vice-President — B.D. Marsh, Indiana; Third Vice-President — L.M. Myers, Georgia; Treasurer — J.W. Bryan, South Carolina. Those nominated as regional delegates are: Northeast — R.J. Eckroade, Pennsylvania, V.P. LaBranche, Massachusetts; North Central — C.W. Geary, Wisconsin, J.W. Leafstedt, South Dakota; South — R.E. Good, Arkansas, L.W. Godwin, Florida; West — J.F. Wortman, New Mexico, C.W. Lum, Hawaii. Dr. J. Lee Alley requested that his name be withdrawn from the slate of nominees for the office of treasurer. Dr. Sam Holland made the motion to nominate Dr. Jones Bryan, South Carolina, for the office of treasurer. The motion was seconded by Dr. Ernest Zirkle. The amended slate of officers for 2003 was unanimously approved by the membership and will now go before the Board of Directors.
PASSING THE GAVEL

M. A. Lea, Jr.

Dr. Maxwell A. Lea, 2002 USAHA President, passing the gavel to Mr. Bob Frost, 2003 USAHA President.
The United States Animal Health Association is concluding its 106th Annual Meeting with record-setting attendance, expansion of services and with the ability to provide a last minute national forum for the experts of the nation with regards to Chronic Wasting Disease. Also at this meeting USAHA and AAVLD have gathered their member experts to assist in forming a committee to serve both USAHA and AAVLD in the matters of the OIE, WTO, and the various standards that will be eventually set for the global market.

In short the USAHA has improved its Annual Meeting, has expanded its communications and information, and has truly become a year round association. In five short years the USAHA has progressed to many phone conferences and meetings per week and multiple conference calls and large meetings throughout the year with agencies and groups around the country. This communication and exchange of information has ultimately provided the USAHA with an annual meeting that is recognized around the world with a resulting work product from our committees that assist and influence the stakeholders and members of USAHA.

The USAHA has been instrumental in accelerating and implementing the first stages of the USDA Master Plan for the federal laboratories in Ames. USAHA will continue to assist with these efforts until the Master Plan is completed. This last year USAHA assisted AAVLD in initiating the National Animal Health Laboratory Network which will provide efficiency in disease diagnosis and surveillance. This partnership of state and federal animal health laboratories is essential for safeguarding the health of our nation’s livestock and poultry, companion animals, wildlife, zoo and exotic species, and of course, human health and food safety.

Attendance has been increasing at our Annual Meeting since I became a member of the Executive Committee in 1999.

USAHA is a science-based and dues-based organization. USAHA provides a forum for communication and coordination, serves as a clearing house for new information and methods, acts to develop solutions to animal health issues and works in harmony with our 45 year old partner, AAVLD. I will strive to continue with these efforts; we have a good team; and we will be successful.
RECOGNITION OF IMMEDIATE PAST PRESIDENT

Dr. Robert Hillman (right) presents outgoing USAHA President, Dr. Maxwell Lea with the Presidents’ plaque for his service to USAHA throughout his year as president.
REPORT OF THE JOINT USAHA/AAVLD COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS

Chairman: Dr. Bruce L. Akey, Richmond, VA
Dr. Francois C. Elvinger, Blacksburg, VA

Mr. John B. Adams, VA; Dr. J. Lee Alley, AL; Dr. Charles W. Beard, GA; Dr. Bob H. Bokma, MD; Dr. Eric J. Bush, CO; Dr. Hector Campos; Dr. James T. Case, CA; Dr. Max E. Coats, Jr., TX; Dr. Robert J. Eckroade, PA; Dr. Luis Alberto Espinoza Rodezno; Dr. Peter J. Fernandez, DC; Ms. Rose Foster, MO; Mr. Bob Frost, CA; Dr. Michael J. Gilsdorf, MD; Dr. Harvey S. Gosser, AL; Dr. Larry M. Granger, MI; Mr. Neil Hammerschmidt, WI; Dr. Richard D. Hull, IL; Dr. Robert F. Kahrs, FL; Dr. Stanley H. Kleven, GA; Dr. Elizabeth A. Lautner, IA; Dr. Donald H. Lein, NY; Mr. Larry D. Mark, VA; Dr. Charles E. Massengill, MO; Dr. Harless A. McDaniel, MD; Dr. Thomas J. McGinn, III, NC; Dr. William Mies, TX; Dr. Kenneth E. Olson, IL; Dr. Jean Petter, GA; Dr. John R. Ragan, MD; Dr. Leon H. Russell, Jr., TX; Dr. Mo D. Salman, CO; Dr. Larry A. Schuler, ND; Dr. David Thain, NV; Mr. David C. Warren, FL; Dr. Stephen E. Weber, CO; Dr. Richard D. Willer, AZ; Dr. Saul T. Wilson, Jr., AL; Dr. Nora E. Wineland, CO.

USAHA Committee Members: Mr. John B. Adams, VA; Dr. J. Lee Alley, AL; Dr. Charles W. Beard, GA; Dr. Bob H. Bokma; Dr. Eric J. Bush, CO; Dr. James T. Case,* CA; Dr. Max E. Coats, Jr., TX; Dr. Robert J. Eckroade, PA; Dr. Luis Alberto Espinoza Rodezno, El Salvador; Dr. Peter J. Fernandez, DC; Ms. Rose Foster, MO; Mr. Bob Frost, CA; Dr. Michael J. Gilsdorf, MD; Dr. Harvey S. Gosser, MO; Dr. Larry M. Granger, MI; Mr. Neil Hammerschmidt, VT; Dr. John P. Honstead, CO; Dr. Richard D. Hull,* IL; Dr. Robert F. Kahrs, FL; Dr. Stanley H. Kleven, GA; Dr. Elizabeth A. Lautner,* IA; Dr. Donald H. Lein, NY; Mr. Larry D. Mark,* VA; Dr. Charles E. Massengill, MO; Dr. Harless A. McDaniel, MD; Dr. Thomas J. McGinn, III, NC; Dr. William Mies, TX; Dr. Kenneth E. Olson, IL; Dr. Jean Petter, GA; Dr. John R. Ragan, MD; Dr. Leon H. Russell, Jr.,* TX; Dr. Mo D. Salman,* CO; Dr. Larry A. Schuler, ND; Dr. David Thain, NV; Mr. David C. Warren,* FL; Dr. Stephen E. Weber,* CO; Dr. Richard D. Willer, AZ; Dr. Saul T. Wilson, Jr., AL; Dr. Nora E. Wineland,* CO.

AAVLD Committee Members: James Case*, Craig Carter*, Robert Eckroade, Rod Frank, Don Lein, Charles Massengill, Grant Maxie, Pam Parnell, Mo Salman,* Beverly Schmitt,* Susan Turnquist, Mark Walter, Randy White.

* present at meeting
The Animal Health Information Systems Committee (AHISC) held its 5th annual meeting as a joint committee of USAHA and AAVLD on Sunday, October 20, 2002 from 1 to 5 p.m. in St. Louis, MO. Attendance fluctuated between 25 and 40 people, with 32 participants (10 of 41 USAHA members, 5 of 15 AAVLD members; 15 participants requesting membership) filling out the provided attendance sheets.

Dr. Elvinger (Virginia Tech) welcomed the participants and gave a brief synopsis of the past year's meeting and activities. The year 2001 masterplan USAHA resolution # 1 was briefly reviewed. Oversight of design, implementation and expansion of the National Animal Health Reporting System (NAHRS) has constituted the principal activity of the committee between meetings as the AHISC chairs also chair the NAHRS steering committee. However, the shifting emphasis towards emergency preparedness and management in case of accidental or intentional introduction of catastrophic animal disease and the need for rapid, accurate and transparent animal health and disease information, will lead to expansion of the committee’s activities.

Dr. Nora Wineland, NAHMS Program Leader at the USDA:APHIS:VS:Centers of Epidemiology and Animal Health, presented the annual report on the status of the National Animal Health Reporting System (NAHRS). Participation by States in the voluntary system increased slightly from 2001 to 2002. There are 35 States that have participated for 2002 (as of September 2002) and an additional 5 States that are preparing to report. The 35 participating States include half to more than three quarters of the national values of production for cattle (79%), swine (56%), sheep (83%), commercial poultry (60%), and commercial food fish (82%). States preparing to report will significantly add to poultry, food fish, swine and cattle. Data for NAHRS collected through and validated by the State Veterinarians’ offices is used in the generation of the annual report to the OIE. Each year the NAHRS Steering Committee meets and discusses the current status and future plans for the system. The steering committee met in early October 2002 in Fort Collins, CO and discussed benefits to States of NAHRS participation, and the recommendation of the Animal Health Safeguarding Review (# 98) concerning NAHRS. Future plans include continued recruitment of additional States and supporting the efforts of participating States. The aquaculture work group has been asked to define reporting criteria and include OIE listed aquaculture diseases in the reporting system.

Dr. Valerie Ragan, Assistant Deputy Administrator for Veterinary Services and National Surveillance Coordinator presented concepts, objectives and needs for a National Surveillance System. One of the primary principles of the Animal Health Safeguarding Review was that the United States must have a comprehensive, coordinated, and integrated surveillance system. Such a system is the foundation for animal health, public
health, food safety, and environmental health. APHIS must be able to detect foreign animal and emerging diseases; monitor disease trends and threats in the US and other countries; detect risk, evaluate control programs; and provide adequate animal health information. The appointment of a new Assistant Deputy Administrator for Veterinary Services, with the primary responsibility for overseeing the development and implementation of a national surveillance system is a significant step. Since that appointment, which became effective in August 2002, there have been considerable activities towards evaluating current initiatives, and creating the infrastructure that will allow for implementation of such a system.

Three key positions will support the basic infrastructure. These positions have been approved, with one already filled, and with descriptions being created for the other two positions. The positions are as follows: 1) FSIS liaison: This person is responsible for coordinating with and developing an ongoing working relationship with FSIS to assure that samples can be collected as needed, to facilitate data sharing, and to trouble shoot as necessary. This person will educate FSIS regarding APHIS’ mission and solicit cooperation. This position was filled by Dr. Bob Sanders in September. The position is based at the FSIS training center in College Station, Texas. 2) NVSL surveillance staff position: This person will be responsible for dealing with all laboratory issues related to surveillance and safeguarding, including assisting with determining laboratory procedures needed for testing for new or emerging diseases, ensuring that testing and procedures meet international standards, determining laboratory, reagent, or funding needs for possible expansion of surveillance, and trouble shooting laboratory related problems. A description is currently being written for this position. 3) An analytical epidemiologist, based in Ft. Collins, CO, will be dedicated full time to surveillance. The scope of this position is still being developed, but will likely include developing mechanisms for capturing data, and conducting ongoing evaluation, watching for trends, and regular reporting. This person will play a large role in the development of a Veterinary Services Annual Report.

There are also other initiatives ongoing to develop additional infrastructure. These include: 1) The National Surveillance Steering committee will be expanded to include more industry representation. 2) The Safeguarding Surveillance Issue Group is developing action plans to specifically address each of the recommendations in the Safeguarding Review. This team includes members from International Services, who will be working to expand international disease risks and considerations. 3) A field implementation team is being developed to work towards actively implementing surveillance enhancements in the short term, and to make recommendations for additional enhancements. This team will consist of seasoned field epidemiologists, veterinary medical officers, animal identification coordinators, and possibly others. 4) A surveillance technical working group is currently
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focusing primarily on analysis of certain surveillance methodologies.

During the initial development of a national animal health surveillance system, attention will be directed towards the following areas: Enhancement of surveillance for current program diseases; ability to rapidly detect emerging diseases and/or foreign animal diseases; surveillance for diseases affecting marketability or economics of industry; surveillance based on risk of disease; monitoring of animal health trends; ability to do focused surveillance as needed. The development, implementation and evolution of the National Surveillance System is a dynamic process. It is imperative that the infrastructure as well as partnerships and cooperation with others outside of APHIS be developed successfully to be effective. The surveillance system that is developed will need to be flexible, adaptable, and responsive. Regular updates on the progress of the Safeguarding Surveillance Issue Group and others will be posted monthly on the VS Safeguarding website. That address is www.aphis.usda.gov/vs/safeguarding.htm.

Dr. Mark Thurmond (UC Davis, CA) presented concepts for disease surveillance systems and evaluation of efficacy of such systems. Since the UK and Taiwan FMD epidemics, the anthrax bioterror incidents, and terrorist events in the United States, the somber recognition has emerged for the urgent need to restructure local, regional, and national foreign animal disease (FAD) surveillance aimed at protecting animal health and agriculture from the new biowarfare threats. Toward that end, new real-time diagnostic tests are being developed for FADs, and the possibility of local or regional testing is being debated. In light of these new developments, a new structure and design for animal disease surveillance should be explored to address the new realities of agroterror, while taking advantage of the power of new real-time diagnostic technology. Dr. Thurmond outlined performance concepts, structure and function appropriate in a surveillance system for both regional and national applications. Generally, surveillance aims at purposefully and systematically seeking out as early as possible the target agent or disease, or identifying elevated risk of acquiring the disease, so that treatment, control, eradication, or prevention can be affected quickly and efficiently. Performance of the surveillance system will be measured by the accuracy (probability of detecting the agent and of detecting the absence of the agent), reliability (intra- and inter-laboratory error), speed, and cost-efficiency. The design of an enhanced surveillance system should address post facto ‘real-time’ surveillance, including reporting and response, for early detection of an FAD agent after it has entered the US, as well as preemptive surveillance aimed at detecting new threats and increased risks of acquiring an FAD at sites of highest risk. A strong national surveillance system should be structured to be probability driven so as to maximize both the overall sensitivity (Se) and specificity (Sp) necessary to minimize false positive and false negative results. For example, sampling and sample sizes should be calculated to target high-risk species, herd types, regions,
or management environments with high probabilities of acquiring and / or disseminating the agent. Consequently, current knowledge of the infectious disease epidemiology for each agent and species should be incorporated into sampling strategies. Examples include transition state probabilities, breed susceptibilities, reproduction numbers (animal and her specific $R_0$), projected contact rates, and directed animal movements. Because accuracy of any surveillance system will greatly depend on performance of the designated assay, it will be critical that assays be rigorously validated to obtain estimates of high confidence for assay Se, Sp, and reliability for all conceivable sample types, species, and management environments. Functionally, the surveillance system will need to include routine quality control and assurance validation, and sensitivity analysis to evaluate new surveillance strategies to address changing risk or population dynamics. Overall utility and cost-efficiency of the system can be promoted by embedding or 'piggy backing' other diagnostic testing or surveillance systems to most effectively utilize existing sampling frameworks or assays. For example, samples used routinely for food safety or indigenous diseases of importance to producers also could be utilized in a national surveillance system. Assays for an array of agents of diagnostic interest to practitioners and producers could be multiplexed or performed in panels that also include important surveillance needs, thereby maximizing information and utility per sample. In summary, creation of new surveillance systems will need to consider the necessary probabilistic structure and design to maximize the likelihood of early detection and reporting of an FAD or to evaluate the risk of the US acquiring an FAD from outside sources.

Dr. Jim Case (UC Davis, CA) presented an overview and discussed the implementation of the National Animal Health Laboratory Network (NAHLN). The overall goal is to contribute to the improvement of national disease surveillance capabilities. The concept was developed in discussion with NVSL that resulted in an MOU with AAVLD. Initial support is from CSREES and APHIS, USDA. The philosophy behind design and implementation of NAHLN is that animal disease surveillance functions are most effectively accomplished as a shared responsibility amongst all animal health agencies. This is true in the case of foreign animal disease incursion, for emerging diseases, or for endemic diseases. The critical nature of the current global animal health situation compels immediate action. The key goals of the NAHLN are to expand detection and response measures for pathogens that threaten animal agriculture and bolster laboratory capability for select agents with support for personnel, equipment, testing and training. The present focus is on 8 select agents of economic and trade importance (agents for foot and mouth disease, hog cholera, African swine fever, Rinderpest, contagious bovine pleuropneumonia, lumpy skin disease, highly pathogenic influenza, exotic Newcastle disease). Other agents of interest for potential future inclusion include agents of zoonotic importance like West
ANIMAL HEALTH INFORMATION SYSTEMS

Nile encephalitis virus, Rift Valley fever, Nipah encephalitis virus, Hendra encephalitis virus, other encephalitides, bovine spongiform encephalopathy.

The NAHLN is to support the deployment of standard diagnostic approaches for identification of select agents; bolster data sharing among animal health agencies through the creation of a secure, two-way communications network and the creation of a national repository for animal health data; bolster cooperation and communication amongst animal health officials through maintenance of confidentiality of source data and providing alerts at appropriate response level. Presently a two-tiered funding structure is in place for the first two years, with tier 1 funded at $2,000,000 (laboratories in CA, CO, GA, TX, WI) and tier 2 at $750,000 (laboratories in WA, FL, NY, IA, AZ, NC, LA). Work plans have been submitted by these laboratories but funding has not yet been released. Each participating laboratory must document their work plan for each of the following areas: personnel, facilities, data record systems, diagnostic systems, quality assurance program, estimated budget and benefits of the NAHLN. Working groups have been constituted to establish the communications infrastructure. Comprehensive national laboratory surveillance, improved diagnostics through standardized methods, surge capacity to respond to animal health emergencies and the possibility for a quantitative assessment of the national animal health status will be benefits of the NAHLN, through use and coordination of the power and potential of the nation’s diagnostic resources, brought together to address a growing threat.

Dr. Mark Engle, Director of Swine Health Programs of the National Pork Board presented the National Swine Surveillance System, originating from recommendation issued in the Swine Futures Project (SFP), a multi-year collaborative project between USDA: Veterinary Services, and Pork Producers. The final SFP report was published in 1999. Surveillance is defined in the SFP final report as “An ongoing process of collection, analysis, and interpretation of health related events occurring in a population followed by timely dissemination of results to those involved in the planning, implementation, and/or evaluation of prevention and control measures.” Recommendations are to proceed with the development and implementation of a comprehensive surveillance plan for the prevention and control of diseases affecting the U.S. pork industry; establishing a system for the rapid detection of Emerging Animal Issues; and developing a collaborative process to respond to Emerging Animal Issues appropriately. Foreign animal diseases (FAD) need to be excluded or detected early such that an appropriate response for eradication can be rapidly initiated; emerging or re-emerging diseases, or changes in presentation of known domestic pathogens need to be recognized early such that those agents can be controlled or eradicated; control and eradication of program diseases need to be completed. The US Swine industry had to cope with several emerging diseases
in the recent past including porcine reproductive and respiratory syndrome (PRRS), post weaning multi-systemic wasting syndrome, porcine dermatitis and nephropathy syndrome, and infections with H3N2 influenza virus, hepatitis E virus, *E. coli* F18, *Salmonella typhimurium* DT 104 and erysipelas. Dr. Engle elaborated that the US swine industry could ill afford another “Mystery Swine Disease”, like the PRRS epidemic that became clinically evident in the US swine population in the late 1980’s. This disease with its consistent clinical signs and pathologic lesions across cases had a tremendous production level economic impact. The lack of treatment and control options left a feeling of helplessness among producers and animal health professionals. There was no coordinated effort to address an extremely serious disease condition, and rumor mill communications to share experiences were the only source of information. The causative agent was finally identified in 1992. Based on this experience the SFP was to evaluate if a surveillance system to provide rapid detection of emerging animal diseases could be developed, such that another “Mystery Swine Disease” or recurrent epidemics of domestic diseases can be avoided by implementing an “early warning system” that would trigger an appropriate response?

As a case in point Dr. Engle presented data on the re-emergence in the Midwest in summer 2001 of erysipelas, a well-known endemic swine disease (*Erysipelothrix rhusiopathiae*, first identified in 1885). Awareness of increased erysipelas incidence arose through rumors and anecdotal information from producers and veterinarians. Retrospective analysis of veterinary diagnostic laboratory and slaughterhouse condemnation data showed that pork producers could have been alerted much earlier to the presence of a potential problem if that data had been evaluated in real time for incidence increases over baseline. Early detection systems need to be established, slaughter and diagnostic laboratory based surveillance enhanced, and swine movement and other regional management practices based prediction systems need to be evaluated. Early detection systems for swine diseases will allow producers to implement prevention strategies and minimize losses through decreased condemnations and death losses, decreased treatment expenses and production losses and delayed shipments. To date the swine futures project initiatives have included slaughter-based surveillance through access to FSIS disposition data, laboratory-based surveillance, development of state-level Swine Health Advisory Councils (SHAC), a PMWS pilot project, implementation of more formal passive surveillance and practitioner based reporting. Effective surveillance systems will enhance pork safety and protect the image of the pork industry, assist suppliers in maintaining availability of health products and protect the competitive position of U.S. pork producers in the world market.

In follow-up discussions, Dr. Engle explained that the system very much relies on data and information already collected at either diagnostic laboratories or within FSIS, which limits the costs of implementation. However,
case definitions have to be established to ensure appropriate collection and evaluation of data. The system is to capture and recognize foremost non-catastrophic but also catastrophic disease emergence or shifts and trend in incidence of endemic diseases and provide the basis for alerts and early intervention.

Dr. Beverly Schmitt, Chief of the Diagnostic Virology Laboratory at the NVSL presented the current efforts to design an electronic information management system at the NVSL. Many demands, internally at NVSL, as well as externally from within USDA and from different constituencies, are directed towards the work group in charge of designing such a system.

Dr. Steve Weber, Leader of the Center for Animal Disease Information and Analysis presented efforts of CEAH to integrate Laboratory Data into the USDA's Emergency Management Records System (EMRS). The EMRS system was used in the recent outbreak of low pathogenic avian influenza in Virginia and is now being used to provide support for the Newcastle disease outbreak in California. Areas have been identified where the EMRS can be improved. One such area is to reduce duplicate record keeping currently required for the submission of samples from State diagnostic laboratories to NVSL for verification, and the subsequent incorporation of test results into the EMRS database. A statement of work has been written to make the process electronic and more efficient. A further requirements analysis will be completed and the process to incorporate identified needs into the EMRS will begin in January of 2003.

Dr. Weber also presented aspects of Information Systems Implementation following recommendations from the National Animal Health Safeguarding Review. Several of the recommendations related directly to the critical need to enhance the role of information systems as they affect animal agriculture, especially animal disease surveillance, and one of the implementation teams is to identifying the needs within VS to address those information technology related recommendations.

Dr. Mark Schoenbaum, Analytical Epidemiologist in the Center for Animal Disease Information and Analysis, addressed issues from a Disease Spread Modeling Workshop of the North American Animal Health Committee—Emergency Management Working Group, held July 9-11, 2002 in Fort Collins, Colorado. The purpose of the workshop was to identify appropriate management decision support tools for planning FMD outbreak mitigation actions including vaccination, and to facilitate the interchange of disease spread and economic modeling methods and techniques among analysts actively engaged in these activities. Thirty-eight participants, including analysts, epidemiologists, economists, risk analysts and decision makers from Canada, Mexico and the U.S., as well as guest speakers from Australia and the Netherlands participated. Decision-maker questions were addressed, as what is the potential size and duration of an outbreak? What are the disease spread and economic impacts of alternative mitigation strat-
egies? How many doses of FMD vaccine are needed for likely outbreak scenarios? What is the probability of successfully containing an FMD outbreak using a particular strategy, given the resources available? Five disease spread models were presented including Australia’s state transition simulation model, the Netherlands’ FMD application of the InterSpread model, UC Davis’s spatial-temporal stochastic model, and APHIS’s state transition simulation model for FMD as well as TB. Further items for presentation and discussion included the integrated economic modeling and welfare analysis, and technical discussions of methods, attributes, outputs, data sources, and others. Discussions lead to consideration of enhancements of APHIS’s state transition simulation model for FMD by including multiple species and production types, adding multiple diseases, integrating economic analysis, considering welfare and net trade impacts, adding direct spatial links, considering surveillance alternatives, comprehensive resource analysis and applying the model at regional test exercises, as well as testing the model with data from recent FMD outbreaks.

Two requests for action were brought before the committee. The committee voted on and approved two resolutions 1) on participation in the National Animal Health Reporting System (NAHRS), 2) on electronic tracking. To conclude it was recognized that the Animal Health Information Systems Committee’s activities support all surveillance and monitoring systems that contribute to the protection of the health of the US livestock population from either accidental or intentional introduction of foreign or exotic disease agents. Information systems will be crucial for support in efforts of exclusion or control and eradication of all catastrophic, but also non-catastrophic disease agents.

Respectfully submitted:

Bruce Akey and François Elvinger, co-chairs
ANIMAL WELFARE

REPORT OF COMMITTEE ON ANIMAL WELFARE

Chair: Dr. Steven Halstead, Lansing, MI
Vice Chair: Ms. Ria de Grassi, Sacramento, CA

Dr. Joan M. Arnoldi, MI; Ms. Ria de Grassi, CA; Dr. W. Ron DeHaven, MD; Dr. Julie Drier, MD; Ms. Debra S. Duncan, KS; Ms. J. Amelita Facchiano-Donald, TX; Dr. Nancy A. Frank, MI; Mr. Daniel M. Goodyear, PA; Dr. Scott R. R. Haskell, WI; Mr. Del E. Hensel, CO; Dr. Richard D. Hull, IL; Mr. Tom J. Hunt, MI; Dr. Arthur J. Kennel, MN; Mr. Jay C. Lemmermen, FL; Ms. Cathy A. Liss, DC; Dr. Calvin W.S. Lum, HI; Ms. Amy W. Mann, VA; Dr. Charles E. Massengill, MO; Dr. Thomas J. McGinn, III, NC; Mr. Terry R Menlove, UT; Mr. Joe Miller, DC; Dr. Raymond L. Morter, IN; Dr. John R. Ragan, MD; Ms. June M. Reed, PA; Ms. Nancy J. Robinson, MO; Mr. David D. Schmitt, IA; Dr. Dale F. Schwindaman, MD; Dr. Morton S. Silberman, GA; Dr. Carolyn L. Stull, CA; Dr. Paul Sundberg, IA; Mr. George Teagarden, KS; Dr. Robert M. S Temple, OH; Dr. Kenneth L. Thomazin, CA; Mrs. Michele C. Turner, CA; Dr. Charles D. Vail, CO; Dr. Gary M. Weber, DC; Mr. Dave Whittlesey, CO; Dr. Elizabeth S. Williams, WY; Dr. Norman G. Willis, Ont. CAN; Dr. Richard W. Winters, TX; Mr. Richard W. Winters, Jr., TX.

The Committee on Animal Welfare met on Monday, October 21, 2002, at the Millennium Hotel in St. Louis, Missouri. The meeting was called to order at 12:30 p.m. by Committee Chair Halstead. Fifteen committee members and 26 guests attended.

Tim Cordes, DVM, Equine Programs Coordinator, USDA-Animal and Plant Health Inspection Service (APHIS), presented an update on the federal horse transportation regulations promulgated in response to the 1996 farm bill. Following input from stakeholder groups, the USDA, APHIS, Veterinary Services-led working group developed a proposed rule. The final rule on humane transport of horses to slaughter was published in the Federal Register (Docket No. 98-074-2) December 7, 2001; full implementation was underway as of March 7, 2002. Specific provisions of the final rule include the requirement that horses be provided access to food, water, and rest, 6 hours before loading on the vehicle; certification that each horse be fit for travel at the time of loading; ensuring that each equine has enough floor space to avoid injury or discomfort; ensuring that stallions or any aggressive equines are completely segregated so there will be no contact with other equine on the conveyance; indicating the date, time and place the equine(s) were loaded on conveyance; phasing-out of double-deck trailers over five years; the requirement for signed owner/shipper statements which prohibit the shipment of certain unfit animals; and the assessment of civil penalties of up to $5,000 per violation. Since the implementation of the
rule numerous investigations have been undertaken by USDA Investigation and Enforcement Service (IES). Additionally, educational videos, guidebooks, leaflets and posters have been developed and distributed and regional training workshops have been held. This program is being assisted by Canada for shipments crossing the national boarder under a letter of intent between USDA and the Canadian Food Inspection Agency (CFIA). Efforts are underway to similarly protect slaughter horses being shipped to Mexico.

Carolyn Stull, PhD, Animal Welfare Extension Specialist, University of California, Davis, provided the findings of a scientific literature review on tail docking of dairy cattle. Dr. Stull pointed out that tail docking is prohibited in many countries that are U.S. trading partners and that public pressure is generally against the practice. The literature reviewed encompassed reasons for and against tail docking, methods of docking used, and objective assessments of the impact on the animal, the animal handler/milker, and food safety. Dr. Stull concluded by stating that, while the practice of tail docking appears to cause minimal discomfort, it does result in increased fly predation and no data support claims that it results in increased milker safety and/or comfort or in improved udder health and/or cleanliness. Dr. Stull and co-authors recommend that the routine practice of tail docking be discouraged, suggesting the consideration of switch trimming when some action is deemed necessary.

Dr. Claude Lavigne, Associate Executive Director of Animal Products, Canadian Food Inspection Agency (CFIA), Ottawa, Ontario, Canada, updated the committee on the activities of the agency in the past year. He addressed Canadian animal welfare legislation, current issues (e.g., non-ambulatory livestock, spent laying hens, slaughter horse transport, tail docking of cattle, labeling relative to method of production claims, biotechnology), farm animal welfare infrastructure within Canada, the role of CFIA in addressing animal welfare, and new developments underway in Canada and internationally on animal welfare.

Chester Gipson, DVM, Deputy Administrator, USDA-Animal Care, gave the annual update of the agency’s activities. Dr. Gipson began by reviewing the administrative structure, budget status and staffing level of the agency. He continued with descriptions of the electronic Freedom of Information Act (E-FOIA) system, training programs conducted by the agency, and air transport regulation changes. Dr. Gipson then presented overviews of the many issues in the spotlight. The issues presented included the state and federal regulation of large, exotic cats, the protection of polar bear welfare, tuberculosis in elephants, interstate movement restrictions on game cocks, 2002 Farm Bill provisions exempting birds, rats and mice used in research from protection under the Animal Welfare Act, and Horse Protection Act-related concerns for preventing the “soreing” of horses and the showing of “sored” horses. Dr. Gipson also presented several proposed regulation
changes or policy statements being considered for publication, including alternatives to identification bands for puppies and kittens including cage cards, regulation of wholesale dealers of hunting, breeding, and security dogs (through a Doris Day Animal League lawsuit), primate environment enrichment, training and handling of potentially dangerous animals, transportation of animals on international carriers, amendments to the requirement for statements of acclimation, revisions to licensing and license renewal requirements, and minimum standards for required veterinary medical records and the incorporation of AVMA euthanasia standards as applicable for licensees.

Marlene Halverson, Farm Animal Economic Advisor, Animal Welfare Institute (AWI), opened her report on the issues of concern to her organization by outlining the specific goals of AWI. She reported the availability on CD-ROM of the State of Minnesota Generic Environmental Impact Statement on Animal Agriculture, Technical Working Paper on Farm Animal Health and Well-being. AWI has completed husbandry standards for swine and plans to develop standards to other farm animal species, including dairy and beef cattle. Presently, 200 swine farms are following AWI’s standards and marketing their pork through the Niman Ranch company. Ms. Halverson reported the recent passing of AWI’s founder and president Christine Stevens.

Ernie Zirkle, DVM, Director, Division of Animal Health, New Jersey Department of Agriculture, provided a status report of the development of legislatively mandated animal welfare standards for farm animals in New Jersey. Dr. Zirkle began by reviewing the events leading up to and following the legislative mandate. Specifically, the livestock community, responding to pressure from the New Jersey Society for the Prevention of Cruelty to Animals, convinced the State Legislature in 1996 to pass this legislation. Funding for implementation was not provided, resulting in a delay in the development of the mandated standards for the humane raising, keeping, care, treatment, marketing and sale of domestic livestock, as well as the rules and regulations governing the enforcement of those standards. Meanwhile, according to Dr. Zirkle, groups advocating animal rights saw this as an opportunity to promote, with some political and social success, their message that the to-be-developed standards should declare veal calf raising, caged laying hens, forced molting and beak trimming as below the minimum level of care considered humane. The animal care standards have been drafted and are in review by the State Attorney General. Dr. Zirkle expects they will be published in November, 2002. Dr. Zirkle concluded by stating that, according to the Agricultural Research Service, over $1 billion was spent by animal activists in the United States this past year. He encouraged USAHA, through the Animal Welfare Committee, to play a stronger role countering animal activist pressure through involvement with allied organizations (animal industry groups, breed associations, research insti-
tutions, etc) in the dissemination of information and scientifically based alternatives and other pro-agriculture activities.

Nora Wineland, DVM, USDA-APHIS-Center for Epidemiology and Animal Health, reported on the 2002 farm bill provision to study disabled livestock. The specific language is contained in Section 10815 of the farm bill legislation. USDA-APHIS-Veterinary Services (VS) is the designated lead to develop the study. The USDA-Food Safety and Inspection Service and USDA-Grain Inspection Packers and Stockyards Administration will assist. The initial effort will focus on cattle, but the agency will evaluate the need to look at other species (sheep, pigs, horses, and goats) because of the definition of “livestock”. Presently USDA-APHIS-VS is gathering on-farm information and using existing mechanisms such as NAHMS (National Animal Health Monitoring System) and NASS (National Agricultural Statistics Service). The agency needs time to plan the study to develop the approach and design questions. Farm animal welfare expertise will be needed for study development and analysis. Dr. Wineland invited the committee to provide her with names of experts in farm animal welfare. The agency needs help identifying existing information sources, designing the study, and interpreting the data.

The Animal Welfare Committee, having completed the business before it, adjourned at 5:25 PM with the following two recommendations and two resolutions:

Recommendation:
That the USAHA Animal Welfare Committee commend the American Association of Equine Practitioners for the position statement of April, 2002 concerning the Transportation and Processing of horses in the United States. This statement, developed following a survey of AAEP members, notably demonstrates fair treatment and consideration of relevant issues.

Recommendation:
The USAHA Animal Welfare Committee chair should appoint an advisory subcommittee to review the mission statement of the Animal Agriculture Alliance (AAA) and, if compatible with the mission of USAHA, identify a liaison to the AAA Board of Directors to foster communication on animal welfare issues of mutual interest. The subcommittee should report its findings to the parent committee at the next scheduled annual meeting.
Background Information: “Soreing” a horse is the intentional and deliberate infliction of pain and harm to the lower leg and foot in the interest of creating a characteristically exaggerated step or gait. The “soreing” of horses is generally recognized as a cruel and inhumane practice. The United States Department of Agriculture is responsible for enforcement of the Horse Protection Act (HPA).

Resolution:
USAHA Animal Welfare Committee supports enforcement by USDA of the Horse Protection Act as intended by Congress to prevent the cruel and inhumane practice of “soreing” horses.

UNITED STATES ANIMAL HEALTH ASSOCIATION
2002

Background Information: “Soreing” a horse is the intentional and deliberate infliction of pain and harm to the lower leg and foot in the interest of creating a characteristically exaggerated step or gait. The “soreing” of horses is generally recognized as a cruel and inhumane practice. The United States Department of Agriculture (USDA) is responsible for enforcement of the Horse Protection Act (HPA).

Resolution:
USAHA requests that USDA research information on technologies that can determine if a horse has been “sored.” This should include, but not be limited to, collaboration with such agencies as the American Veterinary Medical Association (AVMA) and American Association Equine Practitioners (AAEP) to evaluate the effectiveness of the use of technology in the program as well as using research grants to evaluate new technology.
REPORT OF THE JOINT USAHA/AAVLD COMMITTEE ON AQUACULTURE

Chairman: Dr. Scott E. LaPatra, Buhl, ID
Dr. M. Randy White, West Lafayette, IN

Dr. Gary L. Brickler, WA; Dr. James A. Brock, HI; Dr. Jones W. Bryan, SC;
Dr. William W. Buisch, NC; Dr. H. Michael Chaddock, MD; Dr. Terry H.
Conger, TX; Dr. George C. Edwards, NC; Dr. Robert G. Ehlenfeldt, WI; Dr.
Anthony M. Gallina, PA; Dr. Joe S. Gloyd, DE; Mr. Robert E. Good, AR; Dr.
Larry M. Granger, MI; Dr. Christopher H. Hannafin, RI; Dr. Robert M.
Harbison, AR; Dr. Doug M. Hoort, MI; Dr. Robert F. Kahrs, FL; Dr. Charles
L. Kanitz, IN; Dr. Delorias M. Lenard, SC; Dr. Vader M. Loomis, PA; Mr.
Larry D. Mark, VA; Dr. Robert W. Mead, WA; Dr. Robert B. Miller, VA; Dr.
Otis Miller, MD; Dr. Roger J. Odenweller, KY; Dr. Roger E. Olson, MD; Dr.
Charles Palmer, CA; Dr. Gary G. Pearl, IL; Mr. Richard P. Peterson, CA;
Dr. H. Graham Purchase, DE; Dr. Frederick A. Rommel, PA; Dr. Harvey L.
Rubin, FL; Dr. John P. Sanders, Jr., MD; Dr. A. David Scarfe, IL; Dr. Roy A.
Schultz, IA; Dr. Sang J. Shin, NY; Dr. Lewis P. Thomas, WV; Dr. Peter H.
Timm, CA; Dr. Norman G. Willis, CAN; Ms. Ria de Grassi, CA.

Sunday, October 20, 2002; 1:00 to 5:00pm; “Jefferson C” room
Meeting began at 1:07pm.

New Business:

1. Update on the National Aquatic Animal Health Plan—Presented by Dr. Otis Miller. Information includes organizational structure of the Joint Subcommittee on National Aquatic Animal Health Task Force. Dr. Miller briefly reviewed the results of the first meeting of this group which took place on December 12-14, 2001, including the framework, stakeholders, mission statement, purpose and objectives. Second meeting took place in Tucson, AZ, on June 18-19, 2002 which dealt primarily with international importation and exportation. Next steps include assigning working groups to further address international importation issues.

2. Update from USDA-APHIS—Presented by Dr. Otis Miller. This included an overview of APHIS National Aquaculture Plan which includes the Animal Health Protection Act of 2002, US Reported OIE Notifiable Diseases, Infectious Salmon Anemia Program, and Spring Viremia of Carp. Reportable Diseases of Aquaculture have included:

   1. Infectious Salmon Anemia (ISA) in February, 2001
   2. Infectious Hematopoietic Necrosis (IHN) in a federal broodstock hatchery in June, 2002
   3. Microcytosis in oysters in July, 2002, and
Proceedings will be available in February, 2003, from the APHIS International Symposium on Infectious Salmon Anemia. Dr. Miller stated that this will be an excellent resource for learning more about ISA, since there were 19 different speakers at this symposium all of whom submitted manuscripts. Dr. Miller informed the committee about VS Memo 567.6 which discusses that the US is required to report notifiable diseases and APHIS, VS is the official contact point. APHIS, VS is required to report these diseases to OIE. Dr. Miller answered questions from the audience about each of these diseases. More information about these subjects can be found on the USDA-APHIS website which is http://www.aphis.usda.gov/vs/aqua/aquaphis.htm.

3. Update from AVMA’s Aquatic and Seafood Advisory Committee (ASAC)—Presented by Dr. David Scarfe. Dr. Scarfe thanked USDA-APHIS for their role in aquaculture. Dr. Scarfe informed this committee that the AVMA represents 87% of all veterinarians in the US. Issues which AVMA ASAC has been involved include:
   1. National Aquatic Animal Health Plan
   2. Efficiency of implementing international health certificates for aquatic animals
   3. Veterinary accreditation review
   4. State regulations regarding aquatic animals (Florida, for example, has suspended their regulations and asked for BMP’s which are Best Management Practices)
   5. EPA’s guidelines for aquaculture effluent management and regulation
   6. Environmental regulations in some states, (such as Maine, which must post the presence of a pathogen, the drug used to treat the pathogen as well as its metabolites)
   7. MUMS which is the Minor Use, Minor Species drug act is in the process of being sent through the Federal Congress
   8. Judicious use of antibiotics in food fish
   9. Medicated feeds for aquatic animals
Dr. Scarfe reminded the group that there is a list-serve called AquaVetMed which deals with veterinary and aquatic animal information. Dr. Scarfe is an advocate of coalition building to bring those professional individuals together who can solve the problems in the world of aquatic animals.

4. Update from Fish Health Section of the American Fisheries Society—Presented by Dr. Scott LaPatra. Dr. LaPatra gave a brief history of the AFS/ FHS and stated that veterinarians are now playing an important role in this organization and can join this group with an affiliate membership. He discussed the Fish Health Inspector and Fish Pathologist programs and stated that the requirements of these programs have been modified to accept veterinarians, since the training for veterinarians is acceptable for the academic requirements of these programs. Bluebook was updated in 1994.
and the United States Fish and Wildlife Service in a joint effort with AFS/ FHS has just come out with the 2002 Standard Procedures for Aquatic Animal Health Inspections. AFS/FHS endorses and supports the National Aquatic Animal Health Plan, and they want to see aquatic animals protected from pathogens and the health of aquatic animals safeguarded.

5. Regional US report updates from committee attendees:

Dr. Skip Jack reported on gross lesions in catfish which are similar to ‘Ich’, but the lesion is caused by a fluke, called Bulbophorus confuscious. Intermediate hosts include ram’s head snail and white pelicans. Other disease is visceral toxicosis in catfish which has central nervous system clinical signs and splenomegaly with intestinal and gastric intussusception. The cause of this disease is thought to be an algal toxin, but it has yet to be determined. This disease affects food fish to broodfish in the spring and fall.

Dr. Heidel commented on the Klamath River in Oregon. This river is used extensively for irrigation farming. The water flow was increased to save an endangered species of a suckerfish in 2000. In 2001, the water flow of this river was decreased due to increased irrigation needs and salmon are dying in record numbers due to decreased water flow in this river and ubiquitous pathogens.

Dr. LaPatra commented that IHNV has been a very important pathogen this year in salmon farming and wild fish stocks.

6. Suggestions for email discussions for the upcoming year—Presented by Dr. White. Dr. White informed this committee that we have had a request for the development of a list-serve for this group. He contacted Dr. Jim Case at UC-Davis, and Dr. Case did not think that this group had enough members to warrant a list-serve and that group emailing would be the most useful tool for communication within this group.

7. Introduction of draft resolutions.

Dr. Scarfe presented USAHA resolution #1 which encourages USDA-APHIS to do the following:

1. validation and approval of diagnostic and identification tests, and test methods;
2. approval of standardized diagnostic reagents and reference materials; and,
3. quality assurance, quality control, and (4) approval of aquatic animal diagnostic laboratories.

This resolution passed unanimously by this committee.

Dr. LaPatra presented USAHA resolution #2 which states that USAHA endorses the 2002 Standard Procedures for Aquatic Animal Health Inspections Manual and encourages USDA-APHIS to adopt this manual as part of the Aquatic Animal Health Task Force on Aquaculture. Discussion followed about this resolution. There was concern expressed about approving a resolution when the majority of the members have not read this document. Dr.
Miller expressed concern about APHIS adopting this document, since APHIS regulatory personnel have not reviewed this document. It was suggested that this committee review this document and then consider this resolution next year. This resolution was tabled until next year’s meeting.

8. New items from the membership. Dr. Scarfe asked for discussion about the AAVLD-accreditation laboratory process for aquatic animals. Dr. Heidel replied that this issue was visited at one time by a sub-committee and that the AAVLD accreditation committee would not accredit laboratories based on a single species.

Old Business:

1. Review of last year’s resolutions passed by this committee (progress reports of actions taken)- Presented by Dr. LaPatra. Dr. Miller informed this group that the latest responses from USDA/APHIS were not yet included in these responses.

Other Business:

Distribution of Handouts entitled: Proposed quality control limits for *Aeromonas salmonicida* subsp. *Salmonicida* ATCC 33658 and *Escherichia coli* ATCC 25922

Meeting adjourned at 4:47pm.
REPORT OF THE COMMITTEE ON
BIOLOGICS & BIOTECHNOLOGY

Chairman: Dr. David A. Espeseth, Perkasie, PA
Vice Chairman: Mr. Robert W. Tully, Olathe, KS

Mr. J. Bruce Addison, MO; Dr. Joan M. Arnoldi, MI; Dr. Charles A. Baldwin, GA; Dr. Gerald M. Buening, MO; Dr. Yung Fu Chang, NY; Ms. Mary Lou Chapek, NE; Dr. Vergil S. Davis, DE; Dr. James J. England, ID; Dr. William H. Fales, MO; Dr. Patricia L. Foley, IA; Dr. Robert W. Fulton, OK; Dr. Joe S. Floyd, DE; Dr. James A. Gourlay, NY; Dr. Keith N. Haffer, SD; Dr. Richard E. Hill, IA; Dr. Alex Hogg, NE; Mr. Joe N. Huff, CO; Mr. Majon Huff, CO; Mr. Steven A. Karli, IA; Dr. Jonathan Katz, IA; Dr. Lloyd H. Lauerman, WA; Dr. Joan Leonard, KS; Dr. Randall L. Levings, IA; Dr. Raymond W. Loan, TX; Dr. Stewart McConnell, TX; Dr. Robert B. Miller, VA; Dr. Larry F. Moore, MO; Dr. Marshall Phillips, PA; Mr. Robert E. Pitts, GA; Mr. Ronald E. Plylar, KS; Dr. Donald Randall, Jr., CO; Dr. C. W. Ridky, ME; Dr. Thomas C. Schooler, TX; Dr. George P. Shibley, MD; Dr. Randy R. Simonson, MN; Ms. Mary Anne Williams, CA; Dr. W. H. Wohler, TX; Dr. Andrew G. Yersin, IA.

The Committee on Biologics and Biotechnology met during the annual meeting on Monday October 21, 2002, from 12:30 – 5:30 P.M.. Eighteen members and 29 guests were present. The Chairman welcomed the participants to Saint Louis and the meeting of the USAHA Committee on Biologics and Biotechnology. Last year’s committee report, the agenda for the meeting, and USAHA’s guidelines for conduct of committee meetings were reviewed.

USDA, APHIS, Veterinary Services (VS), Center for Veterinary Biologics (CVB), Program Updates and Issues:

- **CVB, Licensing and Policy Development (LPD) and CVB, Laboratory (L):** Richard Hill, DVM, MS, Director, CVB-LPD, VS, APHIS, USDA, presented a report on licensing, policy development, and laboratory activities during FY 2002 for the veterinary biologics program. Center for Veterinary Biologics (CVB) licensing, policy development, and testing activities in FY 2002 resulted in 2 new establishment licenses and termination of one establishment license resulting in 99 licensees that are authorized to distribute products in or from the United States under the provisions of the Virus-Serum-Toxin Act (VSTA). Ninety-three new product licenses were also issued including nineteen unique new products. Sixty-two product licenses were terminated resulting in 2,512 active licenses at the end of the year. Two new permits for distribution and sale were issued resulting in sixteen permittees at the end of the fiscal year. The number of research and evaluation permits issued
decreased slightly to 157 in addition to 6 transit shipment permits. Testing rates decreased significantly in FY 2002 with the biggest difference seen in post-licensing check tests and test and release tests. The number of pre-license serial tests conducted remained stable at a total of 520 serials tested. The top licensing and testing priorities included application review, policy development, and pre-licensing testing (Master Seeds, Master Cells, and Serials). The focus on risk-based campaign testing continued, as routine post-licensing testing rates remained low. Additional key initiatives at the laboratory included continuation of the quality assurance initiative and reagent production. The Center adjusted to multiple vacancies within the program including a vacancy in the Director position at the Laboratory. A new organizational structure for the CVB was announced that realigns activities along functional lines within two program units. The status of recently Proposed Rules, and upcoming Proposed Rules and guidance documents, was reviewed as well as progress made by the CVB on international harmonization initiatives in FY 2002. The CVB announced the dates for the twelfth Veterinary Biologics Public Meeting (March 31 - April 2, 2002) and requested agenda suggestions for the meeting.

- **CVB, Inspection and Compliance (IC):** Steven Karli, Director, CVB-IC, VS, APHIS, USDA, reported the CVB, IC activities for FY 2002 have resulted in continued compliance with the VSTA. Fewer inspections were conducted this year due to a staffing shortage and a continued shift in emphasis toward compliance actions and investigations. Twenty-five in-depth inspections, two follow-up inspections and twenty-three special inspections were conducted this year. The special inspections consisted of prelicensing or new construction site visits, observation of immungenicity studies, and biosecurity inspections of facilities required for some permitted agents in partnership with APHIS, VS, National Center for Import and Export (NCIE).

The regulatory actions taken this fiscal year have remained fairly steady compared with the previous year. In FY 2002, 58 formal regulatory actions were taken by the Center. A total of 28 new investigations of violations of the VSTA were opened. Currently, there are 43 active investigations being conducted by the Center. As in the previous year, many of the investigations and regulatory actions stemmed from Internet advertising and shipment of unlicensed veterinary biologics.

A Biologics Epidemiologist position was classified and advertised. Interviews were conducted and a selection is currently pending. This will continue to move CVB to the pharmacovigilance program as described in the proposed regulations published in the Federal Register on January 15, 2002. This program will allow for better decision making...
in the compliance arena as well as a positive feedback loop for licensing and evaluation of products.

CVB was fortunate to receive monies from APHIS, International Services for a Trade Issues Resolution Management (TIRM) position. This added resource has been used to hire a Senior Biologics Specialist and a shared support person to direct export activities done at the Center. The process has been re-engineered to allow for better customer service, providing a reduced review time for both Certificates of Licensing and Inspection and Export Certificates. The review time has been reduced for Certificates of Licensing and Inspection from two months to less than two weeks. Export Certificates should be reviewed and processed within 2 working days. This fiscal year CVB-IC reviewed 4701 Certificates of Licensing and Inspection and 128 Export Certificates.

The release of serials to the market place was steady, with 17,576 serials reviewed this fiscal year. The number of audits (serials returned to the manufacturer for errors) has increased since January of 2001. This year CVB returned 455 APHIS Forms 2008 to the manufacturers for correction. CVB review of the APHIS Form 2008 for clerical and scientific errors have been beneficial in increasing the quality of the documents received.

The number of product inspection activities was steady. CVB-IC personnel reviewed 125 facility documents, 244 extension of dating requests, 78 reprocessing requests and 4 rebottling requests.

Progress has been made concerning the USAHA 2001 Resolution No. 5, on electronic submission of documents to the Center. This project has taken considerable resources from CVB, but the outcome will be beneficial to industry, the end user, and the Center. CVB is constructing a secure Internet firm services module with a prototype for APHIS Form 2008 submissions to be done by April 2003, in time for the Public Meeting.

- **Biotechnology Products:** Louise Henderson, PhD, Chief, Biotechnology and Diagnostics, CVB-LPD, VS, APHIS, USDA, reported that the CVB has updated several documents in the past year for biotechnology-derived veterinary biologics. The Animal Health Institute Summary Information Format Working Group has finished its work and new risk assessment summary information formats are now available for Category I (inactivated biotechnology-derived products), Category II (gene-deleted biotechnology-derived products), and Category III (live vectored products). In addition to providing new formats that have resulted in greatly reduced duplication of information contained in the document without deleting information, CVB has provided additional guidance for the process of submitting documents for the licensure of biotechnology-derived products. CVB also has
included examples of each of the categories of products to provide additional guidance. They have tested the new formats and have found that both the submitting firms and CVB consider the documents much easier to manage. They are expecting to have guidance for additional categories by next year at this time. The documents can be accessed at our website (http://www.aphis.usda.gov/vs/cvb).

The Food and Drug Administration (FDA)-USDA, “Guidance for Industry: Drugs, Biologics, and Medical Devices Derived from Bioengineered Plants for Use in Humans and Animals”, draft dated September 12, 2002, is now available for comment. It is the first FDA-USDA joint guidance document and is available at the following web sites: http://www.aphis.usda.gov/vs/cvb; http://www.fda.gov/cber/guidelines.htm; and http://www.fda.gov/ohrms/dockets/default.htm. The comment period on this document is open until January 10, 2003, and we encourage comments from those with veterinary biologics interests to submit comments to Dr. Patricia Foley, Staff Officer, at the CVB.

CVB has also revised VS Memorandum 800.73, “General Requirements for Immunodiagnostic Test Kits for Detection of Antibody or Antigen”. This version adds definitions and clarifies specific expectations. The most significant change is additional guidance on the formulation and validation of serial release panels. In addition, manufacturers are reminded that ingredients of animal origin must be sourced from countries whose BSE status is either no or low risk as defined by NCIE and 9 CFR 94.18. CVB will be updating the 9 CFR regulations for veterinary diagnostic test kits in the near future.

In 2003, CVB expects to revise risk assessment summary information formats for additional categories of product, specifically for DNA-mediated vaccines and plant-based biologics. They also plan to add a Risk Analyst to their staff and provide revised documentation on risk analysis for release of genetically modified live organisms into the environment.

- **Public Health Security and Bioterrorism Preparedness Response Act of 2002 (Public Law 107-188) and Its Implications**: Andrea Morgan, DVM, MS, Associate Director, Animal Health Programs, VS, APHIS, USDA, Riverdale, MD, reported that on June 12, 2002, the President signed the “Public Health Security and Bioterrorism Preparedness Response Act of 2002” into law. Public Law 107-188 is designed to improve the ability of the United States to prevent, prepare for, and respond to bioterrorism and other public health emergencies. It requires people possessing, using, or transferring agents or toxins deemed a threat to public health to notify the Secretary of the U.S. Department of Health and Human Services (HHS). It also requires people possessing, using, or transferring agents or toxins deemed a threat to animal or plant health and to animal or plant products to notify the Secretary of
the U.S. Department of Agriculture (USDA). For USDA, the section of the new Act that pertains to agents and toxins that pose a severe threat to animal and plant health and to animal and plant products is called the “Agricultural Bioterrorism Protection Act of 2002”.

An interim rule with the list of agents and toxins deemed a threat to animal or plant health or to animal or plant products is published in the August 12, 2002 Federal Register. The text of the rule may be found at [http://www.aphis.usda.gov/ppd/rad/webrepor.html](http://www.aphis.usda.gov/ppd/rad/webrepor.html). Written comments regarding the agents and toxins on the list will be accepted through October 11, 2002. The agents and toxins deemed a threat to public health are listed in Appendix A of Chapter 42 Code of Federal Regulations, Part 72. The text may be found at [http://www.gpo.gov/nara/cfr/](http://www.gpo.gov/nara/cfr/).

Anyone possessing, using, or transferring any “Select Agents”, “High Consequence Livestock Pathogens and Toxins”, and/or other agents or toxins deemed a severe threat to plant health or to plant products is affected. People who exclusively possess products that are, or contain “Select Agents” and that are cleared, approved, licensed, or registered under any of the following Acts are exempt from the notification requirement. These Acts are: The Federal Food, Drug, and Cosmetic Act; Section 351 of the Public Health Service Act; The Act commonly known as the Virus -Serum-Toxin Act (eighth paragraph, under the heading “Bureau of Animal Industry” in the Act of March 4, 1913, 21 U.S.C. 151-159); and The Federal Insecticide, Fungicide, and Rodenticide Act.

**Molecular Techniques for Evaluation of Vaccines For Purity to Meet National and International Regulations.**

Lloyd Lauerman, DVM, PhD, Washington State University, Puyallup, WA, presented the first paper of two papers sponsored by the committee for presentation at a specified time. Dr. Lauerman indicated that industrialized nations are placing more stringent testing requirements on live vaccines. An example was given concerning a live attenuated bacterial (LAB) vaccine sold in Australia. The Australian Quarantine and Inspection Service required the US produced LAB vaccine to be tested for 9 pathogens of 4 animal species. The decision was made by the manufacturer to use molecular techniques to demonstrate that the LAB vaccine did not contain any of the 9 designated pathogens. Polymerase chain reaction (PCR) assays for the 9 agents were selected from the literature. Difficulty was encountered in obtaining DNA extracts of some of the agents since 6 of the 9 organisms were on the Center for Disease Control select agents list. A two-step PCR assay for *Burkholderia mallei* was presented as an example to demonstrate the efficiency of molecular techniques for evaluation of LAB vaccines. A full text of this paper is published in these proceedings.
Reduction of Animal Use in Biologics Manufacturing—An Industry Perspective:

Mary Lou Chapek, MT(ASCP), MA, President, MVP Laboratories, Inc., Ralston, NE, presented the second paper sponsored by the committee for presentation at a specified time. In this paper, Ms. Chapek indicated that it is encouraging that in the year 2002 science has progressed to the point that traditional animal tests can often be replaced, reduced or refined by *in vitro* technology. The major point of her presentation was to discuss the current status of the 3Rs (replacing, reducing, refining) within the USDA and the veterinary vaccine industry. She reviewed the advantages of *in vitro* assays from an industry perspective. The obstacles to implementing the 3Rs were described, along with proposed solutions. She also discussed consumer and industry needs in the coming decade. A full text of this paper is published in these proceedings.

Minimizing Animal Numbers, Pain and Suffering in Biological Manufacturing:

Dr. Martin L. Stephens, PhD, Vice President for Animal Research Issues, the Humane Society of the United States, Washington, D.C., reported that the production of human and veterinary biologics consumes an estimated 10 million laboratory animals annually, worldwide. The Humane Society of the United States examined animal use patterns in the United States to assess the impact of biologics manufacturing on laboratory animal pain and distress. Information was available on only those species regulated by the U.S. Department of Agriculture (USDA), which excludes lab-bred mice and rats, as well as all non-mammals. They focused on USDA pain and distress category E, i.e., pain and distress unrelieved by drugs. For 1998 (the most recent year for which data were available when the study began in 2001), vaccine-related testing alone accounted for 61% of all regulated animals that experienced unrelieved pain and distress (N=96,536). This analysis supports the contention that vaccine testing, and the broader field of biologics manufacture, should be a priority for the development and application of alternative methods (the 3Rs of replacement, reduction, and refinement). This paper surveyed key developments in the 3Rs field generally, and then discussed the application of the 3Rs to biologics manufacture. It was concluded that stakeholders in industry, oversight agencies, academia, alternative methods, and animal protection, should work together proactively to minimize the use and suffering of animals in the production of veterinary biologics.

Use of *in vitro* Techniques to Reduce the Use of Animals in Veterinary Biologics Manufacture:

Karen Brown, PhD, Consultant, stated that the evaluation of *in vitro* assays for replacement of animal tests, still required for testing of veterinary vaccines, has been underway for more than twenty years. During this
time, test systems such as ELISAs, electrophoresis, HPLC, FPLC, etc. have been investigated with very positive results. However, the biological industry is still plagued by unrealistic in vitro assay validation requirements, imposed by APHIS, utilizing increased numbers of host animals, instead of reduced numbers of animals. APHIS has suggested that there is a lack of proof that Master References, used in in vitro assays as the benchmark for serial release testing, cannot be proven to be stable, even when stored at –70 C or below, without routine repeat animal testing. The data presented show comparisons of animal-based immunogenicity tests with ELISA tests and electrophoretic analysis. They demonstrate that in vitro ELISAs are excellent predictors of stability, or lack thereof, and that a simple method such as electrophoresis can be used to secondarily monitor stability of Master References. It is time for APHIS to recognize the effectiveness of in vitro assays and for industry and regulatory agencies to aggressively implement new science-based technologies in our approach to product release testing and monitoring of Master References to reduce animal usage.

Committee Discussions and Resolutions:

The Chairman, David A. Espeseth, opened the meeting for discussion on any issues the committee members wished to address. A motion was made and seconded that a resolution be made on the subject of APHIS policy on replacing, reducing, and refining animal testing requirements for biological products. A proposed resolution was presented to the committee for consideration. Discussion of the motion indicated that safety and potency testing for serial release of biological products has historically been conducted in laboratory and host animals. These tests often produce pain and suffering in the animals used for testing. The tests also result in death of the animals either from the disease-producing organism itself, or by euthanasia after the test is complete. In this age of science & technology and humane concerns, there is an expectation that in vitro assays can be more effectively utilized to accurately determine the potency and safety of veterinary biologics, as well as to reduce animal usage. CVB has been responsive by announcing a policy to replace, reduce and refine animal testing requirements. However, recently published regulations and guidelines such as VS Memorandum 800.90, “Guidelines for Veterinary Biological Relative Potency Assays and Reference Preparations Based on ELISA Antigen Quantification”, dated August 5, 1998, and VS Memorandum 800.102, “Exemption from Leptospira Bacterin Testing Under 9CFR 113.101(c), 113.102(c), 113.103(c) and 113.104(c)”, dated May 23, 2002, dramatically increase animal usage and/or substitute one species for another. These appear to contradict CVB’s stated policy.

During the discussion some language changes were recommended to improve the draft document. Upon conclusion of discussion, the committee voted to accept the recommended changes and passed the following resolution to be sent to the Deputy Administrator of Veterinary Services: The
United States Animal Health Association urges the Deputy Administrator of APHIS-VS for CVB to accelerate the implementation of CVB’s stated policy to replace, reduce and refine the use of animals in all tests associated with safety and potency of veterinary biologics by actively reviewing and amending all current 9 CFRs, memorandums, and SAMs, to ensure they reflect CVB’s policy of decreased animal usage.

There were no additional issues raised in the committee and the meeting was adjourned.
MOLECULAR TECHNIQUES FOR EVALUATION OF VACCINES FOR PURITY TO MEET NATIONAL AND INTERNATIONAL REGULATIONS

Lloyd H. Lauerman, Washington State University, Puyallup, WA

Industrialized nations are placing more stringent testing requirements on live vaccines. An example of such additional test requirements was encountered recently concerning a live attenuated bacterial vaccine sold in Australia. In 1999 the Australian Quarantine and Inspection Service (AQIS) issued the Animal Quarantine Policy Memorandum, which set out the import policy and requirements for the importation of live and novel veterinary vaccines. The policy requires that livestock vaccines have a demonstrated and well-documented safety record. Annex 3 of the memorandum lists animal pathogens/diseases of economic and social concern that are either exotic to Australia, potential for exotic strains of endemic pathogens or potential contaminants of concern.

The AQIS required that the US produced live attenuated bacterial vaccine be tested for 9 pathogens of 4 animal species (Brucella abortus, Brucella melitensis, Brucella suis, Burkholderia mallei, Coxiella burnetii, Ehrlichia risticii, Mycoplasma hyopneumonia, Mycoplasma mycoides subsp. capri and Taylorella equigenitalis). The testing procedures were to be determined by the manufacturer. The decision was made by the manufacturer to use molecular techniques to demonstrate that the live attenuated bacterial vaccine did not contain any of the 9 designated pathogens. Scientific articles reporting polymerase chain reaction (PCR) assays for each of the pathogens were found in the literature and standard operating procedures were written. A multiplex PCR assay was used for the 3 Brucella species. Nested PCR primers were used in 2-step PCR assays for Burkholderia mallei and Ehrlichia risticii. The live attenuated bacterial vaccine was tested for the remaining organisms using 1-step PCR assays.

In validation of laboratory protocols it is good laboratory practice to have a positive and negative control run at the same time as the test samples. However, due to new national laws enacted in response to bioterrorism, it has become much more difficult to obtain even DNA extracts of organisms on the select agents list (42 CFR Part 72, Appendix A Interstate shipment of etiologic agents; Select Agents. Federal Register, August 23, 2002) to be used as the positive control in PCR assays. Six of the agents listed above are designated select agents. In June of this year, the Center for Disease Control (CDC) was directed not to send out any cultures or reagents until further notice. This directive is still in effect. In the future in order to obtain cultures or genetic material of select agents from CDC it will be necessary to fill out an application for Laboratory Registration and Select Agent Transfer Tracking System (42 CFR Part 72.6 Additional requirements for facili-
ties transferring or receiving select agents; Final Rule. Federal Register, Oct. 24, 1996).

Molecular techniques, such as PCR assays are excellent for evaluation of live bacterial vaccines for detection of the presence of specific agents because of the ease of sample preparation (DNA extraction), and the sensitivity and specificity of the procedures. A 2-step PCR assay, such as the *Burkholderia mallei* procedure, is generally more sensitive than a 1-step PCR assay. The *Burkholderia pseudomallei* PCR assay was reported to detect as few as 2 bacteria. These primers were used for *Burkholderia mallei*, since it was documented that *Burkholderia mallei* is genetically identical to *Burkholderia pseudomallei* in this segment of the 16S rRNA gene. Glanders caused by *Burkholderia mallei* is a disease of animals and is epidemiologically different from melioidosis of humans caused by *Burkholderia pseudomallei*. This 2-step PCR assay was used to evaluate the live attenuated bacterial vaccine for the presence or absence of *Burkholderia mallei* by extracting DNA from triplicate samples of the original master seed and passages 1 through 4. The DNA used for the *Burkholderia mallei* positive control was extracted from an ophthalmic Mallein reagent obtained from the National Veterinary Services Laboratory, Ames, Iowa. Figure 1 shows an electrophoretogram of the amplicons from multiple vaccine samples (lane 1-9 and 11-16), molecular size marker (lane 10), *Burkholderia mallei* positive control (lane 17) and negative control (lane 18). Lanes 19 and 20 were blank. The *Burkholderia mallei* positive control (lane 17) exhibited a band at the expected 397 bp amplicon size with no bands evident in the lanes containing the amplicons of the vaccine samples. Thus the live attenuated bacterial vaccine was demonstrated to be free of *Burkholderia mallei* DNA. Molecular techniques have been proven of worth for specific and sensitive detection of microbial agents.

**References**

MOLECULAR TECHNIQUES—EVALUATION OF VACCINES FOR PURITY TO MEET NATIONAL AND INTERNAT'L REGULATIONS

Assoc Vet Laboratory Diagnosticians, pp16 and 17, 1998.


**Figure 1:** Electrophoretogram of PCR amplicons generated using the live attenuated bacterial vaccine samples and *Burkholderia mallei* PCR assay (lane 1-9 and 11-16, triplicate samples of master seed and passages 1-4; lane 10, molecular size marker; lane 17, *Burkholderia mallei* DNA positive control; lane 18, negative control; lane 19 and 20, blank)
In preparation for this meeting, I have spoken with many of my colleagues regarding their views on the elimination of the use of test animals in the veterinary biologics industry. I will attempt to reflect the opinions of my associates while also drawing upon my background and experiences. I am a microbiologist who has been in the vaccine manufacturing business for over 30 years. Currently I am owner and president of MVP Laboratories, Inc., a Nebraska corporation that manufactures veterinary biologics and adjuvants.

Most importantly for our discussion, I have had many years of hands on experience in animal testing. I especially remember checking canine vaccines for virulent viruses by intracranial and intraocular inoculation of 12-week-old puppies. In the early 1970s, there was no better way to ensure the safety of our vaccines. I still recall how some of the young dogs ran to greet us when we entered the room and how they continued to trust us, even after repeated painful test procedures. Many of you probably have similar memories.

It is encouraging that in the year 2002 science has progressed to the point that traditional animal tests can often be replaced, reduced or refined by in vitro technology. The major points of my presentation will be first of all to discuss the current status of the 3Rs (replacing, reducing, refining) within the United States Department of Agriculture (USDA) and veterinary vaccine industry. I will then review the advantages of in vitro assays from an industry perspective. Next the obstacles to implementing the 3Rs will be described, along with proposed solutions. And lastly, I will discuss consumer and industry needs in the coming decade.

The USDA has identified the 3Rs as a strategic goal. However, USDA’s Center for Veterinary Biologics (CVB) has little funding available to implement the 3Rs, making it very difficult to address this goal. Presently, the majority of animals subjected to tests causing pain and distress in the United States are used to comply with potency and safety requirements of the CVB. Perhaps it would be helpful to have more interaction between CVB and Animal Care to determine ways of implementing the 3Rs.

The U.S. veterinary biologics industry does not have the 3Rs as a strategic goal. This is to be expected because many of the animal tests that we perform are required by law and not under our direct control. We philosophically favor more humane test methods addressing the 3Rs, but will
implement the most cost-effective test regardless of its impact on animal usage.

At present *in vitro* assays have several common applications in the USA industry. For instance, all live vaccines are tested for potency using these assays, usually involving titration of live viruses or bacteria. Some inactivated vaccines are tested for potency using parallel line Enzyme Linked Immunosorbent Assays (ELISAs), while others still rely on traditional animal tests.

*In vitro* assays offer many important scientific advantages for industry over their animal test alternatives. They fill a valuable need in monitoring the manufacturing process because they are sensitive, giving firms the ability to better quantitate immunogens. By comparison, animal tests often provide only pass or fail results. By using laboratory techniques to control the amount of antigen in a vaccine, industry can improve consistency, minimize reactivity, and maximize efficacy.

When developed correctly, these assays are highly specific and can measure the target immunogen in the presence of other antigens and other components, even adjuvant. In the traditional animal potency tests, it is often not clear what is being measured. Animal tests typically require long periods of time, often measured in weeks. *In vitro* assays, on the other hand, require much less time, usually hours or days. Laboratory methods are also more reproducible. Animal tests can vary greatly from test to test, day to day and laboratory to laboratory because they often are as much a measure of the animals as of the vaccine.

Theoretically, at least, *in vitro* assays can replace, reduce and refine the use of animals in vaccine potency and safety testing. Such a decrease in animal usage would result in significant cost savings for manufacturers. For example, *in vitro* potency assays may typically cost only half as much to perform as traditional animal tests. These cost savings could be used to meet consumer needs, such as new vaccine development.

*In vitro* technology, when combined with modern vaccine production methods, provides a high degree of scientific certainty regarding vaccine consistency and quality. Unlike the early days in our industry, seeds, cells and ingredients are now well characterized prior to use in manufacturing. The risk of potency or safety failures is further minimized by limiting the number of passages from master seed, by the intensive use of extraneous agent testing and by widespread in process testing using *in vitro* assays. *In vitro* technology, together with modern production methods, have greatly reduced the need for traditional animal testing.

Despite the many scientific advantages, there are two major obstacles to implementation of *in vitro* assays for potency and safety in the U.S. The first is the narrow focus of the effort. The current 3Rs focus within the United States is on replacing traditional animal potency tests for inactivated vaccines with ELISA assays. Clearly, the solution is to expand the focus to
include, for example, other laboratory methods of determining potency, such as high-pressure liquid chromatography (HPLC) and polymerase chain reaction (PCR). Statistical analysis could be applied to existing animal potency test results to reduce the numbers required. In addition, some animal potency tests could be refined from a vaccination-challenge to a vaccination-serologic evaluation.

An expanded focus could also include current animal safety tests. Some of these tests are still necessary. For example, the intraperitoneal mouse safety test may correlate the effects of endotoxin to field results as well as or better than the in vitro limulus test. As a practical matter, adverse safety reactions are sporadic and probably mostly related to predisposing factors in the test animals. They detect only serious problems in vaccines with few, if any, batches being rejected. For this reason, animal safety tests for serial release have limited usefulness.

Traditional animal safety tests can be considered for replacement with laboratory assays, for example, tissue culture or PCR, to detect specific contaminants. By evaluating available data, the numbers of animals used for batch release safety tests might be reduced. And further, the unavoidable animal safety tests that cause pain or distress could be refined by anesthetizing the animals prior to testing.

An expanded focus of tests considered for the 3Rs could also include new potency and safety tests. We could require that these not be implemented unless they replace, reduce or refine animal usage. For example, Veterinary Services Memorandum Number 800.102 was published May 23, 2002, regarding an exemption from the requirement to test leptospira bacterins for potency in hamsters. APHIS encourages firms to perform ELISAs instead, while using reference bacterins which must be requalified in farm animals and dogs every two to five years. Substitution of one species for another does nothing to accomplish the 3Rs.

The second obstacle to in vitro assays in the U. S. is the animal use and cost requirements of defensive research for inactivated vaccines. The CVB mandates requalification studies for ELISA master references be performed in host and/or laboratory animals every two to five years. Many in our industry believe that this is unreasonable, considering that a high level of scientific confidence is achieved in human vaccines without continual retesting in the host. This requirement has had a major animal use and financial impact on our industry since it was implemented in 1999. Thirty to seventy host animals are required per vaccine antigen being tested. To correlate host animal results to laboratory animals, hundreds or even thousands of additional test animals are necessary. The cost can range from $75,000 to $300,000 per monovalent vaccine. This animal usage and cost can be multiplied by the number of antigens in a vaccine to determine the numbers for multivalent products. For example, each manufacturer of a five way feline vaccine is required by CVB to requalify, by vaccinating and
challenging 150 to 350 kittens every two to five years at a cost of $375,000 to $1,500,000. In some cases, a firm's expenditure for this defensive research may approach 50% of the total research budget.

The solution, which has already begun at CVB, is a re-evaluation of the reference requalification requirements. We ask regulators to recognize that more science-based technology is available which would reduce, rather than increase, animal usage. Modern vaccine production methods minimize the need for continual retesting in animals. Reduced animal usage would result in reduced costs, allowing manufacturers and government to spend more of their limited resources meeting consumer needs.

What are these consumer needs? Vaccine availability is important to veterinarians, pet owners and livestock producers.

For low sales volume vaccines, for example, those for sheep and goats; or for low profit vaccines such as Erysipelothrix Rhusiopathiae Bacterins, Reference Requalification expenses may equal the profits for several years. When this occurs, the vaccine becomes an economic liability. It may then be discontinued, limiting its availability in the field.

Vaccine affordability is another important concern of vaccine consumers. Defensive research costs for companion animal vaccines are being passed on to consumers. Pet owners will pay higher prices because of the emotional attachment to their animals. However, for livestock vaccines, increased costs must be absorbed by the manufacturer or the vaccine discontinued. Livestock producers view their animals as a business and will immunize them only after a careful analysis of the costs and benefits.

Consumers rely on manufacturers and government to protect their animals against new diseases that enter the country. This is especially important because of the frequent movement of goods and animals across national borders in this time of free trade. The public would be better served if government and industry spent their limited funds on licensing West Nile Virus vaccines for example, rather than continually requalifying distemper or bovine virus diarrhea vaccines. Consumers also desire safer and more effective delivery systems. If we, as manufacturers, are required to spend up to 50% of their research dollars defending existing vaccines, these important consumer needs may go unmet.

What will we expect from our regulatory agencies in the coming decade? Consumers and industry will expect leadership in developing regulations and guidelines that are based on science, address cost concerns, and implement the 3Rs.

In conclusion, the current 3Rs focus in the USA is narrow and can be expanded to save animals and reduce costs. Defensive research requirements, specifically for Reference Requalification are animal use intensive and tie up valuable funding. Regulations can be made more reasonable. Resources will then be available to meet consumer needs.

My hope in presenting this paper is to help focus attention and funding
to change some of the more inhumane and outdated animal testing requirements. My inspiration is from the following poem by Ella Wheeler Wilcox (1850-1919):

I am the voice of the voiceless,
Through me the dumb shall speak
Till the deaf world’s ear be made to hear
The wrongs of the wordless weak.

And I am my brother’s keeper,
And I shall fight his fight:
And speak the word for beast and bird
Till the world shall set things right.
Dr. Gary A. Anderson, KS; Dr. T. Lynwood Barber, CO; Dr. William C. Davis, WA; Dr. Edward J. Dubovi, NY; Dr. James F. Evermann, WA; Dr. Robert W. Fulton, OK; Dr. Chester A. Gipson, MD; Dr. Bert A. Gore, AK; Dr. Christopher M. Groocock, NY; Dr. Robert B. Hillman, NY; Dr. Thomas J. Holt, NC; Dr. Thomas H. Howard, WI; Dr. Michael M. Jochim, CO; Dr. Karen R. Jordan, NC; Dr. Robert F. Kahrs, FL; Dr. Jorge W. Lopez, ; Dr. N James MacLachlan, CA; Dr. Stewart McConnell, TX ; Dr. Robert W. Mead, WA; Dr. Janice M. Miller, IA; Dr. Lyle D. Miller, IL; Dr. Donald R. Monke, OH; Dr. John Nehay, CA; Dr. Bennie I. Osburn, CA; Dr. James E. Pearson, IA; Dr. Ronald Schultz, WI; Dr. Theron G. Snider, III, LA; Dr. David E. Stallknecht, GA; Dr. Jeffrey L. Stott, CA; Dr. Mark C. Thurmond, CA; Mrs. Michele C. Turner, CA; Dr. Thomas E. Walton, CO; Dr. William C. Wilson, WY; Dr. George O. Winegar, MI; Dr. Andres de la Concha.

The Bluetongue and Bovine Retrovirus Committee met in the Jefferson C Room, The Millennium Hotel, St Louis, Missouri, from 12:30 PM to 5:30 PM, Monday, October 21, 2002. There were 34 in attendance. Chairman James Mecham conducted the meeting.

Dr. Eileen Ostlund, National Veterinary Services Laboratories, Ames, IA, gave an “Update on Diagnostic Observations for Bluetongue, Epizootic Hemorrhagic Disease and Bovine Leucosis Virus in the United States”.

Bluetongue (BT) and Epizootic Hemorrhagic Disease (EHD) Isolations/PCR positives

Calendar Year 2001

In 2001, virus isolation attempts for BT and/or EHD were completed on 386 samples and 144 samples were tested by PCR. The positive results are listed in the following tables.
### Table 1
BT virus isolation/PCR positives calendar year 2001

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>Serotype</th>
<th>VI Only</th>
<th>PCR only</th>
<th>VI &amp; PCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ*</td>
<td>1</td>
<td>Mule deer</td>
<td></td>
<td>Neg</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>Bighorn Sheep</td>
<td>17</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>FL</td>
<td>3</td>
<td>Deer</td>
<td>?</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>KS</td>
<td>1</td>
<td>Cattle</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MO*</td>
<td>1</td>
<td>White-tailed deer</td>
<td></td>
<td>Neg</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MO</td>
<td>1</td>
<td>Elk</td>
<td>13</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>NM</td>
<td>1</td>
<td>Sheep</td>
<td>17</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>Mule deer</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>TX</td>
<td>2</td>
<td>Goats</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

*samples also positive for EHD virus

### Table 2
EHD virus isolation/PCR positives calendar year 2001

<table>
<thead>
<tr>
<th>State</th>
<th>No.</th>
<th>Species</th>
<th>Serotype</th>
<th>VI Only</th>
<th>PCR only</th>
<th>VI &amp; PCR</th>
</tr>
</thead>
<tbody>
<tr>
<td>AZ</td>
<td>1</td>
<td>Mule deer</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>AZ*</td>
<td>1</td>
<td>Mule deer</td>
<td></td>
<td>Neg</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>CA</td>
<td>1</td>
<td>Deer</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>IA / MT</td>
<td>4</td>
<td>White-tailed deer</td>
<td>2</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>IA</td>
<td>1</td>
<td>Deer</td>
<td>2</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>IA</td>
<td>3</td>
<td>Deer</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MO*</td>
<td>1</td>
<td>White-tailed deer</td>
<td>2</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>MO</td>
<td>2</td>
<td>Deer</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>1</td>
<td>White-tailed deer</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

*samples also positive for BT virus
Calendar year 2002 BT/EHD positive submissions to date (January 1 - October 17, 2001)

Bluetongue virus has been detected by isolation and/or PCR from ten specimens. Nine of these specimens originated from Florida: 7 cattle and two deer. One deer isolate has been typed as BT serotype 10. In addition, one sheep from New Mexico tested BT positive. EHD serotype 2 has been identified in 6 deer specimens. The deer originated from Florida, Louisiana, and Ohio.

2001 Bluetongue Proficiency Exam

Fifty-three laboratories participated in the 2001 BT proficiency test. The panel consisted of 20 serum samples. The passing score was one or fewer samples missed. Fifty-one laboratories passed on first attempt. Two laboratories failed first attempt but passed a retest. Fifty-three laboratories are approved to conduct official (export) BT serology tests as of October 14, 2002.

Bluetongue Survey-2002

The biennial BT survey on market cattle samples from 24 northern tier states will be conducted during the late fall and early winter of 2002. The 24 states are divided into 16 regions. States that will be assessed individually are: Idaho, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, New York, North Dakota, South Dakota, Wisconsin, and Wyoming. Areas consisting of more than one state are New England (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) and combinations of Maryland/Delaware, Ohio/West Virginia, and Pennsylvania/New Jersey. Six hundred samples from slaughter cattle originating in each region will be examined for BT antibodies using a commercial CELISA test kit.

Bluetongue Sentinel Survey

Samples were collected for the Bluetongue Sentinel Pilot Project (BSPP) in the spring and fall of 2001 and tested at the National Veterinary Services Laboratories (NVSL). Plans are underway to continue the BSPP in 2002; NVSL will conduct bluetongue antibody tests on BSPP samples. (See following report for summary of BSPP.)

2001 Bovine Leukosis (BLV) Proficiency Exam

Sixty laboratories participated in the 2001 BLV proficiency test. The panel consisted of 20 serum samples and the passing score was two or fewer samples missed. Fifty-eight laboratories passed on the first attempt. Two laboratories failed the first attempt but passed a retest. As of October 14, 2002, there are 60 laboratories approved to conduct official (export) BLV serology tests.

Dr. David Dargatz, Centers for Epidemiology and Animal Health, Fort Collins, CO, gave a presentation on the “Bluetongue Sentinel Pilot Project (BSPP): A Study in 3 States”. The full text of his presentation is printed in these proceedings.
Dr. Arnold Gertonson, Montana State Veterinarian, Helena, MT, gave a presentation on “Bluetongue/Anaplasmosis Prevalence Study of Montana Cattle”.

The goal of this study is to provide information to move towards “Fair” year round trade between the United States and Canada. The design of the study is to determine the prevalence of antibodies to bluetongue and anaplasma in Montana yearling cattle following summer exposure (vector season). This is a joint study between Montana and Alberta, Canada and is an example of working together for a common good - fair trade based on science. The three year serological survey (2001-2003) involves a total of 15,000 head of cattle (5,000 head/year), imported into Canada under the Restricted Feeder Program. Animals are bled upon arrival for processing at the Alberta feedlots and the serum is tested for antibody to bluetongue by a cELISA and for antibody to anaplasma by an rcELISA at the Montana State Diagnostic Laboratory. The serum neutralization assay is used to confirm bluetongue positive samples and to determine virus serotype. The results to date indicate that the prevalence of bluetongue in Montana feeder cattle is approximately 0.37%.

Dr. David Stallknecht, Southeastern Cooperative Wildlife Disease Study, College of Veterinary Medicine, University of Georgia, Athens, GA, gave a presentation on “Temporal Patterns of Hemorrhagic Disease in Georgia White-Tailed Deer”.

Hemorrhagic disease (HD), which is caused by viruses in both the bluetongue and epizootic hemorrhagic disease serogroups, is the most important viral disease affecting white-tailed deer in North America. Outbreaks of hemorrhagic disease cannot be predicted, but appear to occur on long-term cycles (8-10 years) and short-term cycles (2-3 years) depending on geographic location. In Georgia and many other Southeastern states, both cycles appear to occur. In order to investigate the hypothesis that HD is occurring on concurrent long-term and short-term cycles, a simple model based on serologic data from Georgia collected from 1981 to present was developed. In general, the model, predicted activity trends and provided very reasonable estimates of herd immunity. In order to prospectively test this model, predicted and actual changes in herd immunity since 1997 are being compared. This work will continue through 2004. To date, discordance between predicted and actual antibody prevalence trends was observed only in 1999, but based on preliminary data from this year, it appears that such discordance will also be observed in 2002. These inconsistencies may provide a means to identify the drivers of this system, that is, the risk factors or conditions that result in an HD outbreak. Preliminary data suggests that both herd immunity and climatic conditions (specifically severe drought conditions) may be involved. Herd immunity represents a logical explanation for a short-term cycle, and to date, increased HD activity has been detected in every year where herd immunity fell below 30%. Regional
drought conditions also appear on outbreak years and may represent one of the long-term drivers of this system.

**HD Update:**
There has been lots of HD activity reported to the Southeastern Cooperative Wildlife Disease Study this year. To date, we have over 80 isolates. With the exception of three isolates of BTV-10 (GA, NC, VA) all viruses have been identified as EHDV-2. Deer affected with EHDV-2 have been confirmed in AL, GA, KS, LA, MD, NC, SC, TN, TX, VA, WI, and WV.

**Dr. James Pearson, Retired Head, Scientific and Technical Department, Office International des Epizooties, Paris, France, gave a presentation on “The OIE International Standards for Bluetongue—How They Encourage Safe Trade”.

The full text of his presentation is printed in these proceedings.

**Dr. Sarah Kahn, Deputy Chief Veterinary Officer and Director, Animal Health and Production Division, Canadian Food Inspection Agency (CFIA), Ottawa, Canada, presented information on “Regulatory Developments Relative to Bluetongue and Bovine Retroviruses in Canada”.

Bluetongue is a federally reportable disease and Canada regulates the importation of susceptible species from all countries. It has only occurred in the Okanagan Valley, BC. In 1987-88, there was clinical disease, with the outbreak attributed to a natural incursion from the US. The presence of competent vectors in this area was demonstrated. In 1998, virus was isolated from a sentinel herd. Triennial sero-surveys of national cattle herds and sentinel herds in the Okanagan valley are used to confirm free status. Trading partners recognize areas of Canada outside the Okanagan Valley to be free from Bluetongue.

New import regulations/policies are risk-assessment based and developed in accordance with international standards (OIE and SPS requirements). Canada’s regulation making process is similar to the United States (USDA) “rule-making” process. The development of new regulations or policies governing imports into Canada involves extensive consultation with Canadian federal and provincial agencies, industry, trading partners and stakeholders. Following a major outbreak in 1975, comprehensive BT regulations were developed in consultation with USDA. This resulted in bluetongue testing of all imported ruminants. In 1995 an amendment to the regulations provided for the designation of US states as “low risk” for bluetongue for imports occurring during the non-vector season. It also removed testing requirements for imports from low risk areas in winter months and recognized Hawaii and Alaska as bluetongue-free states.

In 1997, a restricted feeder cattle program was developed at the request of industry. This program was further amended in 1998. Qualifying states must be brucellosis and tuberculosis free and must be low risk for
anaplasmosis and bluetongue; an import permit is required; certification requirements are reduced because USDA endorsement is not necessary. Currently 9 states are eligible and over a half a million head of cattle have been imported through this program.

The National Bovine Serosurvey for 2002-03 is designed to detect the disease prevalence of 3 bovine diseases: brucellosis, bluetongue and anaplasmosis. The sampling plan calls for the collection of 15,000 samples, which are proportional to mature cattle distribution across Canada, and targets cows and bulls >2 yrs of age (biased towards finding disease, if present). National ID tags allow trace back to herd and province of origin (false positive reactors traced and herd is tested).

Montana has been reclassified as low incidence for Bluetongue, based on recent serosurvey findings. This facilitates the import of Montana breeding cattle during the summer months.

A 2001 regulatory amendment allows recognition of zones of differing disease status in the US. In March 2001, the USDA asked CFIA to recognize that north-eastern states have equivalent Bluetongue status based on limited historical sero-surveillance. Because Bluetongue is not federally reportable in the US, there are insufficient sero-prevalence data, and no interstate movement controls, it was agreed between the USDA and the CFIA that equivalent status for bluetongue could not be determined at this time. Changes to the Bluetongue import requirements would have to be made based upon risk assessment.

In late 1999, the Canadian beef cattle industry requested year round imports of feeder cattle without BT testing. In August 2000, an Alberta Agriculture risk assessment determined this to result in an unacceptable risk of bluetongue introduction beyond the Okanagan Valley. The industry proposed further mitigating measures including quarantine feedlots and vector control. In October 2001, a CFIA risk assessment determined continued risk of bluetongue introduction. In December 2001, the Canadian Cattlemen’s Association (CCA) undertook the development of a pilot project for limited imports during the summer of 2002. The proposal was rejected by other Canadian stakeholders. The major concerns included: lack of supportive risk assessment, risk to wildlife and the development of antimicrobial resistance (via anaplasmosis treatment). The CCA is developing a further proposal. The CCA sponsored a scientific forum to increase stakeholder understanding of BT and anaplasmosis and approaches to risk management. The industry is developing a further project proposal to be presented in November, for consideration at CAHCC, with a view to importation in summer 2003.

*Culicoides sonorensis* is recognized to be the principal bluetongue vector in Canada. It has not been found east of Manitoba. CFIA risk assessors determined that bluetongue is not a hazard for ruminants imported into and staying in Eastern Canada. This requires movement control between east
and west and CFIA is investigating regulatory options. A proposal to import feeder cattle into eastern Canada during summer months will be discussed with industry. No regulatory change is required for import under permit, with a negative test for anaplasmosis, in summer months only.

A three year collaborative study between the USDA-ARS, Agriculture, Agri-Foods Canada and Alberta industry will study the ecology of *C. sonorensis* in western Canada and develop a virus - vector model to determine if transmission is possible in western Canada.

The European Commission has recognized the Canadian EBL program for certifying bovine retrovirus free herds. Since January 30, 2002, Canada can export cattle from CHAH-EBL herds to the EU.

**Dr. Larry Delver, Canadian Food Inspection Agency, Calgary, Canada, gave a presentation on “Bluetongue and International Trade”**.

International trade rules are ultimately set by the importing country. They are guided by the Office International des Epizooties (OIE), the World Trade Organization, the Sanitary Phytosanitary Agreement, technical barriers to trade, risk assessment, and the Precautionary Principle (WTO SPS Agreement). Basically, an importing country cannot demand a guarantee against a disease that occurs in their country and for which they do not have a control or eradication program. However, some countries are not members of WTO and some countries don’t honor the agreement fully. The OIE Animal Health Code is discussed semi-annually and changes are voted upon annually in late May at the general session. Recommendations come from various sources based upon recent scientific information. Recommendations from the OIE are not always followed. Bluetongue is one of the OIE List A diseases. These diseases have serious economic or human health implications because they are rapidly transmitted, have potentially serious economic implications, cross international borders and can affect multiple species. There has been discussion about downgrading bluetongue to List B. The general distribution of bluetongue is between 40N and 35S; however, even within those latitudes are areas of low incidence, seasonal freedom and freedom from bluetongue. The presence of bluetongue is dependent on a competent vector and the right climatic conditions.

The OIE International Animal Health Code, Chapter on Bluetongue has developed a set of guidelines and definitions for establishing bluetongue-free or seasonally free classification of countries and zones within countries. The OIE has also developed guidelines and recommendations for importing animals and animal products from a free country (no restrictions), a seasonally free zone or an infected country. In reality guidelines and recommendations are only that, OIE is not a regulatory body, only an advisory one.

The WTO SPS Agreement can be contravened and if the importing country is challenged the case could drag on for years in Geneva before the issue is resolved. As an example, the European Commission declared
that importation of live cattle from Canada should not be restricted seasonally. In fact the UK restricted Canadian cattle imports to the winter months until recently. Ireland still has seasonal restrictions in place.

There are tangible effects of Country Freedom classification. Canada could export live ruminants and embryos to the EU, at least until Regulation 01/1326. Now embryos are okay. The United States and Australia could not export live ruminants to the EU because of the bluetongue status.

What is the threat of bluetongue? The general distribution of the disease is determined by the presence of a competent vector. C. sonorensis and C. occidentalis are considered the two vectors in North America. The virus must replicate in the vector and it needs an ambient temperature of +10°C for 10 days. So far, the Okanagan Valley is the only place in Canada that has satisfied these requirements.

What is next? Bluetongue has been reported in the EU (Corsica, Italy, Sardinia, Greece). This may force the European Commission to amend its legislation and perhaps its import conditions from third countries. New research may reveal new strategies for dealing with the disease threat.

Dr. Jorge Lopez, Pan American Foot and Mouth Disease Center (PAHO), Rio de Janeiro, Brazil, gave a presentation on “Bluetongue as Part of the FMD Differential Diagnosis in the South American Eradication Program”.

In South America, the importance of the differential diagnosis of diseases that produce lesions that can be confounded with vesicular diseases is more evident due to the success of the FMD eradication program. The need for a final diagnosis in order to provide the necessary information to the hemispheric FMD surveillance system has helped in the implementation of new diagnostic techniques. PANAFTOSA has played an important role in implementing new techniques for viral diseases, harmonization of these techniques in the countries of the region and producing the necessary reagents.

Techniques for Bluetongue serological studies are now available in 9/10 countries for AGID and 6/10 countries for competitive ELISA, but virus isolation can be performed in 2/10 countries and PCR in one country. Several countries have performed Bluetongue serological surveys for epidemiological surveillance or to fulfill export requirements. In general, seropositivity is found north of the latitude 35° S.

In 2001 two Bluetongue isolations were made in the region. The first in Campo Tenente, Curitiba, State of Paraná, Brazil and the second in the Departments of Ituzaingó and Santo Tomé, Province of Corrientes, Argentina. The Brazilian isolations were made in PANAFTOSA from blood and tissue samples of clinically affected sheep and goats, confirmed by RT-PCR and typed by VN as type 12. The Argentinean isolations were performed at INTA-Castelar from blood taken from asymptomatic cattle that had seroconverted to Bluetongue by ELISA, confirmed by RT-PCR and
typed by PCR and VN as type 4.

Dr. Louise Kench, Biosecurity Australia, AFFA, Canberra, Australia, gave a presentation on “Zoning of Bluetongue Viruses, OIE and Trade—The Australian Experience”.

Health requirements for bluetongue are a major impediment for Australian livestock exports. The presence of bluetongue viruses in parts of Australia affects the export of cattle, sheep, goats, camels, deer and ruminant genetic material because a number of importing countries require testing, sourcing of exported animals from defined areas and/or restrictions on the ports from which the animals can embark. Unnecessary trade restriction is apparent, for example, when a country’s import conditions specify that livestock must test serologically negative for bluetongue virus pre-export without allowing options for export of seropositive but non-infective stock. The degree of trade restriction imposed by various countries’ bluetongue import conditions has historically been quite variable.

Easing of overly restrictive bluetongue requirements is an important goal for Australia. Some progress towards this is occurring as an increasing number of countries are accepting regionalization of bluetongue viruses in Australia and incorporating science-based risk management into their import conditions. Such progress is in line with recent revisions of relevant OIE Code chapters. It can also be attributed to Australian efforts to widely distribute the evidence for bluetongue virus regionalization in Australia. Australian government veterinary officers frequently present this material to counterparts in overseas countries to encourage discussion and allow further explanation. Despite this, and the extreme rarity of bluetongue disease in this country, a significant number of countries still have unnecessary bluetongue requirements in their import conditions.

Bluetongue issues of topical interest internationally include transiting animals through a bluetongue virus activity zone for export and the accepted length of time that cattle from the zone of possible transmission need to spend in the free zone before they pose no risk as a source of virus to competent insect vectors (i.e. bluetongue infective period). Australian research on measures to protect animals against Culicoides vector attack has included evaluation of the effectiveness of insect repellants and covers over livestock. More research is envisaged in 2003 so that a range of scientifically supportable measures, practical in the Australian environment, are available. Affected OIE Members have yet to agree on the duration of the maximum effective viremia for bluetongue virus. The current OIE Code chapter on bluetongue states that this period is 100 days. Australia maintains that there is no valid scientific evidence indicating that the period in the free zone immediately pre-export should be more than 60 days.

Central to both of the above issues is the development of bluetongue virus zones that are scientifically sound and defensible. With the OIE’s endorsement of regionalization of bluetongue and recent outbreaks of blue-
tongue disease in various countries, zoning for bluetongue viruses has become an important trade issue. Bluetongue affected countries and adjoining countries must now set up bluetongue monitoring and surveillance programs to OIE standards and clarify their own bluetongue virus status. Some countries are in the very early stages of understanding bluetongue virus epidemiology and vector ecology in their regions.

In Australia, knowledge of the epidemiology and distribution of bluetongue viruses is now very advanced owing to extensive research and the collection of a large body of data from continuous surveillance for bluetongue viruses and their vectors over the last 20 years. Assessment of this data shows that bluetongue viruses are present in parts of the north and east of the continent. They are not found in southern Australia, or in large well-defined parts of central and northern Australia. The majority of the country is free from any evidence of these viruses. Of the 24 known serotypes of bluetongue virus, only eight have been recorded in Australia—BLU 1, 3, 9, 15, 16, 20, 21, 23. BLU 1 and 21 are the most widely distributed serotypes and are the only two serotypes that have been recorded in Queensland and New South Wales. These serotypes are not regarded to be pathogenic. The other six serotypes are restricted to the far north of the Northern Territory and the northern tip of Western Australia, and some have only been isolated rarely in the past 20 years. The bulk of Australia’s livestock are located either in the virus free zone or in a zone which contains the milder serotypes.

Animal health authorities in Australia have prepared several submissions on bluetongue virus in Australia to assist export negotiations (Bluetongue Virus Regionalisation in Australia, Bluetongue Virus Zoning in Australia). These documents contain comprehensive information on bluetongue viruses and their vectors in Australia. Biosecurity Australia (BA) updates the submissions regularly and distributes copies to counterpart veterinary authorities. The most recent versions of Bluetongue Virus Zoning in Australia (March, August 2002) include information assembled to enable definition of a 2 year bluetongue virus zone map for Australia. This map displays three zones: a zone of possible bluetongue virus transmission, a surveillance zone and a bluetongue virus free zone. The boundaries of the zones have been defined in accordance with the requirements of the OIE International Animal Health Code Chapters on Surveillance and Monitoring (1.3.6), Zoning and Regionalisation (1.3.4) and Bluetongue (2.1.9).

Information underpinning the establishment of the three zones is sourced from the National Arbovirus Monitoring Program (NAMP), preceding programs and State/Territory government serosurveys. The NAMP is Australia’s current arbovirus monitoring program. Climate and geography are principal determinants of the distribution of bluetongue virus vectors in Australia and this information, as well as host distribution data, is integrated into the bluetongue zoning system. A computerized bluetongue risk forecasting
system which combines geographical, climatic, epidemiological and other information with current surveillance findings provides further support for the bluetongue zone maps.

The NAMP succeeded former national arbovirus programs in 1993. Under the NAMP, strategically located sentinel herds are regularly monitored for seroconversion to bluetongue and other arboviruses. There are currently 76 sentinel herds and more than 100 vector trapping sites located throughout Australia. Vectors are monitored by trapping at sentinel herd sites and other locations on a regular basis. Four *Culicoides* species are recognized as vectors of bluetongue viruses in Australia (*C. brevitarsis*, *C. wadai*, *C. fulvus* and *C. actoni*) but only one, *C. brevitarsis*, is widely distributed. *C. fulvus* and *C. actoni* are more efficient vectors but are only found in warm, wet areas of the far north of Australia.

Current surveillance data is stored on a national arbovirus database. Most of the results from virological and entomological examinations over the last 20 years are also held in this database. Data are entered via a website portal by the NAMP representative for each State or Territory as soon as they become available. This regularly updated database, sited at a protected area of the NAMP website, enables Australian veterinary authorities to view current results at any time. It also provides the ability to sort data quickly in a variety of ways.

Australia has invested considerable resources into the development and communication of bluetongue zones in the last few years. Australia’s bluetongue zoning system is now fully computerized enabling precise and accurate definition of zone boundaries. There are three levels of precision suited to different purposes. In order of increasing complexity these are: faxable maps for each State and the Northern Territory, a ‘bluetongue atlas’ in which each rectangular box can be opened up to display the area in more detail, and an interactive digital map on CD which uses Arc Explorer. Bluetongue virus zone maps for Australia (including faxable, color maps and the atlas) are available at [www.namp.com.au](http://www.namp.com.au). Australian animal health authorities have agreed to display the most current map at this site.

**Dr. Armando Giovannini, Instituto Zooprofilattico Sperimentale dell’Abruzzo e del Molise “G. Caporale”, Teramo, Italy, gave a presentation on “Bluetongue in Southern Europe and the Mediterranean Basin”**.

Dr. Giovannini presented information on the serotypes of bluetongue virus present in the Mediterranean Basin and the spread of viruses between 1998 and 2002. Bluetongue virus serotypes 1, 2, 4, 6, 9, 10 and 16 have been isolated. Bluetongue virus serotype 2 appears to be the most pathogenic. In the summer and early fall of 2000, during the epidemic peak, BT surveillance was based on sheep flock clinical examination and random laboratory confirmation of clinical diagnosis. This was also associated with an intensive entomological surveillance. In late fall and winter of 2000,
in the post epidemic period, an intensive serological survey was carried out in infected areas and in the areas surrounding them. Surveillance results showed the existence of a mosaic of infected and uninfected areas, very likely related to the ecological mosaic that is typical of Mediterranean regions. Therefore, regionalization was defined according to the results of surveillance, and was limited to a protection zone radius of 20 km around any evidence of viral circulation and limited the surveillance zone to the surrounding provincial area. This strategy relied on the existence of an effective early warning system, and intensive serological and entomological surveillance.

In addition to regionalization, a vaccination program was undertaken to reduce virus circulation and eventually to attain eradication of the infection. Risk assessment models were developed to assess the spread of infection in the absence or presence of vaccination. Simulation models indicated that the vaccination of at least 80% of all susceptible populations (sheep, goats, cattle) could reduce virus circulation significantly. Therefore, in 2002, the Italian Ministry of Health decided to vaccinate all domestic ruminants in the affected areas. In those areas where more than 80% of susceptible animals were vaccinated, there was a significant decrease in the number of new cases compared to those areas where less than 50% of susceptible animals were vaccinated. This is the first attempt to use vaccination to reduce the bluetongue virus circulation and eventually to attain eradication of the infection.

Molly Murphy, Department of Medical Microbiology, University of Georgia, Athens, GA, gave a presentation on “Spatial and Temporal Factors in EHDV Genetic Variation”.

The epidemiology of BTV and EHDV suggests that serotype diversity decreases with increase in latitude; and evidence of exposure decreases with an increase in latitude. Disease, when it occurs, generally increases in severity with an increase in latitude. Disease caused by EHDV generally occurs in late summer. It is usually asymptomatic or mild in cattle; however, it is highly variable in white-tailed deer-ranging from inapparent to severe wasting and death. This variability in disease manifestation could be the result of genetic diversification within this group of viruses that can occur by reassortment of the segmented genome or via the error prone RNA polymerase. However, the rate at which genetic diversification occurs and whether it persists in virus populations is not known. Phylogenetic analysis and genetic diversity analysis of the NS3 gene and the VP2 gene from numerous isolates of EHDV was done to elucidate the epidemiological behavior of EHDV. These studies lead to the conclusions that EHDV is evolving slowly, with little indication of reassortment; and that EHDV may exist in a near-perfect host parasite relationship. They also suggest that EHDV may overwinter in a central endemic site, then radiate outward during a disease outbreak.
Dr. James Mecham, USDA, ARS, Arthropod-borne Animal Diseases Research Laboratory, Laramie, WY, gave an “Update on Sequence Analysis of the Gene Coding for VP7 of Epizootic Hemorrhagic Disease Viruses”.

Sequence data was generated from temporally and geographically distinct isolates of EHDV. Some temporal and geographic grouping of virus isolates was noted; however, there was a high degree of conservation of sequence of the gene coding for the VP7 protein among all the isolates. This high degree of genetic stability suggests that this protein plays an important role in the biology of the virus.

A resolution, resolving that the USDA, APHIS actively continue negotiations with the European Union, to open that market to breeders and exporters of U.S. cattle, was presented to the committee. Following discussion, committee members present at the meeting voted in support of the resolution.
THE OFFICE INTERNATIONAL DES EPIZOOTIES
INTERNATIONAL STANDARDS FOR BLUETONGUE:
HOW THEY ENCOURAGE SAFE TRADE

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Summary

The Office International des Epizooties (OIE) has developed International Standards to minimize the risk of the spread of bluetongue (BT) through international trade. These Standards include procedures for prompt reporting of BT outbreaks; requirements that should be met for a country or zone to be defined as free of BT; requirements that should be met to import animals, semen, and embryos into a BT free country or zone; and the General Provisions that countries should meet to reduce the risk of spread of BT through trade. There was an extensive revision of the bluetongue Standards in 1999 and they now include additional provisions to import animals from an infected country into a free country. These Standards allow the importation of animals with antibody against BTV if they are negative for BTV isolation or BT nucleic acid. The goal of these Standards is to facilitate trade while minimizing the risk of the introduction of BT.

Introduction

Preventing the spread of disease through international trade is one of the primary objectives of the Office International des Epizooties (OIE). This is accomplished by establishing International Standards that facilitate trade while minimizing the risk of introducing diseases such as bluetongue (BT). The OIE was founded in 1924 as a result of an outbreak of rinderpest in Belgium. Initially there were 24 countries that joined together with a mandate to share information about disease outbreaks to allow the Member Countries to take the appropriate control methods to prevent further spread of the disease. There are now 162 OIE Member Countries. Providing a mechanism for prompt reporting of disease outbreaks/occurrences is still one of the primary roles of the OIE.

In 1968 the OIE International Committee (IC), made up of the Chief Veterinary Officers of the Member Countries, approved the first International Zoo-Sanitary Code for the harmonisation of trade of animals and animal products (1). Bluetongue was one of the diseases for which Standards were established. In 1995 the Standards developed by the OIE were formalized as international standards by the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS Agreement) of the World Trade Organization (WTO) (2).

Developing BT Standards, that allow the safe trade of animals and ani-
mal products, has been very difficult as much of the world is infected or has the potential to be infected. Since the United States is an infected country these Standards have great significance for its trade. In addition, these Standards have taken on new importance as the infection has moved north and west into Europe. Another factor that has complicated the development and application of these Standards is that there are 24 types of BTV and under the SPS Agreement an infected country has the right to attempt to prevent the introduction of types that are not currently present. A monitoring and surveillance program must be in place to demonstrate that the other types are not present. The Standards that have been and are being developed to promote safe trade of animals, semen, and embryos will be discussed.

The WTO SPS Agreement

The OIE was identified by the SPS Agreement as the competent international organization for developing international Standards, Guidelines, and Recommendations relating to animal diseases and zoonoses. In order to harmonize health measures, the Agreement states that governments should use these international Standards, Guidelines, and Recommendations. The goal of the Agreement is to minimize the risk of disease transmission and remove unjustifiable sanitary or health restrictions on international trade. The Agreement states that it is the sovereign right of a country to provide an appropriate level of animal health protection against pest or disease entry. However, this sovereign right is not to be misused for protectionist purposes and import sanitary measures can only be put in place if a similar level of protection against the disease is applied to all imports and internally by the importing country. Member Countries can introduce Standards providing a higher level of protection than provided by the OIE Standards if there is a scientific justification but these National Standards must be based on a risk analysis.

OIE Standards for Bluetongue

The OIE Standards are contained in the *International Animal Health Code* (the *Code*) (3) and the *Manual of Standards for Diagnostic Tests and Vaccines* (the *Manual*) (4). The *Code* provides the Chief Veterinary Officers of the OIE Member Countries with recommendations for establishing national health measures or rules applicable to the importation of animals and animal products. The *Manual* describes the diagnostic methods that are to be used and the methods for the production and control of biological products. The *Code* and *Manual* are developed by the OIE Specialist Commissions made up of experts elected by the OIE IC. The proposed or revised Standards are submitted to the Member Countries for review and comment. These comments are included as appropriate in the proposed Standards which are submitted to the IC for approval. A revised version of the
The OIE International Animal Health Code, Bluetongue

Chapter 2.1.9 of the Code outlines the requirements that should be met for a country or zone to be defined as free of BT and the requirements that should be met to import animals, semen, and embryos into a BT free country or zone. Prior to 1999, this Chapter of the Code stated that BTV susceptible species could only be imported from an infected country into a free country if they were negative for antibody and were held in quarantine for 40 days. In 1996, there was a request from a Member Country to modify the Bluetongue Chapter of the Code. This resulted in the formation of an Ad hoc Group which developed a new Chapter which was reviewed and modified by Member Countries. In 1999, the modified Chapter was approved by the International Committee. Changes and refinements in the Chapter have been approved each year since then. Some of the key components of the Chapter as published in the 2002 version of the Code (5) will be summarized here.

The first Article of the Chapter includes some general, very important information. It states that for the purposes of the Code, the infective period for bluetongue virus (BTV) shall be 100 days. Prior to 1999 this period was 40 days. The An Ad hoc Group that was formed to review the Code was asked to make a recommendation on the infective period and a review of all the studies that had been performed on this subject was carried out and subsequently published. (6,7) Based on the Ad hoc Groups recommendation and the Member Country comments, the period was increased to 60 days and in 2001 to 100 days. This Article specifies that the BTV distribution historically has been between latitudes of approximately 40°N and 35°S. It also outlines the surveillance and monitoring requirements that are to supplement the General Provisions of the Code, which will be described later. It states that if a country that lies between 40°N and 35°S and the county does not have confirmed BTV clinical infection, it should establish a surveillance and monitoring program. This program should be adjusted for local conditions such as historical, geographical and climatic factors, ruminant and Culicoides population data, or proximity to enzootic or incursional zones. Random and targeted serological surveillance should provide at least a 95% level of confidence of detecting an annual seroconversion incidence of 2% in cattle (or other ruminant species if sufficient cattle are not available). It goes on to state that countries or zones located outside this part of the world but adjacent to a country or zone not having free status should be subjected to similar surveillance; this surveillance should be carried out over a distance of at least 100 kilometres from the border with that country or zone. An Appendix to the Code is being drafted that will provide a more detailed Standard for bluetongue surveillance and monitoring.

The Chapter defines a free country or zone as: 1) A country or zone
that lies wholly north of 40°N or south of 35°S, and is not adjacent to a
country or zone not having free status, or 2) is a country or zone within the
historically infected zone that has a surveillance and monitoring program,
as outlined above, which has demonstrated that there is no evidence of
BTV in the country or zone during the past 2 years and there has been no
vaccination against BT during the previous 12 months, or 3) a country or
zone within the infected zone that has a surveillance and monitoring pro-
gram that demonstrated no evidence of Culicoides. The Chapter states
that animals that were kept in a BTV free country or zone since birth or for
at least 100 days prior to shipment can move freely into a free county or
zone. It also allows animals that have only been in the country or zone for
28 days to be tested for bluetongue antibody using the agar gel immunodif-
fusion (AGID) test or the enzyme linked immunosorbent assay (ELISA)
and if negative be imported into a free country. Another alternative is that
after 7 days in the free country the animal can be tested for BT nucleic
acid using the polymerase chain reaction (PCR) or virus isolation can be at-
temptsed on the animal and if negative by one of these procedures, the
animal can be imported into a free country. Also the Chapter states that the
importation of animals from an infected country or zone will not affect the
status of a free country or zone in which surveillance and monitoring have
found no evidence of BTV vectors; this was a significant change that was
added in the 1999 revision.

The 1999 revision of the Chapter added an Article describing a BTV
seasonally free zone. This is an infected country or zone for which for part
of a year surveillance and monitoring demonstrate no evidence either of
BTV transmission or of adult Culicoides. The seasonally free zone is con-
sidered free up to 28 days before the earliest date when historical data
indicate that virus activity would recommence. Animals can be imported
into a free country after 100 days in a seasonally free zone; however, in
many countries or zones this is not feasible as they do not have a free
period of 100 days. However, the Code goes on to state that animals in the
seasonally free zone during the free period can be imported if they have
had two negative AGID or ELISA tests seven days apart after 21 days of
residence or two negative PCR tests seven days apart after 7 days of resi-
dence.

A BTV infected country or zone is a country or zone that does not meet
the requirements to be free or seasonally free. The 1999 revision provided
more methods to import from an infected country or zone to a free country.
It states that, if the animals were protected from Culicoides attack, they can
be imported to a free country using about the same requirements as out-
lined above for importing from a seasonally free zone.

Semen from animals that have been in a free country for 100 days at
the time of collection can be imported into a free country. Semen from other
animals can be imported into a free country after two negative AGID or
ELISA tests on blood samples from donor taken 28 and 60 days after collection or one negative PCR or virus isolation test on a blood sample taken at the time of collection. In accordance with International Embryo Transfer Society (IETS) recommendations, in-vivo derived embryos from bovine are considered not to present a risk of BTV transmission. Embryos from other susceptible species should meet criteria similar to those for the importation of semen.


Part 1 of the Code, General Provisions, includes the first 20 Chapters (7). These Chapters provide the basic Standards underpinning the disease specific chapters. The following are some of the more significant points included in these Chapters:

**OIE List A and B diseases:** The OIE has designated 15 diseases, including BT, as being List A diseases. List A diseases are transmissible diseases which have the potential for very serious and rapid spread, irrespective of national borders, and consequently are of major importance in the international trade of animals and animal products. There are also 75 list B diseases, which are considered to be less significant in the trade of animals and products.

**Notification and epidemiological information:** Countries shall make available to other countries through the OIE whatever information is available that will help prevent the spread of important animal diseases. Member Countries shall report outbreaks of List A diseases, including BT, to the OIE within 24 hours if they were previously considered free. They shall also report a provisional diagnosis of BT if this represents important new information of epidemiological significance to other countries. Following the initial report, monthly reports will be provided. The OIE will forward this information to Member Countries. The USA has reported to the OIE every year that bluetongue is endemic in cattle, sheep, goats, wildlife and camels; as the USA is not considered free, there is no requirement to report each new case within 24 hours. The OIE International Committee in 2001 passed a resolution asking that the disease reporting requirements be evaluated and revised. It is anticipated that a revised notification procedure will be presented to the International Committee in 2003.

**Evaluation of Veterinary Services:** This Chapter provides guidelines for the evaluation of Veterinary Services, which is an important element in the risk analysis process of an importing country. The results of this evaluation can help provide the importing country the assurance that information on sanitary/zoosanitary situations provided by the Veterinary Services of an exporting country is objective, meaningful, and correct.

**Obligations and ethics in international trade:** The obligations of the importing and exporting countries are provided. As stated in the SPS Agreement, commodities imported should comply with the national level of protection that the importing country has established. The requirements apply-


ing to pathogens or diseases subject to official control programs in a coun-
try or zone should not provide a higher level of protection on imports than
that provided for the same pathogens or diseases within that country or
zone. For most diseases, a country that has endemic infection and that has
no program to control the disease cannot apply import restrictions. How-
ever, since there are 24 types of bluetongue that do not cross protect, re-
strictions on exotic types can be justified. Before these restrictions are put
in place, surveillance and monitoring programs should be carried out in
order to determine what types of bluetongue are present in the country to
meet the requirements outlined previously.

**Surveillance and monitoring of animal health:** This Chapter outlines
the minimum requirements for a country to have a surveillance and moni-
toring program that will substantiate elements of the country’s reports on its
animal health situation and is the basis for a country to be able to claim
disease free status for a disease. Information provided by the exporting
country’s surveillance and monitoring program is a key component of the
application of OIE Standards and of the risk analysis conducted by an im-
importing country. As outlined above, obtaining freedom of BT requires docu-
mented evidence that an effective system of surveillance for BTV infection
is in operation. A new Chapter of the Code that provides for a detailed
surveillance and monitoring program for BTV is under consideration by the
OIE.

**Zoning and regionalization:** The procedure for designating a zone is
provided. Zoning provides a country that has the disease in one portion of
the country the method to establish a disease free zone in another portion
of the country. The size, location and delineation of a zone will depend on
the epidemiology of the disease, environmental factors, and surveillance
and applicable control measures. The extent of zones and their limits should
be established by the Veterinary Administration on the basis of natural,
artificial, or legal boundaries and made public through official channels.
The Chapter encourages importing countries to recognize the zones that
an exporting country develops. The United States has attempted to de-
velop a free zone from which animals can be exported with fewer restric-
tions.

**Import Risk Analysis:** The detailed procedures for conducting a risk
analysis are provided. A higher level of SPS measures can only be put in
place if there is a scientific justification and it is supported by a risk analy-
sis. The components of the risk analysis are: hazard identification, BTV in
this case; risk assessment, which is the evaluation of the likelihood and
consequences of entry, establishment, or spread of BTV and includes re-
lease assessment, exposure assessment, consequence assessment, and
risk estimation; risk management, which describes the determination of the
measures necessary to reduce the level of risk to an acceptable level for
the importing country; and risk communication, which is the exchange of information on risk.

**The OIE Manual of Standards for Diagnostic Tests and Vaccines**

The *Manual* is a companion volume to the *Code* and provides a uniform approach to the diagnosis of BT. The purpose is to facilitate international trade in animals and animal products by describing internationally agreed upon laboratory methods for diagnosis and requirements for the production and control of BT vaccines. The methods described also form the basis for effective BT surveillance and monitoring.

The *Manual* describes in detail the various tests for the diagnosis of BT. It provides a list of prescribed tests; these are the tests that are required by the *International Animal Health Code* for the testing of animals in connection with international trade. The 2000 edition of the *Manual* specifies that agent identification, AGID, ELISA, and PCR tests are the prescribed tests and these tests are described in detail.

The agent identification procedures described is intravenous inoculation of embryonating chicken eggs or sheep inoculation. It states that isolation can be attempted in cell culture but the success rate is often much lower than in eggs or sheep. These procedures require 3-5 weeks; consequently, they are usually not practical to meet the import requirements outlined above.

The 1999 changes in the *Code* allowed the use of PCR to qualify animals for importation into a free country or zone. The following is a quote from the *Manual* concerning the use of PCR for BTV. “Primer-directed amplification of viral nucleic acid has revolutionised BT diagnosis. Results to date indicate that polymerase chain reaction (PCR) techniques may be used, not only to detect the presence of viral nucleic acid, but also to ‘serogroup’ orbiviruses and provide information on the serotype and possible geographical source (topotype or genotype) of BTV isolates within a few days of receipt of a clinical sample such as infected sheep blood.” It goes onto provide complete details for conducting the test, including the suggested primers that are for a conserved region of the gene.

The AGID and ELISA are prescribed serological tests for BTV and are described in detail in the *Manual*. Both tests are group specific and can detect all types of BTV with one test. The AGID was described about 30 years ago but is still used by many countries. The lack of specificity of this test is a limitation as it can detect antibodies to other orbiviruses, particularly those in the EHD serogroup; however, the sensitivity is adequate. A competitive or blocking ELISA procedure is described. The monoclonal antibodies that can be used for this test have been derived in a number of laboratories, and appear to bind to the major core protein VP7. In the competitive ELISA, antibodies in test sera compete with the monoclonal antibody for binding to antigen. The competitive ELISA has been standardised after comparative studies in a number of international laboratories. Advan-
tages of the ELISA over AGID are its adaptability to automation and less subjectivity exercised in reading the results.

Virus neutralization is designated as an alternative test. An alternative test is one that is suitable for the diagnosis of disease within a local setting, and can also be used in the import/export of animals after bilateral agreement. The virus neutralization test is specific for each type of virus; consequently each virus type must be included in the test. This makes the test difficult and usually impractical for use as an export test.

Discussion and Conclusions

The 1999 revision of the BT Chapter of the Code and the 2000 edition of the Manual have attempted to address the need to establish methods for safe importation from BTV infected as well as free countries or zones. The revised Code also allows the importation from seasonally free countries or zones without restriction after the 100 day incubation period or after one or more tests. These changes do address the fact that much of the world is infected or potentially infected with BTV and should not be restricted from trading bluetongue susceptible animals.

Another issue that is addressed in the revised Code is the need for surveillance to determine the distribution of BTV. BTV often does not produce clinical disease in many susceptible animals; consequently, surveillance must be conducted to determine the extent of the distribution in the potentially infected countries or zones. The continuing spread of the virus north and west into Europe will require increased surveillance in the region. Bluetongue surveillance and monitoring procedures are addressed in the Code and will be expanded upon in the new Chapter that is being developed as an Appendix to the Code.

There are 24 types of BTV and infected countries have the right to restrict imports from countries that have different types of BTV. However, this should only be done if a surveillance and monitoring program has confirmed that the other types are not present.

Zoning for an arbovirus is difficult to justify but zoning for vectors is practicable. Australia and the USA have demonstrated that there is no evidence of infection in a portion of their countries even though there has been animal movement from the endemic zones to the free zone, due to the absence of vectors in the free zone. Based on this observation, free zones can be established if an appropriate surveillance and monitoring program is in place.

References


REPORT OF THE COMMITTEE ON BRUCELLOSIS

Chairman: Dr. Sam D. Holland, Pierre, SD
Vice Chairman: Dr. Claude E. Barton, Nashville, TN

Mr. John B. Adams, VA; Dr. L. Garry Adams, TX; Dr. J. Lee Alley, AL; Dr. Terry L. Beals, MD; Dr. C. Carter Black, GA; Mr. Neal F. Black, MN; Dr. Carole A. Bolin, MI; Dr. Richard E. Breitmeyer, CA; Dr. Conley Byrd, AR; Mr. John S. Cargile, TX; Dr. Norman F. Cheville, IA; Dr. Max E. Coats, Jr., TX; Dr. Terry H. Conger, TX; Mr. Ed Corrigan, WI; Dr. Debra C. Cox, MD; Dr. Donald S. Davis, TX; Dr. Debbi A. Donch, MI; Dr. John C. Doyle, OK; Dr. Mark L. Drew, ID; Dr. Anita J. Edmondson, CA; Dr. Philip H. Elzer, LA; Dr. Steven R. England, NM; Dr. Brian H. Espe, OK; Dr. Donald E. Evans, KS; Dr. Anthony G. Frazier, AL; Mr. Bob Frost, CA; Dr. Arnold A. Gertonson, MT; Dr. Michael J. Gilsdorf, MD; Mr. L. Wayne Godwin, FL; Dr. William L. Hartmann, MN; Dr. Bob R. Hillman, ID; Dr. E. Ray Hinshaw, AZ; Mr. Majon Huff, CO; Mr. Jon G. Johnson, TX; Dr. Arthur J. Kennel, MN; Dr. Maxwell A. Lea, Jr., LA; Dr. Jim Logan, WY; Dr. Bret D. Marsh, IN; Ms. Barbara M. Martin, IA; Dr. Charles E. Massengill, MO; Ms. Phyllis Menden, WI; Mr. Richard E. Nelson, VT; Dr. Don L. Notter, KY; Dr. Roger J. Odenweller, KY; Dr. Steven C. Olsen, MD; Mr. Scott Petty, Jr., TX; Dr. Michael Piontkowski, KS; Dr. Valerie E. Ragan, MD; Dr. Thomas J. Roffe, MT; Dr. John J. Schiltz, IA; Dr. David D. Schmitt, IA; Dr. Larry A. Schuler, ND; Dr. Roy A. Schultz, IA; Dr. Gerhardt Schurig, VA; Dr. Clarence J. Siroky, WI; Mr. Glenn N. Slack, KY; Dr. Barrett D. Slenning, NC; Dr. David A. Stringfellow, AL; Dr. Paul L. Sundberg, IA; Dr. Arnold C. Taft, MD; Mr. George Teagarden, KS; Dr. Lewis P. Thomas, WV; Dr. Tom Thorne, WY; Dr. Kenneth J. Throlson, ND; Dr. James A. Watson, MS; Dr. Gary M. Weber, DC; Dr. Richard D. Willer, AZ; Dr. Larry L. Williams, NE; Mr. Steve Wolcott, CO; Dr. Glen L. Zebarth, MN; Dr. Ernest W. Zirkle, NJ.

The Committee on Brucellosis met on Sunday, October 20, 2002, from 12:30 – 5:30 PM at the Millennium Hotel, St. Louis, MO. There were 29 committee members and 27 visitors in attendance. A total of 19 presentations were given during the half-day meeting. A summary of presentations and actions taken by the committee are given below.

Phil Elzer, Chairman of the Brucellosis Scientific Advisory Sub-Committee, presented the report and recommendations of the sub-committee. The status of the NVSL serum bank was reviewed and recommendations were made for ongoing monitoring and maintenance of the bank. Barbara Martin was appointed to serve as the contact person between NVSL and the sub-committee. In response to Dr. Holland’s request the sub-committee requested that all published and unpublished data on the vaccination of bison and elk be referred to the sub-committee for evaluation and recom-
BRUCELLOSIS

Recommendations to the Brucellosis Committee on 2003. The complete report was approved and is included in this report.

Dr. Debra Cox, APHIS, VS, presented the FY2002 status report of the cooperative brucellosis program. The Brucellosis Emergency Action Plan (EAP) approved in 1997 remains in effect. Increased emphasis during FY2002 on surveillance and the testing of adjacent, contact, and community herds resulted in the disclosure of nine newly affected herds compared to six in FY2001. Of the nine newly affected herds, four were in Texas, two in Missouri and one each in Idaho, Oklahoma and South Dakota. Five of the nine herds were found as a result of market testing. One resulted from a post-quarantine release test, one by a diagnostic test because of abortions, one as an adjacent herd and one disclosed from an epidemiologic investigation. Forty-eight states and PR & VI held Class Free status at the end of the year, with Texas and Missouri remaining in Class A status. Management and control of brucellosis in Yellowstone National Park and the Greater Yellowstone Area continued to be a major issue during FY2002. The complete text of the status report is included in these proceedings.

Carter Black, Georgia Assistant State Veterinarian, presented the report of the Sub-Committee on Swine Brucellosis. Feral swine continue to be identified as the remaining reservoir of both pseudorabies and B. suis, and an ongoing threat to domestic swine. The complete report was approved by the full committee and is included in this report.

Dr. Pamela Ibarra, Mexico, Director of the Brucellosis Campaign, presented a status report of the Mexican brucellosis program. Dr. Ibarra reported that a decline in the national economy had caused a reduction in some brucellosis activities. However, the reduction of brucellosis infection in both livestock and humans continues. There were 2190 cases of brucellosis reported in humans during 2001, with the vast majority being caused by B. melitensis. There is a large population of goats in Mexico. Dr. Ibarra reported that most are vaccinated with Rev 1 vaccine. Vaccination is a major part of the Mexican brucellosis program in both cattle and goats.

Barbara Martin, USDA, APHIS, VS, NVSL, gave a presentation on the impact of the select agent rule. The Department of Health and Human Services (HHS) has regulated the transfer of agents that pose severe threat to public health & safety since April 15, 1997 (42CFR 72.6). Brucella abortus, suis, and meletinsis are regulated by the Select Agent Rule. Facilities that transfer the agents are required to register with the Centers for Disease Control (CDC) and notify CDC of any agent transfers.

Public Health Security and Bioterrorism Preparedness and Response Act of 2002 was signed into law by President Bush on June 12, 2002. It was designed to improve the ability of the U.S. to prevent, prepare for, and respond to bioterrorism and other public health emergencies. A section of the act pertains to agents and toxins that pose a severe threat to animal and plant health and to animal and plant products. The United States De-
partment of Agriculture (USDA) has established a list of biological agents and toxins that have the potential to pose a severe threat to animal or plant health or to animal or plant products. *Brucella abortus*, *suis*, and *meletinis* are included on both the HHS and USDA lists and are considered “overlap” agents.

The Animal and Plant Health Inspection Service (APHIS) is currently working with the CDC on the next phase of implementation of the law. In this phase, regulations that are due to be published in December will establish registration procedures that will incorporate new requirements for facility security and personnel background clearances, along with the biosafety requirements for working with the listed agents. The registration regulations go into effect 60 days after publication of the rule.

There are provisions in the law that allow for exemptions from the registration process for diagnostic and clinical laboratories doing diagnostics, verification, or proficiency testing; and for products that are, bear, or contain overlap agents or toxins and that are cleared, approved, licensed, or registered under either the Federal Food, Drug, and Cosmetic Act; Section 351 of the Public Health Service Act; the Act commonly known as the virus-serum-toxin act; or the Federal Insecticide, Fungicide, and Rodenticide Act. Additional information, including a complete list of agents and toxins, is available at the following websites: CDC website:  http://www.cdc.gov/od/ohs/ APHIS website:  http://www.usda.gov/vs/ncie

Terry Conger, Texas Brucellosis Epidemiologist, presented the report of the Sub-Committee on Education. Brucellosis in wildlife in the Greater Yellowstone Area, and in feral swine, continues to be the two main issues addressed by the sub-committee. The complete report was approved by the committee and is included in this report.

Tom Roffe, Biological Resources Division, U.S. Geological Survey, gave a presentation on the effectiveness of *B. abortus* Strain 19, single dose calf-hood vaccination, in elk. The full text of this paper is included in these proceedings.

Bob Hillman, Idaho State Veterinarian, presented a report on the history of Idaho wildlife brucellosis management efforts. This report is significant because it includes a case history where there is proof, beyond reasonable doubt, that brucellosis was transmitted to a cattle herd through commingling with infected elk on a winter feed-ground. The entire text of this presentation is included in these proceedings.

Taylor Woods, Missouri State Veterinarian, presented a report of an outbreak of brucellosis in Missouri during 2002. In March 2002, a herd of 66 cattle were tested because of an abortion storm in the herd. There were 23 reactors disclosed on the initial test. The epidemiologic investigation revealed that this herd had been a fence-line adjacent herd in 2000 to an affected herd that was discovered in 2001. Testing of 67 herds within a two-mile radius of the affected herd disclosed a fence-line contact herd with
four reactors disclosed in 16 tested. Additional adjacent and community herds to the newly found affected herd were tested. A retest of 26 high-risk community herds in 2002 disclosed one reactor in a herd of 26 animals. This herd was approximately 1.5 miles from the index herd. Field strain *B. abortus* was isolated from the reactor. The affected herds have been de-populated, or will be shortly. Whole herd vaccination with RB51 has been applied in the adjacent and community herds. This case is an excellent example of good epidemiologic investigation and eradication measures.

Dr. Arnold Gertonson, Montana State Veterinarian, gave a presentation on the joint management plan of the GYIBC. He reported that procedural plans are being developed. Also, he reported that there were 4,000 – 4,500 bison in the Yellowstone herd this year and approximately 800 in the Teton herd. There is no grass for the northern Yellowstone herd and it is expected that large numbers will be migrating from the park this winter. Vaccination of heifers and calves, test and removal of reactor animals and hazing animals back into the park are procedures planned for use this winter.

Dr. Jack Ryan, APHIS, VS, showed a short video on the transmission of brucellosis from aborted bison fetuses. The video vividly showed the attraction of adult bison and cattle females to aborted bison fetuses.

Phil Elzer presented a scientific paper entitled, “Brucellosis Challenge in RB51 Vaccinated Bison”. The full text of this paper is included in the proceedings of the scientific session.

Steve Olsen, ARS, NVSL, presented a report on “Standard Techniques in Vaccine Efficacy Studies”. This was designed to allow for a comparison of studies on the subject. This study concluded that RB51 vaccination is protective against *B. abortus* infection.

Terry Kreeger, Wyoming Game and Fish Department, presented a brief report on what was considered to be a successful Wildlife Brucellosis Symposium held recently in Jackson, WY. A wide-ranging agenda of topics on all aspects of brucellosis in elk and bison were presented.

Tom Thorne, Wyoming Game and Fish Department, reviewed the history of elk vaccination at the National Elk Refuge, Jackson, WY. He stated that vaccination was done at the refuge for three years in the 1980’s, but was discontinued. Efforts are being made currently to resume vaccination with Strain 19 vaccine. There are approximately 25,000 elk that winter on the National Elk Refuge and 22 Wyoming feedgrounds.

Rick Willer, Arizona State Veterinarian, presented a paper entitled, “Experience with Waiver for Intact Heifers in Northern Sonora”. The complete text of this paper is included in these proceedings.

Terry Conger, Texas Brucellosis Epidemiologist, presented an update of brucellosis in Texas in 2002. Since December 2001, four new *Brucella abortus* field stain infected herds have been disclosed in Texas. The herds have been located in northeastern, eastern, and southeastern Texas. There
is no epidemiological link between any of the herds. *Brucella abortus*, biovar II, was isolated out of three herds and the fourth was a non-isolate. The most probable source for two of the infected herds was attributed to area spread from herds no longer in existence. The source of infection for another was probably a retained heifer from the previous infection 12 years ago. The source of infection for the fourth (non-isolate) herd is still up for conjecture. All herds have been depopulated and all present adjacent herds have been tested negative. The last herd was depopulated on October 1, 2002.

Sam Holland, South Dakota State Veterinarian, presented an update of the brucellosis situation at the Triple U bison ranch near Pierre, SD.

Claude Barton reported on the response to Resolution Number 6 from 2001. One resolution and three recommendations were reviewed, approved by the committee and forwarded to the Committee on Resolutions and appropriate officials.

There being no additional business, the meeting was adjourned at approximately 5:15 PM.
The subcommittee met on Saturday from 8:00 to 11:00 PM, October 19, 2002, with 21 attendees present. There were representatives from industry, along with state and federal personnel.

Debbie Cox gave a report of the status of the national program. Four states are currently in Stage II (TX, AR, FL, and LA). During the past year, 14 infected herds were disclosed. There remains only one known infected herd (TX). Depopulation has greatly helped. Newly infected herds were disclosed by first-point testing, testing high-risk swine, and good epidemiology. All newly disclosed infected herds, except one in New Jersey, involved exposure to feral swine. Depopulation expenditures totaled $197,000.

Dr. Cox also discussed the need for a National Feral/Wild Swine Program. A national program is needed to address OIE issues. In order to participate in international trade, domestic swine must be free of disease and have a mechanism in place to limit disease transmission from feral/wild swine.

A national budget is needed to study population dynamics, implement disease management, aid state programs, provide staff to coordinate program, set minimum guidelines for state programs, and provide educational material and training as needed.

State programs should include but are not limited to:
1. Advisory committee
2. Authority established for any and all management plans
3. Have population studies in place
4. Disease surveillance in place
5. A separate marketing system in place for feral/wild swine
6. An education program in place
7. Quarantine of all feral swine
8. States/Area that have infected feral/wild swine will have to do additional testing

For the Stage II states to advance in status, they must go 2 years without disclosing infection.

State Reports of Stage II States:

Dr. Jim Amend reported that Texas had 3 infected herds disclosed during FY 2002, (September 1, 2001-August 31, 2002). All of the infected herds were east of I-35 and feral exposure was the common denominator.

Dr. Maxwell Lea reported that there was no swine brucellosis disclosed in domestic swine in Louisiana during the past year. There were 13 reactors disclosed by first-point testing and all were related to feral swine.

The chairman reported on behalf of Dr. Conley Byrd for the State of
Arkansas. No newly infected herds were disclosed.

The Feral Swine Committee update was given by Dr. Max Coats. The Committee voted to resubmit the 2001 resolution with the additional language of “long term” funding.

Dr. Dave Stallknecht, SWCDS, stated that Georgia would be used as a model for population and disease presence in feral swine. A determination will be made on the location of feral swine and whether swine brucellosis exists in the population.

Dr. Bret Marsh, State Veterinarian of Indiana, pointed out that the swine brucellosis program is for domestic swine. USDA, APHIS should clarify whether swine brucellosis in feral swine alone would impede the progress of a state’s domestic program.

A discussion was held on the issue of consolidating the Swine Brucellosis Subcommittee with the Feral Swine Committee.

**Resolutions and Recommendations:**

The following resolutions are submitted from the Swine Brucellosis Subcommittee to the Brucellosis Committee.

Subject: Recommendation from the USAHA Brucellosis Committee

The recommendation is as follows: Case Reporting for Swine Brucellosis in Feral Swine

Background: States with feral swine populations are encouraged to conduct surveillance programs to detect cases of swine brucellosis both in domestic and feral swine. Detection of swine brucellosis in feral swine should be reported, but should not interfere with state advancement to free status.

Recommendation to USDA, APHIS, VS: When cases of swine brucellosis are detected in feral swine with no spread to domestic swine, such cases: (1) should be reported as an addendum to quarterly reports, and (2) should not be reported as cases in domestic swine, and (3) should not interfere with advancement to free status.

**2002 Resolution**

**BACKGROUND INFORMATION:**

Feral/wild swine continue to pose an increasing threat of acquiring, harboring and transmitting diseases with significant animal and human health importance and trade impact. There is a crucial need for pertinent research and field studies that address threats related to feral/wild swine.

**RESOLUTION:**

The United States Animal Health Association urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) and Veterinary Services (VS), Agriculture Research Service (ARS) and
Cooperative State Research, Extension and Education Service (CSREES) to recognize the feral/wild swine threat as a high priority to provide long range funding for research, program support and field studies.

In particular, funding is necessary to:

1. Conduct population studies needed to support the development of disease threat management strategies.
2. Define the role of Brucella strain RB51 and/or VTRS-1 for use as a dual vaccine and conduct field trials to determine their efficacy.
3. Conduct further field trials and studies in relation to swine brucellosis and pseudorabies infection in feral swine and their transmission to domestic swine.

Motion for adjournment was made and seconded. The meeting was adjourned.
BRUCELLOSIS EDUCATION SUBCOMMITTEE REPORT

Terry Conger

The Brucellosis Education Subcommittee met on October 20, 2002, to discuss information and education initiatives that need to be made. The state veterinarians from Wyoming (Dr. Jim Logan), Idaho (Dr. Bob Hillman), and Montana (Dr. Arnold Gertonson), led the discussions on the Greater Yellowstone Area (GYA). The group encouraged the development and dissemination of information emphasizing the following points:

1. The manner in which the state of Idaho expeditiously addressed the transmission of infection from elk to a privately owned cattle herd to curtail further spread.
2. The high level of surveillance of cattle herds in the GYA that is ongoing.
3. The use of established media resources in order to effectively disseminate the information about GYA initiatives.
4. The fact that a potential bioterrorism select agent (Brucella abortus) is now being harbored in a public arena.
5. Continued efforts to emphasize the maintenance of a temporal and spatial separation of wildlife reservoirs (elk, bison and feral swine) from domestic livestock are appropriate.

The educational efforts of the past have played an important role in informing the public of the issues surrounding the eradication of brucellosis, and shall continue to do so in the future.
BRUCELLOSIS SCIENTIFIC ADVISORY
SUB-COMMITTEE MEETING

October 20, 2002
Sunday – 9am-12noon
Chairman: Philip H. Elzer (LA)

Sub-Committee members present: Don Davis (TX), Don Evans (KN), Barb Martin (IA), Steve Olsen (IA), Jack Rhyan (CO).

Sub-Committee members absent: Gerhardt Schurig (VA). Don Davis had Schurig proxy.

Attendees: 11 people plus committee members.

Agenda:
1. Introduction of sub-committee members.
2. Old business:
   a. NVSL serum bank status.
3. Presentations—No official request from Dr. Holland—no official action needed.
4. Charge from Dr. Holland—Collect all vaccination data from elk and bison—analyze and make recommendations next year—2003.
5. Other Business:
   Ed Corrigan presented FPA status on 3.c above.

Sub-Committee Recommendations: Unanimously passed.

Recommendation 1: That NVSL provide this sub-committee with a yearly update on the brucellosis serum bank status by species of known positive and negative animals, which should include vaccinated animals in a data base: Barb Martin will serve as the contact person between this sub-committee and NVSL.

Recommendation 2: USDA, APHIS requested an evaluation of wildlife vaccination (strain 19 and strain RB51) from published and non-published materials. The sub-committee requests that anyone with data pertinent to this subject submit it to the Chair by May 1, 2003. After reviewing this data the committee will address the second portion of the request regarding research priority needs.

Respectfully Submitted
Philip H. Elzer, Chairman
History of Idaho Wildlife Brucellosis Management Efforts

Animal Health and Fish and Game officials in Idaho began testing wild elk in the Idaho portion of the Greater Yellowstone Area for brucellosis in the mid 1980s. Serological evidence of brucellosis in wild elk in the state of Idaho was first documented in 1998 when elk on two different feed sites near the Wyoming border were tested. The serologic documentation of brucellosis in elk resulted in the establishment of a Governor’s Wildlife Brucellosis Task Force, which was charged to evaluate all aspects of the wildlife brucellosis issue and develop recommendations for a wildlife brucellosis management program. The task force sent its recommendations to the Governor in the fall of 1998. The Governor directed the state Departments of Agriculture and Fish and Game to implement the recommendations.

Major components of the Idaho Wildlife Brucellosis Program include:

- Active and passive brucellosis surveillance in cattle. Active surveillance entailed identification and testing of cattle herds that could be exposed to infected elk herds. Passive surveillance included the MCI and BRT programs.
- Brucellosis adult vaccination, with Strain RB 51 Brucella abortus vaccine, of cattle herds that were considered to be at risk.
- Surveillance in elk to determine prevalence and distribution of brucellosis in wild elk in the state.
- Temporal and spatial separation of cattle and affected elk herds during the period of the year that brucellosis transmission from elk to cattle could occur.
- Strategy to reduce and, over time, eliminate winter feeding of elk.
- Reduction of seroprevalence in infected elk herds through removal of seropositive females from elk feedgrounds. These feedgrounds included three private feed sites and one site managed by the Department of Fish and Game to reduce elk depredation on stacked feed and cattle feedlines.
- Rehabilitation of elk winter ranges and establishment of additional elk winter range.
- Re-establishment of elk winter migration to native or improved winter ranges through capture and translocation of seronegative elk from feedgrounds to winter ranges.

In the fall of 1998 state and federal animal health staff identified four cattle herds that were considered to be at risk because elk from brucellosis affected herd units were fed, during the winter, with the cattle herd or in association with the cattle herd. These four herds were tested and adult
vaccinated. All four of the cattle herds were test negative on serologic tests for brucellosis.

Since 1998, one owner changed management practices and fenced elk away from his cattle feeding area in order to prevent possible exposure of the cattle to brucellosis. One owner sold his cattle. One of the two remaining cattle herd owners does not feed elk, but the cattle ranch is located in the vicinity of the Department of Fish and Game elk feedground.

The fourth herd owner has persisted in feeding elk, during the winter, in association with the cattle herd. The female cattle in this herd were calfhood vaccinated with either Strain 19 or Strain RB 51 *Brucella abortus* vaccine. Additionally, most of the female cattle were adult vaccinated with Strain RB 51 *Brucella abortus* vaccine in the fall of 1998. All test eligible cattle in the herd have been tested annually, beginning in 1998. All tests, prior to 2002 have been negative.

Persistent efforts, by state and federal animal health staff and fish and game staff, to persuade this owner to stop feeding elk and to work with the departments to remove the elk from the premises were not successful. Neither the Department of Agriculture nor the Department of Fish and Game has authority to prevent private citizens from feeding wildlife. The owner has made it very difficult for the agencies to manage the elk herd unit that winters on the cattle ranch.

In 1998 and 2001, animal health and fish and game staff were able to trap, and test and release small numbers of elk on the ranch. Radiotelemetry collars were placed on several of the captured elk. These radiocollared elk were monitored to determine movements and locations of the elk during winter, spring, summer and fall. Data generated from these studies was to be utilized in development of a management plan for the elk herd unit. It demonstrated that the elk herd winters on and in the vicinity of the cattle ranch, migrates to the southwest corner of Yellowstone National Park for the summer and fall, then returns to the ranch feeding area in the winter.

**Brucellosis Confirmed in Elk and Cattle**

During February and March 2002, animal health and fish and game staff trapped and tested eighteen elk on the cattle ranch. Two of these elk were seropositive, a yearling female and a bull calf. Both were removed to slaughter. Tissue samples were collected and submitted to the National Veterinary Services Laboratory (NVSL) for brucella culture. *Brucella abortus*, biovar 1 (not a vaccine strain) was isolated from one of these animals.

The cattle herd on this ranch was tested on April 13, 2002. On the test of fifty adult cows, 42 head were negative, 2 were suspects and 6 were classified as reactors. One of the reactors had aborted in late December 2001. The remaining reactors had normal calves or were still pregnant at the time of the herd test. The herd was placed under quarantine. Milk for brucella culture was collected from each of the suspects and reactors. In
addition two bulls and ten yearling heifers that were not included on the test of the adult cow herd were tested. The bulls and yearling heifers were seronegative. Repeated serologic testing of the suspects and reactors, by the Idaho Animal Health Laboratory and the NVSL, confirmed that all six of the original reactors continued to exhibit reactor titers. One of the suspects seroconverted to reactor status and the other suspect fell to the negative range.

On May 9, 2002, state and federal animal health officials received culture results from the NVSL. *Brucella abortus* biovar 1 (not a vaccine strain) was isolated from the milk sample collected from the reactor that had aborted in December 2001. The herd was declared to be a brucellosis infected herd. The cattle were appraised, identified with reactor tags, and all the intact male and female cattle were moved in sealed vehicles, on June 3, 2002, to a federally inspected slaughter establishment where the cattle were slaughtered on June 4, 2002. The owner retained all the steer calves. The owner received federal indemnity for the animals slaughtered.

Although desirable, it was not possible to collect tissue samples for culture from all animals in the herd. Tissues samples for brucella culture were collected from nine animals, including all the reactors, the suspect and one of the family milk cows, at the time of slaughter. *Brucella abortus* biovar 1 (not a vaccine strain) was isolated from six of the animals.

**Epidemiology**

The brucellosis infected cattle herd was pastured in common with eight other cattle herds and adjacent to five additional cattle herds during the summer of 2001. The cattle were turned onto the allotments in mid June and were removed by mid October. All of these herds were considered potential sources of brucellosis as well as being potentially exposed to the infected herd. Cattle remaining in these herds were tested during April and May 2002. All sales of sexually intact yearling and adult cattle were traced and either tested or confirmed as slaughtered. Over eleven-hundred cattle from forty-seven herds or purchasers were traced and tested in Idaho and four other states. Over three hundred-fifty additional cattle, including weaner calves, were traced from 60 herds or purchasers to slaughter or terminal feedlots.

All the cattle traced and tested were negative. No MCI reactors have been identified from any of these herds. The owner of the infected herd had purchased only one bull during the last four years. At the time that brucellosis was found in the herd, the bull was still in the herd and was test negative.

After completion and review of the epidemiology for this case, all of the epidemiologic and laboratory evidence indicates that the source of disease in this outbreak was the brucellosis affected elk herd. Transmission to the index cow would have occurred in the late winter or early spring of 2001.
The index animal was negative on the 2001 brucellosis test and aborted in December 2001. All of the potential cattle source herds were negative. No MCI cases have been traced to any of the impacted herds. The index herd has a history of feeding elk from a known affected herd in association with the cattle. The index herd has a history of four years of negative brucellosis tests.

The epidemiologic information also indicates that the contact and adjacent herds were not exposed to brucellosis from the index herd during the 2001 grazing season. The index cow was test negative in the spring of 2001. This cow aborted over two months after the last possible exposure to contact and adjacent herds. None of the contact or adjacent herds were wintered in association with elk.

In order to assure that brucellosis infection does not remain in any Idaho cattle herds, all of the contact and adjacent herds will be tested when they return from summer ranges in October 2002. Additionally, the owner of the infected herd purchased new cattle after the infected herd was depopulated. These cattle will also be tested in October 2002.

Conclusions and Take Home Messages

- Brucellosis was transmitted from elk to cattle.
- Feeding of brucellosis affected elk on cattle feedgrounds increases the potential for transmission of the disease to cattle.
- Vaccination of cattle, in the absence of management practices to reduce the potential for transmission, will not protect all cattle from infection.
- The actions, or failures to act, by the owner of one cattle herd can impact many cattle herds in numerous states.
- Brucellosis in wild elk impacts the ability of the United States to control and eradicate brucellosis from cattle.
In fiscal year (FY) 2002, the focus of the National Brucellosis Eradication Program continued to center around finding and eliminating the last vestiges of brucellosis in the United States. Increased emphasis was placed on surveillance and the testing of adjacent, contact, and community herds. This action resulted in the disclosure of an increased number of affected herds. Nine newly affected herds were disclosed in FY 2002, compared to six in FY 2001 and 14 in FY, 2000. No herds were quarantined at the end of FY 2002 or FY 2001 compared to three at the end of FY 2000, and ten the year prior. The first two affected herds disclosed in FY 2002 were in Texas in December. In February, animals were found to be infected in a bison herd in South Dakota. Missouri disclosed two affected herds in March and Texas disclosed one affected herd in March and one in August. Oklahoma disclosed one affected herd in April and Idaho disclosed one in May. All of these herds were depopulated with the exception of the bison herd which will be discussed later.

The Brucellosis Emergency Action Plan (EAP) was approved and implemented in July 1997, and continued into FY 2002. As part of the Plan, all activities involving brucellosis surveillance and management of new cases are now conducted as an emergency action and are given top priority. Additional personnel and fiscal resources are made available where needed. The specific critical program elements of the EAP may be found in the 1999 USAHA proceedings. The Emergency Action Plan remains in effect and will remain in effect until brucellosis in cattle has been eliminated.

A major modification was made to the Brucellosis Eradication Program in fiscal year 1998, allowing a State to retain Class Free status when one affected herd is disclosed, and certain criteria are met. As mentioned previously, two Class Free states, Idaho and Oklahoma, each disclosed one affected herd in FY 2002. The most probable source of infection of the herd in Oklahoma was a cow that had been imported ten years earlier. Brucellosis affected elk from the Yellowstone National Park (YNP) that were being fed with the cattle were considered to be the source of the infection of the herd in Idaho. Both the Idaho and Oklahoma herds were rapidly depopulated, and the epidemiology and resultant contact herd testing was completed within the required 60 day time frame, with no additional infection found. Thus, both states were able to retain their Class Free status.

Management of brucellosis continued to be an issue in Yellowstone
National Park and in the Greater Yellowstone Area during FY 2002. In December 2000, the Secretaries of Agriculture and Interior signed a Record of Decision (ROD) for a bison management plan for the State of Montana and YNP. The bison herd in YNP is affected with brucellosis, and this ROD was the culmination of a planning process that has extended over ten years, including intense mediation discussions for 8 months regarding the management of bison that leave YNP and enter Montana. The bison management plan is not a plan to eradicate brucellosis, but is a means to manage bison to minimize the risk of brucellosis transmission. The agencies recognize the importance of cooperating in the management of bison in and around YNP. Now that this plan has been completed, APHIS intends to work with the other agencies towards developing a brucellosis elimination plan for the Greater Yellowstone Area. This plan will include elk, and will be quite broad and complex in scope. Research is continuing on RB51 vaccine in anticipation of its use in the bison of Yellowstone National Park, as part of the bison management plan.

In the Greater Yellowstone Area, approximately 934 bison migrated out of the Park, but were successfully hazed back within the Park’s boundaries. Two hundred sixty two (262) bison were captured. Of those, 63 bison were tested negative, and released, and 199 test positive bison were removed. Three bison that could not be captured were lethally removed. The hazing operations were multi-agency cooperative efforts, as per the joint bison management plan.

A previously affected bison herd was disclosed in South Dakota in February, 2002. Brucellosis eradication activities on this herd have been ongoing since 1982. The main herd was depopulated in early 1999 with the calves remaining as foundation stock to rebuild the herd. The herd plan included extensive testing and vaccination with RB51. Additional reactors in the calves were found in the herd in February, 2002. In April, an agreement between the herd owners, the South Dakota Animal Industry Board, and APHIS, Veterinary Service, was reached and signed. The plan included spaying and neutering the calf crop that had reactors, and working with the remaining animals to study the possible latent effects of Brucella abortus in bison. A portion of the ranch has been established as a research facility and a quarantine will remain in place until completion of three consecutive negative herd tests. If reactors are found on the third consecutive herd test or subsequent herd tests, this herd will be depopulated or the complete herd spayed and neutered. South Dakota has retained Class Free status contingent on the implementation and close monitoring of the herd plan.

Brucellosis program reviews were conducted in four states during Fiscal Year 2002. These reviews were conducted to either determine if a state would retain its Class Free status after one affected herd was disclosed, or to assess the progress of a Class A state in order to make recommendations for program enhancements.
The brucellosis Uniform Methods and Rules (UM&R) has been reviewed and draft changes have been approved. Several additional changes are under consideration and are being distributed for comments. These changes are intended to further refine the brucellosis eradication program as the country moves closer to achieving brucellosis free status. It is anticipated that a new UM&R will be published in 2003.

As progress continues towards the goal of eradicating brucellosis from domestic livestock, more emphasis is being placed on surveillance activities to assure that the last affected herd is found, and to maintain surveillance after brucellosis is eradicated in order to prove to our international trading partners that the country is indeed free of the disease. A national surveillance position has been created and brucellosis surveillance will be incorporated as part of a national, comprehensive, integrated surveillance system.

Although there are still many states in the United States where vaccination is currently a very necessary and vital part of their brucellosis program, the use of brucellosis vaccine in the United States in general is decreasing. According to Office of International des Epizootics’, (OIE) international health standards, one of the requirements for a country to be declared free of a disease is to not have used vaccine in the past three years. Therefore, at some point in the future, after the goal of total eradication of brucellosis has been reached, the use of vaccine may no longer be necessary and may actually hinder our ability to compete in international markets. In preparation for such a time, a working group has been formed to define the steps that would have to be taken to discontinue the use of brucellosis or any other animal vaccine.

Due to normal reporting delays from the field stations, certain of the following graphics regarding the cattle brucellosis eradication program contain estimated data.

As of September 1, 2002, 48 States, Puerto Rico, and the Virgin Islands held Class Free status and 2 States were Class A (Figure 1). Seventy seven percent of the Nation’s 33.8 million beef cows that have calved are located in Class Free States, and 23 percent are located in Class A States (Figure 2). Of 9.2 million dairy cows, 95.2 percent are in Class Free States and 4.8 percent are in Class A States (Figure 3). Of all beef and dairy cattle, 81.3 percent are in Class Free States and 18.7 percent are in Class A States (Figure 4).

There was a total of nine brucellosis affected herds in FY 2002. This was an increase from the six affected herds in FY 2001 (Figure 5). These nine herds were in five states, with four herds in Texas, two in Missouri, one in South Dakota, one in Oklahoma, and one in Idaho (Figure 6).

The number of herds under quarantine for brucellosis at the end of the FY was zero both on September 30, 2002, and on September 30, 2001 (Figure 7).
Brucellosis Milk Surveillance Test (BMST) surveillance detected no brucellosis affected dairy herds in FY 2002. A total of 73 suspicious BRT laboratory reports resulted in 60 herds being blood tested for a herd test rate (HTR) of 82 percent. The HTR in FY 2001 was 42 percent (Figure 8).

There were 9.5 million Market Cattle Identification tests conducted in FY 2002. Of these, approximately 6.5 million samples (62 percent) were collected at slaughter plants and approximately 3.0 million (38 percent) were collected at stockyards (Figure 9). Stockyard testing is primarily conducted in the Central and Southern regions, where the majority of the states that have recently attained Class Free status, or are still Class A are located. Market testing has been a very valuable tool in finding newly affected herds in those states.

The total number of cattle tested for brucellosis in FY 2002 was 10.5 million, approximately 2 percent less than were tested in FY 2001. Of these, 958,000 (9.2 percent) were sampled on farms or ranches and 9.5 million (90.8 percent) were tested under the MCI program. There was an ten percent decrease in reactors from 1435 in FY 2001 to 1172 in FY 2002, 51 of which were found on farms (Figure 10). There were 4.4 million calves vaccinated for brucellosis in FY 2002. There were 4.7 million calves vaccinated in FY 2001 (Figure 11).

Of the nine newly affected herds found in FY 2002, five were found as a result of market testing. The other four herds were found as a result of a post quarantine release test, a diagnostic test due to abortions, being adjacent to an affected herd and as part of an epidemiologic investigation.

Seven brucellosis affected herds were depopulated in the U.S. in FY 2002, at a cost of $350,891.95 in indemnity. This is an increase from the $211,153 in indemnity paid in FY 2001. An additional $19,493.33 was spent to purchase exposed herds and $17,198.85 to purchase cattle that were traced out of affected herds. Depopulation continues to be the preferred method of handling affected herds under the Emergency Action Plan.

The Brucellosis Eradication Program is making progress towards realization of its goal to eradicate brucellosis from cattle in the United States. However, it is imperative at this stage of the program to maintain a high level of surveillance, and to continue to act rapidly and thoroughly when each new case is disclosed, in order to finally achieve eradication.
State Classification
September 30, 2002

Distribution of Beef Cattle in U.S.
by Brucellosis Status
September 30, 2002

Class Free
77%

Class A
23%

Figure 2
Distribution of Dairy Cattle in U.S. by Brucellosis Status
September 30, 2002

- Class Free: 95.2%
- Class A: 4.8%

Figure 3

Distribution of All Cattle in U.S. by Brucellosis Status
September 30, 2002

- Class Free: 81.3%
- Class A: 18.7%

Figure 4
Number of Reactor Herds from FY 1991-2002 by State Classification

Newly Affected Herds
October 1, 2001 - September 30, 2002 - 9
October 1, 2000 - September 30, 2001 - 6
Brucellosis Affected Herds
As of September 30, 2002 – 0
As of September 30, 2001 – 0

Brucellosis Milk Surveillance Test (BMST)

Figure 8
Market Cattle Identification (MCI) Blood Tests

Fiscal Year

MCI Slaughter MCI Market

Reactors Found

Fiscal Year

Ranch or farm MCI

Figure 9

Figure 10
Calves Vaccinated

Figure 11
EXPERIENCE WITH WAIVER FOR INTACT HEIFERS FROM NORTHERN SONORA

Dr. Rick Willer, AZ State Veterinarian
October 20, 2002

In December 2001, APHIS issued a waiver to Sonora, Mexico for the export of intact heifers for feeding purposes. This waiver has its roots in the In-Bond cattle-feeding program initiated in 1990 to address the severe drought conditions in Northern Mexico. Cattle could be exported to the U.S. In-Bond, and thus not be subject to the duties levied by U.S. Customs. These cattle were to be fed in specifically approved feedlots under tight restrictions, and then returned to Mexico for slaughter. U.S. Customs duties on cattle were eliminated in 1994 as a result of NAFTA. Because there was no longer an incentive to return the cattle to Mexico through forfeiture of the bond, APHIS terminated the In-Bond program in 1995.

In 1997, Arizona requested permission to import intact heifers from Sonora for feeding purposes only using the same restrictive procedures used for the In-Bond feeding program. That request was denied in large part because of problems that arose during the In-Bond program. Namely, once the In-Bond cattle arrived in the U.S., APHIS received requests to slaughter the cattle in the U.S., spay them at their destination, or test them and qualify them for release from the restricted feedlot.

In early 1998, Sonora applied to APHIS for official recognition of their brucellosis status for the northern 4/5 of the state. There was only one quarantined herd left in that region of the state. That herd was discovered in April of 1997 and released from quarantine in December 1998.

In July 1998, Texas Cattle Feeders were granted a 90-day waiver to feed intact heifers from TB Stage 2 states in Mexico. Arizona was granted a similar 90-day waiver, however, at the request of Arizona, the waiver was restricted to Sonora heifers only. This waiver eliminated the TB test at the Port of Entry. Other requirements remained in place, namely a TB test at origin, inspection, dipping and brucellosis testing at the Port of Entry, the cattle were branded with an “M” as well as an “F”, the trucks were sealed at the Port, and the cattle were transported to pre-approved restricted feedlots. These cattle were sent directly to slaughter in sealed trucks at the end of the feeding period.

Sonora re-applied for a similar waiver in July 2002 but was denied. The reason was that APHIS was nearing completion of their action on Sonora’s regionalization request for brucellosis and tuberculosis. That regionalization request for brucellosis is still pending four years after their original request.

The procedures for importing intact breeding cattle are contained in CFR part 93. In addition to the health certification and TB test requirements, it requires two negative tests for brucellosis; the first test being a
test of the herd of origin conducted between 30 – 90 days prior to export, and the second being conducted by APHIS-VS at the Port of Entry on the lot being exported.

A waiver granted Sonora in December 2001 distinguishes intact heifers for feeding and for breeding. Intact heifers from the Northern 4/5 region of Sonora, a low risk for brucellosis as well as TB, could now be exported for feeding purposes with the following requirements: two brucellosis tests, including the herd test of the herd of origin between 30 and 90 days prior to export and a test of the lot being exported. The test of the lot must be within 30 days of presentation at the border, and there must be at least 30 days between the two tests. The blood samples from the lot for export had to be tested at NVSL, a rather impractical requirement. Because of Northern Sonora’s Modified Accredited Advanced status, no herd of origin test for TB is required, rather the feeder heifers are tested for TB at origin. The feeder heifers are still branded with an “M”.

In April 2002, after a review of Sonora’s State Public Health Laboratory, APHIS revised the December 2001 waiver to allow for brucellosis testing at that laboratory rather than at NVSL. In addition, the time frame for the testing of the lot was reduced to no more than 5 days prior to export, rather than within 30 days prior to export.

The Laboratory protocol approved by APHIS was that feeder heifers must be negative to the Rose Bengal test (basically a plate “card” test) and/or the Rivanol test. Northern Sonora is the only area in all of Mexico where a distinction is made between a feeder heifer and a breeding heifer. All other heifers are considered as sexually intact, capable of breeding, and thus subject to the breeding cattle entry requirements.

Problems have arisen in this most recent waiver granted Sonora. The cost of spaying versus meeting the TB and brucellosis test requirements is comparable. While spaying costs about $8.50 per head and there is a three week waiting period for healing and recovery before they can be presented for export, testing of intact feeder heifers costs approximately $2.50 per head, and the shortest amount of time to complete testing for brucellosis is 31-35 days before presentation at the border. While spaying appears to be more expensive, when spaying costs are compared to the cost to test the entire herd of origin, and the lot for export, the cost for testing approaches the spaying cost, depending on the size of the herd of origin. In addition, it is extremely difficult to meet the five-day requirement for export from the date of the test of the lot. It is hard to obtain the test results and health documentation, make the arrangements with the Sonora Cattlemen’s Union for a crossing date, and get the cattle to the border in five days.

One additional problematic aspect to consider is the fact that once the “feeder” heifers cross into the U.S., it becomes a state responsibility to ensure the cattle remain in feeder channels. Thus, there are post-entry state regulations that have to be met once the heifers arrive at their final
destination. Currently, Arizona requires post-entry testing for both brucellosis and TB unless the cattle are branded with an “F” and consigned to an approved feedlot. Arizona is considering dropping this requirement based on the low risk these cattle present for both diseases.

Sonora’s application for regionalization of the northern 4/5 of the state for brucellosis is still pending. APHIS is waiting for Mexico to complete the revision of the Mexican NOM (UM&R) and for Sonora to update their application addressing the brucellosis standards revised shortly after the 2001 meeting of the Brucellosis Committee.
The meeting of the committee on Captive Wildlife and Alternative Livestock was called to order by Chairman Dr. Bob Temple at 7:30 am on 23 October 2002. There were 67 people in attendance of which 18 were committee members. In his opening remarks Dr. Temple welcomed attendees and requested that any resolutions be forwarded to the chair at this time.

The Deputy Administrator for Animal Care, USDA, Dr. Chester Gipson who succeeds Dr. Ron DeHaven presented an Update on Animal Care Issues and Activities. It was noted that since FY 99 Animal Care funding has risen from $9.2 million to $15.2 million which has allowed an increase in the number of inspectors from 64 in FY99 to 99 in FY02. Animal Care is responsible for enforcing the Animal Welfare Act in 8,881 facilities, 4,739 Dealers/Breeders, 2,549 Exhibitors, 1,216 Research Facilities and 377 Carriers and Intermediate Handlers. During FY01 the staff performed 12,005 total inspections. Issues in the spotlight included a concern about six polar bears being exhibited in Puerto Rico, work on a future policy statement regarding the safe and humane handling of potentially dangerous Large Exotic Cats in response to concerns about a number of reported maulings. 3 symposia will be scheduled to discuss these issues at a future date.

There are a number of proposed rule changes. It can take 4 to 5 years to get a proposed rule change through the system; wherever possible it is better to create an acceptable guideline rather than to change a regulation. The 2002 Farm Bill included a provision to exclude Birds, Rats of the genus Rattus, and Mice of the genus Mus, bred for use in research from the Ani-
mal Welfare Act as well as to add further restrictions on interstate transportation of game cocks. These provisions would amend the definition of “animal” and will require extensive study before implementation. A separate issue was presented on a draft Policy on Training and Handling of Potentially Dangerous Animals. The draft policy has been published for comment; the final policy developed and cleared by the Department and OMB. It will be published and implemented soon. In addition there will be revisions proposed to the regulations for Licensing and renewals to strengthen these requirements as they pertain to both domestic pets and captive wildlife. Publication for public comment is expected in 2003. Another proposed rule change will be the Submission of Itineraries to Animal Care by Traveling Exhibitors and Prairie Dog Suppliers. This will assure access for inspection in a timely manner.

Based on the recommendations of the National TB Working Group for Zoo and Wild Animals, the proposed rule will require licensees to follow the Working Group guidelines for testing, treating and monitoring of elephants for tuberculosis. Under the FAA re-authorization bill, air transport carriers will be required to report cases of animal escape, injury or death to the Department of Transportation (DOT). There will be an MOU signed between the DOT and USDA. AVMA Animal Welfare committee has done a study on the minimum age for transport of dogs and cats. The proposed rule would extend the minimum transportation age to all species.

Dr. Bill Clay, Deputy Administrator of Wildlife Services presented USDA Wildlife Services (WS) Review of Current Activities. He opened with a discussion of the changes in the organization which focus on an increased effort in the area of wildlife disease. The mission of WS is to provide federal leadership in managing problems caused by wildlife. These services are performed on a request basis and WS partners with key groups including other federal and state agencies, wildlife and animal health organizations, universities and other wildlife facilities and international association of fish and wildlife agencies. WS operates in two modes through research and methods implementation and operational wildlife damage management. Wildlife can adversely affect resources and costs to industries can exceed $1 billion dollars annually in agriculture, natural resources, urban and industrial property and public health and safety. They also work to protect 150 endangered species from threats.

The first allocation for disease research and mitigation began in 1999. Now WS receives $25 million dollars per year to perform this role. WS is preparing to add a new wildlife disease research facility with BL-3 capacity in the next few years. If funds become available it is planned to create emergency response teams to intervene in wildlife crisis situations. The rabies management program started in the mid-1990s in Texas with the distribution of oral rabies vaccine to control the disease in coyotes. Since that time it has expanded significantly and has been very successful. The
plan is to extend the vaccine barrier thru Alabama and northern Florida in
the coming year. This will however require significantly more funding. Stop-
ping the spread of rabies has both public health and economic implica-
tions.

WS has been actively involved in West Nile Virus (WNV) surveillance
through the collection of wild birds and other animals around the country. In
1997 WS began working in Michigan on bovine TB in captive and wild deer.
In addition to depopulation efforts, research is being performed on the role
of coyotes and other mammals as reservoirs of this disease. WS has been
involved in Chronic Wasting Disease (CWD) control and surveillance ef-
forts that began in Wisconsin in March 2002 and also has been assisting
the Colorado Division of Fish and Wildlife on their efforts. WS is working
with Veterinary Services (VS) on a national action plan for feral swine due
to concerns about Pseudorabies and Swine Brucellosis as well as feral
swine killing livestock throughout the country. This research is focusing on
contraceptive vaccines and alternative management techniques. Lastly, WS
has established a cooperative agreement with the Southeastern Cooper-
tive Wildlife Disease Study to train personnel on the recognition and han-
dling of emerging wildlife diseases.

Dr. Dominic Travis, Veterinary Epidemiologist, Lincoln Park Zoo, pre-
sented The Results of a Pilot Study: The National Zoological West Nile
Virus (WNV) Surveillance System. In collaboration with CDC a program
has been created for 200 member institutions of the AZA accredited zoos
to perform surveillance of collection animals to act as a sentinel system for
public health. The goals are to provide information for public health and to
ensure the health of the wildlife in zoos. The Working Group included many
stakeholders and a document was produced entitled Surveillance for West
Nile Virus in Zoological Institutions available on the American Association
of Zoo Veterinarians (AAZV) and the Association of Zoos and Aquariums
websites. CDC provided funds for Cornell Diagnostic Laboratory to do this
pilot testing of zoo animals when the disease began its spread into the
Midwest. This is a real time vs. a retrospective study, it provides for the
sharing of data while ensure the confidentiality of the animals within these
zoological parks. This effort has resulted in the standardization of testing
and definition of confirmed positive and negative samples thru a single
laboratory.

In the first 6 months there were 64 participating institutions in 30 states.
This overwhelming response was well beyond the initial expectations. Due
to the success of this pilot effort, CDC has increased funding for the pro-
gram in its second year that will allow Cornell Diagnostic Laboratory to
maintain this expanded level of service. After 1 year, there are 94 institu-
tions participating from 41 states. 3074 animals have been tested through
this program between August 2001 and August 2002. Work has been initi-
ated by select zoos to evaluate the use of the WNV equine vaccine in
Mr. Tom Scheib from the Reindeer Owners and Breeders Association presented a case study of West Nile Virus infections in Reindeer. In general reindeer appear to react to infectious diseases differently than other deer species. It was suggested that reindeer and other types of deer would not be expected to suffer from clinical illness due to WNV. On September 6 & 7th two reindeer calves suddenly died. On September 12th a 10½-year-old bull presented with neurologic signs and died 24 hours later. The animal was negative for CWD. None of these animals were tested for WNV. Then a 12½-year-old gelding presented depressed and was later confirmed by serologic and PCR testing to be positive for WNV. Also reindeer at the National Veterinary Services Laboratory died of WNV while other hoof stock species in the same area seemed unaffected. Reindeer appear more sensitive and succumb quickly to the disease. A vaccine program is being considered for next spring.

Dr. Michele Miller, a veterinarian from Disney’s Animal Programs presented The Creation of Primate Handling Guidelines for AZA Accredited Zoos to Minimize the Risk of Zoonotic Disease Transmission. The goal of this work is to provide information to the 208 AZA Accredited Zoological Institutions regarding the management of Non-Human Primates (NHP) and zoonotic disease risks. Topics addressed in the draft guidelines include personnel responsibilities, materials required, definition of primate areas, procedures for working in primate areas including handling of animals and biological samples, waste disposal and human illness and injury. In addition there are sections on staff training and public protection. Specific examples of recommendations were discussed. The intensive preventive health programs performed by AZA accredited zoo include extensive efforts in veterinary health care, preventive medicine and the protection of animals, staff and public from potentially zoonotic diseases. These guidelines further enhance these efforts.

Mr. Charly Seale, the Executive Director of the Exotic Wildlife Disease Association presented State TB Testing Statistics in Alternative Livestock. In 1995 the USDA established a double TB testing requirement on the cervid industry. Two negative tests within 90 days for interstate shipment. This has created a financial burden on the industry costing about $30 million dollars since 1995. A retrospective survey study was performed to determine whether this second test provided any additional important information on alternative livestock. In 2001, statistics maintained by 18 states showed that there were 35,835 animals tested for TB but only one tested positive. The game breeders in the state of Texas have been the national leaders in testing and controlling the diseases that occur within alternative livestock. Since 1995 Texas has tested 37,500 head of alternative livestock with no positive results. The other 17 states have tested approximately 177,510 head of alternative livestock during the same time period with only
one positive test. The Exotic Wildlife Disease Association believes that this data supports the modification of current requirements for a single TB test prior to interstate movement within a 30-day period.

Dr. Doug Hoort, Program Manager Animal Industry Division, Michigan Department of Agriculture, presented An Overview of the Cervid TB Control Program in Michigan. The difficulty at present is dividing resources to attend to surveillance and control programs for both CWD and bovine TB. The additional requirements of CWD will greatly tax the available resources. Fortunately, Michigan has the legal infrastructure in place in its TB program that will help ensure a high level of protection during times of limited resources. 56% of cervid facilities move live breeding stock (cervidae) and this is where the majority of the regulatory efforts are focused. Michigan has close to 100% compliance on herds moving breeding stock through testing or quarantine. There is no movement of cervids off of the facility premises, either live or dead without meeting inspection criteria. Compliance is done by both field vets as well as new category of compliance officers that follow up on registration and potentially illegal animal movement. The testing for bovine TB in captive cervids within the state of Michigan continues and fortunately all tests have been negative to date.

Dr. Lynn Creekmore Staff Veterinarian, USDA/APHIS/VS Eradication and Surveillance Team presented A Review of the USAHA CWD Workshop held on 22 October 2002. She noted that when CWD spread beyond the endemic areas in Wyoming, Colorado and Nebraska, there was an effort to form a National Plan which is now posted on the National Wildlife Health Center, USDA and CWD Alliance websites. An implementation committee was chaired by Dr. Bruce Morrison with representatives from state and federal governments completed and implementation plan, including a proposed budget in September 2002. This document is now going through further review and will then be forwarded to OMB and beyond for approval. The components of this plan include: communication for a unified approach to the disease; scientific and technical information transfer to share information; diagnostics which address the logistics of the diagnostic processes (capacity and development of tests); and a management section in wildlife and farmed animals with a unified approach (everything from the endemic areas where management spread is greater vs. new areas where eradication is primary). Surveillance is crucial for both farmed and wild animals (225,000 animals are planned to be tested this year) and finally a research effort will be implemented to fill in the many gaps in knowledge.

Federal and state agencies all agreed that there was a need for uniformity and a national approach to control or eradicate this disease in farmed animals. The proposed program for farmed animals and is part of the national plan. The development of the farm program started in 1998. Each year they have worked in an inclusive effort to develop a plan to take toward implementation. In previous years implementation was limited by fund-
ing, however, in the next fiscal year the funding prospects have improved. The regulation as in the midst of the review process and it is hoped that they will be ready for publication and comment within the next few months. It is planned that work will begin on the UM & R which will serve as the handbook for agencies to follow in implementing the program. Emergency funds released last year have allowed APHIS to respond more aggressively to trace animals in positive and exposed herds. Ante mortem testing technologies look promising on the horizon but are not necessarily close to implementation. Dr. Creekmore encouraged the producers of alternative livestock to contact her if they are interested in participating in an expanded CWD farmed animal program.

Dr. Dominic Travis, Veterinary Epidemiologist at the Lincoln Park Zoo presented Designing a Template for a National Surveillance System for TB in Captive Ungulates. The American Zoo and Aquarium Association (AZA) and the American Association of Zoo Veterinarians (AAZV) was interested in doing a retrospective survey of tuberculin testing methods and results in AZA member zoos. The long-term goal was to create a real time web based reporting system for member institutions. The issues of TB that zoos face are state certification, the zoonotic potential, the lack of valid tests for the variety of species and the need to move animals for captive breeding. In 1996 the USAHA recommended to the USDA that a National TB working group be created. A set of guidelines for control of TB in elephants was completed in 1998. The TB surveillance plan for ungulates began in 2001 to integrate past and future data in real time. A survey was completed by 150 of 155 AZA programs (97% response). The topics included movement, testing and surveillance and determining species prevalence. The results showed that the vast majority of animal movement performed by AZA institutions occurs between its members. Therefore the AZA population may be viewed as a closed herd. With a greater emphasis on preventive health programs in AZA accredited zoos there are an increased number of bovine TB tests being performed. There are a variety of test methods in use and being evaluated in the various taxonomic groups. The National TB Working Group has implemented a prospective monitoring system to provide better information via a database website. A review of the web pages provided details of how the system works and the information that will be accumulated. This template could be applied in allied industry, government and research venues and will result in decreased effort and increased efficiency.

Dr. Tom Meehan, Director of Veterinary Services for the Brookfield Zoo presented A Pilot Study of Shiga-toxigenic E. Coli and Salmonella in Contact Animals from AZA Accredited Zoos. There were two cases of E.Coli 0157:H7 infections associated with farm visits, which stimulated public concern and prompted this study. These farms allowed public handling of the animals and then visits to a public food service area. There was a
misperception that this might also be a problem in petting zoos. The AZA accredited zoos have guidelines that stipulate supervision and hand washing facilities that are at the site of the petting animals and are recommended for use before proceeding to any public food area.

Dr. Jim Keene of the USDA Meat Animal Research Center assisted with this study. A total of four AZA Accredited zoos collaborated providing 377 samples that were analyzed for both Salmonella and Shigella Toxigenic E. Coli 0157 (STEC). 0/377 animals were positive for STEC and 1/377 were positive for salmonella. The conclusion was that the fecal prevalence of these organisms is extremely low in these zoo settings with the suggestion that it may not be a problem in the AZA petting zoo environment as compared to selected farm environments. This was a pilot study; the hope is to do a much broader survey culture program of AZA Accredited zoos in 2002/3. The benefits of maintaining public contact with animals are important for the future of the livestock industry and zoological parks. The benefits of maintaining public contact areas in closely monitored AZA institutions appear to outweigh the risks posed by this potential pathogen.

Two resolutions were brought to the committee. After extensive discussion these two resolutions were approved. The first called for USDA evaluation of a rapid ELISA based test for CWD and the second was to request that USDA-APHIS work with other agencies to develop uniform processes concerning aquatic animal and wildlife disease diagnostics and pathogen identification. The text of these resolutions can be found attached to this committees report.

The meeting was adjourned by Dr. Bob Temple at 12:30 p.m.
REPORT OF THE COMMITTEE ON ENVIRONMENTAL RESIDUES

Chairman: Dr. John C. Reagor, College Station, TX
Vice Chairman: Dr. Gavin Meerdink, Urbana, IL

Dr. Eric J. Bush, CO; Dr. Don A. Franco, FL; Mr. L. Wayne Godwin, FL; Dr. Robert G. Hicks, VA; Dr. Tari P. Kindred, VA; Dr. J. C. Leighty, MD; Dr. Gary D. Osweiler, IA; Dr. Jane F. Robens, MD; Dr. Paul F. Ross, IA; Dr. Manuel A. Thomas, Jr., TX; Dr. Larry J. Thompson, GA; Dr. Gary M. Weber, DC.

October 19, 2002


Selenium: an Interlaboratory Collaborative Study

Eighteen laboratories throughout the US participated in studies to compare selenium results on samples of animal tissues. Results were compared between laboratories relative to whole blood, serum liver, hair and forage. Significant improvement in laboratory result conformity was found over results of a similar study done approximately ten years ago. The difference between methods was significant especially on samples with low concentration. The committee decided that there was room for improvement and decided to repeat this study within the next few years.

Mycotoxin Grain Contamination for the 2002 Crop

Mycotoxin, i.e., aflatoxin and fumonisin, concentrations in corn rival those found in 1989. The reports at the meeting indicated most severe problems in the south central United States. Meeting attendees reported producer contacts that suggested financial ruin from high aflatoxin concentrations, which resulted in conditions of no sale. For this reason the committee invited a noted researcher in the area of aflatoxin control to speak about toxicosis prevention.

Dr. Tim Phillips, Texas A&M, is a noted long time investigator in the effects and control of aflatoxin and discovered the aflatoxin binding capacities of NovaSil®. His lecture and discussion was sponsored by Trouw Nutrition USA, Highland, IL. A summary of his report follows:

Aflatoxin was once considered a storage problem, however, it is formed
in the field preharvest as well as post harvest under unsuitable conditions. Drought and insect damage enhance mold growth and the development of aflatoxin. The problems associated with this toxin occur worldwide in virtually all animal species as well as humans. A common problem is the aflatoxin M₁ residue in milk when the total dairy cattle feed concentrations exceed approximately 40 ppb.

In times like these we in the livestock health profession are bombarded with questions regarding effective methods for the use or sale of contaminated grains. Claims regarding the efficacy of various agents (e.g., clays or bentonites, etc.) reverberate through the agriculture community. NovaSil®, a feed additive approved for improvement of feed flow, has been found to bind aflatoxin in feeds in the presence of moisture. This agent provides no effect or benefit for any other known mycotoxin problem. No other clay products have been found to be affordable in similar animal protection. The protection provided (by the prevention of intestinal toxin absorption) in the ruminant is less pronounced than in the monogastric animal. Adsorption of nutrients by NoviSil® has not been observed. The binding capacity of this product is not affected by feed type.
REPORT OF THE COMMITTEE ON FEED SAFETY

Chairman: Dr. Thomas J. McGinn, III, Raleigh, NC
Vice Chairman: Mr. Richard Sellers, Arlington, VA

Mr. David C. Ailor, DC; Dr. Chris D. Ashworth, AR; Dr. Fred D. Bisplinghoff, FL; Dr. Roy D. Brister, AR; Mr. Fred Cespedes, AL; Mr. Ed Corrigan, WI; Dr. Morris S. Cover, MD; Mr. Kevin G. Custer, GA; Dr. Nicholas M. Dorko, Jr., CT; Dr. Richard L. Dutton, NE; Dr. Don A. Franco, FL; Dr. G. Yan Ghazikhanian, CA; Dr. Eric Gonder, NC; Dr. Jay Hawley, IN; Dr. Michael Hellwig, AR; Mr. Larry E. Hendricks, IL; Dr. Charles L. Hofacre, GA; Dr. G. Thomas Holder, MD; Dr. Rex D. Holt, GA; Mr. Robert H. Jones, AR; Dr. David C. Kradel, PA; Dr. Elizabeth A. Lautner, IA; Dr. Bert A. Mitchell, MD; Ms. Linda Morrison, CAN; Dr. F. J. Mulhern, CA; Dr. Fonda A. Munroe, CAN; Dr. Kakambi V. Nagaraja, MN; Dr. Gary D. Osweiler, IA; Dr. William E. Pace, FL; Dr. Gary G. Pearl, IL; Dr. Benjamin S. Pomeroy, MN; Mr. Stephen Pretanik, DC; Dr. Kurt E. Richardson, GA; Dr. Hans P. Riemann, CA; Mr. Michael C. Robach, GA; Dr. Jane F. Robens, MD; Dr. John A. Schmitz, NE; Mr. James E. Stocker, NC; Dr. Arnold C. Taft, MD; Dr. H. Wesley Towers, DE; Dr. Stanley A. Vezey, GA; Ms. Elizabeth K. Wagstrom, IA; Dr. W. Douglas Waltman, GA; Dr. Gary L. Waters, MT.

Committee Summary

The Feed Safety Committee convened on October 22, 2002 from 12:30 - 5:30 PM in the Clark Room of the Millennium Hotel, St. Louis. The business discussed included the committee will go to quarterly conference calls to inform each other and USAHA of feed safety issues and well as to follow through on action items.

The committee reviewed and made changes in a resolution passed earlier in the Food Safety Committee asking APHIS in cooperation with federal/state agencies to establish a working group to study and make recommendations related to the biosecure disposal of animal byproducts and animal mortalities.

The following reports from the scientific session:

FDA/CVM REGULATORY UPDATE: BSE, DIOXIN, CODEX, COUNTER-TERRORISM, CLONING, SALMONELLA

Dan McChesney, Ph.D.
Deputy Director
Office of Surveillance and Compliance
Center for Veterinary Medicine

Amending the Feed Ban

◆ Regulation and exemptions under review from both the scientific and
enforcement perspective
- Public Hearing October 30, 2001
- ANPR to publish in 2002 or 2003

Concerns about the Current Feed Ban
- Safety of exempted proteins
- Cross-contamination of feeds
- Labeling pet food with caution statement
- Feeding poultry litter to cattle

BSE Enforcement

Enforcement activities
- continue to take appropriate enforcement actions
  - compliance rates are very high so fewer actions
  - more stringent actions for repeat violators
- activities prioritized
  - follow-up inspections
  - firms using prohibited material
  - for cause inspections
  - % of firms not using prohibited material
  - sampling (140) imported feed from at risk countries

Enforcement Activities (9/10/02)

More than 15,000 inspections conducted
Firms with initial inspections:
- 10,892 reported to CVM
Firms handling prohibited materials: 1,599
- which is 15% of those firms inspected/reported

<table>
<thead>
<tr>
<th>BSE Compliance</th>
<th>3/02</th>
<th>9/02</th>
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<tr>
<td>Firms inspected (initial)</td>
<td>10,458</td>
<td>10,892</td>
</tr>
<tr>
<td>Firms handling PM*</td>
<td>2143</td>
<td>1599</td>
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<tr>
<td>Firms out-of-compliance</td>
<td>113</td>
<td>15 OAI (0.9%)</td>
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<tr>
<td></td>
<td></td>
<td>114 VAI (7.1%)</td>
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Enforcement Activities (9/10/02)

1,599 firms handling prohibited materials

<table>
<thead>
<tr>
<th>PM = prohibited materials</th>
<th>% PM</th>
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</thead>
<tbody>
<tr>
<td>Renderers</td>
<td>225</td>
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<tr>
<td>Feed mills, FDA-licensed</td>
<td>1,116</td>
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<tr>
<td>Feed mills, non FDA-licensed</td>
<td>4,809</td>
</tr>
<tr>
<td>Other firms</td>
<td>4,742</td>
</tr>
<tr>
<td>PM = prohibited materials</td>
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</tbody>
</table>

Detection Methods and Problems
- Exemptions in regulation make testing feed or feed ingredients for prohibited protein very challenging
- Detection of prohibited proteins in feed is possible
REPORT OF THE COMMITTEE

- specificity and sensitivity problems
- Detection of Prions in Feed Is Not an Option
  - Current prion-based tests examine brain extract
  - Sensitivity needed to detect prions in feed is below that which can be achieved (103-107 Infective Units; 1 unit = 1013 molecules)

**Current BSE Research Initiatives at CVM**

- Detection of multiple species by PCR
  - Single set of PCR primers
    - cattle, deer, elk, sheep, goat, pig and horse
    - using restriction endonucleases can distinguish material of equine and porcine origin
  - Universal primer permits single analysis of materials of concern to FDA
- Development of a new ELISA test
  - Based on protein unique to bovine MBM
  - prohibited from exempt bovine materials

**Codex**

- The document consider in June 2002 was at step 3 of the 8 step process
- TF completed review of Sections 1-5, not able to complete review of Sections 6 & 7
- Because review of the entire document could not be completed the TF decided to hold the document at step 3
- Plan to advance entire document to step 5/8 in March 2003; procedurally permitted

**Codex**

- Task Force agreed to:
  - specifically identify feed additives and veterinary drugs in appropriate section
  - “antibiotics should not be used in feed for growth promoting purposes in the absence of public health safety assessment”
  - information on lists of prohibited and undesirable substances in feedingstuffs available online at Codex documents CX/AF 01/4 and CX/AF 02/4

**Codex**

- Steps for March meeting
  - US delegation met in Aug. to develop comments on floor document due to Secretariat by Sept. 15
  - drafting group revises document and re-submits to Secretariat
  - US will hold Public Meeting Jan/Feb 2003
  - TF meets in Copenhagen in March 2003
  - Resolve GMO labeling and product tracing
  - Complete review of sections 6 & 7; accept all section
  - TF charter ends in 2003
FEED SAFETY

PUBLIC HEALTH SECURITY AND BIOTERRORISM PREPAREDNESS AND RESPONSE ACT OF 2002
◆ Primary impact for FDA concerns the food provisions of the Federal Food, Drug and Cosmetic Act (FD&C Act) although there are several important drug provisions.
◆ The definition of food includes food, food additives, dietary supplements and animal feed.

Sec. 305 REGISTRATION OF FOOD FACILITIES
◆ registration of domestic and foreign food facilities
◆ includes any factory, warehouse, or establishment that manufactures, processes, packs, or holds food
◆ exempts farms, restaurants, other retail food establishments, nonprofit food establishments, and fishing vessels that do not process
◆ limits foreign facilities to those whose products are exported to the U.S. without further processing or packaging outside the U.S.
◆ owner, operator, or agent in charge shall submit the registration
◆ one-time rather than annual
◆ notify FDA of changes in a timely manner

Sec. 306 MAINTENANCE AND INSPECTION OF RECORDS FOR FOODS
◆ authorizes access to certain records when there is a reasonable belief that an article of food is adulterated and presents a threat of serious adverse health consequences or death to humans or animals
◆ applies to all records relating to the manufacture, processing, packing, distribution, receipt, holding, or importation of food
◆ excludes farms and restaurants
◆ limits requirement to establish records for traceback to the immediate previous source and the immediate subsequent recipient
◆ limits recordkeeping requirement to 2 years

Sec. 307 PRIOR NOTICE OF IMPORTED FOOD SHIPMENTS
◆ requires prior notice of imported food shipments
◆ notice to provide the:
◆ article; manufacturer and shipper; grower (if known); country of origin; country from which it was shipped; and anticipated port of entry
◆ if notice not provided, article refused admission
◆ if inadequate notice provided, article held at the port of entry until proper notice is provided; requires Secretary to determine whether there is any credible evidence or information indicating that the article presents a threat of serious adverse health consequences or death to humans or animals
REPORT OF THE COMMITTEE

Sec. 303 ADMINISTRATIVE DETENTION

Detention:
◆ authorizes officer or qualified employee of FDA to order detention of food if there is credible evidence or information that the food presents threat of serious adverse health consequences or death
◆ establishes process that requires, after an opportunity for informal hearing, appeals decision in 5 days
◆ subject to judicial review;
◆ process terminates seizure or injunction filed;
◆ detention order terminates if appeal requirements not met
◆ prohibited act to transfer an article of food in violation of detention order or remove or alter any required mark or label

Other Provisions
◆ Sec. 304 DEBARMENT FOR REPEATED OR SERIOUS FOOD IMPORT VIOLATIONS
◆ Sec. 308 AUTHORITY TO MARK ARTICLES REFUSED ADMISSION INTO UNITED STATES
◆ Sec. 309 PROHIBITION AGAINST PORT SHOPPING
◆ Sec. 314 AUTHORITY TO COMMISSION OTHER FEDERAL OFFICIALS TO CONDUCT INSPECTIONS

Dioxin
◆ Findings (EPA and WHO)
◆ EPA and WHO examine similar sets of human and animal data
◆ Concluded dioxins could affect human health at lower levels than previously thought
◆ Major difference over whether there are thresholds levels below which exposure poses negligible risk.
◆ EPA-no safe threshold; WHO-assumed there is

Dioxin
◆ Levels in food and feed not known or well documented in the US or the EU
◆ FY 2002 sampling assignment
◆ 50 samples, including mineral products, whole grains/oilseeds, alfalfa hay and corn silage
◆ Recent EU guidance levels are based on background data, not on a formal risk-assessment
◆ EU goal appears to be to eliminate products with the highest background levels

Dioxin Levels in Domestic Feed
◆ FY 2000 results on animal fats, animal meals, oilseed deodorizer distillates, and molasses
  ■ assayed for 7 dioxin, 10 furan, and 3 PCB congeners
How do the tested products compare to the new EU standard? the average for each product class is below the EU standard except menhaden fishmeal and deodorizer distillates

Future Dioxin Actions
◆ Short term:
  ■ continue gathering information on dioxin levels in feed
  ■ address products with high levels on case-by-case basis
◆ Long term:
  ■ CFSAN, CVM developing integrated approach to cut levels in feed, food using information from FDA surveys, EPA risk assessment, National Academy of Sciences review

Salmonella
◆ Salmonella in pet treats incidents in 2000 and 2001, 2002 and CVM’s routine surveillance sampling of feed and feed ingredients indicate that Salmonella-contamination is still common
◆ CVM reconsidering its regulatory approach from educating violators to traditional enforcement tools (e.g., warning letters, recalls and seizures).

New Directions, 2002
◆ CVM is developing criteria for deciding which Salmonella-positive findings should be pursued using traditional enforcement tools
◆ CVM will publish results of FDA’s annual sampling program for Salmonella in feeds (past results available by the end of 2001; annual results thereafter).

Animal Clones
◆ CVM officials have met with commercial, academic groups conducting cloning
◆ to encourage publication of safety data
◆ Asked for temporary halt to entry of food and feed made from clones
◆ in July 2001 CVM UPDATE

Other Steps
◆ Contracted with National Academy of Sciences for study of safety issues study released August 20
◆ Cosponsored public meeting with Pew Initiative on Food and Biotechnology in Dallas, September 26

Actions on Cloning Coming Soon
◆ Food Safety White Paper — December 2002
◆ Animal Safety White Paper — December 2002
◆ Proposed policy/guidance — Spring 2003
◆ Comment period - Public Meeting — Spring 2003
◆ Policy implemented — Summer 2003
EU Limits on Dioxin in Feeds
◆ European Union imposed beginning in July 2002
◆ 0.75 ppt for feed materials of plant origin, vegetable oils and by-products
◆ 1.0 ppt for minerals
◆ 2.0 ppt for animal fat, milk fat and egg fat
◆ 0.75 ppt for other land animal products, milk and milk products and eggs and egg products

EU Limits on Dioxin in Feeds
◆ 6.0 ppt for fish oil
◆ 1.25 ppt for fish, their products and by-products with the exception of fish oil
◆ 0.75 ppt compound feedingstuffs, except fur animals, pets and fish
◆ 2.25 ppt for feedingstuffs for fish and pets

DEVELOPMENT AND IMPLEMENTATION OF A VOLUNTARY HACCP PROGRAM FOR THE COMMERCIAL FEED INDUSTRY
Tim Herrman
Extension State Leader
Grain Science and Industry
Kansas State University

Project Team: Keith Behnke, GSI: K-State; Subramanyam Bhadriraju (SUBI), GSI: K-State; Michael Langemeier, AgEcon: K-State; Elizabeth Boyle, ASI: K-State; H. Thipparreddi (REDDI), Food Sci: UN

This is a summary of his grant proposal and what he presented to the group. He has observed feed manufacturers being more cooperative in implementing a voluntary HACCP program in the last 6 months.

Project Title: Development and Implementation of a Voluntary HACCP Program for the Commercial Feed Industry
Amount: $534,000
Duration: 10/02 to 9/05
Principal and Co-Investigators: Herrman, Timothy, J.; Behnke, Keith, C.; Bhadriraju, Subramanyam, H; Langemeier, Michael, R.; Boyle, Elizabeth, A. E.; Thipparreddi, Harshavardhan.
Institutions: Kansas State Univ., Manhattan 66506; Univ. of Nebraska, Lincoln 68538.
Departments: Grain Science and Industry, K-State; Agricultural Economics, K-State; Animal Science, K-State; and Food Science Univ. NE.

Summary:
Feed manufacturers will continuously improve the quality and safety of feed as they adopt a voluntary hazard analysis critical control point (HACCP) program in response to this project. This will help ensure delivery of safe meat, milk, and eggs to consumers through the elimination of food-borne pathogens and other hazards in animal feed and will help retain the com-
parative advantage of the U.S. agricultural industry in the global market. To accomplish this, we perform 4 tasks that include: assessing the biological hazards in finished feeds and ingredients; developing, implementing and evaluating voluntary HACCP programs in 15 feed mills; analyzing the economies of implementing technical recommendations; and building a distance learning program. We will measure Salmonella contamination in feed before and after thermal processing. We will assist teams develop and implement their voluntary HACCP program. The implementation of HACCP in the feed industry will largely depend on the economic costs of implementation, thus, we will perform an economic analysis of voluntary HACCP implementation. Distance learning modules (suitable for professional development and undergraduate instruction), extension bulletins, workshops, and web-site communication of results will extend project results nationally and internationally. The 165+ million tons of animal feed produced annually in the United States represents an approximate market value of $25 billion.

**Approach to Objectives:**

**Task 1 —Assess Hazards in Ingredients and Finished Feeds**

We will evaluate 15 commercial feed mills located within 500 miles of the Kansas State University campus in Manhattan, KS comprised of 3 feed mills at cattle feedlots in NE, KS, and CO; 3 feed mills for vertically integrated broiler operations in AR, 3 feed mills manufacturing turkey feed in KS, NE, MN; 3 mills producing dairy feed in KS, SD, IA; and 3 feed mills producing swine feed in MO, IA, and KS.

We will evaluate feed mills during winter, shortly after coarse grains are harvested which can contain higher levels of moisture and during the warmer months of late spring and summer.

Detection, isolation, and quantitation of Salmonella spp. will be performed following methods described in FDA Bacteriological Analytical Manual (FDA-BAM, 2000). An evaluation of the current insect load for incoming ingredients and collection of baseline data on existing insect and rodent populations at the feed mills will be performed.

**Task 2—Develop, Implement, and Evaluate a Model HACCP Program for Feed Mills**

The HACCP team at each feed mill will describe the feed product and its distribution, develop a process flow, and verify the flow. To accomplish this goal, we will conduct training sessions for the HACCP teams at each feed mill. Besides the biological hazards, the HACCP team members will identify other potential hazards (including bio-terrorism), identify those hazards that can be controlled, recommend controls, and recommend corrective action when a deviation occurs. Assistance (by project staff) will be provided to HACCP teams during the preparation of their written program to ensure consistency and facilitate the evaluation phase of the project.

Sampling and evaluation of feed ingredients and finished feed will be performed following the implementation of the HACCP program at each
feed mill.

Task 3 — Analyze The Economies of Implementing Technical Recommendations

An economic analysis of the impact of implementing HACCP in the feed industry involves two components. The first component involves the development of detailed pro-forma budgets that document the specific costs of implementing HACCP. The second component involves an examination of the feasibility of alternative technologies that can be used to control hazards.

Task 4 — Build a Distance-Learning Program

We will develop a curriculum (distance education modules, training materials, Extension publications, web pages) for HACCP implementation in the feed industry. Identification of training material topics will occur two ways. First, HACCP teams formed at each feed mill will participate in focus groups to assess adoption constraints of all kinds (e.g. educational, technical, economic). This input will enable the project team to identify and develop appropriate training materials necessary to implement a successful HACCP plan. Second, results from Tasks 1-3 will provide the necessary data to create science-based performance standards. Training materials will be developed around these performance standards to support technology transfer to the feed industry via distance education modules, training materials, extension fact sheets, and web-site access described below.

Summary:

Feed manufacturers will improve the quality and safety of feed through adoption of a voluntary HACCP program. We will perform 4 tasks that include: assessing the biological hazards in finished feeds and ingredients; implementing HACCP programs in 15 feed mills; analyzing the economies of implementing HACCP; and building a distance learning program.

IMPLICATIONS OF POTENTIAL REMOVAL OF SUBTHERAPEUTIC ANTIMICROBIALS FROM FEEDS

J. Stan Bailey
USDA, ARS
Athens, Georgia

Antimicrobial Drug resistance is a global concern for both human health and agriculture
◆ Swann report, 1969
◆ Institute of Medicine’s National Research Council report, 1980
◆ Council for Agricultural Science and Technology, 1980
◆ World Health Organization, 1997
◆ and many others
What is happening?
◆ February, 1998—the Danish poultry industry voluntarily stops use of all antimicrobial growth promoters
◆ June, 1999—the majority of antibiotic growth promoters used in monogastric diets were removed within the EU
◆ The FDA is considering a similar ban on use of most subtherapeutic antibiotics in the U.S. animal industries

How much antibiotics are used in the U.S.
◆ 18 million pounds of antibiotics used annually for livestock production
◆ 17% (3 million pounds) used specifically for growth promoting or subtherapeutic purposes

Why are subtherapeutic antibiotics used
◆ In animal, subtherapeutics are fed to improve animal health, promote animal growth, and increase feed efficiency.
◆ Weight gain and feed efficiency has been reported to increase from 4 to 10% with the feeding of low levels of antimicrobial drugs (Doane's, 1988)

How do growth promoter antibiotics work
◆ Not clearly understood
◆ No benefit to performance of germ-free animals therefore their effect is likely one of antimicrobial activity rather than being caused by direct interaction with the physiology of the animal

The presence of intestinal microflora (which can be affected by antibiotics) reduces animal efficiency through the following mechanisms:
◆ Competing with host for nutrients
◆ In some cases eliciting an immune response which causes appetite suppression
◆ Causing disease, particularly necrotic enteritis

Mechanisms continued:
◆ Lowering digestive efficiency by degrading the digestive enzymes and reducing the absorptive surface areas
◆ Increasing the size of the intestinal tract through the production of stimulatory compounds

What will happen if sub-therapeutic antibiotics are banned for use in feeds?
◆ Not clearly and consistently documented.
◆ Anecdotal evidence suggest that there is an increase in necrotic enteritis and loss of productivity.
◆ Major question? Will removing sub-therapeutic antibiotics from feeds lead to decreased resistant bacteria and how much will production be affected.

Emborg et al., 2001
◆ Tracked productivity data from 1995 to 1999 from 6815 Danish poultry
REPORT OF THE COMMITTEE

flocks
◆ Compared time before and after discontinuation of subtherapeutic antibiotics
◆ Found no difference in total weight of birds produced, no difference in number of dead birds, and a 1.6% increase in feed conversion

Stein, 2000
◆ Reported that following removal of sub-therapeutic antibiotics in Sweden and Denmark, overall animal health and performance were not severely impacted, although a greater prevalence of post-weaning scours was noted.
◆ An increase in therapeutic antibiotic use was observed however, the total amount of drugs used was deceased.

Anecdotal
◆ Large U.S. poultry producer discontinued use of most sub-therapeutics – because of necrotic enteritis problems started using again.
◆ Italian poultry producer reports that necrotic enteritis is “killing them” since EU mandated discontinuation of sub-therapeutics in feed.

Alternative to Sub-therapeutics
◆ Essential to optimize management, particularly during critical growth periods and times of stress (Mathew, 2002)
◆ Prebiotics
◆ Probiotics
◆ Chemical alternatives

Bedford, 2000 Potential treatments for use in antibiotic free feeds
◆ High quality ingredients
◆ Whole grain cereals
◆ Processing
◆ Live microflora additives
◆ Fermentable sugars
◆ Feed sterilization
◆ Vaccines
◆ Feed lectins

Conclusions
◆ Concerns about antibiotic resistance will likely lead to reduced availability of many classes of drugs as sub-therapeutic growth promoters.
◆ The effect that removal of these drugs from feeds will have on animal health and productivity is not well (or consistently) documented.
◆ It would be advisable to continue to seek alternatives to traditional sub-therapeutic antibiotic growth promoters and to push for more studies documenting the effect of removal of these drugs.
NON-ANTIMICROBIAL PRODUCTION ENHANCERS (NAPES) UPDATE
Liz Wagstrom, DVM, MS
National Pork Board

Antibiotic Resistance Issues
◆ Coordinated and appropriate response is necessary
◆ Examining alternatives to antibiotics is one response
◆ Provide producers information to make knowledgeable decisions about the use of alternative products

National Pork Board Position
◆ It is essential to public health and food safety, animal health and well-being, and the environment to maintain the effectiveness and availability of antimicrobials. All decisions affecting the availability of antimicrobials for animal use need to be transparent and based on sound science.

National Pork Board Position
◆ The National Pork Board supports the use of antimicrobials only when they provide demonstrable benefits and urges producers to:
  ■ take appropriate steps to decrease the need for their application;
  ■ adhere to judicious use guidelines;
  ■ assess the benefits and costs of all uses of antimicrobials; and
  ■ complete the Pork Quality Assurance Program and fully implement into their daily operations the management practices described for responsible use of animal health products.

National Pork Board Position
The National Pork Board supports the development of effective and affordable alternatives to the use of antimicrobials for enhancing production.

It has charged its Non-Antimicrobial Production Enhancement Working Group to review the knowledge with regard to the efficacy and economy of the use of non-antimicrobial alternatives to enhance production, to identify the confounding variables that must be controlled to scientifically evaluate the success of these products and/or management techniques, to recommend a research agenda to address knowledge gaps, and to develop a plan of action to educate pork producers about these products and/or management techniques.

NAPES Working Group
◆ Review the knowledge with regard to the efficacy and economy of the use of antimicrobial growth promoters compared to non-antimicrobial alternatives:
  ■ on the growth and health of pigs, and
  ■ on the quantity and carriage rate of enteric zoonotic pathogens in pigs.
◆ Identify the system and animal confounding variables that must be
controlled to scientifically evaluate the success of non-antimicrobial production enhancers.

- Recommend a research agenda to address knowledge gaps.
- Develop a plan of action to educate pork producers about these products and/or management techniques

**NAPES Group Members**

- Mark Cook, U of Wisconsin
- Rex Gaskins, U of Illinois
- John Korslund, Iowa Pork Producer
- Dave Anderson, Elanco
- Chad Risley, Chr Hansen
- Phil Thacker, U of Saskatchewan, Canada
- Jill Appell, Pork Safety Committee Chair
- Kenneth Bischoff, ARS
- Rod Mackie, U of Illinois
- Alan Mathew, U of Tennessee
- Marcia Hathaway, U of Minnesota
- John Patterson, Purdue
- Connie Schmidt, AASV
- Hans Stein, S. Dak. State
- Jim Pettigrew, U of Illinois
- Jim Lewis, MN Pork Producer

**NAPES Meeting**

- March 20-21, 2002
- Critical Review of Alternatives
- RFP for Demonstration Projects
- Development of Index System

**Critical Review of Alternatives**

- Identify Classes of Alternatives
- Prioritize by Potential Value to Producers
- Professional Review
  - what is product
  - proposed/documented mechanism of action
  - peer reviewed/other literature
  - attributes
- Review panel to edit critical review

**Demonstration Projects RFP**

“Identify a documented health and/or production problem in nursery pigs in commercial production units, develop a mitigation that involves non-antimicrobial interventions (alternative products, management practices, nutritional strategies, etc.) and provide measurement and data on the results of the intervention.”
Demonstration Projects RFP
◆ $200,000 (4 - $50,000 projects)
◆ Collaborative - producers, universities, health/management/nutrition
◆ Real world facilities
◆ Different size/types of production facilities

Pork Board Funded Research
2002 Checkoff Funded Research Grants
◆ Defining the Health Benefits of the Nutritional Interaction between Conjugated Linoleic Acid and Fish Oil
  Dr. Josep Bassaganya-Riera, Iowa State University
◆ Evaluation of Antimicrobial Alternatives to Reduce the Development of Antibiotic Resistance
  Dr. Darryl Ragland, Purdue University

2001 Checkoff Funded Research Grants
◆ Alternative Strategies for Utilizing Antimicrobials as Growth Promotants
  Dr. Marcia Hathaway, University of Minnesota
◆ Conjugated Linoleic Acid: A Dietary Immune Modulator that Decreases Intestinal Inflammation
  Dr. Josep Bassaganya-Riera, Iowa State University
◆ Lactobacillus Acidophilus as Probiotic to Control Salmonella in Swine
  Dr. Stanley Gilliland, Oklahoma State University

2000 Checkoff - funded Research Grants
◆ Applied Studies on Immune Stimulation by Lactobacilli for the Reduction of Human Foodborne Salmonella and Replacement of Subtherapeutic Antimicrobials
  Dr. D.L. Hank Harris, Iowa State University
◆ Efficacy of Antimicrobial Peptide Precursors as an Antibiotic Alternative in Pigs
  Dr. Tim S. Stahly, Iowa State University

1999 Checkoff - funded Research Grants
◆ Ability of dietary conjugated linoleic acid (CLA-60) to improve the efficacy of a swine dysentery vaccine by enhancing the cell-mediated immune response
  Dr. Josep Bassaganya-Riera, Iowa State University
◆ Effect of oligosaccharides and organic salts on the health and performance of growing-finishing pigs
  Dr. Alan L. Sutton, Purdue Research Foundation
◆ Reduction of Salmonella by Bacteriophage Treatment
  Dr. D. L. Harris, Iowa State University

Antimicrobial Use “Decision Tree”
◆ Evaluate need for antibiotics and/or alternative products. Considers factors such as:
ventilation
- stocking density
- weaning age
- genetics
- management
- disease load
- others

Decision Tree
◆ First meeting October 2002
  ■ University nutritionists, veterinarians, epidemiologists, practicing veterinarians, producers
◆ Look at funding future projects to validate model

Non-Antimicrobial Production Enhancers
Antimicrobials as production enhancers
◆ increase average daily gain
◆ increase feed efficiency
◆ lower the incidence / prevalence of certain diseases
◆ No one current product can be substituted for antimicrobials and provide the same effects

Alternatives to AGP
◆ Alternative feed additives
  ■ acidifiers
  ■ pro-biotics
  ■ enzymes
  ■ oligosaccharides
  ■ herbs and plant extracts
  ■ others

Organic Acids
◆ Acidification of feed or water
◆ Gastric pH 3.5
  ■ digestion of proteins
  ■ maximize populations of lactobacilli v. pathogens
◆ Intestinal effects
  ■ affect bacterial population in upper small intestine
  ■ fumaric acid
  ■ formic acid
  ■ lactic acid
  ■ organic acids mixed with fatty acids and mono- and di-glycerides
  ■ citric acid

Acidifiers
◆ Positive performance data in 8 of 14 exp. with nursery pigs
◆ In starter diets, 1.5-2% may be necessary
FEED SAFETY

◆ Mode of action not well understood
  ■ Type of acid
  ■ Action in stomach or intestines
◆ Application possible in drinking water
  ■ Watch pH

  **Probiotics and competitive exclusion**

◆ Protective
  ■ adherence to intestinal mucosa
  ■ production of bacteriocins and organic acids
  ■ competition for nutrients
  ■ stimulation of intestinal immune response
◆ Stimulatory
  ■ increase feed intake
  ■ increase permeability of the gut and increase nutrient uptake
◆ Lactobacillus casei
◆ Bifidobacteria
◆ Lactobacillus acidophilus
◆ Streptococcus faecium
◆ Brevibacterium lactofermentum
◆ Bacillus coagulans
◆ Bacillus cereus
◆ Bacillus licheniformis
◆ Bacillus subtilis
◆ Bacillus toyoi
◆ Saccharomyces boulardii
◆ *Saccaromyces cerevisiae*

**Enzymes**

◆ Increase digestibility of complex carbohydrates
◆ Improved feed conversion (0% to as much as 8%)
◆ Reduced incidence of diarrhea
◆ Activity dependent on
  ■ age at weaning
  ■ components of diet
  ■ source of enzymes
◆ Decrease manure phosphorous content
◆ phytase
◆ amylase
◆ glucanase
◆ glucoamylase
◆ cellulase
◆ xylanase
◆ pectinase
Enzymes
◆ Improved digestibility reduces nutrients in hind gut
  ■ Reduces number of pathogenic bacteria
◆ Most research in diets based on barley and wheat
◆ Results are variable

Oligosaccharides
◆ Non-digestible substances
◆ Prevent pathogens from binding to intestinal ligands
◆ Flushing out effect
◆ Slightly positive effect on performance with mannanoligosaccharide

Herbs and plant extracts
◆ Some herbs and plant extracts possess antimicrobial properties
◆ Have been used extensively in human medicine
◆ Garlic, Oregano, Chilli, others
◆ Poorly researched for pigs
  ■ Positive results with garlic

Immune Modulators
◆ Decrease incidence / prevalence of clinical / subclinical disease
◆ Reduce the need for therapeutic antimicrobials
◆ antibodies
◆ spray dried plasma
◆ cytokines
◆ antimicrobial peptides
◆ conjugated linoleic acid

Other Feed Supplements
◆ Improvements in average daily gain
◆ Improvement in feed efficiency
◆ Improvement in feed intake
◆ Decrease incidence / prevalence of disease
◆ zinc
◆ copper
◆ vitamin E
◆ CLA
◆ phospholipids
◆ prebiotics
  ■ fructooligosaccharide
  ■ fructans

Conclusions on Alternative Additives
◆ So far, no alternatives have shown same potency as antibiotics in preventing diseases
◆ No “magic bullets”
◆ Combinations are possible
Alternative Management Strategies

Improved Diet Formulation
◆ Reduced crude protein content of diets
◆ No soybean meal in starter diets
  ■ Fish meal, potato protein, crystalline AA
◆ Inclusion of spray dried animal plasma in starter diets
◆ Using heated or processed cereal grains
◆ Barley- or oat-based diets
◆ Specific fibers
◆ Fermentation by-products (DDGS)

Feeding Management
◆ Restricted feeding
◆ Multiple feedings right after weaning
◆ Liquid feeding
◆ Fermented liquid feeding
◆ Water supply

Later Weaning
◆ Active immunity established
◆ Dry feed intake started before weaning
◆ Water intake started before weaning
◆ Improved sow reproduction
  ■ Higher number of live born pigs
◆ Sow longevity?

Disease prevention
◆ Reduce cross fostering
◆ Reduce mixing at weaning
◆ All in-All out
◆ Off site weaning
◆ Avoid crowding

THE RENDERING INDUSTRY: REPORT/RECOMMENDATIONS
TO THE FEED SAFETY COMMITTEE OF THE USAHA
Don A. Franco, DVM, MPH, DVPM
President, Animal Protein Producers Industry
Vice President, Scientific Services
National Renderers Association

The rendering industry looks to the future with guarded optimism and the hope and confidence that the regulatory agencies of the United States with the responsibility to ensure feed/food safety, and animal and public health, will base future decisions/rules on the existing scientific knowledge of risk and avoid the compelling temptations to pursue policies based on political appeasement and zero risk.

On the subject of the transmissible spongiform encephalopathies
(TSEs), using the objective of the transmission, amplification and prevention of bovine spongiform encephalopathy (BSE) as a prototype, the existing compliance inspection findings of over 98% of rendering facilities with 21 CFR 589.2000 (Animal Proteins Prohibited From Use in Ruminant Feed) by the FDA needs no further elucidation. The record validates the commitment of the rendering industry (and the allied feed industry) to play an active preventive role to assure that BSE is never introduced into the US through a feed-borne mechanism. I know of no other regulatory initiative that will approximate that level of compliance, even in a country without any evidence of the disease, and sixteen years after the disease was first reported in the UK.

There are still elements within the FDA who want to impose their views of risk on the public due to the “subjective” nature of risk analysis, the uncertainty of knowledge of risk, and the political dimensions of risk debates to support a hyper-conservative approach. While that philosophy has “molecules” of logic, the historical record of the TSEs, the current risk epidemiology, and the instituted preventive controls employed over the years for the protection of animal and human health should be the predominant reference source for future policies. Especially relevant is the continuing inclination for an agency to heighten an issue like chronic wasting disease (CWD) pending a further calculus of risk. This is unfortunate due top current knowledge of the disease that has accumulated over the past 36 years in this country that indicates CWD is unique to deer and elk, is not known to transmit to cattle, sheep, or goats, and is not associated with any human health relevance.

The agency has indicated that it would use the advance notice of proposed rulemaking (ANPR) to solicit public comments on their proposals. The rendering industry plans to play a significant contributory role by providing insightful options for consideration/recommendation.

In reality, an agency of government could serve to disenfranchise sectors of society involved with the control of hazards and risks when that agency fails to put risk in context based on the existing science. As a result, the rendering industry strongly advises that future planned policies/rules be based on science, and not the nuances of undefined precautionary principles or the aspects of zero risk as heightened by some. The pursuit of zero risk as a goal is frequently unnecessary, economically impractical, often unattainable, and likely to create unfounded public concern when zero risk is not attained. Additionally, the pursuit of zero risk as a goal for one issue may preclude resource availability for other priorities.

The Animal and Plant Health Inspection Service (APHIS) of the USDA continues to examine the varied dimensions of risk reduction strategies for potential BSE pathways with special relevance to dead stock and “downer” cattle. The agency plans to use the advance notice of proposed rulemaking (ANPR) approach, in like manner of the FAD, that will provide an opportu-
nity for public comment on the subject. The rendering industry sees this as an opportunity to highlight the subject based on risk and plans to collaboratively work with the agency to develop workable options to prevent any transmission of the disease to the cattle population.

APHIS, doubtless, has been under pressure from diverse special interest groups to enhance additional safety dimensions to their current BSE prevention and control policies. This is in spite of the agency’s own internal risk assessments done since 1994 that identified the minimal aspects of risk and the recent findings of the Harvard Risk Analysis (HRA) study that the US is resistant to BSE published in November 26, 2001.

The historical record should both affirm and validate that based on 160 years of commercial rendering in the US and the production of meat and bone meal (MBM) that has been subsequently used as a feed ingredient in livestock feeds for over 100 years that the risk factors for the transmission and amplification of BSE through the use of MBM in this country must be considered minimal, at worst. Additionally, the FDA current regulations prohibiting the feeding of animal feed since 1997 should be an indication for regulatory comfort. The agency, nonetheless, sees a need for preventive measures that are over and above what are currently in place and that have worked well for the agency for the past 16 years. This defies logic even for a disease that is both complex and enigmatic. While the rendering industry readily appreciates the necessity for caution, risk factors for an outbreak of BSE have been the lowest in this country since the disease was initially reported in 1986 in the UK.

If the agency is truly concerned about potential risk factors that could be associated with dead stock and “downer” cattle in the transmission of BSE, they must look beyond the confines of the rendering industry and examine the likelihood of the introduction of requirements to handle byproducts and mortalities disposed of other than by rendering that should provide the same levels of traceability, biosecurity, and environmental accountability expected from the rendering industry. That could serve as the added security sought by the agency.

Sixteen years after the initial outbreak of BSE in the UK and the implementation of extensive surveillance and testing programs in the US, assurances can be provided that the feed/food supply in the country is safe. This is the result of planned prevention strategies and the commitment of the responsible government agencies. The cattle industry, and the feed/rendering industries that all worked collaboratively to prevent BSE, and by inference, the human counterfeit variant Creutzfeldt-Jakob disease from gaining an foothold in the country.

In closing, I am reminded of an excellent quote from a paper written by Short in 1984 on: “The social fabric at risk toward the social transformation of risk analysis” published by the American Sociological Review. The author stated: “Risk is now generally used to relate only to negative or unde-
sirable outcomes, not positive outcomes. This is even the case in more technical assessments of risk. While risk and cost-benefit analyses focus on both positive and negative potential outcomes, benefits tend to receive short shrift in these analyses, as do positive aspects of risks.” To this I add my own perspective. Risk so often is used to denote a phenomenon that has the potential to deliver great harm, whether or not the probability of this harm eventually is estimable. In essence, the government must also put risk in its proper perspective when making attempts to address regulatory options.

DIOXIN RESTRICTIONS IN ANIMAL FEED
EU AND US SITUATIONS
Markus Cooke, Ph.D.
Cooke Companies International
P.O. Box 810
Chapel Hill, NC 27514 USA

The EU has three regulatory levels: Maximum, Action and Target
Maximum level: Primary regulatory control
PCB added by 12-21 2004
EC establishing a PCB database
Current Maximum levels will be adjusted by 12-31-06

Action level:

Target level: These will be achieved over time
Will be set to meet the TWI goals
Levels will be set by 12-31-04

Internationally acceptable Dioxin risk levels:
TDI 1-4pg TEQ/Kg BW/day  WHO
TWI 14pg TEQ/Kg BW/wk  EC
TM70pg TEQ/Kg BW/mo  JEFCA

Dr. Cooke gave dioxin measures for a variety of feedstuffs according to EU regulations.
Types of feed contamination in EU:
PCB contaminated, recycled vegetable oils and fats
Ball clay/ kaolinitic clay
Citrus pulp pellets
Drying Process
Choline Chloride
Contaminated trace elements

Special Situations:
Levels don’t apply to food products containing less than 1% fat
Temporary derogation clause
Investigations
5% of monitoring results
US FDA programs for dioxin:
1. Develop baseline information
2. Monitoring dioxin, furan and PCBs
3. Following up any high values found

Dr. Cooke gave numbers of feed samples taken and tested for dioxins over the last year.

He then gave average results of these tests in different feed samples such as animal feed, MBM, Poultry meal, fish based feed ingredients and byproducts meal.

EPA reports that dioxin levels in the environment is down 77% since 1987. Backyard barrel burning was 57% of this decrease.

Summary:
1. EU regulations are fully in place
2. These regulations are now expanding to PCBs
3. FDA feed programs show few problems
4. EPA, USDA, and FDA continue testing
5. New EPA regulatory programs will look at asphalt, secondary zinc, TiO2
6. FDA sampling plans are set for 2002/2003
REPORT OF THE COMMITTEE ON FOOD SAFETY

Chairman: Dr. Richard E. Breitmeyer, Sacramento, CA
Vice Chairman: Dr. Bonnie J. Buntain, Washington, DC

Dr. Robin C. Anderson, TX; Dr. Lekan Ayanwale, AL; Dr. Marilyn F. Balmer, MD; Dr. Bill F. Barnum, OK; Dr. David H. Baum, IA; Dr. Terry L. Beals, MD; Mr. John R. Behrmann, PA; Dr. Joseph L. Blair, VA; Dr. Dale D. Boyle, DC; Mr. Terry L. Burkhardt, WI; Dr. David M. Castellan, CA; Dr. H. Michael Chaddock, MD; Dr. W. Jan Charmins, WV; Dr. Andrew A. Clark, OR; Dr. Max E. Coats, Jr., TX; Dr. Chris S. Cnich, UT; Mr. Carl W. Cushing, VT; Dr. Paul L. Dieterlen, IN; Dr. William H. Dubbert, VA; Dr. Elizabeth Enciso, MI; Dr. R. David Glauer, OH; Dr. James M. Glover, CA; Mr. L. Wayne Godwin, FL; Dr. Bert A. Gore, AK; Dr. Larry M. Granger, MI; Dr. Tsegaye Habtemariam, AL; Dr. Cheryl Hall, MD; Mr. Neil Hammerschmidt, WI; Dr. David R. Hermes, IN; Dr. Robert G. Hicks, VA; Dr. G. Thomas Holder, MD; Dr. Rex D. Holt, GA; Dr. David Hopson, MO; Mr. Danny R. Hughes, AR; Dr. John P. Huntley, NY; Dr. John R. Irby, TX; Dr. Lee C. Jan, TX; Dr. Robert F. Kahrs, FL; Dr. Susan J. Keller, ND; Dr. Tari P. Kindred, VA; Mr. Kevin M. Kirk, MI; Dr. Spangler Kloppe, DE; Dr. Glenn E. Kolb, WI; Dr. Elizabeth A. Krushinskie, VA; Dr. Daniel E. LaFontaine, SC; Dr. Elizabeth A. Lautner, IA; Dr. William F. Leese, VA; Dr. David J. Ligda, IN; Dr. Anne A. MacKenzie, CAN; Mr. Michael M. Mamminga, IA; Mr. Arthur P. Marquez, NM; Dr. Bret D. Marsh, IN; Dr. David T. Marshall, NC; Dr. James D. McKean, IA; Ms. Phyllis Menden, WI; Mr. Stephen L. Merkler, OH; Dr. William Mies, TX; Mr. Joe Miller, DC; Dr. Armando Mirande, GA; Dr. Bert A. Mitchell, MD; Dr. Harry C. Mussman, MD; Dr. Lee M. Myers, GA; Dr. David N'ganwa, AL; Dr. Carol A. Olmstead, MT; Dr. Kenneth E. Olson, IL; Dr. Gary D. Osweiler, IA; Dr. James K. Payne, FL; Dr. Marshall Phillips, PA; Mr. Stephen Pretanik, DC; Dr. H. Graham Purchase, DE; Dr. Marshall Putnam, GA; Dr. Gerardo Quaassdorff, VT; Dr. John R. Ragan, MD; Dr. G. Donald Ritter, DE; Mr. Michael C. Robach, GA; Ms. Nancy J. Robinson, MO; Dr. Leon H. Russell, Jr., TX; Dr. John P. Sanders, Jr., MD; Dr. Charles R. Seagren, SD; Mr. Glenn N. Slack, KY; Dr. Harry Snelson, NC; Dr. Theron G. Snider, III, LA; Dr. Manuel A. Thomas, Jr., TX; Dr. Kenneth L. Thomazin, CA; Mr. Daniel J. Vitiello, DC; Dr. Lyle P. Vogel, IL; Mr. David C. Warren, FL; Dr. Irene V. Wesley, IA; Dr. Richard D. Willer, AZ; Dr. Larry L. Williams, NE; Dr. Nora E. Wineland, CO; Dr. Richard R. Wood, IL; Mr. John F. Wortman, Jr., NM; Ms. Ria de Grassi, CA.

The Committee on Food Safety was called to order by Dr. Richard Breitmeyer, Chairman, at 12:30 p.m. on October 20, 2002. There were 26 members and 52 guests in attendance. Dr. Breitmeyer provided an overview of the program, which was followed by self-introductions of attendees.
The Committee is very grateful for the contribution to this report by Dr. John Ragan.

Dr. Terry Wilson, USDA, APHIS, VS, presented *Natural and Intentional Introductions of Bioterrorism Agents to Our Food Supply*. He described his work with the Department of Defense and the intelligence community in defining the threat of agroterrorism in the United States as a significant element of the overall terrorism concerns and preparations of the nation. Dr. Wilson pointed out that, while numerous agencies have a role in intelligence gathering and analysis, USDA does not have a mandate for that activity, and must depend upon effective liaison with the intelligence community to insure that American agriculture is protected. He indicated that a recent publication by the Agricultural Research Service of a list of pathogenic agents makes it clear that many potential bioterrorism agents are endemic in much of the world, and thus readily available to those who would misuse them. He pointed out that materials gathered by the intelligence community from potential terrorist groups around the world indicate that the U.S. economy is a common target, and that those parties are well aware of the impact, which animal and zoonotic disease outbreaks can have on that economy. A number of willful introductions of animal pathogens have been documented in several countries, including the U.S.

Dr. Wilson suggested that there is an urgent need for a seamless plan for defense against agroterrorism, including extensive liaison between the animal industries and its supporters with the intelligence community, adequate staffing and funding within agricultural agencies, and training in animal diseases for a wide range of law enforcement, emergency response personnel, and others who would be critical to an effective response to a bioterrorism attack.

He recommended a number of sources of information on bioterrorism, including the ARS list of animal pathogens mentioned above and the "Anarchist’s Cookbook" as high priority reading for those working in protecting the health of U.S. livestock. He indicated a willingness to assist those interested in learning more about bioterrorism defense, and can be contacted through the Veterinary Services Emergency Programs Staff.

A panel presentation on *Carcass Disposal Issues* was lead by Dr. Linda Detwiler. She indicated that the issue was raised as a result of concern about BSE, but that it is actually a much broader concern affecting all of the stakeholders in animal agriculture, and well as the public. There are a number of alternatives available for disposal of animal carcasses and related materials. They include rendering, burial, burning, incineration, landfill, composting, and digestion. However, there are problems with each of the alternatives. Cost, environmental hazards, capacity, and the fact that no one ("not in my backyard") wants to be near any of the disposal processes are just examples of those problems.

The Harvard risk assessment on BSE suggested that TSE’s might be
REPORT OF THE COMMITTEE

recycled back into the food system through inadequate disposal of dead animals on farms. Increasingly, we do not know what becomes of the on-farm carcasses and viscera from some slaughter processes that do not go directly to rendering facilities. USDA and state efforts resulted in the testing of nearly 20,000 high-risk cattle for BSE in FY 2002.

Dr. Richard Breitmeyer, State Veterinarian from California and Dr. David Glauer, State Veterinarian from Ohio, spoke about state concerns for the disposal issue. They indicated that the loss of market for meat and bone meal has created a real problem for the rendering industry, and that there is a risk of losing the benefits that this industry brings to society. This market loss adds to the problems of energy costs, pollution and odor control, and separation of product to create real difficulty for renderers. While producers’ primary concerns are cost, availability, and convenience, animal health officials have great concern for the availability of disposal capacity at reasonable cost in the case of major animal health emergencies, which require destruction of large numbers of animals in a short period. In addition to the usual disposal concerns for animal carcasses and slaughterhouse waste, it is now recognized that disposal of condemned or out-of-date product in channels of commerce is often a challenge.

Dr. Doris Olander, USDA, APHIS, VS, (WI) presented Options for Disposal, a review of animal carcass and waste disposal. She reviewed the goals of disposal: animal health, public health, and environmental preservation, and indicated that regulatory buy-in is important for whatever disposal options are selected. Summary points include the advantages and disadvantages of various disposal methods:

**Burial**—advantages include rapidly and locally available, excellent capacity and easy to build; disadvantages include potential ground water contamination, potential human health risks, no active steps to kill pathogens, potential expensive remediation costs, potential regulatory and legal problems and local opposition.

**Landfills**—advantages include excellent capacity, good containment of carcasses, associated pick-up services, leachate management services and groundwater monitoring; disadvantages include no inactivation step (simply degradation), wastewater plants may be reluctant to take leachate and many do not want in backyard.

**Rendering**—advantages include heat inactivation of pathogens, by-products can be marketed, established transportation system, good mass reduction and excellent capacity; disadvantages include potential to contaminate feed with prohibited materials, industry concerns about certain materials, poor public understanding and awareness of industry and limited numbers of facilities in some states.

**Incineration**—advantages include significant inactivation of pathogens including TSEs and good mass and volume reduction; disadvantages include lack of capacity, regulatory restraints, no collection system, cost is
high and may raise concern about airborne dispersal of pathogens.

Alkaline Hydrolysis ("Digestion")—advantages include TSE inactivation under specified conditions and moderate operating costs; disadvantages include low capacity, high initial costs and by-product disposal may be difficult.

Mr. David Kirstein, National By-products, presented State of the Rendering Industry, and described the current issues impacting the rendering industry. He indicated a concern for improper or illegal disposal of dead animals on farms. He reviewed information from the Sparks Company report on disposal methods and costs, which show that there are approximately three billion pounds/year of livestock mortalities in the United States. Also, the report indicates that the percentage of those materials handled by renders has decreased since the FDA restrictions on feeding of meat and bone meal to ruminants have been in place. Mr. Kirstein suggests that significant portions of those carcasses are no longer being rendered are from "high risk" animals for TSE's. He indicated that regulatory agencies are largely unaware of what is being done with those carcasses diverted from rendering, and that a portion of them are likely being improperly handled by composting processes that are inadequate.

Dr. Ross Hamilton, Darling International, also addressed disposal issues from the perspective of the rendering industry in his presentation, Necessary Disposal Standards, Options, Feed Grade vs. Disposables. He reminded the group that the FDA feed rule put in place for TSE prevention might inadvertently be causing an increase in food safety due to bacterial pathogens in materials diverted from rendering, which effectively eliminates bacteria. He pointed out that 75% of the meat and bone meal is now classed as "restricted" by FDA, and that there is no non-feed usage for rendered protein product. He indicated a concern that "if it is not rendered, it is not consistently regulated." He pointed out some of the limitations on non-rendering disposal alternatives, such as low capacity, opportunity for technical failures in composting, lack of traceability of animals land-filled, etc. He indicated that the rendering industry might have to be divided between producing feed-grade product and providing a disposal service. Also, as that portion of the industry committed to disposal grows, service fees will also need to increase. In summary, Dr. Hamilton stated that the rendering industry offers society's best method of disposal of animal carcasses and other animal waste products.

Representatives from the rendering industry offered a resolution for the Committee's consideration, which would provide for federal licensing and standards for animal disposal (see below).

Dr. Mark Rasmussen, USDA, ARS, NADC, presented information on ongoing work in pre-harvest food safety at NADC. Projects include the carcass contamination imaging system licensed and being developed by eMerge International. The system has proven very sensitive in detecting
fecal contamination by the presence of chlorophyll derivatives. It is being field tested under contract with a major beef processor. Work continues on the study of fasting, transport, and refeeding of food animals, and the impact they have of food safety risk factors. Also, the search for answers to the rapid spread of pathogens in lairage continues, with efforts to identify prevention practices and to evaluate the feasibility of immediate slaughter of animals as they arrive at plants.

Researchers are working to better define the ecology of E. coli O157:H7 in cattle, and to develop interventions, which will reduce levels of the pathogen in slaughter cattle. The question of whether cattle may serve as a marker for environmental saturation with the agent is being explored. Also under study is the relationship between this and other pathogens and the numerous protozoa, which inhabit the bovine gastrointestinal tract.

Dr. Robert Kahrs presented *Food Safety: Global Trade and Market Access*, and reviewed the importance of food safety issues in international trade. He also emphasized the importance of veterinary leadership in educating the public from farm to table about food safety issues. Consumer trust is often shaped by the media; and those in the media must have a reliable source of accurate information. He closed by encouraging the veterinary community to work with organizations to be proactive in getting appropriate information and messages to the media and the general public about food safety. Dr. Karhr's paper follows in its entirety.

One resolution was passed unanimously and forwarded to the Committee on Resolutions, *Biosecure Disposal of Animal Byproducts and Mortalities*.

The meeting was adjourned at 5:30 p.m.
Global access involves domestic and foreign markets. Domestic markets fluctuate with consumer preferences, prices, media coverage and consumer trust. International markets are more complicated. They reflect price and the import requirements of recipient countries.

When prices are competitive, foreign market access depends on requirements of importing countries that must be verified by officials of exporting nations. Although influenced by economic, scientific and political factors, these documents contain mostly sanitary requirements. Mutually agreeable wording of export certificates is best achieved when trust exists between the parties. Thus, the trust issue is crucial to domestic and international market access and focuses largely on food safety.

Veterinary medicine is among the most highly respected and trusted of the professions. Globally, veterinarians are heavily involved in public health and in many countries are the authority figures and principle advocates of science-based food safety measures. The veterinary profession is trained in food hygiene, epidemiology, microbiology and zoonotic diseases. If veterinarians spoke with one voice on food safety, they could improve global health and US markets at home and abroad.

In the United States, veterinary activity is sprinkled throughout the food chain. The profession’s input includes on-the-farm residue avoidance and disease reporting activities by practitioners. It also includes veterinarians employed by poultry and meat production and processing companies, state animal health and public health officials and the academic and diagnostic communities. These are joined by federal veterinarians whose activities are divided among domestic disease control, meat and poultry inspection and international trade activities. When speaking on behalf of their employers, these professionals have organizational agendas that dilute their impact. The organizations they represent may have differing positions on food safety and varying levels of credibility in the eyes of the public.

When speaking collectively on behalf of the profession, veterinarians are the nation’s most credible and trusted advocates of common sense food safety measures and international sanitary issues. Even though the United States Animal Health Association (USAHA), the American Association of Veterinary Laboratory Diagnosticians (AAVLD), the American Veterinary Medical Association (AVMA), and National Association of Federal Veterinarians (NAFV) have food safety expertise, veterinarians rarely speak with one science-based voice on food safety issues. Thus, their input is unheard in public forums and their talents are unappreciated by public health agencies, and other groups involved in food safety issues. They ought to
be asked to participate but are not.

The USAHA, AAVLD, AVMA, NAFV and USDA could establish a food safety task force representing the spectrum of veterinary activities and including members of specialty groups. Its credentials would permit it to be a trusted communicator with domestic consumers, international markets and the press.

This task force, serving as an expert committee could use press releases to reorient or remind the public of their responsibility. Amidst publicity about massive recalls and inspection deficiencies, the public seems to have forgotten the facts of life about food poisoning. These are that intestinal tracts of all humans and animals contain microorganisms that can multiply rapidly in unrefrigerated foods but usually won’t survive cooking. What is rarely mentioned in news reports is that risk reduction involves the entire food chain but ultimately resides in restaurants and home kitchens where refrigeration, prevention of cross-contamination and thorough cooking are essential.

The Task force could comment on proposed food safety regulations and import-export measures and speak on domestic food safety issues. They could also revive the dying National Animal Health Reporting System, support standardized animal ID and other issues essential to US credibility and trust in global market places.
FOREIGN AND EMERGING DISEASES

Chairman: Dr. Mo D. Salman, Fort Collins, CO
Vice Chairman: Dr. Corrie C. Brown, Athens, GA

Dr. Helen M. Acland, PA; Mr. John B. Adams, VA; Dr. Bruce L. Akey, VA; Dr. Wilbur B. Amand, PA; Dr. Alex A. Ardans, CA; Dr. Joan M. Arnoldi, MI; Dr. Lekan Ayanwale, AL; Dr. Charles A. Baldwin, GA; Dr. Derek J. Belton, Dr. Bob H. Bokma, MD; Dr. Steven R. Bolin, MI; Dr. Theresa L. Boyle, ; Mr. Philip E. Bradshaw, IL; Dr. Richard E. Breitmeyer, CA; Dr. Gary L. Brickler, WA; Dr. William L. Brown, KS; Dr. William W. Buisch, NC; Dr. Conley Byrd, AR; Dr. Jerry J. Callis, NY; Dr. Hector Campos, Dr. Yung Fu Chang, NY; Mr. Alan R. Christian, MD; Dr. Luis Alberto Espinoza Rodezno, Jaime Estupinan, NY; Dr. Adele Faul, ; Dr. Peter J. Fernandez, DC; Dr. Richard W. Fite, MD; Dr. Patricia L. Foley, IA; Dr. James M. Foppoli, HI; Dr. Don A. Franco, FL; Dr. Anthony M. Gallina, PA; Dr. Dorothy W. Geale, CAN; Dr. John E. George, TX; Dr. E. Paul J. Gibbs, FL; Dr. Joel Goldman, LA; Mr. Daniel M. Goodyear, PA; Dr. Tsegaye Habtemariam, AL; Dr. Amir N. Hamir, IA; Dr. Heidi J. Hamlen, CA; Dr. Christopher H. Hannafin, RI; Dr. Sebastian E. Heath, DC; Dr. Billy R. Heron, CA; Dr. David W. Hertha, AL; Dr. Owen W. Hester, AL; Dr. Sharon K. Hietala, CA; Dr. Richard E. Hill, IA; Dr. Sam D. Holland, SD; Dr. Thomas J. Holt, NC; Dr. Martin E. Hugh-Jones, LA; Dr. Jeffry J. Huse, NY; Dr. John L. Hyde, NY; Dr. William T. Jolly, DC; Dr. Robert F. Kahrs, FL; Dr. Nels Konnerup, WA; Dr. Elizabeth A. Lautner, IA; Dr. Hardi Liauw, ME; Dr. David J. Ligda, IN; Dr. Linda L. Logan, TX; Dr. Jorge W. Lopez, ; Dr. Juan Lubroth, NY; Dr. Edward T. Mallinson, MD; Dr. Bret D. Marsh, IN; Ms. Mary J. Marshall, UK; Dr. Peter W. Mason, NY; Dr. Thomas S. McKenna, NY; Dr. Tracey S. McNamara, NY; Dr. Robert W. Mead, WA; Ms. Phyllis Menden, WI; Mr. David A. Miller, IA; Mr. Joe Miller, DC; Dr. Robert B. Miller, VA; Dr. John C. Morrill, TX; Dr. Fonda A. Munroe, CAN; Dr. David Nganwa, AL; Dr. James E. Novy, TX; Dr. Raul Casas Olascoaga, Dr. Richard E. Pacer, AA; Dr. Charles Palmer, CA; Mr. Richard P. Peterson, CA; Dr. John W. Poe, KY; Dr. Kelly R. Preston, MD; Dr. Gerardo Quaassdorff, VT; Ms. June M. Reed, PA; Dr. Mark A. Remick, MI; Dr. John Roberts, PA; Dr. Luis L. Rodrigues, NY; Dr. James A. Roth, IA; Dr. Jack L. Schlater, IA; Dr. Thomas C. Schooler, TX; Dr. Eduardo Serrano Perez, ; Dr. David M. Sherman, MA; Dr. George P. Shibley, MD; Dr. Harry Snelson, NC; Dr. Paul Sutmoller, VA; Dr. David E. Swayne, GA; Dr. Sabrina L. Swenson, IA; Dr. Pamela K. Swift,
The chair and vice-chair, Drs. Mo Salman and Corrie Brown, reviewed resolutions from last year as well as the strategic plan of the committee. Dr. Brown shared with the committee members the liaison reports for this year (see attached).

Dr. Bill Wagner, CSREES, gave an overview of the National Animal Health Laboratory Network. As of last week, all of the final work plans have been approved, with funds disbursed. Expectations for the laboratory include adequate, trained personnel, facilities meeting BSL-3 capability, quality assurance program, and record system and communications capability to share data. He stressed that this is the initial step of the National Network and that the number of laboratories will continue to expand.

Dr. Tom McKenna, USDA-APHIS, reviewed the eight diseases diagnostic tests that will be transferred to the National Animal Health Laboratory—FMD, CSF, ASF, CBPP, RP, HPAI, VVND, LSD. Validation of an avian influenza realtime PCR is nearing completion. CSF will be the next test to be refined and validated. The FMD test is scheduled to be the third to be released.

Dr. Norm Willis, Consultant to OIE, presented “Socioeconomic Impacts of Foreign Animal Diseases.” Much attention is focused on the possibility of a significant outbreak of a FAD in North America, and the accepted framework now is prevention, preparedness, response and recovery. Additional attention should be paid to predictors of disease, especially social and political factors. In addition, consequences of disease should be examined in a broader context, to include not only economic impacts, but also social and psychological problems that result.

Dr. Joe Annelli, USDA-APHIS, reported on progress made by the National Animal Health Emergency Management System over the last year. Three courses were held for Area-Veterinarians-in-Charge, to train them on the Incident Command System (ICS), which is being implemented throughout the USDA. A Satellite Seminar was held in September 2002, to discuss the ICS. The ICS was used in the low path avian influenza outbreak in Virginia this year. In the ICS, the Area-Veterinarian-in-Charge and the state veterinarian are the area commanders.

Dr. Jim Case, University of California-Davis, presented a paper co-
authored with Drs. Steve Tharratt and Dave Hird, “Perceptions of State Public Health Officers and State Veterinarians Regarding Risks of Bioterrorism in the US.” The full paper can be found in the June 15, 2002, issue of the *Journal of the American Veterinary Medical Association*. A cross-sectional survey of the 51 State Health Officers (SHO) and State Veterinary Officers (SVO) was done in the spring of 2001. The overall risk posed by bioterrorism was rated as between “possible” and “very likely” by all respondents. The perception of risk to the United States was significantly greater than the risk perception of the individual state. Physicians assessed the risk of an FMD event lower than both the veterinarians and other professionals. State veterinarians were less likely to be aware of bioterrorism events within their state than state health officials. Veterinarians perceived the risk of a hoax involving anthrax lower than State Health Officers. Both State Health Officers and State Veterinary Officers offices assessed the importance of integration for bioterrorism related activities as higher than integration for other health activities.

Dr. Valerie Ragan presented a status report on the Animal Health Safeguarding Review. APHIS has formed issue groups – national surveillance system, laboratory systems, exclusion activities, coordinated response, veterinary accreditation, organizational dynamics/communication, and information technology. These groups were charged with developing an action plan and an implementation plan. Specific initiatives with respect to foreign and emerging diseases include: data collection, laboratory network development, International Services participation, and development of two new positions—NVSL Safeguarding staff and CEAH Analytical Epidemiologist position. Updates on the Review are posted monthly at: www.aphis.usda.gov/vs/safeguard.htm.

**Panel on Chronic Wasting Disease**

- Dr. Mike Gilsdorf, USDA-APHIS, outlined the State/USDA/Department of Interior National Management Plan. Earlier this year, a multi-agency task force created an implementation plan, which will be submitted in September 2002. Budget needs have been identified—$7.2 million requested for the national herd certification program. Funding for wildlife will be determined by Congress.

- Dr. Wayne Cunningham, State Veterinarian, Colorado, spoke on “CWD—A View from the State Veterinarian.” He emphasized that state rules and regulations vary and what might be applicable in Colorado may be very different in other states. With respect to Colorado statutory responsibility, domestic elk and fallow deer are classed as “alternative livestock” and therefore identified, inventoried, and movements tracked. Because of this extensive database, when CWD became a serious problem in Colorado, tracebacks were easily accomplished. There were some problems
REPORT OF THE COMMITTEE

with free-ranging animals moving the disease into captive herds. The Department of Agriculture has no jurisdiction over free-ranging animals. Communications with the media were problematic.

- Dr. Mo Salman, Colorado State University, presented “Diagnostics—Validation of new rapid tests for the surveillance system.” Several commercial companies have developed tests for BSE—all operate on the same principle, that is, proteinases are used to degrade normal PrP, and then monoclonal antibodies detect the abnormal prion protein. The CSU lab collaborated with two European companies, applying the BSE test to CWD samples to test its usefulness for this disease. The second phase of this validation study is currently in the process with at least three commercially available tests.

Panel on test exercises

- Dr. Mark Teachman, USDA-APHIS, reviewed Exercise Minotaur, which was an FMD test exercise conducted in Australia. There were over 1,000 participants, including political leaders, policy makers, and representatives from industry. A series of emergency management plans were activated. An innovative concept was a focus on worker safety and minimizing stress.

- Dr. Ty Vanieuwenhoven, USDA-APHIS-EP, talked about recent agricultural test exercises—Silent Prairie and Crimson Sky. Silent Prairie was a Department of Defense. It involved an intentional introduction of FMD with the purpose of determining what the impact would be for the military. In late September of 2002, the first of a six-part program, Crimson Sky, was undertaken. ANSER, a consulting group, designed the exercise, with considerable input from the North Carolina Department of Agriculture. The participants were divided into four rooms—an inter-agency group, consisting of deputy cabinet members, a USDA group, an industry group, and a group composed of various states. Communication among the rooms could have been enhanced. Positive impacts of the exercise included an opportunity for agriculture advocates to educate the other players in the exercise and validation of the National Animal Health Emergency Plan. The next APHIS exercise with Crimson Sky will be held in December.

- Dr. Dorothy Geale, Canadian Food Inspection Agency, reviewed the tripartite exercise. She noted three main points for consideration. First, there is a tendency for “third day syndrome”—participants had difficulty on the third day because of continual stress. Second, facilitators should be experienced in interpersonal issues and not just technical specialists. Third, if the exercise is spread over too long a time line, there is lack of continuity of players
and enthusiasm

- Dr. Linda Logan, State Veterinarian, Texas, relayed how the Texas Emergency Response Team (TERT) interacted in the tripartite exercise. Lessons learned were multiple. First, communications at national and international level were suboptimal. Second, there was lack of authority and mechanisms to immediately shut down animal movement. Third, the READEO structure did not mesh well with the state emergency management system. Fourth, better mapping capacity was essential.

- Dr. Lee Myers, State Veterinarian, Georgia, reviewed test exercises and planning in the state of Georgia. In 1999, there was a simulated high path avian influenza outbreak, with both bioterrorism and public health components. They worked on an accelerated time schedule and there was no field component. In 2001, there was a regional exercise with Florida, Georgia, South Carolina, and North Carolina, which occurred over three days. It was a complicated scenario and in Georgia ran on a real time schedule with a field component. The real time schedule effectively tested field response (sales records collection, area census gathering). The interstate communication and planning could have been improved. Some of the support players did not remain fully engaged for three days—an accelerated time schedule would be better for the ancillary partners.

Dr. Mark Thurmond, University of California-Davis, delivered a paper, “Educational preparedness of veterinarians for foreign animal diseases.” Dr. Thurmond was Chair of an Ad Hoc Subcommittee on Educational Issues (Corrie Brown, Paul Gibbs, Beth Lautner, Linda Logan, Tracy McNamara, Lee Myers, John Smith, Harry Snelson, Alfonso Torres, Gale Wagner, Terry Wilson, Mark Thurmond) and oversaw the development of a “white paper” which will be submitted to the Journal of the American Veterinary Medical Association. Suggestions for improving FAD education were directed to universities, the AVMA and USDA. Universities were encouraged to assess curriculum for adequate FAD content, design admissions policies to help attract students specifically interested in corporate and public veterinary medicine, and to increase FAD funding to recruit and retain faculty members interested in this area. Suggestions for the AVMA were to provide strong leadership in promoting foreign animal disease education and continuing to support the Council on Education’s efforts to enforce guidelines requiring foreign animal disease education. Suggestions for USDA were to persist in continuing education on FADs and to promote the improvement of the accreditation process.

Panel on Rapid Diagnostics
- Dr. Robert Heckert, USDA-ARS National Program Leader for
Animal Health, reviewed the ARS role in rapid diagnostics. The partnership between ARS and APHIS is critical. States and universities are active collaborating units. Pathogen detection using classical methods are now being replaced by rapid methods. The Department of Agriculture received $18.3M from Department of Defense to detect plant and animal diseases, and formation of a bioinformatics database. Plum Island received $8.8M for FMD, RP, ASF, CSF, CBPP, LSD, VS. SEPRL received $3M for HPAI and VVND, as well as look-alikes. NADC received $1.5M to examine the look-alike diseases, specifically pestiviruses and PRRS. ABADRL received $0.5M for vesicular stomatitis. For international validation, collaboration with various laboratories around the world is being organized.

- Dr. Tom McKenna, USDA-APHIS-FADDL Laboratory Chief, spoke about FAD testing and the importance of test validation. ARS and APHIS signed a partnership agreement in February 2002, for transfer of rapid diagnostic tests being developed. APHIS will establish criteria for validation but ARS will do the validation. Work plan for field validation of CSF and FMDV PCR tests is being drafted. Validation criteria will be finalized in November 2002. Once tests are validated, staff in the NAHLN laboratories will be trained. There will be proficiency tests for validated assays. APHIS will continue to work with ARS and others on the development of new tests.

- Dr. Jim Pearson, Consultant to OIE, reviewed the OIE test approval protocol. The OIE maintains manuals delineating standards for diagnostic tests and vaccine development. Described tests are based on criteria that will qualify animals for trade. There are additional alternative tests for use in bilateral agreements. New methods can be proposed to the Commissions by Member Countries or OIE Reference Laboratories. The 2004 edition of the manual will have a chapter on validation of nucleic acid amplification procedures.

- Dr. Barb Martin, USDA-APHIS-VS, spoke about validation criteria. There are three stages of validation—bench development, field validation, and collaborative studies. In bench development, gold standard or reference test, reagents, and equipment, are all important considerations. For field validation, the number of samples necessary varies greatly depending on the test and the disease. In collaborative studies, the test goes “on the road.” It is essential that the test be rugged enough to work in a variety of laboratories. Test validation is an ongoing process and each test needs to be continually monitored for reliability and reproducibility.

- Dr. Alfonso Torres, Cornell University, talked about the involvement
of state and university diagnostic laboratories in FAD testing. This is a radical departure from previously existing policy. Dr. Torres stressed that the implications of an incorrect diagnosis are immense.

- Dr. Alex Ardans, California Department of Animal Health and Food Safety, talked about the NAHLN and the potential for validating tests as they are developed in the user environment.

Dr. J. Callis, a retired USDA:ARS researcher, regretted to attend the meeting and to present his talk entitled “Non-transmission of Foot-and-Mouth Disease Virus by Embryos from Foot-and-Mouth Disease Virus Seropositive Sheep and Convalescent Goats”. Dr. Callis, however, submitted the paper and it is attached to this report.

Dr. Paul Kitching, Director, CFIA Foreign Animal Disease Diagnostic Laboratory, presented a paper, “New Strategies for the Control of FMD.” As a result of the UK outbreak and subsequent global discussions, large scale slaughter is no longer politically acceptable as a means of controlling and eradicating FMD. In the event of FMD in Europe or North America there will be considerable pressure to use vaccination. Several nonstructural protein antibody tests for FMD are available but none have been validated. The requirements for FMD free status as delineated by OIE were reviewed. A key question is how to identify the vaccinated animal that is a carrier.

Dr. Tim Carpenter, University of California-Davis, presented a paper (co-authors Tom Bates, Mark Thurmond), “A Simulation Model to Evaluate Alternative FMD Eradication Strategies,” This team, with input from both state and federal partners, has developed a computerized model to determine how quickly FMD might spread through the state. Data were collected to ascertain the level of activity of direct and indirect contacts, which would potentially result in transmission of FMDV if one premises contained animals, which were infected and another with susceptible animals. These data were combined with information regarding the probability that such a contact would result in transmission. Ring and high-risk vaccination and/or preemptive slaughter alternatives were found to significantly reduce the number of herds predicted to be infected. However, based on the direct costs of all programs, only vaccination alternatives were found to be economically viable.

Dr. Luis Rodriguez, USDA-ARS, gave an update of research activities at the Plum Island Animal Disease Center. The three main areas of research are: genomics and epidemiology (including rapid diagnostics); mechanisms of disease control and immune response; and outbreak interventions. Rapid diagnostics has been covered previously. Investigations of immunity to FMD have revealed that FMD blocks T cell response in swine, and so development of specific immune response is shut off early in infection. Promising areas of outbreak interventions include fast acting vaccines and antivirals. They did a pilot trial of UBI-FMD peptide-vaccine in cattle.
Consensus peptide including the loop region of type-O FMD VP1 induced peptide-specific antibodies but failed to protect cattle against FMD type O. Dr. Marvin Grubman’s work on FMDV empty capsid vaccines was reviewed. Capsid genes within an adenovirus vector were efficacious—one dose of this virus protects 100% of swine challenged 7 days postvaccination. Insertion of interferon (IFN) alpha in an adenoviral vector protected swine against acute viral infection for 24 hours and longer. Combination antiviral and vaccination strategy protected swine five days later.

Janet Warg, USDA-APHIS-VS-NVSL, presented “Validation of a PCR Assay for Detection of *Cowdria ruminantium*.” The pCS20 region is the most widely used diagnostic target. NVSL worked on a nested PCR to increase sensitivity. For validation, three different geographic regions of the United States were examined. Specificity of the nested pCS20PCR on U.S. origin cattle is 99%. Specificity was examined for white-tailed deer and elk. All to date have been negative.

Dr. Mark Schoenbaum, USDA-APHIS-VS-CEAH, reported on a disease modeling workshop held as part of the North American Animal Health Committee—Emergency Management Working Group meeting. Various disease-spread models from different countries were discussed at the meeting. There were excellent recommendations and countries benefited by taking the best parts of all exercises for use.

Three resolutions were passed by the committee during their second session of this year’s meeting. One resolution was discussed and not forwarded to the general session.

**USAHA Foreign and Emerging Diseases Committee**

*Liaison Reports*

*October 2002*

These brief reports are designed to update members of the USAHA FED Committee regarding relevant activities over the last year.

**NATIONAL ASSEMBLY OF CHIEF LIVESTOCK HEALTH OFFICIALS**

Submitted by Dr. Joan Arnoldi

State Veterinarian, Michigan

The National Assembly of Chief Livestock Health Officials (NACLHO) has been most concerned with emergency planning, especially for Foot and Mouth Disease. All members, as well as their AVIC counterparts, attended a 10-day training session sponsored by the Department of Justice on Foreign Animal Diseases (FAD) and Emergency Management. Specific disease concerns this past year for NACLHO have been Bovine Spongiform Encephalopathy (BSE), Chronic Wasting Disease (CWD), Scrapie issues, and Avian Influenza and its impact on trade.
There have been in-depth discussions on the importance of individual and premises identification in tracing diseases, especially FAD's.

**AMERICAN VETERINARY MEDICAL ASSOCIATION**  
Submitted by Drs. Lyle Vogel and Cindy Lovern, AVMA

The American Veterinary Medical Association considers foreign and emerging animal diseases a matter of national security that threatens our country's economic infrastructure. Spring and summer 2002 found the AVMA Veterinary Medical Assistance Teams (VMAT) in the state of Virginia assisting the United States Department of Agriculture during the low pathogenic avian influenza outbreak. The creation of the AVMA Committee on Disaster and Emergency Issues (CDEI) further illustrates AVMA's commitment to disaster and emergency issues including foreign and emerging animal diseases. In these days of bioterrorism threats, animal diseases are of utmost importance. It is crucial that the veterinary profession play the lead role in surveillance, detection, and prevention of these potentially devastating diseases. That is why AVMA is working closely with USDA/APHIS to develop a new veterinary accreditation program, which includes foreign animal disease education modules. In addition, the AVMA Council on Education requires that veterinary schools and colleges include foreign animal disease education in their curriculum in order to meet AVMA accreditation standards. Additionally, the AVMA is one of the six partners on the National Animal Health Emergency Management System Steering Committee. Also, through a liaison to the Joint Subcommittee on Aquaculture, National Aquatic Animal Health Task Force, the AVMA is examining the harmonization, with terrestrial FADs emergency management, of aquatic-FAD prevention, preparedness, response and recovery efforts that will be incorporated into a National Aquatic Animal Health Plan that is being developed. The AVMA has also provided input to APHIS and others on new aquatic FAD emergence in the US (Infectious Salmon Anemia, Mikrocystosis, Spring Viraemia of Carp). With the development of the new education standards for veterinary school accreditation, the new veterinary accreditation program, the VMAT, and the CDEI, AVMA continues to support the veterinary profession in the areas of greatest concern to our members.

**USDA, APHIS, VETERINARY SERVICES, EMERGENCY PROGRAMS**  
Submitted by Dr. Joe Annelli

- Veterinary Services (VS) is working with State agencies and Tribal Nations in the development of approximately 89 cooperative agreements totaling over $18.5 million for projects designed to improve the United States emergency preparedness and
surveillance capabilities. These cooperative agreements were funded by supplemental Homeland Security Funds.

- Emergency Programs (EP), in conjunction with the Federal Emergency Management Agency have developed a draft Federal Response Plan for responding for foot-and-mouth disease (FMD) and other highly contagious diseases. The draft plan went out for comment in November 2001 changes have been reviewed and incorporated by both FEMA and USDA and the revised draft was redistributed in September 2002.

- VS provided more than 300 Federal, State, and private veterinarians the opportunity to serve on 30-day details to the United Kingdom to help manage the FMD outbreak. This was a valuable experience for those involved and provided a valuable service to the United Kingdom.

- VS continued to offer foreign animal disease (FAD) courses at the Plum Island facility, including a 1-week FAD course for laboratory diagnosticians and a course taught in Spanish. VS also trained a pool of personnel from around the country to serve as Foreign Animal Disease Diagnosticians doing FMD diagnostics in the event of an FMD outbreak in the United States. There was also a Poultry Specialist Foreign Animal Disease School conducted at NVSL.

OFFICE OF INTERNATIONAL EPIZOOTICS
Submitted by Dr. Norm Willis, Past President, OIE

In its Third Strategic Plan (2001-2005), the OIE defined its mission as a “manager of information”—To convert international scientific data on animal health into information and to transform information into knowledge products that meet the needs of Member Countries.

A full-time web master position has been created to monitor formal and informal electronic information and to verify its authenticity before transmission to Member Countries. The OIE Web Site has been substantially enhanced to provide more readily available and timely information. A working group to evaluate the development of standards for animal welfare has been created. The proceedings of the Joint WHO/FAO/OIE Technical Consultation on BSE: public health, animal health and trade, have been recently released for purchase. OIE is playing a greater role in food safety because of its mandate in zoonosis and its ability to address this massive problem of society because of its networks and skills. A symposium for “Vaccines for OIE List A and Emerging Animal Diseases” was held September 16-18, 2002 in Ames, Iowa, jointly sponsored by the International Association for Biologics, the OIE, APHIS, and the Institute for International Cooperation in Animal Biologics. A working group is being developed by OIE to assess alternatives for the safe and effective disposal of dead or
slaughtered animals. The Fifth Edition of the International Aquatic Animal Health Code 2002 has been released and is available. In May 2003, elections will be held for members of the Administration Commission, and for members of all four Specialist Commissions for three year terms.

For over eight years the OIE has been reviewing its scheme for categorizing diseases, i.e., List A & B. Finally, next May a new system may be presented to the International Committee for approval which would no longer use the designations of List A & B.

NATIONAL INSTITUTE OF ANIMAL AGRICULTURE, EMERGING DISEASES COMMITTEE
Submitted by Dr. Bob Crandell

During the 2002 NIAA Annual Meeting March 25-27, the Emerging Diseases Committee sponsored a Seminar with the theme, “The Threat and Response to Emerging Infectious Diseases”. The speakers were: Drs. Carole Bolin, Michigan State University, Victoria Bridges, USDA-APHIS-VS-CEAH, and David Zeman, South Dakota State University. After the scientific presentations in the Committee’s business session, the following Resolutions were approved: ARS Emerging Diseases Appropriation, Funding for Plum Island Facilities, Federal Funding for Oral Rabies Vaccination Programs for Wildlife, Veterinary Education and Accreditation and National Animal Health Laboratory Network (NAHLN). All Resolutions were adopted as Action Resolutions by the NIAA Board of Directors. Copies of the Resolutions are available from the NIAA Office at 1910 Lyda Ave., Bowling Green, KY 42104 or on the internet at www.animalagriculture.org.

CANADIAN FOOD INSPECTION AGENCY
Submitted by Dr. Dorothy Geale
Foreign Animal Diseases Specialist

- FAD stringent import prevention activities continue; 2001 FMD resources reallocated to a travellers’ awareness campaign to leave uncertified agricultural products in the country of origin.
- Edible Residual Material (swill) feeding containing meat has been prohibited.
- National Centre for FAD in Winnipeg diagnostic capacity improved by importation of 23 strains of FMD virus from Pirbright in June 2002;
- FAD Manual of Procedures is to be streamlined and formatted similar to United States Emergency Response Plan System;
- National standards in biosecurity and personal protection equipment for on-farm visits by CFIA staff are being implemented;
- FAD Eradication Support plans (FADES) with the provinces are
being updated to an integrated response to agricultural emergencies;

- Epidemiologists from academia, provinces or CFIA staff who are specialized in mathematical simulations were sponsored to examine models from the Netherlands and Australia at a North American workshop in Fort Collins to design a management decision support tool for FMD control measures; devolution of expertise to all CFIA’s areas (Atlantic, Quebec, Ontario, West)

- CFIA FMD experts participated in a collaborative scientific revision of the CFIA FMD strategy along with veterinarians from provinces and industry, to be endorsed at the Canadian Animal Health Consultative Committee meetings in December 2002;

- USDA’s Internet based EMRS (emergency management response system) is being adapted for Canada with concomitant development in oracle to integrate with CFIA’s informatics platform;

- Zoning from principle to practice is being implemented in collaboration with the Federal, Provincial/Territorial Agri-Food Inspection Committee and industry;

- Internationally learning from the experiences of others by participating as international evaluators in Australia’s FMD exercise “Minotaur” a whole of government simulation examining socio-economic consequences as well as disease control.

- Revision of the 1982 North American Foot and Mouth Disease Vaccine Bank agreement and Vaccination Program to harmonize Canada, United States and Mexico vaccination response.

- CFIA continues its work in raising FAD awareness through publishing articles and participating stakeholder meetings

ASSOCIATION OF AMERICAN VETERINARY COLLEGES,
INTERNATIONAL ACTIVITIES COMMITTEE
Submitted by Dr. Gale Wagner

The committee was newly formulated after the March meeting of the AAVMC. Current committee members are: Corrie Brown, chair, Dave Hird, Christine Jost, John Kaneene, Mushtaq Memon, Jim Roth, Gale Wagner, Bettye Walters. One hundred copies of the USAHA Foreign Animal Diseases “gray book” CD were mailed to each and every veterinary college in the U.S. and Canada. Jim Roth’s USDA-funded program to create an internet course on Emerging and Exotic Diseases is nearing completion and should be available for all schools of veterinary medicine in 2003. Corrie Brown’s and Gale Wagner’s USDA-funded program for the construction of a digital library of animal and zoonotic diseases is nearing completion of the first stage. The library will support searches to match clinical signs for diagnosis, and includes 165 diseases. So far digital assets (pictures, text)
FOREIGN AND EMERGING DISEASES

are included for 35 of the diseases.

SECRETARY’S ADVISORY COMMITTEE ON FOREIGN ANIMAL AND POULTRY DISEASES
Submitted by Dr. Corrie Brown

The SACFAPD met in September 2002. Current membership includes Gus Douglass, Chair, Corrie Brown, Vice Chair, John Adams, Tobin Armstrong, Richard Breitmeyer, Bob Eckroade, Don Franco, Jim Niewold, June Reed, Jerry Saliki, Fred Small, Wes Towers, Saul Wilson. The meeting was opened by Secretary Ann Veneman, who stressed the importance of preparing for animal disease emergencies. The committee commended APHIS for many activities in protecting animal health. Specific recommendations were to continue building emergency management infrastructure, increase integration of USDA with academic partners, and continue development of plans to deal with avian influenza.

U.S. AGENCY FOR INTERNATIONAL DEVELOPMENT
Submitted by Dr. Sebastian Heath

A concept paper outlining steps towards Foot and Mouth Disease eradication from South America was drafted as a follow-on from the Exploratory Workshop on “Foot and Mouth Disease Eradication from the Andean Community: Should USAID play a role?” (http://www.cast-science.org/usaid/index.html). The purpose of this concept paper is to assist USAID reevaluate its role in animal health in developing countries. The specific case of Foot and Mouth Disease (FMD) eradication from South America serves as a potential model for animal health programs around the world. The concept paper can be viewed at: http://www.cast-science.org/usaid/footandmouthdisease_cp.pdf. For further information contact Sebastian.heath@att.net.
NON-TRANSMISSION OF FOOT AND MOUTH DISEASE VIRUS BY EMBRYOS FROM FOOT AND MOUTH DISEASE SEROPOSITIVE SHEEP AND CONVALESCENT GOATS

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Summary

The research performed aims to search the potential risk of transmission of foot-and-mouth disease virus (FMDV) through embryos obtained from FMD seropositive donor sheep and FMD convalescent donor goats (experimentally inoculated) and transferred to free recipient animals.

Two experiments were performed in sheep. In experiment No. 1, seventy nine ewes and four rams were used and in experiment 2, thirty three ewes and four rams. In both experiments, animals were selected from an endemic area from farms where an outbreak of FMD was reported. The ewes in both experiments were then subject to a 14 day heat synchronization. The donors were subjected to a superovulatory treatment and insemination. The embryos were collected by surgical technique. A group of goats consisting of 48 does and 3 bucks were confined in the maximum isolation units and infected with FMD virus. A strain of O1 was inoculated by intradermalingual route. The animals developed clinical signs and became positive to viral infection associated antigen (VIAA) after normal course of the disease and the virus was isolated from oesophageal-pharyngeal fluids (OPP). Heat synchronization, superovulatory treatment and insemination were performed and the embryos were collected by surgical technique.

Sheep and goat embryos were handled following the recommendation of the International Embryo Transfer Society (IETS). The presence of FMDV was evaluated in 185 ovine embryos and in 293 caprine embryos. In addition, flushing and washing fluids from all the donor animals were assessed. Results showed that no infectious virus was present in any material tested. The rest of the embryos (60 sheep and 100 goat embryos) were frozen in liquid nitrogen for further transfer to FMDV seronegative recipients in an experimental field in Peninsular de Valdes, an area of Argentina free from FMDV since 1991. A total of 24 sheep embryos were transferred to 23 recipients and 96 goat embryos were implanted in 38 goat recipients. There was no clinical sign of foot and mouth disease during the experimental period in any of the experimental animals. All the serological tests performed to determine antibodies against VIAA in the recipient ewes and
does and in the newborns were negative.

Acknowledgment
The authors are thankful and recognized the technical assistance given by Dr. Hernan Baldassarre and his associates, also to Dr. Carlos Munar and his group especially in Phase 1. In the same way, the support of J. J. Callis, A. A. Schudel, J. J. Pereira is appreciated. Many thanks to Dr. S. Laporte for his assistance in the field work at the experimental unit of INTA in Peninsula de Valdes.

Introduction
The transport and commerce of embryos of domestic species are a valuable tool to introduce and improve the genetic material (germplasm) of livestock. The need to avoid the transmission of infectious diseases through embryos between herds, regions and/or countries is vital for the future of the commerce of embryos.

Many studies have been performed to assess the potential risk for the transmission of Foot and Mouth Disease Virus (FMDV) through bovine embryos (5, 13, 14, 15, 16, 19, and 21). The evidence produced allowed the Office International des Epizooties (OIE) to place FMD in category 1 for cattle only, (3, 4). This means that the risk of transmission is negligible provided that the embryos are properly handled between collection and transfer (2). However, there are no peer-reviewed publications on the transmission of FMDV through embryos of small ruminants (20).

The objectives of this research were to assess the risk of transmission of FMDV through embryos obtained from seropositive sheep and convalescent goats (artificially infected). Specimens were tested in vitro and were implanted into females in Patagonia, Argentina which was free of FMDV in 1991 when this experiment was performed.* OIE declared Argentina free of FMDV with vaccination in May 1997 and free of FMDV without vaccination in May 2000. Unfortunately, Argentina was again declared infected during late 2000.

Materials and Methods
Experimental Animals
a. Donors:
Sheep
Sheep were selected from two farms where outbreaks of FMD were reported in the 6 months previous to the initiation of the experiments. Animals were affected with virus strain O1. Blood samples were taken to assess antibodies against virus infection-associated antigen (VIAA) and animals that were positive were selected. Two experiments were performed. In experiment No 1, * This work was developed under the cooperative agreement INTA-CICV-USDA-APHIS No 12-34-93-173-CA. Res. C.D. INTA No. 38/90.
seventy nine ewes and four rams were used, and thirty three ewes and four rams were used in experiment no. 2.

**Goats**

Virus infection-associated antigen and Oesophageal-pharyngeal Fluid (OPF) negative healthy goats were confined in the maximum isolation units at INTA-Castelar to be infected with FMD virus. A group of 48 does and 3 bucks were infected with 10,000ID/50% O1 Campos FMD virus by intradermalingual route. All animals developed clinical signs of FMD, and became positive to VlAA. In addition, FMDV was isolated from OPF in 8 animals that remained carriers of the disease.

b. Recipients:

A group of naive sheep (n=23) and goats (38) to FMDV were selected. All the recipients were VlAA negative. The embryo transfer took place in an Experimental Field of INTA at Peninsular de Valdes-Chubut Province, located in a FMDV free area of Argentina since 1991.

**Embryo Collection**

Donor sheep and goats were synchronized with intravaginal sponges (60mg medroxiprogesterone-Cronogestal-Lab. Konig) during 14 and 12 days, respectively.

Superovalutory treatment with FSH (Folltropin-Vetfarm) was initiated 48 hours before the sponges were removed. Ewes received a total dose of 18 mg injected in 6 decreasing doses. In goats a total of 12 mg in 8 decreasing doses were used.

Artificial insemination was performed at 48 hours and 60 hours after sponge removal by intrauterine laparoscopy. At the same time, the females were with the males in order to allow natural service in sheep. The same procedure was performed in goats with the only difference that the artificial insemination was done by the cervical route.

In both species the embryo collection was performed 6 days after the first artificial insemination. A surgical technique was used; both uterine horns were flushed with an 8 GFoley catheter after exposure of the uterine horns by laparotomy. The flushing medium was Dulbecco’s Phosphate-Buffered Saline (D-PBS) (GIBCO-CaT No 14280), with 1% Fetal Bovine Serum, antibiotics and antimycotic. For anesthesia a combination of xilazine (Rompun-Bayer) and Ketamine9Vetanarcol-Lab. Konig) was used.

In goats, there was approximately 39 days between the inoculation of FMDV and the embryo collection.

**Experimental design**

The embryos were handled following I.E.T.S. recommendation (2). After ten washes, the embryos were frozen in liquid nitrogen to be evaluated for FMDV and transfer to FMDV free recipient females.
Flushing fluids and washing fluids were obtained and stored at -70C until they were processed for assay for FMDV.

**Virologic evaluation**

The embryos, flushing fluids and washing fluids were assessed either by in vitro and/or in vivo assays. The embryos were handled as it was described by Villar, et.al. (21). In vitro testing was performed by virus isolation. The samples were inoculated onto monolayers of lamb kidney cells (T25 tissue culture flasks) at Plum Island Disease Center, Foreign Animal Disease Diagnostic Laboratory, APHIS-USDA or onto monolayers of bovine fetal thyroid (10 tubes per sample) at INTA Castelar. Monolayers were observed daily for 72 hours post inoculation and were considered to give negative results if no cytopathic effect could be detected after three blind passages. In vivo testing (NVSL-APHIS) consisted of sonicated material inoculated intradermolingually (2ml) in multiple sites and intramuscularly (1.1ml) into each of two steers. The steers were monitored clinically on a daily basis for 21 days with serum collection on day 0, 14, and 21 post inoculation to assess antibodies against VIAA.

**Embryo Transfer to Recipient Females**

Sheep and goat recipients were synchronized with intravaginal sponges 960 mg medroxiprogesterone-Cronogestal-Lab. Konig) for 14 and 12 days respectively. Ovulation was stimulated by giving 40mg PMSG injections at the time of the sponge removal.

Heat detection was performed twice a day (AM-PM). Males with harnesses were used. As soon as the males detected females in heat, these animals were identified and taken away.

Ovine and caprine embryos were thawed and transferred to recipient females that were on day 6 of their cycle. Anesthesia was induced with a combination of xylacine and ketamine. Surgical embryo transfer was performed.

**Clinical Studies and Evaluation of Serums for Foot and Mouth Disease Antibody**

Continuous clinical studies and serum evaluation of the recipient females were performed before the embryo transfer and bimonthly from the transfer up to parturition.

After parturition, blood samples were taken from the dams and the newborn animals. They were performed right after parturition, and at 30, 45 and 60 days postpartum.

The detection of antibodies against VIAA was conducted according to the method described by Alonso Fernandez (1).

**Results**

In sheep, a total of 50 eggs/embryos were collected from experiment 1. Twenty five eggs/embryos were frozen in vials and sent to PIADC for further virologic evaluation. The remaining 25 good quality embryos were fro-
zen in straws to be transferred to recipient females in Peninsula de Valdes-Chubut Provence in the southern part of Argentina, a FMD disease free area since 1991.

In experiment 2 a total of 116 embryos/eggs were obtained; 46 embryos and 18 empty zona pellucida and embryos with broken zona pelucida were sent to PIADC for virologic evaluation and 16 embryos were retained at INTA for the same purpose. Thirty six embryos were chosen according to their stage and quality and were frozen in straws to be transferred to recipient females or for in-vitro evaluation to detect FMDV.

In goats, a total of 398 eggs/embryos were collected. Two hundred ninety three eggs/embryos were frozen in vials and sent to PIADC for further virologic evaluation and 100 good quality embryos were frozen in vials and sent to PIADC for further virologic evaluation and 100 good quality embryos were frozen in straws to be transferred in Peninsular de Valdes.

The results of in vitro virus isolation from sheep and goat embryos at PIADC and at INTA were negative and there was no clinical sign of FMD and no serological evidence of antibodies against VIAA in the steers inoculated with the sonicated material. In addition, all the flushing fluids and washing fluids assessed for the presence of FMDV were negative.

The good quality embryos frozen at INTA-Castelar were transported to Peninsular de Valdes.

Sheep and goat embryos were thawed and transferred to synchronized recipient females. Twenty four sheep embryos were transferred to 23 recipient females. In goats, 96 embryos were transferred to 38 recipient females. Four lambs and one kid were born from the embryo transfers performed. No recipient females or newborn developed any clinical sign of FMD during the period of this experiment. All blood tests to detect VIAA in the recipient females and newborns were negative.

Discussion

The potential risks of transmission by E. T. of infectious diseases have been studied in sheep and goats (6, 7, 8, 9, 10, 11, 12, 17, 18, 19, 20, 22, 23). However, to the best of our knowledge there is no peer-reviewed publication that studied transmission of FMDV by embryo transfer in small ruminants (20).

Foot and mouth disease is a highly infectious disease that has a rapid spread between susceptible animals. Embryo transfer (E.T.) has been proposed as a mean of controlling the transmission of disease between herds and or countries. The transmission of foot and mouth disease virus (FMDV) has been the focus of much research conducted in cattle (5, 13, 14, 15, 16, 19, 21). The results of these studies in the bovine allowed the Research Subcommittee of IETS Import/Export Committee to suggest to OIE that FMD should be categorized in category 1 (3), a category which encompasses disease agents for which sufficient evidence has accrued to show that the risk of transmission is negligible provided that the embryos are
properly handled between collection and the transfer.

In this study, sheep that went through a natural outbreak of FMD and were seropositive at the time of the embryo collection were used as donor animals. This scenario was considered the most likely to occur in the field. The embryos were obtained from this type of donors may be used in the international trade and represent a potential risk that should be studied and assessed.

It was impossible to find goats from any region of the country that were naturally affected with FMD virus. No animal was detected with VIAA or positive oesophageal-pharyngeal fluids (OPF). For this reason, healthy, VIAA and OPF negative animals were experimentally infected with FMD virus and embryos were obtained during the convalescent period.

In these experiments, all of the embryos and collection fluids tested for the presence of FMDV were negative. Moreover, the recipient females and the newborns did not show any sign of the disease and tested negative for antibodies against VIAA.

The poor results of superovulation in ewes and the low pregnancy rate obtained in both experiments suggest that it is necessary to review both the stimulatory protocol in sheep and the cryopreservation protocols. However, to assess reproductive performance was not the main goal of this research, and the poor response in no way invalidates the disease transmission results.

From our results we conclude that transfer of properly processed embryos could be a useful and safe tool for the preservation of germplasm from sheep and goats that were exposed to FMDV. More experiments are probably needed to definitely conclude that the risk of transmitting FMDV by sheep and goat embryos collected from donors is negligible. However, our results are promising.

References


NON-TRANSMISSION OF FMDV BY EMBRYOS FROM FMD SEROPOSITIVE SHEEP AND CONVALESCENT GOATS


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REPORT OF THE COMMITTEE ON GOVERNMENT RELATIONS

Chairman: Mr. Robert Frost, Lincoln, CA
Vice Chairman: Dr. Donald H. Lein, Ithaca, NY

Dr. J. Lee Alley, AL; Dr. Jones W. Bryan, SC; Dr. Henry Childers, RI; Dr. Bob R. Hillman, ID; Dr. Maxwell A. Lea, Jr., LA; Dr. Jim Logan, WY; Ms. Amy W. Mann, DC; Dr. Bret D. Marsh, IN; Dr. John J. Schiltz, IA; Dr. H. Wesley Towers, DE; Dr. Richard D. Willer, AZ.

AAVLD members present—President Dr. Pat Blanchard, President Elect Dr. Terry McElwaine, Past President Dr. Dave Zeman, Secretary/Treasurer Dr. Alex Ardans, Chairman of Government Relations Committee Dr. Bruce Akey

The Government Relations Committee met in conjunction with the Board of Directors of the AAVLD, and the Chairman of the AAVLD Government Relations Committee in Washington, D.C. February 25-27, 2002. Over the three days, the Committee met with USDA:APHIS Administrator Bobby Accord and USDA:ARS Acting Administrator Ed Knipling as well as their key support staff. In addition, the group met with a number of animal industry representatives. The key issue addressed was Emergency Planning for an Animal Health Disaster. This one issue encompassed a number of critical related issues including plans for a National Animal Health Lab Network. A number of other important issues were discussed and are mentioned in this report.

On February 25th, the Committee met with representatives of the American Farm Bureau Federation (AFBF), National Milk Producers Federation (NMPF), National Cattlemen’s Beef Association (NCBA), National Renderers’ Association (NRA), National Pork Producers Council (NPPC), National Turkey Federation, and American Veterinary Medical Association. Also joining the meeting at the NCBA’s offices were former Senator John Melcher and a representative from Cornell University’s Government Relations office. Dr. Gary Weber opened the meeting by giving a brief history of NCBA’s involvement with animal health issues surrounding the initiatives to increase global trade. Along with the increase in trade has come an increase in risk to the livestock industry. Accordingly, there should be a corresponding increase in APHIS activities to reduce the risk. NCBA feels that although APHIS has been addressing these issues, they lack the necessary people and budget to do this adequately. Weber sought our help to ensure APHIS has adequate resources, maintains the necessary resolve, and increases their foreign presence.

John Adams shared NMPF’s concerns with the lack of APHIS resources
and infrastructure. He mentioned a number of issues related to the National Animal Health Emergency Management System (NAHEMS). In his opinion, the U.S. is not ready for an animal health emergency. He suggested a need for multiple regional response teams instead of the two READEO’s, and that these teams should consist of more than just federal people. He expressed their concerns that USDA’s Homeland Security Council appeared to be a new bureaucracy within USDA to deal with emergencies. He felt that the current director of Emergency Programs needed more authority and money. In regards to perceived problems with the NAHEMS Steering Committee (SC), he thought that once there was commitment from the Secretary’s office, problems in the SC would sort themselves out. After Adams suggested a need for a national laboratory network, AAVLD President Elect Dr. Terry McElwaine shared AAVLD’s plans for such a system.

Tom Cook from the NRA was questioned about disposal of dead or downed livestock. Cook mentioned their industry’s third party audit system that has certified 218 of the 224 U.S. rendering facilities in compliance with the FDA feed ban. He mentioned an APHIS advanced notice of public rule making on handling of dead animals on the farm, with the intent to possibly prohibit them from the rendering system. NRA’s research indicates that only 50% of those animals are being rendered. He did not think that burying or composting were the solution because 50 billion pounds of raw material is rendered every year. He said that most independent renderers would help with BSE sampling providing the animal is held until a result is known. Adams mentioned a pilot study where veterinarians are paid to check CNS cases when called by producers.

Animal identification was discussed briefly. Adams thought it was needed especially in an animal health emergency and should be included in the Animal Health Protection Act. Weber mentioned the NCBA policy to work on a system to trace an animal to the farm of origin that is overseen by the State Veterinarian and accessible only by animal health officials.

Two members of the National Emergency Management Association (NEMA) joined the Government Relations Committee and AAVLD Board of Directors for an evening discussion. The state emergency management directors from Arizona and North Dakota shared some national budget information they obtained at their NEMA meeting the previous day. The President’s 2003 budget proposal includes over $3 billion for Homeland Security. They thought this amount might even be doubled. Approximately $1 billion is earmarked for communications at the state and local level, and several hundred million for planning, training, and exercises. They also mentioned USDA’s $50,000 grant to NEMA to develop a template emergency response plan. They said that the initial 20% of the funds recently allocated by Health and Human Services to state health departments for Homeland Security require those departments to design a plan with statewide integration in mind. State departments of agriculture should be included in this
integration. Finally, they expressed NEMA's desire to establish a close relationship with USAHA.

On the morning of February 26th, the group met with APHIS Administrator Bobby Acord, Acting Associate Administrator Dr. Ron De Haven, and Acting Deputy Administrator for Veterinary Services Dr. John Clifford. For part of the meeting, we were joined by Deputy Undersecretary for Marketing and Regulatory Programs Dr. Jim Butler who also serves on USDA's Homeland Security Council.

Drs. De Haven and Clifford addressed the majority of specific issues brought forth by the Committee. De Haven sorted out the USDA and APHIS allocations of the supplemental budget of the Department of Defense. Of the $328 million allocated to USDA, $119 million went to APHIS. Because this is a one-time money allocation, they can’t add many personnel. Some of the money will go to state grants. The proposed 2003 budget includes a $120 million increase over 2002 and will be used to build infrastructure and implementation of recommendations from the Safeguarding Review. De Haven mentioned a planned meeting with HHS to discuss the Department of Defense supplemental budget allocation. Although APHIS had similar funding legislation, they were not successful in getting it through Congress. He stated the need to get the message from the top level of HHS to state health departments about the need for inclusion of state animal health officials in expenditure planning. De Haven also mentioned the cooperative agreement recently signed with ARS.

Dr. Clifford mentioned Veterinary Services’ plans to establish two new Associate Deputy Administrator (ADA) positions. One, ADA for Emergency Programs, was currently being recruited. He implied that the position of Director of Animal Health Programs might be reclassified as an ADA with CEAH reporting to that person. Work on the emergency response manuals was ongoing. Recently the draft manual on disposal was released for wide review and comment. Other manuals would trickle out with anticipated completion by July 2002.

Deputy Undersecretary Butler explained that the reason for not elevating animal safeguarding issues to as high a level as human terrorist threats was a concern over an its negative impact on consumer confidence. He asked for our patience because USDA wanted to get some infrastructure in place first. He said that we should be seeing an increase in communication “moments” discussing the need for additional funding for homeland agriculture security functions. Butler mentioned his concerns about an idea to incorporate U.S. Customs, Coast Guard, Immigration and Naturalization Service, and APHIS into a single national border agency for exclusionary activities. Also discussed were the increased safeguarding personnel including 350 PPQ port inspectors and 17 PPQ port veterinarians, and that the current 50 dog teams would be increased to 150.

Former Congressman Ralph Harding, now with the USDA Legislative
and Public Affairs, joined the meeting briefly to discuss the Animal Health Protection Act. He confirmed that the AHPA language of Senate Bill 1482 had been incorporated into the Farm Bill that was now being reviewed by a joint House-Senate conference committee. He stated we needed to help sell the bill to the House conferees.

APHIS Administrator Acord reiterated Butler’s statement that USDA walks a fine line between explaining risks and causing panic. He also suggested that the drive to obtain HHS funding for use in animal health safeguarding needs to be at the state level. Acord then mentioned APHIS’ plan to propose a rule on indemnity and the sharing of costs with the states when only an emergency is declared rather than an extraordinary emergency. He suggested that FMD was probably one exception to this idea. Acord stated he would support a push to get authorization language or actual funding for the National Animal Health Laboratory Network. Acord thought that USAHA needed to continue pushing for additional money to fund the ARS-APHIS Master Plan because money for homeland security and bioterrorism may get tight next year.

During the afternoon, the Committee met with ARS Acting Administrator Ed Knipling, several of his staff, APHIS Administrator Acord, and Drs. Clifford and De Haven. Both the Master Plan and the National Animal Health Laboratory Network were discussed. Again, although the Master Plan was on schedule, and in fact ahead of schedule on funding, it was again discussed that there was currently no funding in the 2003 budget. The 2004 budget calls for such a large amount ($358 million reduced to $319 million because of the Dept. of Defense supplemental appropriation) that there are concerns about the need for getting some money in the 2003 appropriations.

AAVLD has been working on a National Animal Health Laboratory Network for two years and finally signed an MOU with NVSL in November 2001. ARS’ role in that Network, namely to help with development of tests and facilitating their validation, was discussed. AAVLD emphasized that the idea capitalizes the individual strengths of the 38 accredited laboratories in the network. De Haven underscored the need for such a network in an FMD outbreak. He did emphasize the need to have their lab confirm the index case of an FAD or an emerging disease that will have impact on international markets. Finally, it was pointed out that there is only $5 million in the 2003 budget for Plum Island that only covers maintenance. The future funding for that facility is not as clear.

The entire day of February 27th the Committee met with ARS Acting Administrator Knipling and key ARS animal health laboratory directors. Except for the initial discussions with Knipling and assistant Dr. Caird Rexroad, the remainder of the meeting with ARS was presentational in format. Only key items from those presentations are included in this report.

Dr. Knipling discussed ARS budget. Although 10 to 12 percent of the
total budget is related to animal health, there are many other animal related research activities. Congress has been supportive of emerging disease projects. Their funding is normally targeted to specific diseases which makes it more sellable to Congress; but less flexible for ARS. The 2003 budget went to Congress February 4th; the House subcommittee would meet tomorrow and the Senate subcommittee in 2 weeks. Their current budget is slightly less than $1 B, a 10% increase from last year. Although the '03 budget request is basically flat, it incorporates $10 M in decreases and about the same in new initiatives; so some ongoing programs are slated for termination.

The decreases proposed by OMB include the termination of '01 and '02 add-ons, some of which are related to animal health, and closure and consolidation of a number of labs. There is a perception that there are too many labs; they have ~100. The Senate version of the current Farm Bill calls for a USDA facility review. There was a similar provision in the 1996 Farm Bill and a report was issued in August 1999. The report supported modernization of Ames. The basis for the recommendations in the report included whether it was cost effective to improve a lab facility, there was duplication at facilities, or it was not a federal role to do a particular type of research. Dr. Knipling touched on the recommendations for specific facilities. He said in the short term, closure/consolidation will impact poultry labs; in the long term it may impact other animal health labs.

Dr. Knipling said that labs are considered a security liability; the bio-level 3 labs are getting the most attention. He said this will spill over to other labs and possibly even to state labs. Of the $40 M allocated to ARS for physical security, they hadn’t spent any yet. The '03 budget did have $5 M for biosecurity research although ARS asked for $170 M.

Finally, he discussed their emerging disease research budget. He said that there was $8 M on the animal side including for Mareks, PRDC, diagnostics and vaccines for FMD, NDV, BSE, and genomics.

Dr. Rob Hechert, National Program Leader for Animal Health, said that ARS is to support APHIS on research for diseases affecting national animal health or global trade. There are 12 locations for animal health research with 100 scientists and a budget of ~$50 M. After reviewing program objectives, he touched on future research initiatives as well as how they are meeting new disease threats. There was brief discussion on ARS’s ability to make a rapid response to a new disease issue. Although they currently have a limited ability to re-tool their research, they are working on a document that addresses how they can better support APHIS’s needs.

Dr. Mark Urlaub discussed research gaps in emergency preparedness. ARS held a workshop last fall to address these issues with APHIS, CSREES and other stakeholders. Their '04 budget will reflect their research priorities in this area.

Dr. Keith Murray, center director for NADC, mentioned the major shifts
that are driving ARS’s work including new emerging and re-emerging diseases, WTO standards, food safety threats, new technologies, and higher expectations from ARS. He then discussed 2-year and 5-year projections for NADC. Finally, he discussed the master plan for modernization of the NADC facilities. They will be breaking ground in September ’03 with completion in 2 years. He emphasized that there was nothing in the master plan about equipment replacement and that it is designed to replace the current workload; if new programs are added on, they will be overloaded.

Dr. David Huxsoll, director of the Plum Island ADC, discussed FMD research issues including rapid pen-side tests, tests that distinguish vaccination from infection, new vaccines, and epidemiology using genome sequencing. He said that the DOD has invested heavily in field-deployable systems for rapid identification of biological agents. Those tests are PCR based—highly sensitive and specific with results in < 2 hours. In some cases, it can detect FMD infection before clinical symptoms are observed. Finally, he stated that lab security issues were currently being addressed.

Dr. Andy Hammond, Athens Poultry Research Lab, said the vision for this lab was to be a National Center for Poultry Research and Food Safety. He mentioned the Russel Research Center, the J. Phil Campbell National Resource Conservation Center, and the SE Poultry Research Lab. ARS was proposing an $88 M BL-3 research facility. They are also in need of a $4.5 M poultry production research facility.

Dr. David Swayne, Southeast Poultry Research Lab, said that although the name indicates it is a regional lab, it is really a national lab. They work on exotic and emerging poultry diseases including AI, NDV, Avian Pneumovirus, Poultry Enteric Mortality Syndrome, WNV, and SE. After giving an update on their research activities, he discussed future plans including merger with the Lab in Lansing.

Dr. Jeff Letchworth, Arthropod-borne Animal Disease Research Program, said it was one of the smallest programs with a budget of less than $30 M. They have 14 projects at 9 sites. Areas of emphasis include having each lab have one focus. They concentrate on research on fundamental tools that have a wide application, GIS, IPM, and technology transfer.

Dr. Ron Rosenberg, Arthropod-borne Animal Disease Research Lab in Laramie, discussed their goals including maintaining their facilities and expertise, exploring conventional and novel control strategies, renting space from the U of WY, developing rapid diagnostic tests for arboviruses, understanding the epidemiology of Bluetongue, evaluating immune enhancement WNV infected horses, and the presence of VSV in grasshoppers.

Dr. Don Knowles, research leader at the Pullman, WA lab, discussed a number of research discovering his lab was involved in including isolation of a monoclonal antibody for diagnosis of prion diseases, development of the first practical live animal test which can identify infection 2 years before clinical symptoms, development of a serological assay for Anaplasma
marginale that has good sensitivity, and development of improved tests for Babesia in horses. He then discussed future work plans.

Dr. Roger Breeze, discussed homeland security issues and how they drive ARS research projects. For instance, we don’t have vaccines for FMD, Rinderpest, VVND, HPAI, and CBPP with the strains found in Middle East countries because we don’t trade with them yet those virus strains could be intentionally introduced. He discussed lessons learned from the CSF outbreak in the Netherlands, and the FMD outbreaks in Japan, Taiwan, and the UK. He mentioned the immensity of the people, vehicle and container traffic into this country. He thought surveillance needed improvement with real time feedback of results. We need surveillance of our physical world, biological world, and virtual world. Dr. Breeze discussed priorities for research including rapid pathogen detection, compilation of pathogen databases, and novel interventions. To accomplish progress in these areas, there is a need for genomic sequencing of pathogens, detection technology, ability to differentiate look-alike diseases, experimental validation of this work, and finally field validation. He reviewed points of intervention including active real time global surveillance, novel broad spectrum antivirals to prevent as well as eliminate diseases, production of disease resistant animals, design of molecular vaccines, saving of germplasm for future use, and import interrogation.

Dr. Joan Lunney, Beltsville Area Research Center, reviewed each of its component lab’s research activities. Some of the activities of the various labs include studies on basic immunology and disease resistance, research on pathogens in waste, and research on parasite biology, epidemiology and systematics. All labs at this center use PCR first, then move to immunology based detection assays.
The committee was called to order at 12:30 pm with 18 members and 25 visitors present. The purpose of the committee as stated in the by-laws was reviewed with the committee to reaffirm the reason of our meeting.

Dr. Anthony E. Wrathall reported on studies involving embryo transfer with cattle affected with bovine spongiform encephalopathy. The following is his report.

**Embryo transfer from cattle with bovine spongiform encephalopathy (BSE) did not transmit the disease**  
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**Introduction**—Embryo transfer is valuable for multiplication and transport of bovine genetic material, but the possibility that BSE infectivity might be transmitted via this route has given rise to much concern, especially in the context of international trade. The objective of this project was to show that in vivo-derived embryos processed using the sanitary protocols recommended by the International Embryo Transfer Society (IETS) do not transmit the disease.

**Materials and methods**—One hundred and sixty seven clinically affected BSE cows were superovulated, artificially inseminated (AI) and their embryos were collected non-surgically 7 days after AI. The embryos were washed 10 times as recommended by the IETS, then cryopreserved. Semen from clinically affected bulls was used for approximately half the AIs, and semen from healthy bulls was used for the remainder. Later, the viable embryos were thawed and transferred singly into recipient heifers which had been imported from New Zealand and then kept under biosecure conditions on a farm in North Yorkshire. After embryo transfer the recipients were monitored for clinical signs of BSE for 7 years, and the embryo transfer offspring were likewise monitored for 7 years after birth. The brains of casualties, plus those of the recipients and offspring killed after 7 years were examined for BSE by histopathology, PrP immunohistochemistry, and electron microscopy of scrapie-associated fibrils. In addition, non-viable embryos (1020) were sonicated and injected intracerebrally into genetically suitable mice (20 per mouse) which were monitored for up to 700 days post-injection. The brains of these mice were then examined for spongiform lesions by histopathology.
REPORT OF THE COMMITTEE

Results—A total of 347 heifers were used as recipients for embryo transfer, and 266 live offspring were born of which 54% had BSE-positive sires as well as BSE-positive dams. Twenty seven recipients and 20 offspring died during their monitoring periods but none of these casualties showed clinical signs of BSE. The brains of all the casualties, plus those of all the recipients and offspring killed after 7 years were negative for BSE by the three tests used. Likewise the brains of the mice were negative when examined for spongiform lesions.

Conclusions—it is concluded that, if suitable sanitary protocols are applied, embryos from cattle affected with BSE do not carry BSE infectivity even if they are collected at the end-state of the disease when the risk of maternal transmission is believed to be highest. The results also support the view that BSE is not transmitted via semen. Hopefully therefore, BSE-related restrictions on the international movement of bovine embryos will now be lifted.

Acknowledgments—To many colleagues in the State Veterinary Service, the Veterinary Laboratories Agency, the Agricultural Development and Advisory Service, and elsewhere for their help and collaboration. Also to the Chief Scientist’s Group of MAFF/DEFRA for funding this project.

Impact of European Union (EU) Animal Health Requirements on the Ability to Import Cattle from the USA

Charles J. Larson, Director, International Market Development
Livestock Exporters Association of the USA

Summary: Cattle breeders in European Union member nations have been unable to import live cattle from the USA since 1980 when it became law that such imports were not allowed unless the country of origin was bluetongue free. However, the EU regulations otherwise provide that imports can be allowed if a region of a country is free of bluetongue. This being the case, an effort was made beginning in the early 1990’s to gain regionalized status for some northern USA states or parts thereof where the disease does not exist and the vector is incompetent.

In view of this APHIS and LEA formed a Regionalization Committee* to address the problem. US cattle breeders and livestock exporters had also expressed dissatisfaction with the situation. The committee reviewed the disease and developed a compendium for reference to assure other nations of the safety of importing cattle from certain areas in the Northeastern

*APHIS/LEA Regionalization Committee Members. Dr. James MacLachlan, DR Tom Walton, DR George Winegar, DR Gary Colgrove, DR Najam Faizi, Mr. Charles Larson, Chair.
United States that are confirmed bluetongue virus (BTV) free.

The material was presented to the EU in the spring of 2001 with the result that additional information on surveillance would be required. Surveillance information had been collected for almost 20 years but not to EU satisfaction.

As an alternative another approach has been taken. It proposes the development of a procurement and quarantine system that should meet current EU regulations.

In brief the proposal provides for a privately owned and operated quarantine facility(s) located in a northern state(s) with dual functions. At this site weaned calves of about 3 months of age, that been housed at the farm of origin in hutches away from other cattle and tested as required, but not vaccinated for brucellosis; will be transferred to an intermediate isolation location of the quarantine facility. After 4 months with required testing in the interim, the animals will be moved to the second location of the quarantine facility for about 3-4 months, again tested as required and then exported. Management details during the year-long process are defined in the proposal.

Leukosis is addressed by a testing regime devised to meet requirements.

The calves cannot be vaccinated for brucellosis but removal from the herd of origin at about three months of age will be in advance of the usual age for vaccination in the origin herd.

It is being recommended to APHIS that negotiations with the EU be scheduled early in 2003.

Dr. Don Notter, State Veterinarian, Kentucky, outlined a previously expressed concern that horses accepted under USDA import requirements do not meet state’s requirements that are more stringent. He presented an example concerning equine infectious anemia (EIA) requirements. A negative test for EIA is required by all 50 states, as is a valid certificate of veterinary inspection. Dr. Notter requested expediting movement of imported horses to states of destination by the collection and submission of blood samples at the USDA Veterinary Import Centers. He also requested added emphasis on advanced notification by import centers to states of destination when animals from abroad enter their center.

Dr. Jim Watson, State Veterinarian, Mississippi, reiterated similar concerns as Dr. Notter and addressed the need for an improved method of tracking and analyzing the commercial movements of livestock. To optimize response to a foreign animal disease outbreak, movement information must be available within a few minutes, to at most a couple of hours, to guide implementation of quarantines, surveillance, and epidemiological tracing of exposed or potentially exposed animals during the first critical 24 hour period after disease is detected. The vast majority of international shipments present similar problems of data processing and retrieval. An
addition, the ability for electronic certificates of veterinary inspection would be the ability to immediately determine whether the livestock in question meet the entry requirements for the state or country of destination prior to shipment.

Following the presentations of Drs. Notter and Watson, the committee resubmitted the 2001 resolution requesting that the Secretary of Agriculture take action to measurably improve the notification of states that receive shipments of livestock and wildlife that enter the United States from other countries.

Dr. James E. Pearson, Office International des Epizooties (OIE), Paris, France, outlined the history of the OIE and its current relationship to US animal health concerns. The following is his report:

The OIE was formed 25 January 1924 as a “international office of epizootics for the control of infectious animal diseases”, primarily to combat an outbreak of an exotic disease, rinderpest in Belgium. It started with 28 states and now has 162 Member Countries.

Objectives of the OIE:
1. To safeguard world trade within SPS-WTO agreement by drafting health rules and recommendations for international trade in animals and animal products.
2. To ensure transparency in the animal health situation throughout the world.
3. To collect, analyze and disseminate scientific veterinary information.
4. To contribute expertise and encourage international coordination in the control of animal diseases.
5. To improve the legal framework and resources of Veterinary Services.

International Trade and National Animal Health Regulations:

In 1995, the OIE was identified by the Agreement on the Application of Sanitary and Phytosanitary Measures (SPS) of the World Trade Organization (WTO) as the competent international organisation for developing international Standards, Guidelines and Recommendations related to animal diseases and zoonoses.

WTO SPS Agreement:
1. The goal of the agreement is to remove the unjustifiable restrictions on international trade.
2. The agreement states that it is the sovereign right of a country to provide appropriate level of animal health protection at its borders.
3. The sovereign right of a country is not to be misused for protectionist purposes.
4. Import sanitary measures can only be put in place if a similar level of protection is applied internally by the importing country.
5. In order to harmonize SPS measures, governments should use international Standards, Guidelines and Recommendations.

OIE International Standards:
1. **International Animal Health Code** – applicable to mammals, birds and bees
2. **International Aquatic Animal Health Code** – applicable to fish, mollusks and crustaceans
4. Diagnostic Manual for Aquatic Animal Diseases

These Standards can be purchased from the OIE and are available on the OIE Website, [http://www.oie.int](http://www.oie.int)

**Disease Free Status Based on Compliance with OIE Standards** (The OIE has procedures in place to designate countries or zones free of foot and mouth disease, rinderpest, contagious bovine pleuropneumonia and bovine spongiform encephalopathy):

1. All the European countries, that had foot and mouth disease (FMD) outbreaks in 2001, regained their OIE FMD free status by January 2002.
2. Sixty three countries have been designated as FMD free without vaccination, 5 have zones free without vaccination and there are three countries or zones free with vaccination.
3. The OIE has identified 89 countries as rinderpest infection or disease free.
4. The procedures to establish OIE bovine spongiform encephalopathy (BSE) free countries were established in May 2002 and the first applications are being evaluated.

**Changes to the Codes** that were approved by the OIE International Committee in May 2002:

1. A new Chapter has been added to the **International Animal Health Code** defining historical disease freedom; it outlines the procedures for a country to be identified as disease free after 10 or 25 years with on evidence of the disease.
2. The FMD Chapter of the **Code** has been modified to define FMD infection free and to replace disease free with infection free countries and zones. The revised Chapter also was changed to allow the regaining of FMD free status without killing vaccinates.
3. A revised classical swine fever Chapter was approved; it includes provisions to address the disease in wild pigs.
4. A Chapter establishing Standards for scrapie was approved.
5. A modified BSE Chapter was approved.
6. A modified bovine semen Chapter provides criteria for importing semen from AI Centers that are not IBR/IPV free.
7. A Chapter on the Evaluation of Veterinary Services was added to the **International Animal Health Code**.
8. Changes to 14 Chapters of the **Aquatic Animal Health Code** were approved; changes were made to clarify disease notification procedures and the Standards for 11 diseases.
9. The aquatic and terrestrial Codes are being harmonized.

Recently Completed Actions of the OIE Standards Commission:

1. Three rapid BSE tests were recognized as being suitable for screening but positive tests should be confirmed by immunohistochemistry.
2. The nonstructural protein FMD test was approved as a herd test to identify FMD infection in vaccinated herds.
3. The FMD solid phase blocking ELISA was approved as a prescribed test.
4. The development of the 5th edition of the Manual is underway with publication expected in early 2005. It will include a West Nile Chapter and Chapters on three additional agents that are associated with food safety.

Pending actions of the OIE:

1. The definition of highly pathogenic avian influenza will be reviewed. Revised highly pathogenic avian influenza and Newcastle Code chapters are being developed and a proposal is being considered to have different Standards for infection of these diseases in wild birds.
2. New Standards for Disease notification are being developed which could eliminate the present OIE List A and List B diseases.
3. Proposals for the monitoring and surveillance Standards for FMD and bluetongue are under consideration.
4. Working Groups on animal welfare and food safety have been formed to address the OIE’s role in these areas.
5. Standards for antimicrobial resistance are under development.
6. Guidelines for carcass disposal are being developed.
7. The BSE Code Chapter is being updated and a BSE Chapter for small ruminants is under consideration.
8. Code Chapters for the following diseases are also being developed: Rift Valley Fever, porcine reproductive and respiratory syndrome, chronic wasting disease, West Nile fever, and paratuberculosis.
9. The next Volume of the OIE Scientific and Technical Revue, which will be published in December 2002, will address FMD.

The annual report to the USAHA from USDA APHIS VS and PPQ was presented by Drs. Arnaldo Vaquer and LeAnn Thomas. Their report follows:
(I) ANIMAL IMPORT ACTIVITIES

This past year saw increased imports in several species: swine, camelids, and sheep and goats. There was also a reduction in imports in bovines, cervids, equines and zoo animals. With regards to germplasm there were an increase in bovine embryos, and a decrease in bovine semen imports. Ovine and cervidae semen imports registered a significant decrease.

There was an increase of bovine imports through the Canadian ports but a significant decrease through the Mexican ports. Swine imports through Canadian ports registered a significant increase in numbers.

There were several important occurrences which impacted our imports from Canada and Mexico. The first one was the implementation of VS Notice 02-11, Bovine Tuberculosis Testing Requirements for the Importation of Mexican Cattle, effective April 1, 2002. This VS Notice as the name implies, specifies the import requirements of the United States for Mexican cattle with regards to Tuberculosis. It also mandated a Certificate of Herd of Origin which disclosed more information as to the status of the herd of origin, its geographic location, and traceback features. There were changes in the definition of Herd of Origin, which required a four month period of time for the cattle on common ground. This requirement also put a damper on Mexican Imports. The second one was the downgrading of the province of Manitoba, Canada from Accredited Free to Modified Accredited Advanced status in August 17, 2002. This downgrade required that the Canadian breeding cattle and bison coming into the United States needed an individual TB test. This was done because of two cases of TB in Manitoba in the last 48 months. The third event was the approval by VS, APHIS in October 2001, for the use of cattle ID tags that have been approved by the Canadian Cattle Identification Agency (CCIA) as an alternative method for official ID for the import of Canadian cattle.

Also during this past year there was the creation of a VS Memo on the testing of imported equidae. The memo establishes the policy for determining the entry eligibility of imported horses based on results of tests for EIA, dourine, glanders or piroplasmosis.

With regards to FMD the free status was restored for Japan (January), The Netherlands (January), France and Ireland (Nov 01), and Greece (July).

Finally, there was a well attended public hearing in February 6, 2002 at
Ft. Collins, CO regarding the importation of large numbers of ruminants into the USA.

**TABLE 1: Animal Imports FY 2000, 2001, 2002**

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
<td>2,155,678</td>
<td>2,552,990</td>
<td>2,358,074</td>
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<tr>
<td>Swine</td>
<td>4,286,905</td>
<td>5,072,234</td>
<td>5,907,192</td>
</tr>
<tr>
<td>Camelids</td>
<td>269</td>
<td>229</td>
<td>445</td>
</tr>
<tr>
<td>Cervids</td>
<td>1,595</td>
<td>2,610</td>
<td>2,121</td>
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<tr>
<td>Equine</td>
<td>42,385</td>
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<tr>
<td>Sheep</td>
<td>52,316</td>
<td>81,957</td>
<td>107,641</td>
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<tr>
<td>Goats</td>
<td>1,427</td>
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<tr>
<td>Zoo Animals</td>
<td>48</td>
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**GERMPLASM IMPORTS**

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<tr>
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<td>——</td>
<td>——</td>
<td>——</td>
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<tr>
<td>Equine</td>
<td>2</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Caprine</td>
<td>134</td>
<td>348</td>
<td>64</td>
</tr>
<tr>
<td>Ovine</td>
<td>——</td>
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<td>Deer</td>
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<thead>
<tr>
<th>Semen</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
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<tbody>
<tr>
<td>Bovine</td>
<td>2,820,929</td>
<td>2,565,409</td>
<td>2,351,240</td>
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<td>Equine</td>
<td>13,917</td>
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<td>Porcine</td>
<td>12,538</td>
<td>21,284</td>
<td>17,447</td>
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<td>134</td>
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<td>Cervids</td>
<td>6,252</td>
<td>1,336</td>
<td>837</td>
</tr>
<tr>
<td>Caprine</td>
<td>——</td>
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**POULTRY IMPORTS**

<table>
<thead>
<tr>
<th>2000</th>
<th>2001</th>
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<tbody>
<tr>
<td>Day-old chicks/live poultry</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Hatching eggs (doz)</td>
<td>——</td>
<td>——</td>
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<tr>
<td>Other Live Poultry/ birds</td>
<td>——</td>
<td>——</td>
</tr>
<tr>
<td>Ostrich</td>
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IMPORT/EXPORT

Bovine Imports by Port of Entry

<table>
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<tr>
<th></th>
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<th>2001</th>
<th>2002</th>
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<tbody>
<tr>
<td>Canadian Ports</td>
<td>945,724</td>
<td>1,286,647</td>
<td>1,572,146</td>
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<tr>
<td>Mexican Ports</td>
<td>1,266,327</td>
<td>1,259,801</td>
<td>783,796</td>
</tr>
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<td>TOTAL</td>
<td>2,212,051</td>
<td>2,546,448</td>
<td>2,355,942</td>
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Swine Imports by Port of Entry

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<th></th>
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<th>2002</th>
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<tbody>
<tr>
<td>Canadian Ports</td>
<td>4,286,042</td>
<td>5,071,617</td>
<td>5,906,438</td>
</tr>
<tr>
<td>Denmark</td>
<td>———</td>
<td>612</td>
<td>589</td>
</tr>
<tr>
<td>(research mini-pigs)</td>
<td>———</td>
<td>———</td>
<td>———</td>
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</tbody>
</table>

(II) AVIAN IMPORT ACTIVITIES

A. Commercial Birds
The import of commercial birds are limited to those that are exempt from the Wild Bird Conservation Act, serviced by the U.S. Fish and Wildlife Service. There were 251,262 commercial bird released from USDA supervised private bird quarantine facilities during FY 2002.

B. Pet Bird Program
There were 1,534 pet birds imported into the United States and quarantined at a USDA-operated animal import center during FY 2002.

C. Smuggled/Confiscated Birds
Here were 18 birds seized by the USDA, U.S. Fish and Wildlife Service, or the U.S. Customs Service for illegally entering the United States in FY 2002.

D. Ratite Importations
During FY 2002 no ratites or hatching eggs for ratites were imported into the United States. The current price of ratites and hatching eggs does not justify the cost of importing such animals.

(III) ANIMAL EXPORT ACTIVITIES

During FY 02, Veterinary Services, APHIS negotiated new or revised export protocols (animal health requirements) for exporting poultry, livestock, and germplasm to numerous countries. Veterinary Services tries very hard trying to keep and expand existing markets, but also with accessing new markets. One way of achieving this objective is by negotiating simple, science based export protocols which minimizes expenses to our exporters, and allows the safe export of the commodity. The NCIE has negotiated the following protocols this FY in the American Continent, to make less
restrictive export animal health requirements.

- Dominican Republic 11
- Guatemala 11
- Peru 4
- Ecuador 1
- Bolivia 1
- Brazil 2
- Panama 1
- Mexico 11
- Argentina 2
- Chile 1

The NCIE has also negotiated export protocols for bovine semen and embryos to the Czech Republic and bovine embryos for Lithuania, Hungary and Estonia.

Of significance is that the EU lifted restrictions on bovine embryos due to BSE.

There are several pending protocols without resolution with Peru, (4) and Nicaragua (7).

The Andean Pact Countries (Bolivia, Colombia, Ecuador, Peru and Venezuela) adopted a resolution on Animal Health on 1997 and are now implementing it. Some countries are implementing the rule literally and others are very flexible, creating a fluid situation.

Some countries have placed restrictions on horses and/or birds because of West Nile Virus. The countries are: Dominican Republic, Mexico, Brazil, Argentina, Peru, and Ecuador.

There were three significant developments which impacted negatively on our export of live animals and animal commodities. The three events were: the suspension of the summer restricted feeder program to Canada, the diagnosis of Low Pathogenic Avian Influenza in several states earlier this year in commercial birds, and the diagnosis of Enzootic Newcastle Disease in backyard poultry in California.

Canada on March 15 rejected a proposal for a pilot program aimed at expanding access for US feeder cattle on a year round basis. Canada stated that is their intention to prevent the introduction of endemic cattle diseases that do not exist in Canada and that the proposal did not include a risk assessment in that regard.

On BT and anaplasmosis, the Canadian Cattlemen Association hosted a scientific summit. There was a commitment made to jointly develop a new terminal feeder proposal. Veterinary Services, APHIS has offered a more exclusive forum especially for development of a USDA strategy on anaplasmosis, tick and wildlife issues, treatment mitigation, and concerns around the use of tetracyclines.
Our goal and that of the NCBA is to get a continuation of some sort of the restricted feeder program after March 2002. We have met with the Canadians in Ottawa to discuss the harmonization of animal health programs and equivalence of status for brucellosis, tuberculosis, and swine pseudorabies. We have agreed on a framework for recognition of animal health status, now we need to provide each other our suggested parameters.

LPAI was diagnosed on eight (8) states in the United States this past year with a significant impact in trade of live poultry, hatching eggs, and poultry meat. The eight states were Connecticut, Pennsylvania, Maine, North Carolina, West Virginia, Virginia, California, and Texas. The Russian Federation, Japan, Mexico, and other countries placed outright bans on all products and/or suspended import from the affected states, and/or increased testing requirements from non-affected states following a massive negotiating effort by the USDA, and the submission of a tremendous amount of information requested from abroad. The effects of the LPAI episode still linger despite having released the last quarantine in Virginia on October 9, 2002.

END was diagnosed October 1, 2002 in some backyard poultry in California. To date the disease is limited to 13 premises in a cluster in the Los Angeles-Riverside county border, in a 30 mile radius. This event has triggered a US-wide ban on poultry and poultry products despite the outbreak being limited to backyard poultry (no commercial birds affected), and being limited to California. As of October 11 the following countries had a ban on US poultry and poultry products: Canada, Japan, Korea, the EU, Nigeria, Poland, Tahiti (French Polynesia), and Taiwan.


<table>
<thead>
<tr>
<th>SPECIES</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bovine</td>
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<td>174,764</td>
<td>114,855</td>
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<tr>
<td>Equine</td>
<td>63,980</td>
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<td>Ovine</td>
<td>407,768</td>
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<td>67,443</td>
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<td>Porcine</td>
<td>79,664</td>
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<td>247,690</td>
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<tr>
<td>Cervids</td>
<td>1,629</td>
<td>2,207</td>
<td>946</td>
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<tr>
<td>Camelids</td>
<td>60</td>
<td>41</td>
<td>103</td>
</tr>
<tr>
<td>Zoo Animals</td>
<td>819</td>
<td>475</td>
<td>396</td>
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**POULTRY EXPORTS**

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<tr>
<th></th>
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<th>2001</th>
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<tr>
<td>Day-old chicks</td>
<td>63,811,631</td>
<td>76,408,735</td>
<td>74,834,894</td>
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<td>Hatching Eggs (doz)</td>
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<td>Other live poultry/</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>birds</td>
<td>45,191,728</td>
<td>36,491,565</td>
<td>30,187,746</td>
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REPORT OF THE COMMITTEE

GERmplasm EXPORTS

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
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<tr>
<td>Bovine Embryos</td>
<td>23,566</td>
<td>15,563</td>
<td>11,776</td>
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<tr>
<td>Ovine Embryos</td>
<td>0</td>
<td>40</td>
<td>30</td>
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<tr>
<td>Porcine Embryos</td>
<td>0</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Equine Embryos</td>
<td>3</td>
<td>10</td>
<td>2</td>
</tr>
<tr>
<td>Cervids Embryos</td>
<td>60</td>
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<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
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<tbody>
<tr>
<td>Bovine semen</td>
<td>12,719,696</td>
<td>11,432,972</td>
<td>10,280,936</td>
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<tr>
<td>Equine semen</td>
<td>6,360</td>
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<td>15,873</td>
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<td>Porcine semen</td>
<td>7,920</td>
<td>12,642</td>
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<td>Caprine semen and embryos</td>
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<td>951</td>
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<td>Ovine semen</td>
<td>1,968</td>
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<td>Cervine semen</td>
<td>2,062</td>
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AQUACULTURE

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<td>Live Fish</td>
<td>25,991,095</td>
<td>9,205,541</td>
<td>9,312,173</td>
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<tr>
<td>Embryo/eggs</td>
<td>84,699,035</td>
<td>128,732,044</td>
<td>103,213,047</td>
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(IV) REGIONALIZATION:

The following countries are being evaluated for the following diseases:

**FMD:** Brazil, Croatia, Hungary, Namibia, Peru, Slovakia, South Africa, United Kingdom, Uruguay, South Africa, and Lithuania

**END:** Argentina, Honduras, Mexico (states of Campeche, Quintana Roo and Yucatan) and Panama

**CSF:** Chile, EU, United Kingdom, Mexico (states of Baja California, Baja California Sur, Sinaloa, and Chihuahua

**SVD:** Italy, Slovakia

**AHS:** Saudi Arabia

**RP:** Slovakia

**TB:** Review efforts to regionalize the Mexican States for TB is ongoing

(V) ANIMAL PRODUCTS ACTIVITIES:

PRODUCTS STAFF

A. IMPORT

The Animal Products staff has been involved in traditional activities as well as new activities. This involves drafting regulations to prevent the entry of animal products that could transmit diseases as well as issuing specific import permits to sate the conditions under which some imports will be permitted.
On June 12, 2002, the President signed the “Public Health Security and Bioterrorism Preparedness Response Act of 2002” into law. This law is designed to improve the ability of the United States to prevent, prepare for, and respond to bioterrorism and other public health emergencies. It requires people possessing, using, or transferring agents or toxins deemed a threat to animal or plant health and to animal or plant products to notify the Secretary of the United States Department of Agriculture (USDA). The section of the new Act that pertains to animal and plant health and to animal and plant products is called the “Agricultural Bioterrorism Protection Act of 2002”. The APHIS, Animal Products staff is implementing this portion of the law that deals with agents or toxins deemed a threat to animals or animal products.

An interim rule with a list of agents and toxins deemed a threat to animal or plant health or to animal or plant products was published in the August 12, 2002 Federal Register. Written comments regarding the agents and toxins on the list were accepted through October 11, 2002.

There will be a second regulation published at the end of the year (as required by the law) to address concerns regarding people possessing, using or transferring these agents and toxins.

Meat activities—a poultry processing facility in Mexico was approved to import US origin poultry, process it, and return it to the US.

B. EXPORT

The export division of the animal products staff has had an extremely active year. Negotiations have taken place with many countries to begin or facilitate trade in many different types of animal products. In some cases these negotiations were conducted jointly with USDA, Food Safety and Inspection Service, or the USDA, Agriculture Marketing Service-Dairy Division. In particular, new markets have been opened for table eggs, beef and pork to Cuba. Some of the activities are as follows:

- Pet food to Australia
- Table eggs to Mexico
- Ruminant products to Japan
- Poultry products to many countries expressing concern about low path avian influenza in the United States
- Animal products to Bulgaria
- Dairy products to Peru
- Sweetbreads to Argentina
- Pet food to Chile
- Meat and livers to Israel
- Pork to Australia and New Zealand
- Poultry to Latvia
REPORT OF THE COMMITTEE

· Dairy products to Egypt
· Poultry to Kazakhstan
· Animal products to Slovakia
· Pet food to Argentina
· Dairy products to Argentina
· Animal products to Romania
· Animal products to Lithuania
· Animal products to Czech Republic
· Pet food to Trinidad and Tobago
· Dairy products to Jamaica
· Fish meal to Israel
· Animal products to Slovenia
· Inedible egg products to Argentina
· Dairy products to Turkey
· Dairy products to Barbados

(VI) VETERINARY REGULATORY SUPPORT, PLANT PROTECTION AND QUARANTINE

A significant change was made in Plant Protection and Quarantine’s (PPQ) organizational structure in fiscal year 2002 (FY02). A Senior Executive Service level position of Assistant Deputy Administrator for Agricultural Quarantine Inspection (AQI) was created and filled. The AQI program is responsible for regulating all agricultural products that enter the United States and has grown over the years, in complexity and diversity of pest and disease pathways, detection tools, data systems, program innovations and the amount of fiscal and human resources devoted to AQI. At the same time, the U.S. has seen considerable growth in trade in agriculture. These factors demand that PPQ deliver a nationally consistent program to ensure a high level of accomplishment of the PPQ mission at all inspection points. This position will be responsible for leading the development and implementation of a national strategy that provides the requisite flexibility to deal with specialized local situations while ensuring consistent delivery of high-quality work in support of safeguarding. The regulated community, the agriculture industry, State governments, and other stakeholders should know what to expect from the AQI program and they should see that expectation fulfilled consistently across the nation so there will be no gaps in the exclusion system. Program staffs included in AQI functions include Port Operations, including Smuggling Interdiction and Trade Compliance, and Veterinary Regulatory Support (formerly Veterinary Medical Office).

The proposed creation of the Department of Homeland Security (DHS) will potentially have a significant impact on PPQ. In this proposal those activities related to AQI functions are slated to be transferred to DHS. The following responsibilities of DHS and APHIS, based on the legislation passed by the House of Representatives, have been identified. Discussions are
ongoing in the Senate.

<table>
<thead>
<tr>
<th><strong>APHIS</strong></th>
<th><strong>DHS</strong></th>
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</thead>
<tbody>
<tr>
<td>Establishment of regulations, policies, and procedures related to importation of commodities and other articles</td>
<td>Establishing, in consultation with APHIS, directives and guidelines to ensure the effective use of DHS personnel</td>
</tr>
<tr>
<td>Pre clearance of foreign commodities</td>
<td>Inspections of imported cargo, means of conveyance, mail, and passenger baggage at U.S. ports of entry and passenger preclearance at foreign locations</td>
</tr>
<tr>
<td>Fumigations and trade protocol verification such as certifying vessels for cold treatment</td>
<td>Treatments other than fumigations and trade protocol verification at the ports of entry</td>
</tr>
<tr>
<td>Non-routine pest identification and plant inspection stations</td>
<td>Routine pest identification</td>
</tr>
<tr>
<td>Pursuit of civil penalties not subject to spot settlement and collection of penalties that have not been paid</td>
<td>Documentation and collection of spot settlements and documentation for proposed civil penalties to be referred to APHIS</td>
</tr>
<tr>
<td>Holding and seizing items in violation of APHIS laws and regulations outside the port of entry</td>
<td>Holding and seizing items at the port of entry that are in violation of APHIS’s laws and regulations</td>
</tr>
<tr>
<td>Providing employees to support foreign details and emergency programs</td>
<td>Providing employees to support emergency programs and domestic details</td>
</tr>
<tr>
<td>Performing safeguarding procedures for pest mitigation within the port environs</td>
<td>Performing safeguarding procedures for pest mitigation in transit corridors and elsewhere outside the port environs</td>
</tr>
<tr>
<td>Training/Supervision of training</td>
<td>Delivery of some training</td>
</tr>
</tbody>
</table>
There are many other activities that are not transferred by the legislation and, therefore, will continue to be carried out in PPQ. These include, the Smuggling Interdiction and Trade Compliance Program, the AQI Veterinary Programs, export certification, pest detection (including within the port environs), risk assessment, methods development in support of AQI, domestic and emergency programs, resolution of trade issues, and quality assurance activities such as program reviews.

The AQI Veterinary Program was initiated this fiscal year with the recruitment, hiring and placement of 14 (of 18 total) field positions. The AQI veterinary medical officers (VMO) received intensive formal training that was coordinated by PPQ’s Professional Development Center (PDC) that included the following areas: APHIS Overview; technical training pertinent to the Animal Product Manual and the Airport Maritime Operations Manual, and port reviews; an Emerging Disease Course; a Communications Module; and a Risk Management Course. Local PPQ personnel participated in “on-the-job” training of these individuals by serving as a “sponsor”. The sponsor’s role was to facilitate learning about the local port culture and operational activities. The objectives of this program, which are still being developed, include: oversight, technical guidance and training for local PPQ personnel at ports of entry; communications with APHIS-VS and State Regulatory Officials; conducting port reviews; supporting risk pathway analysis initiatives; and supporting Smuggling, Interdiction, and Trade Compliance activities. Further, this program supported APHIS-VS animal disease eradication efforts through the participation of 6 AQI veterinarians in the Virginia Avian Influenza Task Force.

Summary of PPQ Activities
(September 2001 - August 2002)

Foreign Vessel and Aircraft Arrival

<table>
<thead>
<tr>
<th></th>
<th>Number of Lots</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maritime</td>
<td>2,624</td>
<td>327,473</td>
</tr>
<tr>
<td>Aircraft</td>
<td>208,897</td>
<td>427,021</td>
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<tr>
<td>Border Crossing</td>
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<td>87,046</td>
</tr>
<tr>
<td>Post Office</td>
<td>21,858</td>
<td>29,951</td>
</tr>
</tbody>
</table>

Animal Products and Byproducts Confiscated or Refused Entry

<table>
<thead>
<tr>
<th>Site</th>
<th>Number of Lots</th>
<th>Weight (kg)</th>
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<td>21,858</td>
<td>29,951</td>
</tr>
</tbody>
</table>
**Miscellaneous Categories**

- Footwear cleaned and disinfected: 190,084
- Maritime civil penalties: 181 totaling $29,100
- Baggage civil penalties (FY 01 data): 14,225 totaling $779,474
- Notification violations: 54 total
ANAPLASTOMOSIS IN CAMELIDS

Bob Frost and Murray E. Fowler, DVM

Anaplasmosis is an economically important disease of cattle, sheep and goats in specific regions of the United States and many foreign countries, especially in tropical and subtropical regions. The disease is transmitted from animal to animal by ticks and biting flies. The organism destroys the erythrocytes and may cause a fatal anemia in susceptible species. Anaplasmosis was once considered to be a protozoan parasite, but currently, microbiologists classify the organisms *Anaplasma marginale*, *A. ovis* and *A. centrale* as ehrlichial infectious agents.5,10

Llamas and alpacas are maintained in habitats that may harbor the ticks involved in the transmission of *Anaplasma* spp, and some regulatory officials, who are not acquainted with camelids, may suppose that such camelids pose a risk to livestock. The following document is meant to dispel concerns. A thorough literature search of articles about anaplasmosis in both Old and New World camelids supported the premise that camelids are not a risk to livestock.

Despite being maintained in endemic areas, there have been no reports of naturally occurring cases of anaplasmosis in South American camelids. However, alpacas have been infected experimentally with blood from infected cattle.6,9 Anaplasma bodies were observed in the blood 29 to 120 days following inoculation, but the infection was subclinical, even though hemoglobin and erythrocyte levels were reduced in the affected alpacas.7

A prominent laboratory diagnostician had the following to say about anaplasmosis in camelids: “I am not aware of any cases of naturally occurring anaplasmosis from *A. marginale* in either llamas or alpacas. Clearly under natural conditions these animals exist in areas where anaplasmosis is endemic in the cattle population. It seems quite likely that if natural infection does occur it would have been documented. Despite this, I am not aware of any anecdotal evidence that the disease occurs in South American camelids. There is a literature reference to an experimentally induced infection. However, there is no evidence that a persistent infection capable of establishing a carrier state or transmitting to other animals can occur, even experimentally. Consistent with this, there is no evidence of anaplasmosis in llamas or alpacas in the United States.”

“Thus state regulations prohibiting import of South American camelids without a negative test for anaplasmosis are misplaced and inappropriate. Even further compounding the problem is that there is no test approved for detection of either antibodies or the intracellular ehrlichia in South American camelids. The complement fixation test, as you are well aware, often has anticomplementary results. The agglutination assay results in false positives, possibly because the lamoids have antibodies against bovine red
blood cell components which are in the agglutination and complement fixation antigens. The newly developed cELISA for *A. marginale* is not approved for llamas and alpacas. This would be an almost impossible task since there would be no true positives to use in validating the assay.\(^A\)

A regulatory official in New York responded to a question about anaplasmosis in camelids as follows: “Please note that you do not need to test camelids for anaplasmosis prior to importation into New York. We do not consider the disease endemic in camelids in any area of the United States.”\(^B\)

Anaplasmosis is a common clinical disease of cattle, sheep and goats which may cohabitate with Old World camels. Serologic evidence of exposure to *Anaplasma* spp has been reported in dromedary camels,\(^1,2,3,8\) but clinical disease has not been reported.\(^11\)

Clearly, anaplasmosis is not a clinical disease in camelids. Although serologic evidence of exposure exists, the laboratory tests have not been validated in camelids, nor are they likely to be validated because of the absence of clinical disease.

**References:**


4. Anonymous, 1981. Annual report of the Veterinary Laboratory, Kisimayo, Ministry of Livestock, Forestry and Range, Dept. of Bet. Services, Somali Democratic Republic


A Personal communication, Terry F. McElwain, D.V.M., Ph.D, Mar. 28, 2002, Professor and Executive Director, Washington Animal Disease Diagnostic Laboratory, College of Veterinary Medicine, Washington State University, Pullman, WA 99164-7040
ANAPLASMOSIS in Camelids
Bob Frost and Murray E. Fowler, DVM

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absence of clinical disease.

**Bovine Tuberculosis in Texas**  
Dr. Terry H. Conger

On November 22, 2000, Texas received the Tuberculosis Accredited Free status with exception of the Modified Accredited Advanced El Paso milkshed Movement Restriction Zone. In July, 2001, a tuberculosis infected purebred beef operation in Fayette County was disclosed. In December, 2001, an affected dairy herd in Pecos County was confirmed. There is no epidemiological link between the herds, nor has a source of infection been identified for either herd. According to CFR specifications, the tuberculosis status of Texas was downgraded to Modified Accredited Advanced on June 3, 2002. The negative tuberculosis test requirement on breeding cattle moving interstate has been implemented. Additional requirements will go into effect on January 1, 2003. The Texas Tuberculosis Working Group has propose a Tuberculosis Action Plan as an alternative to the identification requirements of feeder stock moving interstate as specified in the CFR.

**National Veterinary Services Laboratories**  
Leptospirosis Reference Center  
October 1, 2001 – September 30, 2002

During the period of October 1, 2001 through September 30, 2002, the National Veterinary Services Laboratories Leptospirosis Reference Center received a total of 1,865 sera submitted for *Leptospira* microscopic agglutination test (MAT). Of these, 840 were for diagnostic and 1,025 were for export purposes; the total number of tests performed were 10,373. During this same period, clients requested and were provided 249,540 milliliters of polysorbate 80-bovine albumin medium, 262 *Leptospira* reference cultures, 153 vials of *Leptospira* reference antiserum, 84 vials of *Leptospira* multivalent fluorescent antibody conjugate, and 14 vials of flazo orange counterstain. Twenty-four people from 11 states and one foreign country (MT, IA, CA, GA, IL, MO, CO, KS, TX, WI, WY, and Thailand) participated in a two day *Leptospira* MAT training. Leptospira MAT training schools will also be offered in 2003 to meet incoming training requests.
ANAPLASMOSIS IN CAMELIDS

Bob Frost and Murray E. Fowler, DVM

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REPORT OF THE COMMITTEE ON INFECTIOUS DISEASES OF HORSES

Chairman: Dr. Lee M. Myers, Atlanta, GA
Vice Chairman: Dr. Peter J. Timoney, Lexington, KY

Dr. J. B. Anderson, TN; Dr. C. Carter Black, GA; Dr. Jones W. Bryan, SC; Dr. C. L. Campbell, FL; Dr. Leroy M. Coffman, FL; Dr. Leroy Coggins, NC; Dr. James J. Corbett, CA; Dr. Tim Cordes, MD; Mr. Ed Corrigan, WI; Ms. J. Amelita Facchiano-Donald, TX; Dr. Anthony G. Frazier, AL; Dr. E. Paul J. Gibbs, FL; Dr. Mary H. Giddens, OR; Dr. Chester A. Gipson, MD; Dr. Steven L. Halstead, MI; Dr. Nanette Hanshaw Roberts, PA; Dr. Robert M. Harbison, AR; Dr. Burke L. Healey, OK; Dr. Sharon K. Hietala, CA; Dr. Robert B. Hillman, NY; Dr. G. Reed Holyoak, OK; Dr. John R. Irby, TX; Dr. Bretaigne Jones, MO; Dr. Ralph C. Knowles, FL; Dr. Donald P. Knowles, Jr., WA; Dr. Maxwell A. Lea, Jr., LA; Dr. Donald H. Lein, NY; Dr. Thomas R. Lenz, KS; Dr. Mary Jane Lis, CT; Ms. Amy W. Mann, DC; Dr. Patrick L. McDonough, NY; Dr. Clifford W. McGinnis, NH; Dr. Robert W. Mead, WA; Dr. Andrea M. Morgan, MD; Ky Mortensen, KY; Dr. Don L. Notter, KY; Dr. Roger E. Olson, MD; Dr. Eileen Ostlund, IA; Dr. William E. Pace, FL; Dr. John W. Poe, KY; Mr. Bruce A. Shelfer, FL; Dr. Karen S. Sliter, DC; Dr. Manuel A. Thomas, Jr., TX; Dr. H. Wesley Towers, DE; Dr. Susan C. Trock, NY; Dr. Charles D. Vail, CO; Dr. Thomas E. Walton, CO; Dr. James A. Watson, MS; Dr. Taylor Woods, MO; Dr. Ernest W. Zirkle, NJ.

Committee Summary

The Infectious Diseases of Horses Committee convened on Sunday, October 20, 2002 from 12:30 – 5:30 p.m. at the Millennium Hotel in St. Louis, Missouri. Approximately twenty-six committee members and forty-eight visitors were recorded on roll. A variety of pertinent topics were presented, including a scientific paper on Equine Piroplasmosis: Is Enhanced Sensitivity of Serologic Testing Necessary? Following a productive scientific session, the following actions were taken at the business meeting.

1. **Subject Matter:** USDA, APHIS, VS Memorandum 555.8 Re Equine Infectious Anemia Testing Laboratories

   **Background Information:** Equine Infectious Anemia (EIA) is an infectious disease of horses that impacts the equine industry. The Committee on Infectious Diseases of Horses recognizes that improved policies and procedures should be implemented for approved laboratories conducting official EIA tests as a component of disease control.

   **Resolution:** United States Animal Health Association requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), National Veterinary
INFECTIOUS DISEASES OF HORSES

Services Laboratory (NVSL) implement the attached Veterinary Services (VS) memorandum 555.8, as revised by the Committee on Infectious Diseases of Horses at the 105th Annual meeting of USAHA held in St. Louis Missouri on 20 October 2002.

2. **Subject Matter:** Equine Infectious Anemia Testing Standards  
   **Background Information:** Equine Infectious Anemia (EIA) is an infectious disease of horses that impacts the equine industry. The Committee on Infectious Diseases of Horses recognizes that improved testing standards for both private and institutional laboratories should be implemented to enhance current EIA prevention and control programs.  
   **Resolution:** United States Animal Health Association requests that the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, National Veterinary Services Laboratory review and consider adopting the attached *EIA Testing Standards* through the proposed rule process.

3. **Subject Matter:** Equine Infectious Anemia; Proposed Recommendations Based on UM & R and VS Memoranda 555.7 and 555.8  
   **Background Information:** Equine Infectious Anemia (EIA) is an infectious disease of horses that impacts the equine industry. The current EIA Uniform Methods and Rules and VS Memoranda 555.7 and 555.8 are in need of revision to reflect contemporary methods of diagnosis, prevention and control of this disease.  
   **Resolution:** United States Animal Health Association requests that the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services initiate a dialogue with industry, state and/or regional representatives on the EIA Uniform Methods and Rules and VS Memoranda #555.7 and 555.8 in order to develop a cooperative program for the national control of EIA. In that regard, seven (7) recommendations included in the attached *EIA Subcommittee Report* are offered for review and potential inclusion in the Code of Federal Regulations (CFR) 75.4 through the proposed rulemaking process.

4. **Subject Matter:** Equine Piroplasmosis Serologic Testing  
   **Background Information:** Current data indicates that the complement fixation (CF) test for equine piroplasmosis though of proven specificity, lacks adequate sensitivity for the detection of all low titered serologically positive horses. Due to problems associated with the use of the CF test, competitive ELISA (C-ELISA) tests have been developed and shown to have superior sensitivity to the CF test for the serologic detection of horses infected with equine piroplasmosis.  
   **Resolution:** United States Animal Health Association requests the United
REPORT OF THE COMMITTEE

States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services adopt the C-ELISA as a more sensitive test for the post entry screening of horses for equine piroplasmosis and employ the indirect fluorescent antibody as a referee test at the earliest appropriate opportunity.

5. **Subject Matter: OIE Standards Commission Re Equine Piroplasmosis Testing**

   **Background Information:** Current data indicates that the complement fixation (CF) test for equine piroplasmosis though of proven specificity, lacks adequate sensitivity for the detection of all low titered serologically positive horses. Due to problems associated with the use of the CF test, competitive ELISA (C-ELISA) tests have been developed and shown to have superior sensitivity to the CF test for the serologic detection of horses infected with equine piroplasmosis.

   **Resolution:** United States Animal Health Association requests the United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services submit a request to the Standards Commission of the OIE that, based upon extensive experimental and field evaluation, the C-ELISA for equine piroplasmosis, having comparable sensitivity and specificity to the CF and indirect fluorescent assay tests, be approved by the OIE for the purposes of international trade.

   The Committee recommended that with respect to the presentation given by Dr. John W. Green entitled *Regionalization Recommendations from the Equine Infectious Anemia Survey*, that USDA-APHIS-VS-CEAH remove all reference to equine infectious anemia from this document. Major reservations were expressed of the relevance of this survey and the economic impact that EIA actually represents for the U. S. horse industry.

**EQUINE INFECTIOUS ANEMIA SUBCOMMITTEE REPORT AND RECOMMENDATIONS**

Dr. Ernest W. Zirkle, Subcommittee Chair

The Subcommittee on Equine Infectious Anemia (EIA) of the Infectious Diseases of Horses Committee offers the following recommendations to be presented to the parent committee at the annual meeting, Sunday, October 20, 2002.

The subcommittee recommends that USDA-APHIS-VS initiate a dialogue to develop a cooperative program with industry representatives, states and/or regions based on the most current information contained in the EIA UM&R and VS Memoranda # 555.7 and # 555.8, (as revised in this report) to include permanent identification of equids. This recommendation has seven major components:
A. The subcommittee recommends that consideration of specific elements of the EIA UM&R regarding EIA testing requirements for interstate movement of horses be incorporated into the CFR, title 9, part 75. The CFR currently regulates the movement of EIA reactors only, and there is a need for a federal requirement to have a negative EIA testing status for horses moving interstate. Thus, the sections 2 through 5 and 7 through 10 would be added to part 75.4 as follows:

   Part 75—Communicable diseases in horses, asses, ponies, mules, and zebras Equine Infectious Anemia (Swamp Fever) 75.4; 1. Definitions; 2. General restrictions; 3. Certificates and permits for interstate movement of equids; 4. Handling in transit of equids moved interstate; 5. Restrictions on interstate movement of equids because of EIA; 6. EIA reactor equids; 7. EIA exposed equids; 8. Other interstate movements; 9. Testing procedures for EIA in equids; 10. Official EIA tests; 11. Approval of laboratories, and diagnostic or research facilities; 12. Denial and withdrawal of approval of laboratories and diagnostic or research facilities; (Sections 1, 6, 11, and 12 are currently part of 75.4.)

B. The subcommittee reviewed and updated Memorandum 555.8 strengthening interstate movement testing and laboratory standards as attached.

C. The subcommittee agrees (there was one negative vote and one abstention) that the need for permanent and unique forms of identification of horses for EIA testing is obvious and inevitable. The subcommittee therefore recommends that permanent and unique forms of equine identification should include, but not be limited to, the following: (a) radio frequency implantable devices (RFID), known also as “transponders” or “microchips”, (b) biometric applications of iris or facial anatomy, (c) alpha-angle freeze mark, and (d) lip tattoo of a breed registry. Each of these could be linked to a database or integrated circuitry (IC) card, known also as “smart card”.

D. The subcommittee encourages states to develop quality assurance programs for its EIA laboratories in addition to the USDA proficiency testing. Where states believe more oversight is needed, they could supplement, not replace, existing protocols with additional blind samples or check tests and/or laboratory inspections.

E. The subcommittee endorses USDA-APHIS-VS offering inspection guidelines and courses for inspection of laboratories for EIA testing. These courses will be offered on a fee-recovery basis. The subcommittee further encourages states to train their own inspectors based on guidelines written by USDA.

F. With the cooperation of the industry, the subcommittee
REPORT OF THE COMMITTEE

recommends information about the number of EIA kits sold to each lab be sent to the USDA-APHIS-VS Senior Staff Veterinarian for Equine Programs quarterly for the purpose of monitoring EIA laboratories. This protected information will be available only to the State Veterinarians and AVIC’s for their states only.

G. The subcommittee endorses EIA testing standards (See attachment).

Respectfully submitted by Subcommittee members Steve Halstead, Bob Harbison, John Irby, Chuck Issel, Ralph Knowles, Maxwell Lea, Amy Mann, Bob Mead, Don Notter, Jim Sprague and Ernie Zirkle. Others who participated in the deliberations and were of great help and resource information contributors are Andrew Clark, Leroy Coffman, Tim Cordes, Jerome Freier, John Green, Burke Healey, Albert Kane, Lee Myers, Eileen Ostlund and Bev Schmitt.

EIA SUBCOMMITTEE REPORT ATTACHMENT 1:

VETERINARY SERVICES MEMORANDUM NO. 555.8 DRAFT REVISIONS

Subject: Approval of Laboratories to Conduct the Official Tests for Equine Infectious Anemia
To: Directors, VS Regions
Area Veterinarians in Charge, VS

I. Purpose
The purpose of this memorandum is to outline policy and procedures for approval of laboratories to conduct official tests for equine infectious anemia (EIA) and requirements for those laboratories when performing official tests.

II. Cancellation
This memorandum replaces Veterinary Services (VS) Memorandum No. 555.8, dated April 10, 1997 which is hereby canceled.

III. General/Definitions
Official Test:
All EIA tests are official tests and must be conducted at approved facilities by approved personnel in accordance with the procedures outlined in this Memorandum. Only diagnostic agar gel immunodiffusion (AGID) or enzyme-linked immunosorbent assay (ELISA) test kits that have been officially approved and licensed by the United States Department of Agriculture (USDA) will be utilized for EIA tests.
Approved Laboratory:

State, Federal or University Laboratory: Any site (facility) under the direct supervision of the State animal health official, a USDA-APHIS-VS director, a US military director, or university laboratory director, which has met all the requirements outlined in this Memorandum and in which at least one individual has completed the EIA training course at the National Veterinary Services Laboratories.

Private Laboratory: A singular test site (facility) which has no official supervisory affiliation with a State, Federal or University laboratory and which has met all the requirements outlined in this Memorandum and in which any person conducting an EIA test has completed the EIA training course at the National Veterinary Services Laboratories.

IV. Laboratory Approval
A. All initial requests for EIA laboratory approval should be made to the appropriate Area Veterinarian in Charge (AVIC).
B. Upon the recommendation of the AVIC and State animal health official, the following actions will be taken:
   1. A Federal or State veterinary medical officer will review with laboratory officials the regulatory and technical responsibilities inherent in conducting and reporting official tests.
   2. The physical facilities of the laboratory will be inspected by a Federal or State animal health official. Inspection results will be recorded on the enclosed laboratory inspection worksheet (Enclosure 1 not included for the purposes of this report). Laboratory inspection must be completed and the proposed facility found in compliance prior to participation of laboratory personnel in an EIA training course.
   3. Upon completion of the laboratory inspection, the director of the laboratory will sign the enclosed agreement (Enclosure 2 not included for the purposes of this report) acknowledging his or her understanding of the regulatory and technical responsibilities of the laboratory.
C. The procedures outlined below will be followed by approved laboratories:
   1. Only diagnostic test kits that have been officially approved and licensed by the USDA will be used.
   2. The tests will be conducted according to test protocols as described in literature accompanying diagnostic test kits unless otherwise directed by official National Veterinary Services Laboratories (NVSL) protocols. Appropriate control samples, as specified in instructions accompanying diagnostic test kits, must be included each time the test is performed. In addition, for AGID tests, a weak positive sample obtained from either
NVSL or an approved commercial source must be included each time the test is conducted.

3. Negative test results will be reported to State and/or Federal animal health officials regularly, as instructed by those officials, in both the State where the laboratory is located and the State in which the animals were sampled. State and/or Federal animal health officials shall be notified immediately or in no circumstances more than 24 hours after test completion if horses are positive to the EIA test. When requested by the State or Federal Animal Health Official, reports of monthly totals of EIA AGID and EIA ELISA tests performed by the laboratory shall be provided. EIA test results must be reported within 48 hours of test completion to the veterinarian submitting the sample.

4. Only samples collected and submitted by an accredited veterinarian, State or Federal animal health official, or military veterinarian will be accepted.

5. Each equid sample shall be submitted on a state or federally approved individual animal identification form. Information submitted with the sample(s) shall be legible and shall include the following:
   a. Name, address, and phone number of submitting veterinarian.
   b. Name and address of owner.
   c. Location (including county) of equine(s) at the time of obtaining the samples.
   d. Identification of the equine(s) sampled, including name, color, markings, tattoo, or registration numbers.
   e. Age, breed, and sex of equine(s) sampled.

Note: The signature of the owner or owner’s agent on the individual animal form is required at the discretion of the submitting veterinarian.

6. Reports of test results shall include the name, address, and phone number of the laboratory that conducted the test and the type of test performed.

7. Laboratories shall keep an original copy of each completed EIA individual animal test form for at least 12 months from date of completion.

8. Annual proficiency testing conducted by approved laboratory personnel at each approved laboratory is required. NVSL will supply the samples and evaluate test results. Laboratories receiving approval within 6 months of the proficiency test distribution date are exempt from participating for the approval year only.

9. Biennial inspections of approved laboratories by a Federal and/or State animal health official of the State where the laboratory
is located may be required. During these inspections, one of the items that should be reviewed is compliance with this memorandum. It is also recommended that inspections be conducted on all laboratories that fail an annual proficiency test to determine that tests are being conducted according to official protocols and that personnel conducting the tests are considered qualified by VS.

10. All EIA positive ELISA tests are to be confirmed by AGID. Confirmation testing must be conducted at a State, Federal, or university laboratory. Samples from tests with discrepant results must be forwarded to NVSL. NVSL may conduct ancillary testing on discrepant samples or request additional samples as they may deem necessary.

D. Training

1. Personnel who perform EIA tests must be recognized as qualified by VS. The AVIC and State animal health official must recommend qualified personnel for training and approval by NVSL. The training outlined below is the minimum required:
   a. For private laboratories: The person(s) responsible for conducting official tests for EIA will be trained at NVSL. This training will include successful completion of an individual proficiency test.
   b. For Federal, State, and university laboratories: At least one individual who is actively involved in EIA testing must have received training at NVSL. With approval of the AVIC and State animal health official, personnel previously trained at NVSL may train others in their laboratory to conduct the tests. Training will include regulatory responsibility. Laboratories will notify NVSL of names of individuals who are being trained, and NVSL will certify training of these individuals by providing individual proficiency tests, which must be completed in accordance with standards established by NVSL.

E. The AVIC, State animal health official, and NVSL will evaluate personnel who do not successfully complete proficiency testing in order to determine if additional training at NVSL is necessary or whether approval of the laboratory should be canceled.

F. Laboratories approved to conduct EIA tests will inform the AVIC and NVSL of any change of address or telephone number and when any personnel trained by NVSL to conduct the tests are no longer employed. If trained personnel are not available to conduct the tests, approval of the laboratory will be canceled.
V. Recommendation for Approval

Once the procedures in Section IV-B have been completed, the AVIC and the State animal health official may recommend approval of the laboratory. A jointly signed memorandum and the originals of all completed documents (Enclosures 1 and 2) should be to: Director, National Veterinary Services Laboratories, P.O. Box 844, Ames, IA 50010.

VI. Approval of Laboratories

After the requirements in Sections IV-B and IV-D (laboratory inspection and training) have been satisfactorily completed, the laboratory will be approved by the Director of NVSL and will be notified of approval by a letter signed by the Director of NVSL.

VII. MAINTENANCE OF LABORATORY APPROVAL

Laboratories are expected to follow the policies and procedures outlined in this Memorandum at all times. Approved laboratories are subject to inspection by a Federal or State animal health official at any time during the laboratory’s normal business operation.

VIII. REMOVAL OF LABORATORY APPROVAL

Laboratory approval will be withdrawn by the Administrator when any of the criteria for approval have not been met. Approval will be removed in the following situations: 1) The laboratory requests removal, 2) The Director of NVSL recommends removal or 3) The Director of NVSL receives written recommendation for removal by concurrence of the AVIC and State animal health official. In the latter two situations, the laboratory will be informed of recommendation for removal in a letter signed by the Administrator. In all cases, written notification of the removal of laboratory approval will be provided to the laboratory.

IX. LIST OF APPROVED LABORATORIES

The Director of NVSL will maintain a current list of laboratories approved to conduct official tests for EIA. This list will be updated regularly and available to the Regional Directors, AVICs, State animal health officials and other interested persons, via the United States Department of Agriculture, Animal and Plant Health Inspection Services, Veterinary Services website.

/s/
Deputy Administrator
Veterinary Services
EIA SUBCOMMITTEE REPORT ATTACHMENT 2:

EIA Testing Standards Proposal

Background: The effectiveness of control programs for equine infectious anemia (EIA) is predicated on the use of accurate and specific serologic tests for the detection of antibodies against EIAV antigens. The agar gel immunodiffusion (AGID or Coggins) test is the only serologic test for EIA that has been proven to correlate with virus presence; as such, it remains the gold-standard serologic test for diagnosis of EIA. The specificity of the AGID test is high. However, in routine testing of field samples the approved ELISA tests for EIA appear to be more sensitive than the AGID test, i.e., a lower number of false-negative samples are noted. This is perhaps most evident in results from periodic check test samples for proficiency where the majority of errors occur due to reporting weak positive AGID samples as negative.

As all ELISA test-positive samples must be confirmed by AGID, we believe that adoption of the following paradigm for testing could markedly improve the accuracy of results. First, the results would be more standardized and less subjective than if based on AGID testing alone. Second, it would provide a standard for development of reference and referral laboratories where further testing would clarify the status of horses whose initial serologic results are questionable. Third, it would help establish a sound basis for the creation of stronger state/regional/federal cooperation on EIA control programs.

1. Any laboratory testing for Equine Infectious Anemia (EIA) must be approved as per VS Memorandum 555.8 and will be termed an EIA ELISA Laboratory.
   a. The primary test for all EIA testing is an USDA licensed EIA ELISA test, which is the only test run at all EIA ELISA laboratories.
   b. EIA ELISA tests must be read on a spectrophotometer (ELISA plate reader).
   c. A positive and negative control sample must be used on all ELISA test plate runs and on each
   d. A printout with spectrophotometer readings of all tests is required and must be kept on file, with a copy of corresponding EIA test charts, at the EIA ELISA Laboratory for at least three years, available for regulatory scrutiny.
   e. Certified personnel conducting EIA ELISA tests must successfully complete individual proficiency tests annually. If 100 % proficiency is not achieved in the time permitted by NVSL, one retest within an additional thirty days, is allowed. Failure of the retest will result in the withdrawal of certification and approval of the individual to perform the EIA ELISA test.
f. EIA ELISA Laboratories and ELISA test printouts will be inspected annually by state and/or federal animal health officials.
g. When AGID testing is required for special circumstances (export testing, international movement with specific AGID requirement, etc.) EIA ELISA Laboratories must forward samples to an EIA Reference Laboratory.

2. ELISA positive samples must be retested in duplicate immediately in the same EIA ELISA Laboratory. If confirmed positive, the sample shall be termed a “Confirmed Positive Sample”.

3. Confirmed Positive Sample test results must be immediately reported (within twenty-four hours) to the State Veterinarian and AVIC. A second blood sample, termed the “Regulatory Sample” may be collected by a state or federal animal health official or by a licensed, accredited veterinarian upon specific authorization from the State Veterinarian or AVIC.

4. Confirmed Positive Samples and Regulatory Samples must be forwarded to an “EIA Reference Laboratory”.
   a. An EIA Reference Laboratory must be a state, federal, or university laboratory.
   b. An EIA Reference Laboratory must stock all USDA licensed EIA ELISA test kits.
   c. EIA Reference Laboratory personnel must be trained under NVSL authority as per Memorandum 555.8 in ELISA and AGID testing. Laboratory personnel must pass individual proficiency tests annually.
   d. An EIA Reference Laboratory must commit to a turnaround time of no longer than forty-eight normal business hours after receipt of Confirmed Positive Samples and Regulatory Samples sent to them.

5. The EIA Reference Laboratory must test both the Confirmed Positive Sample and the Regulatory Sample with all USDA licensed EIA ELISA kits and an AGID test.

6. Criteria for determination of tests results at an EIA Reference Laboratory:
   a. Positive results on all USDA licensed EIA ELISA tests and positive AGID = Positive.
   b. Samples with any other combination of results will be forwarded to an EIA National Referral Laboratory and tested with all approved EIA tests.

7. EIA National Referral Laboratory is either National Veterinary Service Laboratory (NVSL) in Ames, IA or the Kentucky EIA Referral Laboratory at the Gluck Equine Research Center, University of Kentucky, Lexington, KY. EIA Referral Laboratories must commit
to a turnaround time of no longer than seventy-two normal business hours after receipt of samples from EIA Reference Laboratories.

8. All costs associated with testing beyond the initial ELISA tests are to be borne by the national EIA Control Program.

REGIONALIZATION RECOMMENDATIONS FROM THE EQUINE INFECTIOUS ANEMIA SURVEY
Dr. John W. Green, USDA-APHIS-VS-CEAH

A survey to help VS establish the information needed to support a regionalization methodology, using equine infectious anemia (EIA) as a model disease, was distributed to all State AVICs. All states except West Virginia responded to the survey. Therefore, this survey summary, analysis and maps apply to all states and Puerto Rico, but not West Virginia.

The survey parallels the structure of information requests that are sent U.S. trading partners. These requests are organized into 11 risk factors. The information requested to evaluate the 11 risk factors describes the quantity and quality of the disease monitoring and surveillance practiced by trading partners to safeguard the health of animals/products exported to the U.S. (Clarification of Information Requested for Recognition of a Region, OMB No. 0579-0040 http://www.aphis.usda.gov/vs/garris/1222.PDF). Reciprocally, these trading partners can ask the U.S., through the VS Import/Export Center, for similar information on which to evaluate U.S. animal health safeguarding practices. This survey was designed to determine if adequate information is available to respond to requests from potential purchasers of U.S. animal/products.

A second reason for the survey was to test the feasibility of developing a regionalization methodology that could be used to limit the loss of exports should a disease appear in the U.S. that might cause foreign buyers of specific animals/products to discontinue accepting exports from the U.S. Under current practices, all exports from all regions of the U.S. would be included in any ban on U.S. animals/products. Hopefully, a regionalization procedure can be developed that would allow exports from some regions. The VS must be able to demonstrate, using data provided by States and AVICs, that disease-free regions can be effectively isolated from diseased regions. This demonstration must be performed quickly by national/CEAH staff and must convincingly prove to foreign recipients of our animals/products that these commodities are disease-free.

The following analysis will follow the organization of the survey that was developed around the 11 risk factors.

Respondent Information and Response Problems

The survey was entered onto the web so that it could be completed and submitted with a minimum of effort and problems. This process was largely unsuccessful. For a relatively few states, it worked as planned. For
most states, however, the process did not work; when they submitted the completed survey, they were not informed that it was not received by CEAH. Thus, many states completed the survey but it was not received by CEAH; subsequent requests by CEAH generated ill will with the States. Many states were forced to print copies of the survey, complete it, and fax it to CEAH.

**Recommendations**

1. Solve computer communication problems between states, CEAH and Riverdale.
2. AVICs and State Veterinarians must initiate equine testing and management standards on all Native American and government lands. These are untested reservoirs for EIA.

**Risk Factor 1.** The authority, organization, and infrastructure of the veterinary services organization in your state available to regulate/monitor EIA.

3. Require equids to be tested when moved off home premises.
   a. Unique identification
   b. Verify destination for interstate movement
   c. Database—web-based, centralized
      i. Geo location of all equids tested
      ii. Geo location of all reactors
      iii. Caretaker/responsible person name and phone number
      iv. Web-based movement tracking database, perhaps using Veterinary Health Certificates
      v. Test results, laboratory used, test used, etc.

**Risk Factor 2.** EIA disease status of your state.

4. Review EIA standards in UM&R to be followed in ALL states
5. Develop a historic database—see Recommendation 3 above

**Risk Factor 3.** The EIA status of adjacent states. **Not applicable to this situation.**

**Risk Factor 4.** The extent of the EIA disease control program in your state.

6. Review standard traceback procedures published in UMR.
   a. Put all movement pathways and caretakers/responsible persons and phone numbers in database.
7. Review standard testing requirements for adjacent properties published in UMR.
8. Review standard monitoring procedures for infected premises published in UMR.

**Risk Factor 5.** The vaccination status of your state. **Not currently applicable to EIA.**
Risk Factor 6. The degree to which your state is separated from adjacent states of higher risk through physical or other barriers. No recommendation required.

Risk Factor 7. Movement controls and biosecurity.
9. Develop an education program for equine owners.
10. Develop random inspection standards for equids in transit. Publish the intention to do this.
11. Require movement health certificates/testing.
   a. Web-based, centralized database—see Recommendation 3 above.
12. Develop standards for identifying and separating reactor animals while in transit.
13. Require animal identification that is permanent, unique, unalterable and acceptable to the industry. Suggest that owners carry evidence of identification for each animal. See Recommendation 3.

Risk Factor 8. Livestock demographics and marketing practices in each state.
14. Open discussion with NASS about enumerating all equids. Alternatively, require all equids to be tested before movement off the home place.
   a. Include in database—see Recommendation 3.
   b. Identify operations/premises by type.
   c. Recreation/backyard horses are a MAJOR unenumerated and untested reservoir for EIA.
15. Locate all horse auctions/equid gathering points. Populated the database. See Recommendation 3.

Risk Factor 9. The type and extent of disease surveillance in your state.
16. Develop a program for regular data analysis and reporting.
   a. CEAH—animal health monitoring—risk analysis—regular reports and summaries.
   b. Regionalization
   c. State reports
   d. Riverdale—management decision-making, resource allocation
   e. Other—American Horse Council, state councils, breed associations, etc.

Risk Factor 10. Diagnostic laboratory capabilities.
17. Review standards for laboratory approval, certification and inspection.
   Link laboratories in the database to report test results and aid in regionalization—see Recommendation 3.

18. Review and publish the emergency response capability for containing and/or eradicating a disease outbreak.

Current Impediments to Effective Regionalization of EIA

1. Electronic communication problems between states, CEAH, and National Export/Import Center.
2. All states don’t follow same or standard procedures.
3. Lack of movement regulations.
4. Lack of complete enumeration of all equids.
5. Lack of uniformity in quarantine regulations.
6. Lack of knowledge about location and extent of untested reservoirs.

EQUINE PIROPLASMOsis: IS ENHANCED SENSITIVITY OF SEROLOGIC TESTING NECESSARY?

Dr. Donald Knowles and Lowell Kappmeyer
Animal Disease Research Unit, ARS-USDA

Equine babesiosis (piroplasmosis), a disease of equids in many regions of the world, is caused by the tick-borne hemoprotozoans Babesia equi (14) and Babesia caballi (17). There is concern about the risk and consequences of entry of these parasites through international movement of horses into the United States where piroplasmosis is limited to Florida (19,25) and apparently not eliminated (B. caballi) (5). The horse population within the United States is presumed to be entirely susceptible to piroplasmosis, therefore management safeguards against the entry and/or dissemination of piroplasmosis is mandatory. A necessary aspect of controlling piroplasmosis is knowledge of the tick-vectors capable of transmitting these parasites within the United States.

In the United States, B. caballi is known to be experimentally transmissible by three native tick species: Anocentor nitens (18,23), Dermacentor albipictus (24), and D. variabilis (21). In a recently completed study (22), five North American tick species: Amblyomma americanum, Boophilus microplus, Dermacentor andersoni, D. occidentalis and D. variabilis were tested for their ability to transmit B. equi. Intrastadial transmission was demonstrated by D. variabilis males and transstadial transmission by B. microplus adults. The collective data indicate that the possibility exists for natural transmission of equine piroplasmosis within the United States. All of these ticks are native to the United States, although B. microplus has been prevented, through acaricide use, from becoming reestablished north of Mexico. Obviously, vector control by use of acaricides is a viable part of a piroplasmosis control program, however there are concerns of the development of acaricide resistance. While the control of potential tick vectors is one method to prevent transmission of equine piroplasmosis, the United States has
adopted the strategy of preventing equine piroplasmosis infected horses from entering the country based on finding anti-\textit{B. caballi} and/or anti-\textit{B. equi} antibodies in horses presented for importation.

Since 1969, the U. S. Department of Agriculture has used the complement fixation test (CFT) \((3,4,6)\) as the official assay for detecting anti-equine piroplasmosis antibody. The limitations associated with the CFT, including the inability to evaluate sera with anticomplement activity, have been described \((11,16)\). Due to the problems associated with the use of the CFT, competitive ELISAs (cELISAs) \((1)\) have been developed for the serologic detection of horses infected with \textit{Babesia equi} and \textit{Babesia caballi} \((6-12,20)\).

These assays are based on monoclonal antibodies, which bind to recombinant merozoite antigens produced in \textit{E. coli}. These antigens are equi merozoite antigen 1 (EMA-1) of \textit{B. equi} and rhoptry-associated protein 1 (RAP-1) of \textit{B. caballi} \((7,8,10,13)\). Monoclonal antibody 36/133.97, used in the cELISA for the detection of anti-\textit{B. equi} antibody binds an EMA-1 epitope conserved in \textit{B. equi} isolates worldwide \((10)\). An initial study showed that the \textit{B.equi} cELISA correctly identified infected horses from 19 countries \((10)\), and subsequent data in which 154 sera from these countries were tested showed a 94% concordance between the CFT and cELISA \((11)\). The discordant sera were retested by immunoprecipitation of 35S-methionine labeled \textit{B. equi} antigen. The CFT(-), cELISA(+) sera were shown to be true positives. Although the precise amino acid sequence of the epitope bound by mAb 36/133.97 isn’t known, the binding region was narrowed to the N-terminal end of EMA1 and a comparison of the deduced amino acid sequences from 15 independent \textit{ema1} genes showed a median identity of 99% and a median similarity of 100%. The lack of significant variation of EMA-1 indicates this merozoite surface protein is not under immune selective pressure and provides a molecular basis for its use as a diagnostic reagent \((2)\).

In an initial study 302 sera previously tested for equine anti-\textit{B. caballi} antibody by the CFT were also tested by cELISA \((8)\). The results of cELISA and CFT were 73% concordant. The majority of the discordant sera \((72/77)\) were CFT(-), cELISA(+) \((8)\). The discordant sera were tested by indirect immunofluorescence assay (IFA) \((12)\). Sera tested by IFA were diluted 1:200 to ensure specificity. The need to dilute these sera leads to the potential of decreased sensitivity. Testing by IFA revealed that 48 of the CFT(-), cELISA(+) sera were true positives \((8)\).

A recent study comparing the CFT and the cELISAs for serodiagnosis of \textit{B.equi} and \textit{B. caballi} found concordances of 76% and 89% respectively \((9)\). In this study 22 sera were found to be CFT(-) and cELISA(+). When tested by IFA, 17 of these sera were shown to be true positives \((9)\). Furthermore, each cELISA was utilized to test 1,000 sera from horses of U.S. origin, considered to be true negatives. The resulting specificities for the \textit{B.equi} and \textit{B. caballi} cELISAs were 98% and 99% respectively \((9)\). These
collective data indicate that the cELISAs for the serodiagnosis of *B. equi* and *B. caballi* provide enhanced test performance compared to the CFT.

This collective information indicates that the potential for tick transmission of equine piroplasmosis exists within the United States and diagnostic assays with enhanced sensitivity relative to the currently used CFT are available. The question, which must be asked, is: with the apparent lack of sensitivity inherent in the CFT, why have we not developed areas of endemicity within the United States? Clearly, there are many factors, which influence the answer to this question. The most direct answer is that we don’t know whether there are endemic areas of equine piroplasmosis within the United States. Also, we have minimal understanding concerning influences of a number of factors, which determine whether or not an infected horse shows clinical disease. Immunogenetics of the horse, the virulence of the infecting strain, the tick burden and the challenge dose are likely factors impacting disease expression.

The fact that there are tick vectors within the United States which have been shown experimentally to transmit *B. caballi* and *B. equi*, and our lack of knowledge concerning other factors which influence the establishment of endemicity and disease expression, it must be concluded that the most sensitive assays available should be used to screen horses, presented for importation, for infection with *B. caballi* and/or *B. equi*.

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WEST NILE VIRUS NATIONAL STATUS

Eileen N. Ostlund, DVM, PhD, Head
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Dr. Eileen Ostlund presented a summary report of the current West Nile virus (WNV) status in the U. S. As of October 19, 2002, there were over 11,000 confirmed equine WNV cases in 38 states. The case fatality rate is estimated to be approximately 33% with a higher case-fatality rate in geriatric horses. Since conditional licensure in August 2001, over 4 million doses of inactivated West Nile virus vaccine have been distributed. The vast majority of clinical West Nile encephalitis cases have occurred in unvaccinated horses. Current information on West Nile virus can be obtained through the USDA website: www.aphis.usda.gov.

EQUINE VACCINE FOR WEST NILE VIRUS

Biological R&D, Fort Dodge Animal Health

The West Nile virus (WNV) was first isolated and identified from birds, mosquitoes, and mammals including horses in three states of the north-eastern United States in 1999. Since then, WNV infection has been spread to southeastern and mid-western states. In order to meet the urgent need
of controlling the WNV infection in equine population, we have developed a killed WNV vaccine. An equine isolate of WNV obtained from NVSL, APHIS, USDA was plaque purified and used as the vaccine strain. The test vaccine was prepared by inactivating virus stocks chemically and adjuvanted with a proprietary adjuvant MetaStim(1). A dose titration study in horses was first conducted to evaluate serum neutralization antibody responses against WNV in horses. A total of 56 mixed breed horses, 9-11 months of age and sero-negative to WNV at the time of first vaccination, were used in this study. Horses were randomized into three vaccinated and one control groups. Horses were vaccinated with the test vaccine at low, median and high dose respectively. All vaccinated horse were administered the test vaccine intramuscularly twice, three weeks apart. Serum samples were collected periodically and were measured for serum neutralization titers using plaque reduction neutralization test. Results indicated that significant increase in serum neutralization titers starting at 7 DPV2 in all three dosage groups. No significant difference in titers at 14 DPV2 was detected among the three dosage groups, although the high dose group had the highest titer as expected.

Eight horses from the median dosage group in the dose titration study were randomly selected and their sera collected at 0 DPV1, 14 DPV1, 0 DPV2, 7 DPV2, and 14 DPV2 were tested using capture ELISA to measure the specific IgG response. A significant IgG response was detected as early as 14 DPV1. As expected, the second vaccination further boosted the response.

The duration of PRNT titers in horses vaccinated with the median dose of the vaccine was also evaluated on samples collected at 8, 11 and 12 months post second vaccination. As expected, PRNT titers decreased over the time. However, a majority of the vaccinated horses still had positive PRNT titers (>5) one year after the second vaccination while the control horses remained negative (<5). The Geometric Mean Titer (GMT) of the vaccinated horses at 12 MPV2 was 14.

Twelve months after the second vaccination, horses vaccinated with the median dose of WNV vaccine and non-vaccinated control horses were experimentally challenged with a WNV isolate of crow origin. After challenge, horses were monitored for rectal temperature and any clinical signs twice daily for two weeks and once daily thereafter until 21 days post challenge (DPC). Serum samples were collected twice daily for two weeks and once weekly thereafter for detection of viremia by virus isolation using Vero cells. The cultures were observed periodically for cytopathic effect. One additional passage in Vero cell culture was performed for each sample and confirmed by indirect fluorescent antibody (IFA) assay specific to WNV. Nine out of 11 (81.8 %) controls developed viremia after challenge while only one out of 19 (5.3 %) vaccinates had transient viremia. The incidence rates of viremia were compared between vaccinates and controls by Fisher’s
exact test (p<0.0001). The frequency of viremic incidence in the control horses ranged from 1 to 7 whereas the vaccinated horse had just one incidence of viremia.

Horses were euthanized and necropsied on 21 and 22 DPC. Cerebrospinal fluid (CSF), spinal cord (cervical, thoracic, and lumbar) and brain (frontal, occipital, medulla oblongata, and brain stem) tissue samples were examined for gross pathology and collected for virus isolation. No WNV associated clinical signs were observed in any of the challenged animals throughout the observation period. No febrile responses were observed in any of the challenged horses. No WNV was isolated from any of the tissue or CSF samples collected from any of the challenged horses.

The primary outcome for the evaluation of efficacy was prevention of viremia. Viremia is the prerequisite prior to the virus crossing the blood-brain barrier. Although viremia may not necessarily lead to the induction of clinical disease (immune-clearance may occur before viruses can cross blood-brain barrier and establish CNS infection), no neurological signs caused by WNV infection would be expected without the occurrence of viremia. Results from this study demonstrate a significant protection (94% of preventable fraction) against viremia in horses vaccinated with the killed WNV vaccine and the long duration of the protective immunity.

AN INTERACTIVE WEBSITE FOR USDA’S NATIONAL TICK SURVEY

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The potential to introduce new tick species and exotic tick-borne diseases into the United States has increased over time with the help of modern transportation. Reduced travel time between international destinations has increased the chances of ticks surviving on an imported host. In addition, there have been increases in the importation of exotic animals by animal dealers, game farms, and private citizens. A National Tick Survey was initiated by APHIS, Veterinary Services, to assess the current distributions of tick species in the United States, to estimate the potential of introducing new tick species or tick-borne diseases, and to determine which environmental factors might influence the survival and distribution of ticks in the United States.

As part of the development and implementation of a National tick survey, we established an interactive website to update and disseminate information on the distributions of several tick species harmful to livestock, poultry, and wildlife. Distribution records and tick identification data from two sources,
the US National Tick Collection and USDA's National Veterinary Services Laboratories, were used to create national-level maps of the distributions of *Dermacentor andersoni* (Stiles) (Rocky Mountain Wood tick), *D. variabilis* (Say) (American Dog Tick), *Amblyomma americanum* (L.) (Lone star tick), and *A. maculatum* (Neumann) (Gulf Coast tick). In addition to distribution maps, information on life cycles, host associations, seasonal activity, and identification keys were also included on the website for each tick species. General information on tick-transmitted diseases, tick biology, and collecting and preserving ticks may also be found on the website. A tick map questionnaire was added to the website to supplement our current database as well as verify or change the present status of a particular tick species in the United States from reported to established. The questionnaire was also intended to increase the accuracy of location information for tick species collected in the United States. The increased use of latitude and longitude coordinates will enhance our current study of biological and environmental factors that may influence the distribution of ticks in the United States.

Biological and environmental factors, spatial analyses, publication references, and distribution maps on other tick species of veterinary importance will be added to the website as tick records are analyzed and verified.

**MARE REPRODUCTIVE LOSS SYNDROME UPDATE 2002**

Roberta M. Dwyer, DVM, MS, DACVPM
Maxwell H. Gluck Equine Research Center

A syndrome of late term abortions (LTA), early fetal losses (EFL) between 35-100 days gestation, unilateral endophthalmitis, and pericarditis occurred in Kentucky late April 2001, termed Mare Reproductive Loss Syndrome (MRLS). An epidemiological study revealed that several factors were associated with the EFL, which had the highest incidence of the four clinical presentations: high eastern tent caterpillar (ETC) (*Malacosoma americana*) concentration and presence of wild cherry trees around pregnant mares, maiden or barren mares primarily affected; mares bred in February 2001, and farms with >50 mares (Dwyer, et al., 2002). Only one factor was associated with mares not developing EFL: feeding hay to mares out on pastures. Over 300 other factors investigated were not associated with losses, including pasture treatments, pasture content, feed type or source, medications administered to horses, etc.

Extensive diagnostic tests on late term abortions revealed no primary infectious pathogen, although ~ 50% of LTA had a non-beta hemolytic *Streptococcus* cultured, with ~17% having an *Actinobacillus* spp isolated. Pasture testing revealed no evidence of ergot alkaloids, endophyte infected fescue, several mycotoxins or other plant agents known to cause repro-
ductive failure in horses. This was obviously a new disease syndrome. Since ETC preferentially live in wild cherry trees which are numerous and indigenous to Kentucky, research efforts were directed to studying their possible link to MRLS. Cherry tree leaves (a food source for ETC) contain prussic acid, which is broken down to cyanide. Extensive efforts by toxicologists could not show a link between cyanide and reproductive abortions (Dirikolu, et al., 2002). Similarly, phytoestrogens (McDowell, 2002), multiple mycotoxins (Newman, et al., 2002), and ergot alkaloids (Schultz and Bush, 2002) were not associated with MRLS.

A farm contingency plan was developed for Spring 2002 with the following recommendations:
- minimize exposure of pregnant mares to ETC;
- keep pregnant mares out of proximity to cherry trees;
- mow pastures frequently; and
- offer hay to horses on pastures

An intensive monitoring program on 12 central Kentucky farms and 1 hay farm was implemented, with pasture soil and forage samples taken throughout the foaling season for analysis of ergot alkaloids, cyanide content of white clover, nitrate and nitrite levels, mineral content, mycotoxin and soil microbiology testing. Soil and forage contents of these compounds were within normal limits (Long, et al., 2002).

Experimental studies into exposing early gestational mares to ETC and/or their frass caused abortion (Webb, et al., 2002; Bernard, et al., 2002). Late term abortions were also induced by nasogastric administration of crushed ETC which had consumed fresh cherry tree leaves (Sebastian, et al., 2002). Neither endophthalmitis nor pericarditis were observed in these mares.

Epidemiologically, the numbers of losses were lower in 2002, and environmental differences were noted, as shown below (Dwyer, 2002):

<table>
<thead>
<tr>
<th>Factor</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather</td>
<td>Drought; abnormal temp</td>
<td>Rain, moderate temp</td>
</tr>
<tr>
<td>ETC pesticide usage</td>
<td>0/133 survey pastures</td>
<td>66/92 survey farms (71.7%)</td>
</tr>
<tr>
<td>Measures against ETC</td>
<td>None/few</td>
<td>Several (survey)</td>
</tr>
<tr>
<td>LTA from MRLS</td>
<td>~500</td>
<td>~170</td>
</tr>
<tr>
<td>Pericarditis/eye cases</td>
<td>~50 each</td>
<td>~9 and 6</td>
</tr>
<tr>
<td>Weak foals born</td>
<td>MANY</td>
<td>34</td>
</tr>
</tbody>
</table>

**Differences between 2001 and 2002**

To date, the exact etiologic agent(s) of MRLS remains unclear. Whether
the ETC contains a toxic agent, or is a vector for a new pathogen is unknown. What is the mode of transmission/exposure in nature? How does this syndrome manifest itself in three separate organ systems (reproductive, ocular and cardiac)? Eastern tent caterpillar control measures on farms appeared to be associated with lowered EFL and LTA rates.

While Koch’s postulates are applied to infectious agents, Sir Bradford Hill’s Causation Criteria are used with toxicological, environmental and multifactorial diseases to determine causation:

1. The strength of the association;
2. The consistency of the association;
3. The specificity of the association;
4. The temporal relationship (exposure must precede the disease);
5. The biological gradient (more exposure=more disease);
6. Biologic plausibility;
7. Coherence (proposed etiology should not conflict with factual information about the disease);
8. Evidence from experimentation; and

While meeting all of the criteria is not necessary to “prove” causation, the first factors are considered the most important and need to be kept in mind as research progresses.

References:
Abstracts from the First Workshop on Mare Reproductive Loss Syndrome (MRLS), University of Kentucky, Lexington, KY, August 2002:
1. Bernard B, Webb B, LeBlanc M. Gastric administration of eastern tent caterpillars causes Early Fetal Loss (EFL) in pregnant mares.
3. Dwyer R. Epidemiological correlates of the 2001 and 2002 episodes of MRLS.
7. Schultz C and Bush L. The potential role of ergot alkaloids in MRLS.
Future updates can be found at http://www.uky.edu/Ag/VetScience/mrls/index.htm
REPORT OF THE COMMITTEE ON JOHNE’S DISEASE

Chairman: Dr. William L. Hartmann, St. Paul, MN
Vice Chairman: Dr. Scott J. Wells, St Paul, MN

Mr. John B. Adams, VA; Mr. J. Bruce Addison, MO; Dr. Robert D. Angus, ID; Dr. Marilyn F. Balmer, MD; Mr. Nathan James Boehm, ND; Dr. William W. Buisch, NC; Dr. Leslie L. Bulaga, NJ; Dr. Michael A. Carter, MD; Dr. H. Michael Chaddock, MD; Dr. Yung Fu Chang, NY; Dr. Michael T. Collins, WI; Dr. Robert A. Cook, NY; Dr. James J. Corbett, CA; Mr. Ed Corrigan, WI; Dr. Debra C. Cox, MD; Dr. Allan L. Dewald, SD; Dr. John C. Doyle, OK; Dr. Robert J. Eisner, NJ; Dr. John I. Enck, Jr., PA; Dr. Kendal G. Eyre, ID; Dr. William H. Fales, MO; Dr. James M. Foppoli, HI; Dr. Thomas W. Freas, IN; Mr. Bob Frost, CA; Dr. Franklyn B. Garry, CO; Dr. Michael J. Gilsdorf, MD; Mr. L. Wayne Godwin, FL; Mr. Steven G. Hennager, IA; Dr. Sharon K. Hietala, CA; Dr. Sam D. Holland, SD; Dr. David L. Hunter, MT; Dr. John P. Huntley, NY; Dr. Jeffy J. Huse, NY; Dr. Richard H. Jacobson, OR; Dr. Todd Johnson, VT; Dr. William T. Jolly, DC; Dr. Bretaigne Jones, MO; Dr. Susan J. Keller, ND; Dr. Tom Kellner, NE; Dr. Arthur J. Kennel, MN; Mr. John C. Lawrence, ME; Mr. Hank M. Lefer, CA; Dr. Donald H. Lein, NY; Mr. Jay C. Lemmermen, FL; Dr. Thomas F. T. Linfield, MT; Dr. Mary Jane Lis, CT; Ms. Sharon L. Lombardi, NM; Mr. Gordon ‘C Cobbie’ Magness, SD; Dr. Charles E. Massengill, MO; Dr. Clifford W. McGinnis, NH; Dr. A. R. McLaughlin, WI; Dr. I. Lee McPhail, OH; Mr. Chris W. Murdock, MO; Dr. Kenneth E. Olson, IL; Dr. Roger E. Olson, MD; Mr. Mark J. Owens, IA; Dr. Janet B. Payeur, IA; Dr. Kristine R. Petrini, MN; Dr. John R. Ragan, MD; Dr. Mark A. Remick, MI; Dr. Hans P. Riemann, CA; Mr. Paul E. Rodgers, WV; Dr. Ronald F. Rohde, WI; Dr. Frederick A. Rommel, PA; Dr. Christine A. Rossiter, VT; Dr. Harvey L. Rubin, FL; Dr. John J. Schiltz, IA; Dr. Larry A. Schuler, ND; Dr. Sarah B. S. Shapiro Hurley, WI; Dr. David M. Sherman, MA; Dr. Sang J. Shin, NY; Dr. William P. Shulaw, OH; Dr. Shri N. Singh, KY; Dr. Ralph E. Slaughter, NE; Dr. Theron G. Snider, III, LA; Dr. Donald C. Sockett, WI; Dr. Judith R. Stabel, IA; Dr. Susan M. Stehman, NY; Dr. William D. Stouder, ID; Mr. Les C. Stutzman, NC; Dr. Deepanker Tewari, PA; Dr. Charles O. Thoen, IA; Dr. Kenneth L. Thomazin, CA; Dr. J. Bradley Thurston, IN; Dr. Cheryl B. Tillman, OR; Dr. Max A. Van Buskirk, PA; Dr. James A. Watson, MS; Dr. Gary M. Weber, DC; Mr. Maurice H. Wessel, Jr., TX; Ms. Diana L. Whipple, IA; Dr. Robert H. Whitlock, PA; Dr. Ronald B. Wilson, TN; Dr. Ching-Ching Wu, IN; Ms. Ria de Grassi, CA.

The Committee on Johne’s Disease met on Monday October 21 and Tuesday October 22 2002, from 12:30 to 5:30 p.m. each day. Ninety-six people attended. The following is a report of the activities of the committee meeting.
The Committee passed one resolution, which requests USAHA approval and endorsement of the amended recommendations of the Ad Hoc Steering Subcommittee and a suggested spending plan for the Voluntary Bovine Johne’s Disease Control Program. The Resolution was forwarded to the Committee on Nominations and Resolutions.

**Chairman’s Report**

William Hartmann  
Chairman of the USAHA Committee on Johne’s Disease

The chairman reviewed the structure of the Committee. The Committee has two subcommittees, the National Johne’s Working Group chaired by Bob Whitlock, Gary Weber, and John Adams, and the Scientific Advisory Subcommittee chaired by Judy Stabel. Currently there are 95 members on the Committee on Johne’s Disease.

The chairman updated the Committee members on the 2001 Resolutions.

- In response to Resolution #22 Judy Stabel organized a Symposium held on October 21, 2002, which addressed the efficacy and management criteria for use of immunologic assays for field application of Johne’s disease testing. Dr. Stabel’s summary of that Symposium is included in this report.

- Resolution #21 requested that NIH make a definitive determination on the zoonotic potential of M. paratuberculosis and inform USDA, FDA, CDC, AVMA and affected food producer organizations of their decision. Dr. Mike Collins updated the committee on the response to this request. Dr. Carole Heilman from National Institute of Allergy and Infectious Diseases (NIAID) responded to the USAHA resolution in writing. In her response she discusses how NIAID is supporting various research initiatives that help address the cause of Crohn’s disease in humans. Follow-up communication with NIAID requesting more detailed information on the exact nature of this research resulted in a letter from Dennis Lang, Enteric Diseases Program Officer, NIH. He states that NIH is not currently supporting any research that examines whether *M. paratuberculosis* is a zoonoses. Rather, he states, that their research focuses on determining whether a bacterium can be identified as an etiological agent in Crohn’s patients. He describes six projects that are currently being funded which deal with this topic. Two proposals relate directly to paratuberculosis, one involves culturing patients for *M. paratuberculosis* another on basic genomics of *M. paratuberculosis*. A total of $2,000,000 in grants has been awarded through NIH. A follow-up conference call was scheduled for October 16, 2002 to further discuss this issue with NIH, but was cancelled since Dr. Lang was unavailable.

- Resolution #20 was an endorsement of the Uniform Program Standards
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for the Voluntary Bovine Johne’s Disease Control Program. Dr. Mike Carter’s follow up to that endorsement is included in his USDA report, which is included in this report.

• Resolution #19 was an endorsement of the funding of many of the elements of the proposed National Johne’s Management, Testing, Research and Indemnity Program for Dairy Cattle. John Adams updated the Committee on the potential for federal funding for the Voluntary Bovine Johne’s Disease Control Program. The Farm security and rural investment act of 2002 (2002 Farm Bill) provides authorization for a national Johne’s control program through 2007. At this time the House has recommended $20,356,000 to support the Voluntary Bovine Johne’s Disease Control Program and the Senate has recommended $21,700,000, with $1,300,000 of that designated specifically for research.

• Resolution #18 requested the Chairman of the USAHA Committee on Johne’s Disease appoint an ad hoc steering subcommittee to recommend priorities that will promote continued progress toward achieving implementation of a comprehensive voluntary national Johne’s control Program. The report from that committee is included later in this document.

Other Committee Business

The Committee passed two recommendations. The full text of those recommendations is found at the end of this report.

One other recommendation was proposed concerning the use of pooled fecal samples in the Johne’s disease control and herd status program. The recommendation was that the Johne’s Committee of the USAHA recommend that USDA change the Johne’s Disease Program Standards to include the alternative of testing of pooled fecal samples for Johne’s disease herd identification and monitoring programs. A motion was made and seconded that this recommendation be forwarded to the Scientific Advisory Committee for further review. Motion passed. USDA input is needed to identify the process for validating fecal pooling so that it can be incorporated into the program standards.

Several items were discussed that the Ad Hoc Steering Subcommittee directed the Committee to accomplish. One recommendation was that the Committee on Johne’s Disease should convene a panel of experts to develop guidelines for use of vaccination as a tool for use in control of Johne’s Disease. This was assigned to the NJWG who will form a subcommittee to review this topic. It was determined that the Steering Subcommittee recommendation that the Committee on Johne’s Disease develop a plan through which the USDA would provide check testing and quality control is already being done and required no further action. Similarly, the direction to the Committee that they should encourage affected industries to promote producer participation in the Voluntary Bovine Johne’s Disease Control Pro-
REPORT OF THE COMMITTEE

gram is being accomplished through the current educational efforts and financial incentives such as reduced cost of testing.

Ken Olson gave a demonstration of the Johne’s Disease educational CD Rom that is being put together by the educational subgroup of the NJWG. This project is discussed in greater detail in the National Johne’s Working Group Report included elsewhere in this report.

Risk Assessments:

A comparison of procedures used in several states

Kris Petrini, Moderator

Kris Petrini moderated a session on risk assessments. The purpose of the session was to demonstrate how various states are using risk assessments and to discuss the risk assessment tools being used. Scott Wells gave a brief history of the Johne’s risk assessment tool, which was originally developed by C. A. Rossiter, L. J. Hutchinson, D. Hansen, and R. H. Whitlock at the request of the National Johne’s Working Group. Sue Stehman discussed the procedures used in New York, which incorporates the use of a Johne’s risk assessment as part of a larger herd health program. Dale Neirby described the risk assessment form used in Minnesota outlining how Minnesota has changed the original form to meet their needs. Todd Johnson shared Vermont’s newly developed Health Improvement Project Workbook, which is being used by veterinarians in his state to conduct herd health risk assessments and to develop herd plans. The need to develop a standardized risk assessment form for use in the Voluntary Johne’s Bovine Disease Control Program was discussed. It was decided that the NJWG should appoint a task force to identify, with input from USDA, the essential components of a risk assessment and to determine how best to develop a standardized form, while still allowing for States to customize procedures to fit their individual needs.

Experience using pooled diagnostic tests in herd control programs

Scott Wells, Moderator

Use of bacterial culture of fecal pools to identify Johne’s disease infected herds

SJ Wells, S Godden, CJ Lindeman, and J Collins

College of Veterinary Medicine, Department of Clinical and Population Sciences, University of Minnesota, St. Paul, MN

Risk assessment-based strategies have been developed to control Johne’s disease based on reduction of transmission of *Mycobacterium paratuberculosis*. After herds are identified as infected, they can choose to implement specific management practices to control transmission on their
operation. An important first step therefore in the implementation of effective control measures is valid categorization of herds based on infection status and prevalence.

The US Voluntary Johne’s Disease Herd Status Program for Cattle for identifying test-negative cattle herds involves testing a statistical subset of the adult cattle in a herd by use of a serologic ELISA to detect antibody against *M. paratuberculosis*. ELISA-positive tests can be confirmed by follow-up bacteriologic culture of fecal samples. This method, however, fails to detect most low prevalence herds (Wells and others, 2002a). Another herd testing strategy involves testing of pooled fecal samples, which allows a higher percentage of cattle to be tested for a fixed laboratory cost. Other countries have begun to use fecal pooling in Johne’s herd control programs (Kalis and others, 2000; Whittington and others, 2000). An experimental study (Wells and others, 2002b) evaluated the sensitivity of bacterial culture of fecal pools and found that it was effective in detecting most pools (using 5 or 10 samples per pool) with at least one cow shedding at moderate to high levels. This study indicated the potential for use of culture of fecal pools for characterizing herd Johnes’s disease infection status using culture methods commonly employed in the US. The objective of this study was to estimate the sensitivity of bacterial culture of pooled fecal samples for *M. paratuberculosis* compared to individual fecal culture at the pool and herd levels.

Fecal samples from dairy cows in 24 Minnesota dairy herds were collected for bacterial culture for *M. paratuberculosis*. Fecal samples were pooled in groups of 5 samples and tested using bacterial culture for *M. paratuberculosis*, in comparison to bacterial culture of individual cow fecal samples. Ninety-four percent of fecal pools containing at least one cow shedding *M. paratuberculosis* at high levels (at least 50 colonies per tube) were test-positive and 88% of fecal pools with at least one cow shedding at moderate levels (10-49 colonies per tube) were test-positive. Bacterial culture of fecal pools detected 94% of infected herds. Within-herd fecal pool culture prevalence was highly correlated with individual cow fecal culture prevalence.

In conclusion, bacteriologic culture of pooled fecal samples provides a valid and cost-effective method of detecting for *M. paratuberculosis* infection in cattle herds and estimating herd prevalence. Bacterial culture of 10 fecal pools (50 cows) per herd was satisfactory for detection of most infected herds. Testing of fecal pools offers advantages of higher herd sensitivity than ELISA-based testing strategies and reduced costs. Additionally, bacterial culture of feces provides a direct measure of the infectious risk of transmission of *M. paratuberculosis*, an advantage not provided by serum antibody detection test strategies. If laboratory capacity were available, use of fecal pooling could be applied in herd status programs for Johne’s disease immediately, which points out the critical need for development of
high throughput antigen detection systems.

References:

Preliminary Results of Evaluation of Use of Pooled Fecal Culture for Detection of Johne’s Disease in Cattle Herds
S M Stehman, R Craver, V Patten, S. Shin,
NYS Diagnostic Laboratory, Cornell University

Justification and Potential Benefits
Serologic tests have been used as a rapid method for herd level screening for Johne’s Disease. However, culture is considered the definitive test for Johne’s and detects infection at earlier stages than serology. Recent advances in a new culture method being developed and validated at the NY Animal Health Diagnostic Laboratory Cornell Diagnostic Laboratory using a liquid media system have shortened the test turnaround time from 4 months to 5 weeks. Individual fecal cultures, while the most accurate and sensitive antemortem test for Johne’s infection, require significant resources at the laboratory level and are costly for farm control programs. Pooled fecal cultures have been used as an economical and sensitive means of assessing herd risk status for Johne’s infection in the Netherlands (cattle) and in Australia (sheep). The relative sensitivity of pooled fecal culture needs to be determined with samples from animals with early and advanced infection. Pooled cultures could be used as an economical means of monitoring progress in low prevalence herd control programs including vaccinated herds where serology cannot be used.

The study objective was to determine relative sensitivity of the pooled fecal cultures compared to individual cultures for detection of low, moderate and high fecal shedders on solid media and liquid media systems using defined samples diluted with negative feces in the laboratory. Samples were run in duplicate. Pools of 2, 5 and 10 were tested for each level of shed-
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ding. Each pool contained 1 to 3 positive samples. Heavy shedders and moderate shedders were detected in all replicates and at all levels of shedding within the same 35-day incubation cycle used for liquid media. For very light shedders, a dilution effect was noted in pools of 5 and 10 but not in pools of 2. An additional one week of incubation was required to detect the very light shedders and in 4 samples only one of the 2 replicates were positive.

The second objective of the study was to determine the relative sensitivity of the pooled cultures compared to whole herd individual cultures and, when available, to whole herd ELISA in well-characterized infected demonstration herds based on past testing and risk assessment. Preliminary results were presented on two herds. The first herd was a low prevalence herd with 3.5 % annual fecal shedding based on past testing. The herd test on a rolling monthly sampling taken from cows at ~150-190 days checked pregnant Of the first 112 samples tested from this herd, 8% were positive with 6 light and 3 heavy shedders identified by individual culture. Pools of 5 and 10 were tested based on pooling by submission order. All heavy shedders were readily detected in pools containing the individual positives with 100% sensitivity. Of the individual light shedders, 60% were detected in the pool of 5, and 2 were detected in the pool of 10 but not in their respective pool of 5. Three pools of 5 and one pool of 10 were positive when individual cultures were negative. This finding has been reported in other poling studies suggesting that pools may detect light shedders missed by individual culture. In summary, preliminary studies suggest that pooled fecal cultures detect all but the lightest shedders detected by individual fecal cultures and pools of 5 are more sensitive than pools of 10 for detecting light shedders.

Comparison of pooled faecal culture and serology as flock-screening tests for ovine Johne’s disease
E.S.G. Sergeant, R.J. Whittington and S.J. More
AusVet Animal Health Services Pty Ltd, 69 Turner Cr, Orange 2800
Phone: 02 6362 1598, Fax: 02 6369 1473, email: evan@ausvet.com.au

The flock-sensitivities of pooled faecal culture (PFC) and serology for the detection of ovine Johne’s disease were compared in a field trial and by simulation.

The flock-sensitivities in the field trial were 92% and 61% for PFC and serology respectively. In low-prevalence flocks (estimated prevalence <2%) the flock-sensitivities were 82% and 33% respectively, compared to 96% and 85% respectively in higher-prevalence flocks (2%).

Simulated flock-sensitivities for a Check Test (sample size = 100) were 67% and 42% for PFC and AGID respectively, and for a Sample Test (sample size = 350 for PFC, 500 for AGID) were 98% and 93% respectively for an assumed prevalence of 2%. A sample size of 450- 550 provided a flock-sensitivity for PFC of 95% for a prevalence of 1%, compared to 1100-1200
for the AGID. Sample sizes for the AGID to provide equivalent flock-sensitivity to PFC were generally 2-3 times the PFC sample size.

**USDA:APHIS:Veterinary Services Report**
Ron DeHaven, Deputy Administrator

Dr. DeHaven thanked the members of the Committee who participated in the Ad Hoc Steering Subcommittee in September 2002. He indicated that their report offered important direction for the future of the Voluntary Bovine Johne’s Disease Control Program. With the proposed significant increase in resources available for this program in FY03, it is extremely important to have clear goals and to measure progress and accomplishments throughout the year to assure future funding.

**National Johne’s disease Program Overview – 2002**
Submitted by Mike Carter, National Johne’s Disease Coordinator

Veterinary Services published the Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program (VBJDCP) in April of 2002. The following is a review of the current status of the developing program in the United States. One component of the VBJDCP is the creation of the advisory committee to assist the State Veterinarian in establishing and operating a Johne’s disease program. Forty-one states have active advisory/working groups. Another 5 States plan to start a committee.

Twenty-three states have control program (infected herds are identified and formal assistance is offered) in place with over 2682 herds identified as control herds in the United States. The herd status program is the Johne’s disease test negative portion of the VBJDCP. The goal of the herd status is to identify herds with a lower risk of Johne’s disease infection. Twenty-nine States have status programs in place and 7 more are currently developing programs for their States. States in the northeast are designing their programs to include a Dairy Quality Assurance aspect to give a broader approach to disease prevention on the farm. More than 630 herds have been enrolled in the various status programs with 160 are advancing within the program to higher levels of assurance for test negative status.

Currently 37 States have laboratories approved for Johne’s serology testing and 21 States have laboratories approved for M. paratuberculosis fecal culture or DNA testing. A significant lack of approved laboratories for fecal cultures exists in the southeast. Reported volume of activities from these laboratories estimates ELISA testing above 471,000 samples and 81,000 fecal culture samples.

Veterinary Services conducted 2 training courses to State designated Johne’s coordinators (DJC) in 2002. Two are planed for 2003 that emphasize on farm risk assessments, herd management plans and critiquing of the management plans. Twenty-nine States have officially appointed Des-
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ignated Johne’s disease coordinators for their State. Demonstration herd projects will also be a key part of the education process. These herds will be used to “show case” management practices that are effective in controlling the spread of Johne’s disease and develop a group of well-characterized herds for other clinical studies. The goal will be to establish demonstration projects in a minimum of 5 States in each region. $386,259 from VS headquarters were given in cooperative agreements and grants for research and educational activities to ten different States including the National Academies of Science Johne’s disease, The Johne’s Steering subcommittee meeting, and sponsorship of the Johne’s Working Group Education Subcommittee Education CD ROM.

Report from the Scientific Advisory Subcommittee
Submitted by Judy Stabel

Background:
The Scientific Advisory Subcommittee was asked to provide recommendations on the use of serologic tests for the detection of Johne’s disease in the US. The subcommittee organized a symposium of experts who have experience with serologic tools to provide the most current data on the efficacy of these tests in the field. Further, the symposium was designed to present a balanced approach by providing a forum for companies who have serologic tests licensed for sale in the US to describe their individual tests. Ultimately, the goal of the symposium was to provide information to the Johne’s committee to enable them to make decisions about the proper application and interpretation of the serologic tests. The following are a series of comments/recommendations put forth by the committee.

Recommendations/Summary:
Although data were provided to support the use of other serologic tests such as the AGID, TipTest, and IFN-g, the ELISA test is the recommended serologic test for use in cattle. A greater amount of data has been accrued to allow critical evaluation of the ELISA. The ease of use, low cost and repeatability are advantages of the ELISA test in herd status and control programs for Johne’s disease in cattle. The converse paradigm of strong cell-mediated immunity during the early stages of disease and strong humoral immunity during the latter stages suggests that one serologic test will not detect animals in all stages of disease. The pattern of host immunity suggests that the ELISA is useful as a detection tool in late stages of infection (i.e., clinical animals). The sensitivity and specificity of existing commercially available ELISA tests suggests that they are most useful in negative status programs. The ELISA test may also be used as a screening tool to presumptively identify infection within a herd. It is not recommended as an individual animal test except for animals showing clinical signs typical of
Johe’s disease.

For state and federal voluntary control programs within the US the ELISA is recommended as a primary screening tool to be followed by other organism-based detection tests. The presence of positive ELISA test results within a herd mandates further testing with either fecal culture or fecal PCR detection of the *M. paratuberculosis* organism. The absence of positive ELISA test results does not indicate a lack of disease in the herd. These herds may be identified as low risk herds. After an initial screen with the ELISA and follow up fecal culture confirms a low prevalence of disease, the test is not recommended since animals are more likely to be in subclinical or early stages of disease and would not be detected. Low prevalence herds should monitor their status with an organism-based detection test.

A major concern with the current ELISA tests that are commercially available is the specificity. Both commercial tests incorporate an adsorption step to reduce the cross-reaction of antibodies in the serum sample to nonspecific mycobacterial components. This methodology has helped enormously to reduce the number of false positives that are reported, however, there are individual herds for which cross-reactivity appears to be a significant problem. These herds may report a high number of false positives due to exposure to *M. avium* spread by birds or migratory waterfowl. Likewise, environmental mycobacteria that are present in the feed or water may also play a role. If lab results indicate an unexpectedly high number of ELISA positive cows the lab should confirm that the assay was valid based on the manufacturers specifications and internal controls. The lab should recommend that the test on those samples be repeated. If a high proportions of the samples are still positive a fecal detection test should be run on all ELISA positive animals in the herd or a statistically valid subset. A direct fecal PCR test would provide much quicker results than conventional culture (2 days versus 12 weeks) fecal samples.

Several areas of research were identified based upon the data presented within the symposium.

**IFN-g Test**—The IFN-g test has not been evaluated thoroughly for use as a detection tool for Johne’s disease in the US. Because IFN-g production by T cells occurs in the early stages of infection this tool could be useful to screen low prevalence herds containing subclinically infected animals. Ideally, the combined use of the ELISA test and the IFN-g test to screen herds would enable the detection of animals in early and late stages of disease. This test needs to be evaluated in field studies for accurate and sensitive detection of Johne’s disease in dairy and beef cattle and sheep flocks. In addition, the efficacy and reproducibility of this test in diagnostic laboratories needs to be assessed.

**Antigens for Detection Tests**—Further studies are suggested to identify proteins from *M. paratuberculosis* which could be used in the development of more sensitive and specific diagnostic tools, particularly the ELISA
Previously identified _M. paratuberculosis_-specific proteins have not been useful as antigens in diagnostic tests. Total genome sequencing of _M. paratuberculosis_ has identified more unique gene sequences that may be helpful. Use of a single antigen in a diagnostic test is probably not feasible and a pooled antigen approach is likely to be more sensitive. The USDA is encouraged to support further research to identify new proteins for development of new diagnostic assays and to devise a multi-laboratory approach for validation of new antigens within existing test formats.

**Specificity of the ELISA in the field**—It is suggested that more intensive studies be conducted to assess the true specificity of commercially available ELISA tests in the field. Estimates of specificity of some currently available assays are very high and range from 97 to 99%. However, some of the studies reporting specificities are based on animals whose true infection status was not well characterized. Specificity evaluations should be based upon animals of known negative status. This could be demonstrated most accurately by selecting animals from test negative herds and evaluating multiple tissues for the presence of _M. paratuberculosis_ organisms. As new assays are approved for licensure in the US, specificity studies should be conducted on animals located in multiple geographic locations. This will provide valuable information concerning the test performance.

**Use of Internal Control Sera**—In an effort to assess the reproducibility of approved ELISA tests between and within diagnostic labs in the US it is suggested that a set of internal control sera be run with each test. NVSL has prepared a set of internal controls to represent negative, low positive and positive sera. These sera have been used in a 5-laboratory study to assess the reproducibility of one commercial ELISA test. It is suggested that this study be expanded to include more laboratories and all approved ELISA tests. These data would allow uniform interpretation of ELISA test performance in laboratories in the US and estimates of assay variability.

**Phase I:** A broad-based study to include the 5 original laboratories and at least 10 more laboratories that routinely conduct ELISA testing will collect data using the internal control sera within their ELISA tests. If possible an equal number of laboratories will be chosen for each commercial ELISA test. Laboratories which run a proprietary ELISA test may also present data demonstrating use of the internal control sera.

**Phase II:** A broad-based study across several designated laboratories will be conducted to provide information on biological effects on ELISA performance. Data from each of the laboratories must not only include serology but fecal culture, herd prevalence, and other biological data such as parity and days in milk. Collectively, these data will provide a comprehensive view of the ELISA performance. Data would be sent from each participating laboratory to one central location (CEAH, APHIS) to perform multivariate analyses.
Phase III: Additive data from Phases I and II will allow recommendations to be made about test interpretation including potential cut-off values for the ELISA that can be used to presumptively designate infection status of animals within a herd. This study will also evaluate the effectiveness of ELISA serology in disease control programs. This could demonstrate whether ELISA assays are valuable management tools for producers who are participating in a control program.

Finally, the members of the subcommittee thank all of the speakers, members of the National Johne’s Working Group, and the Johne’s Committee of USAHA for their participation and support. We would also like to thank USDA-APHIS-VS for funding the symposium.

Report of the Ad Hoc Steering Subcommittee
Submitted by Dr. Bill Hartmann

The United States Animal Health Association approved resolution number 18 during its 105th annual meeting in Hershey, Pennsylvania, November 1-8, 2001. This resolution directed the president of USAHA to request that the Chairman of the USAHA Committee on Johne’s Disease appoint an ad hoc steering subcommittee. This subcommittee was established and the following is a list of members: Bill Hartmann, Paul Ugstad, Mike Collins, Gary Weber, John Adams, Tim O’Neill, Jim Krahn, Scott Wells, Mike Carter, Alan Roussel, Karen Jordan, Bob Whitlock, Chris Rossiter, Mark Davidson, Mike Gilsdorf, Richard Breitmeyer, John Huntley, Jay Lemmerman, Bill Shulaw.

USDA, APHIS, Veterinary Services hosted a meeting of this subcommittee in Riverdale, MD September 17th through the 19th. In the resolution this subcommittee was directed to: recommend priorities that will promote continued progress toward achieving implementation of a comprehensive voluntary national Johne’s control program, to establish a strategic plan for implementation of those priorities, and finally, to adjust the mission statement and goals of the NJWG, as required, assuring continued progress.

What follows is the subcommittee amended report to the USAHA Committee on Johne’s Disease. In addition the subcommittee’s recommends that the NJWG’s mission and goals are no longer necessary. It is recommended that the Committee and the following strategic plan provide direction to the NJWG.

• Goal I: Implement a comprehensive educational and training program
  > Objective: Develop a high quality collection of materials for educating cattle producers, herd veterinarians, animal health officials, and associated industry
  ≥ Recommendation: The NJWG should complete development of an educational CD-Rom and assure adequate distribution. That USAHA endorse the content of the Johne’s CD-ROM and following review and approval by an Ad Hoc subcommittee
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appointed by the chair of the Johne’s disease committee, that the USAHA office in Richmond provide the Johne’s CD-ROM for sale.

> Objective: State programs should be structured to encourage producers to buy animals from low risk and test negative herds to develop a market driven program.
> ≥ Recommendation: The NJWG should recommend methods to accomplish this goal.

• Goal II: Define critical knowledge gaps that influence producer participation and affect Johne’s disease control, prioritize efforts to fill those gaps and secure adequate funding.

> Objective: NJWG should identify critical knowledge gaps.
> ≥ Recommendation: An annual meeting of scientists from ARS, APHIS, CEAH, CSREES, states and Universities concerned with Johne’s disease should be facilitated and funded by USDA to coordinate efforts to fill those knowledge gaps.

> Objective: Foster more collaboration between APHIS, ARS, Universities and CSREES about Johne’s disease investigations.

> Objective: Develop optimal Johne’s disease test strategies.
> ≥ Recommendation: The USDA should contract with a team of experts to describe the optimal testing system for initial differentiation of presumptively infected and non-infected herds.
> ≥ Recommendation: The USDA should contract with a team of experts to review and update guidelines for testing strategies to complement management for control of Johne’s disease in infected herds.

> Objective: Develop and validate model strategies for control of Johne’s disease.
> ≥ Recommendation: Demonstration farms, clinical field trials, and applied studies are critical and of the highest priority to provide the validated management tools to implement a science-based National Johne’s Disease Program. Specific areas to be evaluated should include, but not be limited to:

  ♦ Effectiveness of herd management plans, best management strategies without testing in the control of JD
  ♦ Testing strategies used in control
  ♦ Aggressive test and cull strategies
  ♦ Effectiveness of test strategies to eliminate JD from (low prevalence) beef herds
  ♦ Vaccine use
  ♦ Risks associated with consumption of colostrum and milk by young calves
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- Risks associated with fecal contamination of the environment, including feed and water
- Age-related differences in transmission
- Transmission via natural service (bulls)
- Relative importance of in-utero transmission
- Risks and best management practices in heifer rearing operations where animals from different status herds are commingled.

≥ Recommendation: The Johne’s Disease Committee should convene a panel of experts to develop guidelines for use of vaccination as a tool for use in control of JD in heavily infected cattle herds.

- Goal III: Strengthen a standardized national database to permit measurement of participation and progress in the VBJDHSP
  > Objective: Utilize a national database for Johne’s disease including the following specific measures and assuring that all herd owner identity information remains confidential, unless the owner signs a release to reveal the VJDHSP level.

≥ Number of herds tested
≥ Number of cattle tested
≥ Number of herds participating in the Voluntary Bovine Johne’s Disease Control Program and other data to reflect national status of the program as requested by the National Johne’s disease coordinator’s office. The requested data by each state is required to receive APHIS-VS funds for Johne’s disease programs.

≥ Recommendation: The USDA should provide an annual report to the USAHA Johne’s Disease Committee that provides this information.

- Goal IV: Increase and enhance state implementation of the VBJDCP
  > Objective: To encourage uniformity of state programs through close coordination of state veterinarians, state Johne’s disease advisory committees, USDA AND USAHA

≥ Recommendation: A task force with USDA coordination should develop standardized national risk assessment forms for dairy and beef cattle to be used as a minimum standard under the Voluntary Bovine Johne’s Disease Control Program. This task force should also develop a recommended training structure for veterinarians performing risk assessments.

≥ Recommendation: Each state should do risk assessments and develop herd management plans in the context of herd biosecurity and animal and public health risks.
Recommendation: The USDA should develop a standardized agreement form between the herd owner and State that would accompany the herd management plan.

Recommendation: In order for cattle herds to receive Federal funds, it is mandatory that herds participating in the herd management phase of the Voluntary Bovine Johne’s Disease Control Program have a risk assessment completed with a current and approved herd management plan in place.

Recommendation: USDA and USAHA should encourage harmonization of control requirements to facilitate interstate cattle movements.

Recommendation: USDA should amend the Code of Federal Regulations so that it is consistent with the program standards for the VBJDCP.

Objective: Develop and expand infrastructure to increase VBJDCP participation and implementation

Recommendation: The USDA should provide resources to increase the number of trained personnel available for risk assessment and herd plan development.

Recommendation: The USDA should provide, where requested, increased field support for State Johne’s disease programs. This could include providing field personnel to assist states, epidemiology support, training, information management/standards/sharing (GDB), education, or web access.

Recommendation: The USAHA and the USDA, working together, should formulate a strategy to increase and fund the nation’s diagnostic capability for Johne’s Disease. This could be done by developing regional diagnostic centers through state partnerships in areas where needed.

Recommendation: The USAHA Johne’s Disease Committee should develop a plan through which the USDA would provide check testing and quality control monitoring for serology and organism detection on a continuing basis as part of the requirement for being an approved laboratory.

Recommendation: USAHA, USDA, and Homeland Security should create a committee that includes beef and dairy industry representatives along with university representatives, to develop an integrated risk assessment and best management practices model to protect animal agriculture. The USDA should shift from an individual disease focus to an integrated approach that addresses the biosecurity risks of animal agriculture. Also, to be addressed in the model are animal welfare, animal health, food safety and quality, potential zoonotic pathogens, environ-
mental issues, and economic losses derived from failure to implement best management practices that keep animal farms biosecure and profitable.

≥ Recommendation: The USDA should fund field studies and data gathering efforts to:
  ♦ Document economic and non-economic benefits and factors that affect participation in the VBJDCP
  ♦ Compare Johne’s Disease data from NAHMS 2002 with the previous NAHMS dairy cattle study
  ♦ Analyze cattle health and quality assurance programs and herd status programs as models to increase participation.
  ♦ Determine whether listing Johne’s disease as a reportable disease is an impediment to participation; and whether listing negative status enhances participation.

≥ Recommendation: States should use Federal funds to provide financial incentives to producers to encourage their participation in the Voluntary Bovine Johne’s Disease Control Program.

≥ Recommendation: The USDA should develop a guidance document for the states to assist them in enacting rules/legislation designed to ensure producer confidentiality with regards to Johne’s Disease and other producer-related issues.

≥ Recommendation: The USDA should revise the Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program regarding participation in the VJDHSP and off-site heifer rearing (the current rule regarding off-site heifer rearing discourages participation in the status programs).

≥ Recommendation: The USAHA Johne’s Disease Committee should encourage affected industries to promote producer participation in the Voluntary Bovine Johne’s Disease Control Program.

> Objective: Minimize spread of infection between herds

≥ Recommendation: The USDA should require permanent identification of cattle that test positive by an organism detection test before they leave the farm and require that they move only into slaughter channels. Producers should be compensated $50 for each animal so identified.

• Goal V: Improve budget planning and resource allocation to ensure effective voluntary state Johne’s disease programs
  > Objective: Justify adequate funding for VBJDCP

≥ Recommendation: The NJWG annual report to the USAHA Johne’s disease committee should include an evaluation of program progress in terms of current budget, including recom-
mended funding levels and reallocation of resources for the upcoming budget cycle.

**National Johne’s Working Group Report**  
Submitted by Co-Chairs, John Adams, Gary Weber and Bob Whitlock

During the past year the NJWG met twice for full daylong meetings, once at the National Institutes of Animal Agriculture’s annual meeting in Chicago on Sunday, March 24, 2002. Approximately 45 NJWG members and 25 guests attended that meeting. Dr. Bill Hartmann, Chair, Johne’s Committee, USAHA, Gave a report on the resolutions of the Johne’s Committee. One resolution concerned the appointment of an ad-hoc 16 member steering that will have the following:

a. Herd identification, especially in Johne’s disease infected herds  
b. Herd clean-up mechanism.  
c. Animal movement.

This Steering Committee will have four goals:

1. To evaluate the mission statement and objectives for the National Johne’s Working Group.
2. To evaluate research priorities
3. To develop a strategic plan for the Johne’s Working Group
4. To adjust mission statement for the National Johne’s Working Group as needed.

Resolution # 19 concerned funding for Johne’s disease. Mr. John Adams responded by giving two handouts, National Milk Producers Federation that supported a request to the Appropriations Committee of Congress for $49 million. This would be designated for those 28 states that have a Johne’s committee and would be available in fiscal year beginning October 2002. The indemnity portion of an earlier proposal had been deleted from the request for Johne’s disease appropriations bill and from the farm bill.

Resolution # 20: Dr. Mike Carter, National Johne’s coordinator reported that the program standards have been signed off by the legal advisory group for USDA, APHIS and had received veterinary services clearance to proceed with implementation.

Resolution # 21 concerned National Institutes of Health’s assessment of Johne’s disease as a possible link to Crohn’s disease. Dr. Mike Collins indicated there has been no response from NIAH at this time.

Resolution # 22 A one-day symposium is being coordinated by Dr. Judith Stabel, assisted by Dr. Bev Byrum, Dr. Janet Payeur, Dr. Sue Stehman, Dr. Sang Shin and Dr. Mike Carter. It is anticipated that the ELISA symposium will be held one-half day during the Johne’s Working Group Meeting in St. Louis at the fall meeting of USHA.

Dr. Ken Olson gave a report of the Economic Committee summarizing the beef NAHMS JD study, with Dr. Steven Ott. Dr. Ken Olson reported findings of Dr. Steven Ott concerning 363 beef cow herds, 28 were positive
for Johne’s disease. A technique referred to as “Correspondence Analysis”, evaluated 29 different management factors. The better herds had 17 practices and the poorly managed herd only had 8.6 practices that may have contributed to Johne’s disease. This analysis indicated that the cost of Johne’s disease was $52.80/cow in the better-managed herds. Comments from the group asked whether this data was publishable when the results were based on 40 positive ELISA samples in 30 herds. Perhaps it should be submitted as a methodology paper?

Ken Olson gave the treasurer’s report indicating a current balance of approximately $32,000. The funds resulted from the Johne’s Symposium in St. Paul, Minneapolis and from Akey feeds to support educational efforts for the National Johne’s Working Group.

Dr. Brian McClusky outlined the objectives for the 2002 Dairy NAHMS Study. Biological samples will be obtained from about 105 herds from 20 states. Questionnaires have been submitted to 2,394 producers and 1300 producers agreed to participate in Phase II. Testing will begin March 24 through June 30, 2002. They will evaluate 800 to 900 farms using a detailed risk assessment tool. The testing will be able to detect down to 2% prevalence at 98% confidence of Johne’s disease. About 105 herds will be tested with the milk ELISA, although no official ID required. The QC and Scientific Advisory Committee will give this matter of milk ELISA will be taken under consideration and a report in October. The entire laboratory testing of samples will be done at NVSL.

Dr. Ken Olson gave the CD ROM project update. The CD-ROM panel consisted of Dr. Don Hanson, Chairman of the Education Committee, Dr. Michael Carter, Dr. Bob Whitlock, Dr. Mike Collins, Dr. Chris Rossiter, Dr. Frank Garry, Dr. Don Sockets and Dr. Ken Olson. Letters have been sent out to approximately 70 organizations requesting fund support of the CD project. The anticipated cost of the Johne’s CD with Web-site access to newly approved slides is estimated to be $50 with an updated version expected in 2-3 years following release this fall. A motion by Dr. Mark Remick and seconded, endorsed the concept of the Johne’s CD to be reviewed by the Johne’s committed and then to the Board of Directors USHA. It had previously been approved by USAHA treasurer, Dr. Wes Towers, that USAHA would distribute (sell) the Johne’s CD and be given $10/CD for handling and shipping charges, including accounting.

Dr. Mike Carter gave National Johne’s Disease coordinator’s report listing the following points:
A. 28 states that have active Johne’s programs within their states.
B. Approximately a third to 50% of the states participate on each monthly conference call.
C. Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program have been approved by the USDA legal office on March 20, 2002 and will soon be printed and put into a
PDF format in the next few weeks.

D. The deadline for submission of applications for field studies is March 31, 2002. These studies will include requests by states and universities to conduct Johne’s field studies across the country. Dr. Carter will head-up a group from APHIS, states, universities and perhaps the Johne’s committee to evaluate these proposals.

Johne’s disease is now listed as a line item in the USDA APHIS budget at approximately 3.25 million dollars. The following items should be listed under that budget: training, $25,549 for both eastern and western regions; NVSL, $246,000 for serology; ELISA testing $190,000, printed materials on Johne’s disease, $56,000. The eastern region had $778,000: $2,000 for state for educational use for a total of $58,000, cooperative agreements $174,000, demonstration herds in two states $73,120, and JD surveillance and herd certification staff $472,880.

The budget request for fiscal year 2003 is $3,215,000 of which $2,614,900 would be for APHIS-VS. Fifty percent of that money would be for staff salaries. Training courses $52,898, NVSL (next year) $246,000; CEAH-$30,000, Eastern region—$808,000, Western region—$808,000, Department—$109,978, warehouse—$99,768. Budget request for 2004 are due April 1, 2002, and Dr. Mike Carter needs to have a draft of that available in the next few days. Dr. Carter was encouraged to present more details of the budget at the Johne’s Committee Meeting in St. Louis this fall and will make an attempt to determine how the 2002 budget was spent for Johne’s disease at the fall meeting.

ELISA Quality Control Steering committee report by Dr. Bev Byrum:

This was established to be a one time basis sub-committee to evaluate several issues concerning ELISA testing for Johne’s disease including: well to well variation, plate to plate variation, lot to lot variation and lab to lab variation. The normal variability for each factor will be established using three internal controls (negative, high positive, low positive sera) in duplicate on each ELISA plate in addition to using the manufacturers negative and positive sera. Client confidence in ELISA testing for Johne’s disease needs to be improved. States participating in the initial pilot project include: California, Michigan, Minnesota, Ohio, Pennsylvania, and Wisconsin.

Todd Byrem from Antel-Bio provided more details on the milk ELISA test which was launched in May 2001 as a partial or whole herd screen. Antel-Bio encourages follow-up of any positive milk ELISA test with an organism based detection test. Currently herds targeting for milk ELISA include Wisconsin, Michigan and Indiana, although ads promoting or describing this service have been listed in Hoards Dairyman and press releases have been made available in a number of states including West Virginia, Texas, Arkansas and Canada. During the first year they have performed about 25,000 milk ELISA tests. In April 2002 they expect 2098 milk ELISA samples. The Kappa agreement between milk ELISA and serum ELISA is
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nearly 0.77. Both fresh or preserved milk samples are adequate for ELISA testing. Letters will be sent to state veterinarians about positive milk ELISA samples.

Dr. Janet Payeur reported on the fecal check test and anticipates sending out 75 test kits with fecal samples in May or early June. Last year 60 test kits were sent. Beth Harris, from the University of Nebraska, an APHIS fellow has recently been added to the laboratory staff. She will be concentrated on developing the recommended culture technique for Johne’s disease and also doing developing work with PCR. Dr. Harris will be looking at the following aspects of organism detection:

1. Decontamination phase, are we using the correct antibiotics and looking at synergisms and contaminants.
2. Actual culture method, egg yolk vs. Löwenstein Jensen and centrifugation vs. sedimentation methods.
3. Evaluating the PCR protocol for MAP detection of IS900 and
4. Evaluating the samples provided by the current dairy NAHMS 2002 project using three different methods. Two liquid culture methods, OT and Trek, with Herrold’s egg yolk, and also evaluating other species.

Dr. Barb Martin at NVSL has recently been given the responsibility for the serology check test.

Judy Stabel reported on MAP genomics: 5,867,714 BP with 612 contigs and 36 gaps to fill at this point, 21 unique MAP sequences have been detected. A manuscript will be published—Journal of Clinical Micro in April 2002.


1. They have been used to evaluate HTST, holder method, and cheese methods and cheese for M. paratuberculosis. They include two concentrations of organisms $10^2$ and $10^6$. There have been 108 experiments to this point in time, using Dubos media as a resuscitation media, but having significant contamination problems with Pseudomonas in the water supply.

Dr. Irene Grant recently published in Journal of Clinical Microbiology that MAP would survive pasteurization. MAP was present in 6.7% of the raw milk samples vs. 6.9% of pasteurized milk samples. Dr. Paul Rogers has been added to the staff at NADC ARS as an epidemiologist evaluating at small ruminants and the strain differences between sheep and cattle.

Dr. Sue Stehman gave an update on Trek-ESP system. 14,000 samples have been processed since May, 2001; ESP measures changes in air pressure in the vial. The end of the protocol is 35 days.

A small percent of samples are AFB positive but signal negative and some samples are signal positive, but AFB negative. Heavy shedders are detected in 7 to 21 days, moderate shedders in 22 to 28 days, and light shedders 29 to 42 days. Their data show that 10 to 12% of samples are
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positive. Of the culture positive samples, 43% are light shedders, 15% are moderate shedders, and 44% are heavy shedders. This may be skewed since they are pre-testing most of the herds and animals at greater risk with ELISA.

Previously herd studies have found 70% of samples were light shedders, 10% moderate and only 20% heavy shedders using Herrold’s egg yolk and testing all adult cows in the herd. 1 to 2% of the fecal samples are AFB positive and ESP negative. Approximately 1 to 4% of the samples may be contaminated and in some herds this may be as high as 30 to 40%. They have had 290 herds tested at this point. They are beginning to look at season-to-season variation and the greater contamination in the summer and early fall, primarily fungal. Very little bacilli contamination. They are able to detect AFB’s although contaminated with fungi. AFB’s may be present at 21, 28 to 35 days and up to 60% contamination on some farms (14). Contamination seems to be related to feed and sample handling. Freezing the samples at –80°C, which does seem to reduce sample contamination. Some samples are AFB positive and not able to be confirmed negative on culture. 50% of these samples are less than 28 days and 50% more than 28 days of incubation. Liquid culture has a rapid turn around, semi-quantitative and minimal problems with contamination. Estimated cost per sample for TREK system is $33.00/sample, Cornell currently charges $7.00 for in state samples.

Dr. Stehman reported thirty ELISA positive animals were present in one herd of about 120 animals where they had 3,000 geese on the farm. Previously this closed herd had several negative fecal and ELISA herd tests. Retesting the same herd a few months later found very few ELISA positive samples. The false positive ELISA by KELA may have been related to the mycobacteria from the geese fouling the water supply. The liquid culture has a rapid turn around, semi-quantitative and minimal problems with contamination.

Dr. Stehman gave a brief report on MAP survival in the environment. Initial data suggested that farms with moderate Johne’s infection in cows may have an extensive number of organisms passed out in a slurry even after going through an anaerobic digester. The Northeast USHA meeting will be held on May 6, 2002 in St. Michael’s, Maryland.

Dr. Bev Bryum and Dr. Bill Shulaw gave a report on the liquid culture system by Organon Technika being evaluated by the Ohio Diagnostic Laboratory. Dr. Shulaw indicated the system uses 7H9 media with a CO₂ sensor. They have used samples MAP spiked samples and fecal samples and have passed the last two check tests. They have currently processed more than 24 field specimens. Still learning on it and compared with other cultures sediment picked up 37 positive, NADC test method picked up 53 positive, the Broth pick up 66 positive or (70 total positive). AFB staining was not helpful at this point.
Dr. Don Sockett reported the Wisconsin laboratory is had problems with ELISA testing in herd A with 285 cows; 54 cows were ELISA positive in year 2,000 and on a fecal test all 54 were culture negative. Retested these same cows in 2001, only 3 out of 54 were positive using a different assay.

Herd B had no culture positive from 38 ELISA positive in 2000 and in 2001 had 22 out of 69 positive. This involved bulls and they had a significant financial loss at two different sales. Thirty days later 22 of 22 remained ELISA positive. The lab tested 1,000 animals with two different ELISA tests with a Kappa value of 0.30, an ELISA confirmation test is needed.

Dr. Ralph Slaughter reported on some of the issues concerning false positives for the ELISA and emphasized, the ELISA is a herd tests and not an individual animal test. Queensland Australia has no Johne’s disease, some cattle were ELISA positive. It is possible to absorb these cross-reactive antibodies with a super absorptive agent containing other mycobacterial cells. Monoclonal antibodies in the ELISA kit seem to reduce the number of false positives. Pelicans and birds in high numbers may contribute to the problem of false positive ELISA samples.

Dr. Mike Collins reported that the web site on “Johnes.org” went on line May 2001. Currently it has about 7,000 hits per month. Sponsorship of $300/month is needed to break even. They have a self-testing module under “Convince”. Two other Johne’s projects include a demonstration herd project with Johne’s disease coordinated by Dr. Vic Eggleston. This project will involve 2,400 cattle with 8 different tests for Johne’s disease. In a study of genetics of Johne’s disease involving 12,000 bull daughters, no pattern of resistance has been found at this point.

At the NJWG meeting approximately 40 members of the NJWG and 70 guests were in attendance on October 17, 2002 in St Louis MO. The meeting was started by self introductions. The CD-ROM committee reported they had met twice in Chicago to review slide sets for the Johne’s CD-ROM project and that one more meeting will be required during the first week in December 2002. The Johne’s CD-ROM is projected to contain about 30 slide sets in addition to classic slide sets and printable reference material appropriate for educational materials for Johne’s disease. The CD-ROM panel membership includes Don Hansen, chair, Ken Olson, Bob Whitlock, Chris Rossiter, Mike Collins, Don Sockett, Frank Garry, and Ralph Slaughter. Each CD-ROM subscription will include access to the WEB site to download new slide sets that were not included on the CD-ROM when it was developed. Funding for the CD-ROM has been provided by: Akey feeds, Biocor, IDEXX, ImmuCell, USDA-APHIS, Holstein Association, Agway feeds, Allied Monitor, Novartis Animal Health, and Dairy Farmers of America.

Brian McClusky, Dairy NAHMS 2002, coordinator reported that 2,461 survey forms were sent to farms that resulted in 1013 VMO herd visits and 821 herd risk assessments. Biological specimens were obtained from 106 herds. This included 19,678 serum samples, 18,704 milk samples for ELISA
and 39 herds agreed to provide DHIA data.

Johne’s educational efforts seemed to reached the producer, since only 1% of producers had never heard of Johne’s disease with nearly 45% of producers fairly familiar with Johne’s disease, compared to 18% being fairly with Johne’s, 6 years earlier.

Dr. Janet Payeur reported that the fecal check test and the ELISA check test results were delayed this year in part due to new regulations concerning shipment of biological specimens.

Dr. Y. F. Chang reported on a new DNA probe for Mycobacterium paratuberculosis using the insertion sequence ISMav2 which gives a 494 bp PCR product and when digested with the enzyme Clal to gives two smaller sequences with 311 & 183 bp. No cross reactivity with other mycobacteria has been detected at this time. It appears to be an alternative to IS900 PCR probe for confirmation of Mycobacterium paratuberculosis.

Dr. Deepanker Tewari reported on the Correlation of ELISA and fecal culture in detecting Johne’s Disease. Recent analysis of Johne’s disease testing laboratory data has identified about 6.7% sero-positive dairy cows and about 23% culture positive infected dairy herds in Pennsylvania. Animals found to be sero-positive having S/P ratio below 0.60 (low positive), were frequently (70%) found to be culture negative on a follow up fecal test and only 16% of herds that had one or more low sero-positive animals were identified to be infected. The test is however, highly predictive when high S/P ratio (>1.2) was observed. We found 92-96% likelihood of animals or herds to be culture positive on a follow up fecal culture, if high ELISA S/P values were detected. Only about half of ELISA positive animals are found Johne’s culture positive. Due to low sensitivity of the available tests, it is important to carefully monitor herds that remain culture negative but have one or more sero-positive animals, particularly with high S/P ratio. This information should be analyzed in conjunction with herd history because we have encountered some herds with animals having high S/P values but the farm have been remained negative on fecal culture.

Dr. William Marlatt from South Dakota reported on discrepancies of test results between Biocor and IDEXX Johne’s ELISA. The lab reported 33% of 100 sera from a herd of dairy cattle were ELISA positive with the Biocor test that was inconsistent with the herd owner and herd veterinarian’s assessment of Johne’s disease in the herd. Eight serum samples, including 6 of the same Biocor ELISA positive were test negative with the IDEXX ELISA test. Then a further 39 sera were tested with both tests which reported 17.9% positive on the Biocor and 2.5% positive on the IDEXX ELISA. Subsequently, 96 cows were again resampled when fecal samples were culture negative in 2 different labs using the BACTEC 460. On the Biocor test, 43.8% were positive while the IDEXX test reported one positive sample. Eight months later, sera from 102 cows in the same herd found one serum sample Biocor ELISA positive which was ELISA negative when retested
using a modified absorbant. The milk ELISA at Antel Bio found one positive of 96 samples tested. The author suggested a transient heavy infestation with blackbirds might have been responsible for the transient serological response.

Dr. Mike Collins reported the Johne’s Testing Center at the University of Wisconsin has been running ELISAs for Johne’s disease since 1991 and last performed over 35,000 ELISA assays. Research shows that the magnitude of the IDEXX ELISA S/P value is strongly correlated with the likelihood of the cattle being infected. The manuscript describing use of likelihood ratios in conjunction with the IDEXX ELISA kit will be published in the November 2002 issue of the Journal of Clinical and Diagnostic Laboratory Immunology. Occasionally ELISA results are unexpected or inconsistent with the clinical impression of the herd veterinarian. In this situation, it is always best to review the laboratory results, including the controls run on the day of the assay and repeat testing of those sera yielding positive results. When an unusually high numbers ELISA-positive results continue to be found in a herd without clinical evidence of Johne’s disease or positive fecal culture results, there may be confounding factors that are “confusing” the ELISA. Sometimes the confounding factor can be found, most times it cannot.

Dr. Robert Whitlock reported 40% ELISA positive samples in 56 serum samples from 22 to 24 month old heifers that were raised in a professional heifer raising facility in Pennsylvania. Subsequent testing indicated that all heifers were fecal culture negative. Dr. Scott Wells and Dr. Don Hansen reported on false positive ELISA tests in a herd from Minnesota and Oregon respectively. Based on the occasional occurrence of a significant number of false positive ELISA results in a herd of cattle, recommendations were developed to guide both laboratory personnel and veterinarians that are presented with these frustrating herd results.

Guide to Johne’s disease ELISA Interpretation in Cattle when an unusual number of ELISA positive results are found when the clinical expectation is for a few or no positive ELISA results.

Background information concerning Johne’s ELISA interpretation for Cattle

1. Johne’s ELISA tests are designed specifically as herd tests to predict the likelihood of MAP infection and are much less reliable tests to predict infection for the individual animal.

2. Johne’s serum ELISA tests should always be interpreted in light of the evidence or absence of evidence of Johne’s disease within the herd. Herds with several clinical cases each year are likely to have a higher number of positive ELISA tests (10-20%) compared to herds with no evidence of JD in the herd (< 5%). Estimates, some one should have this info.

3. Laboratories reporting ELISA results should provide sample sera
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ratio (S/P) or the optical density (OD), if S/P ratio is not used.

4. Proportion of dairy cattle that are likely to be ELISA positive: A national estimate suggests the average number of JD ELISA to be 10%, which is based of serum samples, submitted from many diverse dairy herds. This estimate is based on sample submissions from several state and University laboratories. The ELISA positive results from any one heard typically ranges from 0 to 25%.
   a. Herds or groups of dairy cattle with more than 25% of the serum samples as JD ELISA positive should have a history of several adults within the past year with clinical signs of Johne’s disease. Herds with more than 25% true ELISA positive results without clinical evidence of Johne’s disease are nearly biologically impossible.
   b. Conversely, herds with few or no positive ELISA results should be accompanied with a herd history with no clinical cases of Johne’s disease.

5. Proportion of ELISA positive cattle that are likely to be fecal culture positive: Of those ELISA test positive cattle, approximately 35% are expected to have positive fecal cultures when fecal samples are obtained at the time of blood sampling or soon after the positive ELISA serum sample was taken. (This data is based on a survey of five laboratories {160,000 ELISA results} doing Johne’s testing in 2000).

6. Fecal culture positivity in relationship to relative amount of antibody present: Cattle with OD or S/P ratios 300% higher than the cut-point for positive/negative are significantly more likely to be fecal culture positive. Cattle with OD’s closer to the cut-point are much less likely to be culture positive. Samples with higher ELISA test OD or S/P ratio, the greater the likelihood to be fecal culture positive.

Suggested approach for those situations when a much higher number of ELISA positive samples are reported than expected. If the number of test positive ELISA samples significantly exceeds the expected number of positive samples based on clinical assessment of the herd status, then the following steps are recommended:

1. The laboratory providing the service should critically evaluate the quality control sera including the kit positive and negative controls sera and verify the results of the three QC sera were within the expected ranges. Each ELISA plate should include three quality control sera provided by NVSL. The kit positive and negative sera should fall within the recommended limits for that manufacturer’s Johne’s ELISA kits. If the QC sera are not within acceptable limits, then the laboratory running the tests should contact the manufacturer for assistance to regain acceptable QC sera and
test sample results.

2. If the QC sera values are within acceptable ranges then, the laboratory running the ELISA tests should re-test the same sera in duplicate the next day on a different kit lot, if available. If the ELISA values obtained on the repeated samples are significantly different and more closely resembles the expected results, then assume the first test results were invalid.

3. If the repeated tests are similar to the original tests, then the serum samples should be re-run on a second manufacturers Johne’s ELISA kit to help verify the serum samples are JD ELISA positive.

4. If the ELISA results are verified as positive with a second manufacturers kit or if a second manufacturers kit is not available in the laboratory, then the herd veterinarian should re-examine the herd status from which the samples were obtained. If upon re-assessment, there is little clinical evidence of Johne’s disease to explain the unexpectedly high number of positive ELISA tests. Then several options may be pursued:
   a. Collect fecal samples from all the ELISA positive cattle, or if too many then collect fecal samples from the cattle with the highest S/P ratios or highest OD readings. These cattle should be at most risk to be infected. The fecal samples could be pooled in groups of 5 or 10 by the laboratory. Then if time is critical, do a PCR test of the pooled fecal samples. Currently available PCR tests should detect one moderate or heavy shedder in a group of 5 or 10 fecal samples. Even larger pool sizes are worth considering. Confirmation of each ELISA positive animal by fecal culture would be optional depending on the situation.
   b. Alternatively, environmental samples of slurry or random samples from the free stall area could be submitted as individual and pooled samples for PCR testing,
   c. Possible causes of false positive ELISA tests for cattle include:
      i. Large numbers of birds or migratory waterfowl feeding or living in the same environment as the cattle
      ii. Environmental mycobacterial from the forage or water that stimulate antibodies that cross-react with the Johne’s ELISA test.

The NW’s report to the Johne’s committee included deactivating the following sub-committees:
   1. State Programs, Chair, Mike Carter
   2. Certificate of Veterinary Inspection: Chair, Larry Williams
   3. Laboratory Certification: Chair, Janet Payeur
   4. Research committee, Chair, Judy Stabel
   5. Lab Check test criteria for JD ELISA tests, Ray Sweeney
JOHNE’S DISEASE

6. Herd Status program, Co-Chairs, Mike Collins & Leslie Bulaga
   NJWG subcommittees that will continue will include:
   1. Serology Quality Control: Co-Chairs, Bev Byrum & Dave Dargatz
   2. Education Committee, Chair, Don Hansen
   3. Small Ruminants committee: Co-Chairs, Sue Stehman & Bill Shulaw
   4. Economic Impact of Paratuberculosis: Ken Olson, Chair
      The NJWG Co-chairs will appoint a sub-committee to revise the strategic plan for the NJWG and other sub-committees as needed.

RECOMMENDATIONS PASSED
BY THE COMMITTEE ON JOHNE’S DISEASE

Recommendation #1
Subject Matter: Expanded Study of use of external, defined quality control serum samples for ELISA kits for cattle to evaluate test performance across a broad range of approved laboratories.

Background Information: A five laboratory pilot study was conducted using external QC serum controls from a single source (NVSL) to document variability between and within laboratories and to identify sources of variability that could be minimized with laboratory technique. Results of this study suggested that the largest amount of variation was contributed by kit lot followed by laboratory variation, test date, and random error. The pilot study assessed the performance of one licensed cattle ELISA.

Recommendation: The Johne’s Committee of the US Animal Health Association recommends that the USDA APHIS fund a more broad based study to extend monitoring of performance of licensed ELISA kits for cattle. The expanded study would include continued monitoring in the original pilot study laboratories in addition to 10 more approved laboratories representing a broader geographic area that use other approved ELISAs for cattle.

Recommendation #2
Subject Matter: Zoonotic potential of *M. paratuberculosis*.

Background Information: The magnitude of the paratuberculosis problem pivots largely on the question of whether this animal pathogen can infect and cause disease in humans. Definitive determination of the zoonotic potential of *M. paratuberculosis* is essential for effective planning and implementation of Johne’s disease control programs. The agency with the responsibility and authority to carry out research on the impact of *M. paratuberculosis* on human health is the National Institutes of Health.

Recommendation: The Johne’s Committee of the USAHA recommends that NIH conduct or fund appropriate studies to specifically determine if *M. paratuberculosis* is a zoonotic agent.
The USAHA Livestock Identification Committee was called to order at 12:40 p.m. Chairman John Wortman and Vice-Chair Kevin Maher introduced themselves and each gave a very brief biographical summary of their background.

Report from the National Identification Task Force

The first order of business was a presentation of the National Identification Work Plan that was developed by the National Food Animal Identification Task Force, which was coordinated by the National Institute for Animal Agriculture. Mr. Neil Hammerschmidt and Dr. Mark Engle served as the Co-Chairs for the Task Force. Neil Hammerschmidt led the presentation of the National Animal Identification Work Plan. In addition to the written report that was distributed to the committee and others at the 2002 USAHA Annual Convention, the document can be accessed on-line at www.animalagriculture.org. The plan will be distributed to industry groups for comment through March 31, 2003.

In March 2002 the National Institute for Animal Agriculture initiated an industry wide effort to develop a work plan for the advancement of a national identification system. A National Food Animal Identification Task Force was established with 30 plus organizations participating. Several work groups were formed to address certain issues. These issues based work groups and co-chairs were as follows:
Mr. Hammerschmidt described the highlights of The Plan to the committee. The following is the full text of the National Identification Work Plan as presented to the Committee on Livestock Identification:

I. Introduction

What is “National” Animal Identification?

National Identification is an identification system that, through established standards and defined data elements, allows for the compatibility of systems while providing the efficient availability of agreed-to information across each segment of the animal agriculture industry. The establishment of standards allows the overall system to support both marketing and regulatory functions. However, production data is maintained and controlled separate from information required for regulatory animal health programs.

The Need for Animal Identification

Many issues warrant the establishment of a national identification system; most significant is the infrastructure it brings to the animal information system necessary to maintain a financially viable industry. Maintaining the health of the US herd is the most urgent issue for the industry and animal health officials to address, and therefore, is the most significant focus of the National Identification Plan. Establishing the requirements for animal identification that provide the necessary infrastructure to monitor animal diseases, to support their control or eradication, and to establish an adequate emergency management response system provides the foundation of the “system” for the national program.

Ideally, the identification components (animal and premises numbers, identification devices, etc.) can be utilized within production management to support marketing functions. A truly national system allows for the “sharing” of certain components of the system which allows for greater efficiencies, both at the farm/ranch for production management and that of official animal health programs. While the “control” of production management and commercial marketing functions are clearly separate from animal health and food safety regulatory programs, a successful national system pro-
vides for the utilization of such components or “common denominators” across both segments. Expanding the use of identification across multiply uses provides the most cost effective system and one that is user-friendly for the producer and other livestock handling operations.

Animal Health

National animal identification is needed to maintain the health of our national herd through the monitoring, control and eradication of domestic and emerging diseases. A foreign animal disease incursion into this country, accidental or intentional, would require a swift response that can only be achieved with a National Identification Plan.

- Disease eradication

Official animal disease eradication programs have provided the country’s “defacto” national identification programs in the past; i.e., the brucellosis eradication program. It was an accepted practice to identify animals as eradication programs were in full swing. As they wind down, the need for identification remains high as the eradication of program diseases are completed and verified. After the diseases are eradicated, identification remains important for on-going disease surveillance to reassure trading partners of the health status of the national herd.

USDA/Veterinary Services is in the final stages of animal disease eradication programs that have taken many years and millions of dollars to complete. We must be able to quickly and effectively trace diseased or exposed animals in order to finish these programs. Identification is central to the final eradication of diseases and documentation of our animal health status to the international community. In addition, animal agriculture industry associations have identified other diseases considered to be economically significant and/or might become international concerns. A National Identification System would facilitate new disease eradication programs while minimizing implementation expenses.

- Disease control

In addition to disease eradication programs, the animal agriculture industry is interested in controlling or limiting the impact of certain other diseases. An animal identification system plays an important role in those efforts as well.

Without animal identification, it is more difficult to randomly sample animal populations and make statistically meaningful comparisons. A national animal identification system will allow the U.S to use bio-statistics to arrive at scientifically based conclusions from which decisions can be made. The future needs of the livestock industry post-eradication must be taken into consideration. It would seem logical that the interests of all producers involved in animal agriculture would be best served by a National Surveillance System (NSS) designed to maintain and improve the health status of the national herd. The NSS, currently under development by USDA/APHIS/VS, would require a National ID System to be effective.
• Foreign Animal Disease outbreaks
Animals exposed to foreign or emerging diseases need to be quickly traced to protect against further spread and lessen negative impacts on animal production and marketing in the United States and internationally. Animal identification is needed to identify the source of the problem, ensure the containment of the disease, verify the final disposition of affected animals, and provide ongoing surveillance.

Each day our export markets are closed, the industry loses millions of dollars. A national animal identification system will reduce this recovery time. In the U.S. tuberculosis eradication program, unidentified animals typically take several months to trace. This is unacceptable for a foreign animal disease.

• Threats to Biosecurity
Since September 11, the possible intentional introduction of pathogens to harm our food supply has become a reality. Most likely, an intentional introduction will be multi-centric. In addition, many believe there could be a human health component. In either case, swift tracing is even more critical. A national identification system can help to strengthen our nation against animal diseases that are targeted to reduce confidence in our food supply or be directed at human populations indirectly.

Food Safety
U.S. food safety programs are risk-based to ensure the public is protected from health risks of unsafe foods. Decisions within these programs are inherently science-based and involve risk analyses. Risk assessment is useful in understanding the magnitude of the problem faced, and it assists the agency in determining an appropriate risk management response.

Principal federal regulatory organizations responsible for providing consumer protection are the Department of Health and Human Services' (DHHS), Food and Drug Administration (FDA), the U.S. Department of Agriculture’s (USDA) Food Safety and Inspection Service (FSIS) and Animal and Plant Health Inspection Service (APHIS), and the Environmental Protection Agency (EPA). Many agencies and offices have food safety missions within their research, education, prevention, surveillance, standard-setting, and/or outbreak response activities, including DHHS’s Centers for Disease Control and Prevention (CDC) and National Institutes of Health (NIH); USDA’s Agricultural Research Service (ARS); Cooperative State Research, Education, and Extension Service (CSREES); Agricultural Marketing Service (AMS); Economic Research Service (ERS); Grain Inspection, Packers and Stockyard Administration (GIPSA); and the U.S. Codex office; and the Department of Commerce’s National Marine Fisheries Service (NMFS).

The FDA is charged with protecting consumers against impure, unsafe, and fraudulently labeled food other than in areas regulated by FSIS. FSIS has the responsibility for ensuring that meat, poultry, and egg prod-
ucts are safe, wholesome, and accurately labeled. No food or feed item may be marketed legally in the U.S. if it contains a food additive or drug residue not permitted by FDA or a pesticide residue without an EPA tolerance or if the residue is in excess of an established tolerance. APHIS' primary role in the U.S. food safety network of agencies is to protect against plant and animal pests and diseases. FDA, APHIS, FSIS, and EPA also use existing food safety and environmental laws to regulate plants, animals, and foods that are the results of biotechnology.

Mandatory Country of Origin Labeling

Section 10816—Requires mandatory country of origin labeling for beef, lamb, pork, fish, perishable agricultural commodities and peanuts after a two-year voluntary program. The Secretary is prohibited from establishing a mandatory identification system to verify the county of origin of a covered commodity but the Secretary may use, as a model, certification program in existence on the date of enactment, including the carcass grading and certification system, voluntary country of origin beef labeling system, and those systems used to carry out the market access program under the Agricultural Trade act and the National School Lunch act.

Beef labeled with USA as the country of origin must have documentation that the animal was born, raised and slaughtered in the United States. Guidelines for the voluntary program must be issued not later than September 30, 2002, and regulations for the mandatory program must be promulgated not later than September 30, 2004.

Industry Needs

- Market Access—Consumer Demands

Source verification and process verification appear to be gaining consumer momentum, providing producers with an added value opportunity. Also, livestock and animal products from the United States are highly marketable worldwide. Assuring animal traceability through animal identification adds value to the product. Furthermore, as more retailers and consumers demand source-verified systems, the ability of producers to sell their products to these markets might depend on the ability to trace products to the farm of origin. Animal identification is the foundation to this added value process.

Other countries are rapidly developing systems that are already being used as technical barriers to trade. These systems are rapidly becoming the world standard. To avoid the loss of international markets, the United States (U.S.) needs to be consistent with the animal tracking systems of our international trading partners.

Trading partners need to be assured of an animal’s health and the security of the food we produce. Accurate, verifiable identification associated with movement, disease exposure, diagnostic testing and treatment helps to reassure partners of an animal or herd’s health status.
The U.S. is free of many of the diseases of concern to our world trading partners. As the country becomes free of other diseases that concern our world trading partners, the export value of our animals and animal products increases. As our export potential grows, the need to quickly trace suspected foreign or emerging diseases will be more important than ever.

- Genetic Improvement

Genetic superiority of our livestock enhances the ability of the United States to produce abundant, high quality food animal products. Accurate identification increases the reliability of genetic evaluations. While our genetic programs are successful, improved animal ID could be beneficial to further genetic improvement. The utilization of standardized animal identification numbers and devices used for animal health should complement the identification requirements for progeny test programs.

Conclusion—Animal Identification Crisis Looms

**At issue is time.** USDA/Veterinary Services anticipates that within three to four years there will be a crisis in livestock identification if nothing is done. As recently as 1995, nearly nine million calves were identified to the farm of origin with orange brucellosis vaccination ear tags. That number represented slightly less than one fourth of all the newborn calves or about 45 percent of all female calves (only females are vaccinated).

Today, fewer than four million calves are vaccinated (10 percent of total calves, 20 percent of females). When Canada finished eradicating brucellosis, the national herd was identified at the 90 percent level. Three years later, it was down to 10 percent.

The United States is very close to declaring itself free from brucellosis. The level of vaccination will continue to decrease, if not cease entirely. The identification of calves to the farm of origin will be minimal in three to four years. Without identification, our country would be vulnerable to any situation that required rapid tracking of animal movement.

The usefulness of the current system of tracking animals through the Market Cattle Identification (MCI) and Market Swine Identification (MSI) system will diminish as brucellosis, pseudorabies, and tuberculosis are eradicated.

Overview

**Mission:** To ensure the United States has an adequate animal identification system that supports the financial viability of animal agriculture.

**Goal:** Report of the Committee On To develop the essential elements currently required to establish a national identification plan that can be implemented in a timely and cost effective manner.

**Organization of the Task Force:** The National Institute for Animal Agriculture (NIAA) facilitated several activities to assist with the advancement of animal identification in the United States. The two primary efforts included:

- The National Food Animal Identification Symposium, July 30 –
The National Food Animal Identification Task Force

Letters inviting industry organizations to participate in the Task Force were mailed on April 15, 2002. The list of participating organizations that responded to the request is found in the appendix. Additionally, all organizations were asked to suggest names of entities that may have been overlooked in the initial mailing.

Through a conference call in early May, five primary issues were identified and Work Groups were formulated to work on their resolve, including:

- Animal Health (WG on Animal Disease Management)
- Product Marketability (WG on Product Marketing)
- Standardization (WG on Key Data Elements, WG on ID Methods and Devices)
- Industry Concerns (WG on Preharvest Production and Marketing Issues)
- Administration of National Identification (WG on Funding, Authority and Oversight)

Co-chairs were recruited to lead the discussions of each Work Group and their leadership has evolved into that of a steering committee for the Task Force. Each Working Group established specific objectives, and they are listed on the following page.

The Task Force met in Chicago on June 18, 2002 to continue their efforts to address the issues within their work group. The reports from each Work Group were presented to the participants at the National Food Animal Identification Task Force, and breakout sessions for each issue allowed individuals to offer feedback to the Task Force and Working Groups.

The direction to the plan established by each Work Group was formulated in the initial plan document that has evolved through the work of the Task Force and WG Co-Chairs.

Objectives:

- To provide direction to the establishment of a national identification system, as it pertains to animal disease management (surveillance, monitoring, detection, control and eradication, and emergency management response systems) by:
  > determining the populations of livestock by class type and/or a defined high-risk area(s) that warrants required identification.
  > identifying the level of animal identification (lot, premises, and individual animal) needed.
  > determining what information related to animal identification is necessary.
  > describing the time frames that are acceptable for animal disease tracing (time from detection and achieving traceback).
- To determine the information requirements of the national
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identification system that:

> support the production, processing, and delivery of safe animal food products.
> provide timely traceback capabilities to minimize the detrimental effects of chemical, physical, and microbial hazards.
> address consumer concerns of food safety and quality.
> enhance the marketability of food animal products, both domestic and internationally.

- To establish a standardized national premises identification system for the United States.
- To establish a standardized individual animal identification numbering system(s) for the United States.
- To establish standard format specifications of required data that is to be associated with an animal.
- To define identification devices and technologies (visible, electronic, other) that should be established as official identification methods and establish standards for such methods.
- To identify and offer resolve to concerns regarding animal identification systems from individuals who own, raise, and/or handle livestock.
- To evaluate the financial implication of a national identification program, and determine what entities are responsible for funding the national identification program.
- To consider options for funding a national identification program identifying how the additional cost of the identification system might be acquired and/or shared.
- To propose an oversight structure for the national identification program that would establish policies for the administration of the national identification program.
- To ensure the national ID program has adequate government involvement and authority to be recognized by international trading partners.

**Action Steps:**

1. Determine the immediate needs for animal identification and acknowledge the possible long-term requirements.
2. Define a minimal identification system that can successfully address the issues needing immediate action while accounting for flexibility to expand its capabilities to meet anticipated needs of the future.
3. Coordinate efforts among various industry working groups/committees working on animal identification issues.
4. Develop draft plan for review and discussion at NIAA ID Symposium and finalize plan for presentation at USAHA 2002 Annual Meeting.
5. Finalize an implementation plan.

**Time Table**

**2002**

April 15  Invite organizations to participate in Task Force  
April 30  Prepare Task Force roster from replies of each organization  
May 16  Initial conference call  
June 18  Task Force Work Meeting (agreed to location)  
July  Conference calls by WGs to finalize draft report for ID Symposium discussion  
July 31  Report presented at NIAA ID Symposium. Feedback obtained through break out discussions  
August  WG Co-chairs consolidate issue and formulate plan document  
Sept. 10  Distribute plan document to Task Force  
Sept. 25/26  Task Force Meeting to review plan document  
October 14  Distribute plan document to industry participating in USAHA  
October 22  Plan document presented, discussed and revised per USAHA Livestock Identification Committee  
December 2003  Finalize Work Plan  
Jan. 1  
– April 1  Industry Groups and Organizations Review Plan Comment Period  
April  
– as needed  National ID Task Force effort led by National ID Steering Committee:  
  • Receive/review comments from industry groups  
  • Develops work/action plan  
  • Establishes subcommittees for specific tasks (communications, systems [specifications, design, etc.], technology, funding, etc.)  
  • Work on details of the plan II. Standards

**Long Term Capabilities and Requirements Establish the Fundamentals of the National Identification System**

The National ID Task Force agreed that, in the event of a foreign animal disease (FAD) incursion to the US, timely traceback of animals is the key to rapid recovery. They established that the goal of the National Identification System was to have the capability to identify all premises that had direct contact with a foreign animal disease (FAD) within 48 hours after discovery. This requirement establishes the ultimate objective of the long-term plan and provides direction to the establishment of the earlier stages.
To achieve this goal, the movement of individual animals, or “units of animals”, must be recorded into a central database, or a seamlessly linked database infrastructure. Premises ID is a key data element and must be standardized for all animal production operations as well as animal holding facilities, markets and processing facilities. In essence, the unique Premises ID is the “key” to the database that allows authorized users to access more information, in particular the person an animal health official needs to initiate communication with when researching an animal disease problem. Likewise, the establishment of a standard for an individual animal numbering system and group/lot identification is imperative.

**Standardization of Essential Components of National Identification System**

Standards for certain data elements are essential for a successful information system in which data is shared among states and the federal government, as well as being provided or linked through commercial service providers. The key data elements requiring standards include:

- A uniform premises identification system
- A uniform, nationally recognizable numbering system for individual animal identification
- A uniform, nationally recognizable numbering system for a lot or group of animals

Additionally, standards are required for identification devices to ensure minimum performance standards are achieved as well as standards associated with the integration of automated data collection systems. Such standards include:

- Visual identification methods and devices for official use in livestock
- Electronic identification methods and devices for official use in livestock

**II.A. Premises Identification**

The long-term system requirements call for a 48-hour trace back capability; and thus, require the need to record an animal’s or unit of animals origin and its movement to other locations for its entire life. The system must also have the ability to determine the contacts a specific animal had with other animals at the premises, including other production units, markets, exhibitions, and public sales. Identifying these premises with a single and unique number is imperative to have the ability to trace animals and to determine what animals came in contact with a subject animal. If more than one location identifier (premises identification number) is used for the same location, animals subject to contagious disease can go undetected. Therefore, the establishment of a unique location identifier is required by the National Identification System. Additionally, the location at which an animal is terminated must be recorded; thus, all slaughter plants require a unique premises/location identifier. The diversity of the environments in which we manage livestock makes the definition of such locations quite complex. For
simplicity, the following guideline will be used to define location:

“A premises is a location operated by an entity that participates in food animal production and/or commerce that is, in the judgment of the State Animal Health Official or Area Veterinarian in Charge, epidemiologically, and/or geographically, distinct from other livestock production units.”

Such premises include but are not limited to; production operations, markets, assembly points, exhibitions and processing plants. The major point of importance, is that the unique identifier provides the information system with the ability to associate an animal (or unit of animals) and its contacts to a given farm/ranch, market, etc. More detailed information about the location will be allowed to an authorized user; i.e., contact person, address, phone number, etc.

The location identifier in essence is a unique ID that has other pieces of information associated with it. The uniqueness of the code allows the information system to determine what location(s) a subject animal was at and other animals that are to be examined that were at the same location during the stay of the subject animal. As geographic coordinates are established on the location records, more precise information is available for directing an animal health official to the location and if necessary, to have quarantine parameters determined by the information system in the event of an emergency management situation.

To support traceback functions, communication with individuals responsible for the premises must be made in a timely manner. While often the owner of the operation, the legal ownership of the location is not the requirement of the system. Rather, the name of the person on record is the person that is to be contacted when a traceback is performed. The entity that registers the premises determines who the appropriate contact person is. Additional information, such as address, phone, etc., provides the ability to establish communication with a production unit/operation where an animal is or has been located.

**Standard #1: National Premises Identification Number**

The National Premises Identification System provides a unique number across the entire United States and links the entity that participates in food animal production and/or commerce, in particular a production unit (farm/ranch/feedlot, etc.). The business entity, regardless of managing one or multiple species, must have a unique premises number. Additional entities in the animal production chain that will need premises identification numbers include; markets, assembly points, exhibitions, processing plants, etc. For database purposes, the field specification for the National Premises Identification number is defined as:

- 8 characters (two alpha state postal code plus six characters)
  
  Example: WI123456

  The following alpha characters are not to be used as part of the last six characters: “I”, “O”, and “Q”.

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Note: The Premises Identification number is one field (state postal abbreviation plus the six characters stored within the same field).

States can add additional characters at the end of the Premises ID to indicate specific identifier needs for the State (for example, county indicator); however, the official Premises ID that needs to be shared among databases is to use the official format - the two character state code plus six characters.

Information that is to be associated with the Premises ID includes:
- Name of Entity (30 Alphanumeric characters)
- Owner or Appropriate Contact Person* (30 Alphanumeric characters)
- Street Address (30 Alphanumeric characters)
- City (20 Alphanumeric characters)
- State (2 Alpha characters)
- Zip/Postal Code (9 Numeric characters)
- Contact Phone Number (15 Numeric characters)
- Alternate Phone Number 1 (15 Numeric characters)
- Alternate Phone Number 2 (15 Numeric characters)
- Fax Number (15 Numeric characters)
- Contact Person’s E-mail Address
- GPS Coordinates** (xx decimals)
- Date “activated” (8 numeric)
- Date “discontinued” (8 numeric)
- Herd Veterinarian Phone Number (15 Numeric characters)

Note: The final determination of which data elements are required is pending.

* The contact person should be the person the animal health official is to communicate with when performing a traceback (as determined by the entity).

** GPS — in the initial phase the GPS coordinates will direct the animal health official to the premises. In later phases, additional premises values may be used to define the actual parameters of the premises.

When ownership information is associated with the Premises ID, it is recommended that these field specifications be used:
- Name (30 Alphanumeric characters)
- Street Address (30 Alphanumeric characters)
- City (20 Alphanumeric characters)
- State (2 Alpha characters)
- Country Code (15 Alpha characters)
- Zip/Postal Code (9 Numeric characters)
- Phone Number (15 Numeric characters)

Note: The owner information listed with the premises is the owner of the facility and might not be the actual owner of the animals located on the facility.
facility. Animal ownership is separate from the person owning the premises and is related to a single animal.

Additionally, the following field specification standards are recommended for the following:

- **Species:**
  - BOV: Bovine (bison and cattle)
  - EQU: Equine (horses)
  - POR: Porcine (swine)
  - OVI: Ovine (sheep)
  - CAP: Caprine (goats)
  - CER: Cervids (deer and elk)

- **Type of Operation:**
  - *Beef* — Seedstock, Cow-calf, Stocker/backgrounder, Feedlot
  - *Dairy* — Milking Herd, Heifer Grower, Calf Ranch
  - *Preliminary Recommendations*  
    - Swine — Breeding Herd  
    - — Nursery  
    - — Finisher  
    - — Boar Stud

*Note: If a location includes more than one “type of operation” all of the appropriate phases would be included. Example: Farrow to finish = Breeding Herd, Nursery & Finisher.*

- **Brand:** Registered Brand Yes or No
- **Tattoo:** complete if used

The administration and management of the premises number and associated information is the responsibility of each state department of agriculture (or as established by the appropriate governing body within the state). They may opt to utilize their own system or ones developed by private companies, the USDA, or those established through regional alliances. Regardless, the states have the responsibility to achieve and maintain the uniqueness of each premises number. Production entities that have multiple species must have one unique Premises Identification Number.

The USDA, APHIS, VS is to provide a centralized National Premises Identification database for all premises that each state issues along with the associated information for each premises as defined above. This “master” premises database provides for the immediate lookup of any premises in the entire country. Such database is to be exempt from FOIA and/or held by a private company. This database will also be a key component of an electronic health certificate system and will ensure that the system “feeds” the database(s) that records animal movements.

The following terms apply to the administration of a National Premises Identification System:

- A location will maintain the same Premises Number when sold in tact. A historic record providing the previous contact information and the dates that information was associated with the premises
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must be maintained on the premises system.

• Owners with multiple production units and/or holding units that are, in the judgment of the State Animal Health Official or Area Veterinarian in Charge, epidemiologically distinct from other livestock production units, will have a specific Premises ID for each operation (even if the mailing address of said premises is the same).

• Premises ownership and location information should be kept confidential and only partial data would be available to authorized officials. All information associated with that site will be available to the owner of the premises and the owner of the livestock. The person in charge of a premises must register the location(s) he/she is responsible for and must keep the required information current.

• The state will electronically update new and revised premises records to the National Premises Database on a weekly basis.

II. B. Animal Identification

Two types, or levels, of ID are necessary to support animal disease management programs: individual animal and “group/lot” identification. Individual animal identification is needed for animal disease programs for species where animals born on the same premises are not likely to move through the production chain as one group. While certain traceback functions could be achieved with Premises ID alone, point of origin for example, it cannot be used to record an individual animal’s movement to different production points. Thus, to achieve the 48-hour traceback goal, individual animal identification is required for livestock that move through the production chain as individuals.

In species where groups of animals within a barn, lots, pens, etc., move as a complete unit from the point of origin to slaughter, the need to identify the group as a unit is required (not the individual animals within the group). Such groups are referred to within this document as a “unit of animals” and can reflect a particular lot, pen, barn, etc., of animals that originate from a single premises. In such scenarios, the tracking of such animals is achieved by recording the movement of the “unit of animals”. The identification number for units of animal is referred to as “Group/Lot ID”.

The following chart summarizes the type or level of identification necessary by species group to meet the needs of an animal disease programs and the goal for 48-hour traceback capabilities.
II.B.1. Individual Animal Numbers

The industry agrees that a national numbering system is most desirable when individual ID is required. However, with several “official” numbering systems in use today, achieving a single national numbering system can only be accomplished through a planned transition. The standard for the single national numbering system should be:

- compatible with national numbering systems already established in other countries
- avoid duplication of any existing numbers

Current numbering systems considered official for the interstate movement of livestock include:

- USDA uniform state series code
- Breed registration numbers
- Premises ID used in combination with a unique herd management ID

Additionally, the American Identification number is to be recognized as an official number in the CFR in the near future.

The 48-hour long-term goal, most likely, will require the use of RFID technology to automate the recording of animal movements. ISO 11784 establishes the unique code of each transponder contained within the 64-bit code as a three digit ISO country code plus 12 numeric characters. In countries where no national body exists to manage the allocation of unique RFID codes, the manufacturer code assigned by ICAR is to be used in lieu of the country code.

Standard #2: Individual Animal Numbering System

To support the successful transition to RFID technology it is recommended that the National Identification System adopt the ISO code structure as the standard for the country’s national numbering system (same code structure for RFID codes and visual national numbers).

The U.S. Animal Identification Number will become effective no later

<table>
<thead>
<tr>
<th>Species Group</th>
<th>Type/Level of ID</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cattle</td>
<td>Individual</td>
<td>Minimal situations where Group/Lot ID is applicable</td>
</tr>
<tr>
<td>Goats</td>
<td>Individual</td>
<td></td>
</tr>
<tr>
<td>Pigs—Feeders, Sows and Boars</td>
<td>Group/Lot Individual</td>
<td>Premises ID or Individual ID</td>
</tr>
<tr>
<td>Sheep</td>
<td>Individual</td>
<td>Current program requires Premises</td>
</tr>
</tbody>
</table>
than January 1, 2004 and is defined as:

- 3 numeric character field for the country code (840 for the United States)
- 12 numeric character field for the national number

Note: both fields stored and transferred in numeric format. The country code alphas would be printed on official ID devices.

To avoid duplication of existing numbers, the number will start at 2,000,000,000. Previously allocated American ID numbers, but not assigned to a production unit, may be recalled to ensure proper controls are in place to support traceback requirements as the numbers are used in the transition period.

While the current format of the American ID number is similar to the ISO standard for the RFID code structure, it does differ. The American ID number contains a check digit. Additionally, its field character specification is alpha numeric for the animal's national number. To avoid confusion and to support a transition phase to the U.S. Animal Identification number, further allocation of American ID numbers will be terminated effective January 1, 2004. All numbers defined within the CFR that were produced will remain official.

Within each species, it is realized that certain management objectives will require individual identification even if premises ID is adequate for an animal disease program. Genetic programs, for example, require individual identification. When such ID is required, it is recommended that the official animal identification number be used.

II.B.2. Group/Lot Numbers

The most common use of Group/Lot ID is within the swine industry when feeder pigs are assembled and managed as a group from that point forward. In such cases, the individual pigs will not be identified; rather the group will have a unique number associated with it.

Standard # 3 Group/Lot Identification Numbering System

Group/Lot ID will consist of the National Premises ID of the location where the group was created and a six digit numerical number reflecting the date the group was created. This format will result in unique number. Ex: IA123456100302. Data fields associated with the Group/Lot ID would be:

- Species
- Source premise(s)
- Date source(s) entered
- Number of head from each source
- Removals/transfers
- Group/Lot Movements
  - Premises #2, Date #2
  - Premises #3, Date #3
Group/Lot ID can be achieved through complete production data; producers that do not have adequate production data to support Group/Lot ID will use a group “passport” system.

(Note: Need to define passport or develop a new term to clarify the intent of the system.)

Animals removed from the Group/Lot, and commingled with other animals outside of the production system, will require individual ID.

Production systems employing continuous flow animal movements can assign a Group/Lot ID and then record the information as described in the above data fields. The Group/Lot ID will be terminated in the event of a total depopulation of the premises. Upon repopulation, a new Group/Lot ID will be assigned to animals on the premises.

II.C. Identification Devices

The official identification of an individual animal requires the attachment of a device to the animal with the appropriate identification number printed on it or electronically encoded in the chip. Two methods to identify animals are proposed—visible identification using ear tags and radio frequency technology. While most of the parameters or specifications of such devices will be established by the marketplace, some basic performance standards are necessary. Based on current technology and disease management requirements, the state postal code will be visible on all National ID devices. This requirement may change as technology inevitably changes.

Only approved devices for use in the National Identification System will use the USDA shield.

II.C.1 Visible Identification

Basic standards for visible identification devices are contained within this document and are listed below. It is acknowledged that more details and protocols will need to be established to determine which identification devices meet the criteria for “official” devices, including the read distance of the US Shield, national number, etc. It is acknowledged that the needs of producers vary and that in some situations, producers may prefer to have official identification devices provided to meet both needs of herd management and official ID (herd management number printed on a visible tag that also carries the official number). In other cases, the producer may prefer the herd management tag be separate from the official tag (herd number and the national number each printed on separate tags and in such cases, the official tag might be much smaller, i.e., a button-like tag.)

Standard #4: Identification methods and devices for official use in livestock

All officially approved ID tags must meet the following requirements:

• the tag must bear an official unique national number
- the tag is designed for one-time use
- the tag may not be readily altered or otherwise tampered with
  > the national identification number must be easily and reliably readable
  > for RFID eartags, the national number must always be printed on the tag (in the event a RFID device fails or when no reader is available)

**Metal ear tags:** Certain metal ear tags are approved devices for use with the USDA uniform state series code numbers and will continue to be accepted as official identification devices through the date such numbers are used for official identification.

*Note: Such metal tags, with American ID numbers, will be considered equivalent once American ID numbers are defined as official for interstate commerce within the CFR.*

**Plastic ear tags:** Plastic ear tags that meet the above requirements may be approved as official tags.

**Tattoos:** Premises identification in the form of tattoos is an approved official identification. In addition, tattoos reflecting USDA official numbers are an approved identification.

**II.C.2. Electronic Identification**

Radio Frequency Identification (RFID) devices are the most common form of electronic identification used in animal agriculture today. Other technologies, including bar codes and 2-D symbology, if used, must have appropriate standards established. Other biometrics that store measures in digital formats will require standardization as they mature and enter the marketplace. At this time, the primary area of focus is to foster the adoption of national standards for the use of RFID devices in animals.

**Standard #5: Radio Frequency Identification of Animals**

Radio frequency identification devices used for official animal identification must be in compliance with:


Various methods of attaching the RFID device to the animal exist, including implants, boluses, tags (eartags) and tag attachments (cylinder devices that fit over the stem of the male ear tag when applied to the animal). The most widely used method in animal agriculture is the example of an RFID eartag with the code printed on the tag.
eartag device. The utilization of the eartag method will be used as the standard RFID method until more experience is gained with the utilization of other methods. Requirements listed above for identification devices will apply equally to tags that incorporate RFID technology.

Official RFID ear tags will be attached in the animal’s left ear. Additionally, the RFID code must be printed on the RFID eartags.

III. Communication Plan

The national identification plan, known as “Safeguarding Animal Agriculture”, must be well communicated with parties involved in the production and supply chain of animal food products. An extensive communication plan will create awareness and understanding of:

- why identification is important
- the producer-driven program being developed
- the basic components of a national ID system and the importance of each (Premises ID, Individual ID, Lot ID, ID Devices, etc.)
- producer participation options and how they enroll
- short and long term plans of the industry to establish a national ID system

The most immediate fact is to create an understanding of the need for a national program. That in turn creates awareness that the industry is taking a proactive approach to design, develop and implement a producer-friendly system. As producers receive such information, the acknowledgment that a system is being initiated should avoid “surprises” as implementation requirements are put in place.

IV. Enhance Current ID

Opportunity to improve the accuracy and completeness of animal identification records exists within the current system. While it is not the intent to invest significantly to “remodel” the existing system, the priority objective of the phase is to ensure that the system of traceback we now have in place is not lost with the eradication of program diseases. In the case of bovine, we now have official vaccination ear tags, which tell us where the animal was when it was young and official MCI back tags, which tell us where the animal was just prior to slaughter.

There are several areas in which increased vigilance will have great benefit. First, a diligent and prudent effort to apply currently required official ID must be emphasized. It has been demonstrated that the retention of official USDA backtags is much improved when they are properly applied.

Second, a total commitment to collect all man-made identification devices that can be used for animal health traceback is imperative. This objective will require a combined effort on the part of FSIS, APHIS, plant managers, national meat processor associations, and producers. Tags that especially need to be collected include official USDA metal eartags, Mexican eartags, official USDA backtags, CCIA eartags, and other tags with traceable information. Until a total infrastructure of EID readers is in place, hand
collection of these valuable surveillance tools is needed. Third, there needs to be an increased effort to use existing tags in a responsible manner. If official tags are applied, they must not be removed. This is especially important in keeping track of animals entering the country, e.g., imported Mexican feeders. Furthermore, animal health officials conducting tests need to use existing tags. Applying additional tags creates confusion in tracing animals even if it is easier or more convenient than recording old tag numbers. This will take an increased effort on the part of APHIS, AVMA, AABP, AASV, and other specialty organizations as well as producers demanding that additional tags not be applied.

V. Phase-in Plans

The Task Force, realizing the urgency to advance animal identification and acknowledgment that the achievement of the 48-hour traceback system will require years to implement, has designed a phase-in plan to advance the national program. The status of identification varies among each species as does their needs, and thus, have separate implementation plans.

In each phase, events or objectives are defined. To ensure the system functions beyond the livestock operation, the requirements of the system must be determined and accomplished by the target dates.

Cattle

Three primary phases are established to progress towards the system with 48 hour traceback capabilities.

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<th>Phase III</th>
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<tbody>
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<td>Individual ID</td>
<td>Tracking</td>
</tr>
<tr>
<td>Transition Tag with Premises ID or Qualifying Tag</td>
<td>Official ID Tag with AIN</td>
<td>Report Movements Collect Location Data</td>
</tr>
</tbody>
</table>

Phase I—Transition

Phase I provides the initial transition from our current system to that of the future. In so doing, it creates awareness of the national “Safeguarding Animal Agriculture” program. The primary objective of Phase I is to implement the national premises system. This is achieved by requiring, as a minimum, premises identification for all cattle that enter commerce. This is accomplished through the utilization of “Transition Tags” as the minimum. The Transition Tags will have the Premises ID number reflecting the current premises the animal is at when tagged.

Other forms of identification that qualify or meet the requirement are
those that provide the ability to link an official individual number to the Premises that the official number was allocated to. Based on organizations’ ability to meet these policy requirements, tags with the American ID number administered through breed registries, DHIA, etc. will be allowed.

Some producers might prefer to use official identification tags with the Animal Identification Number versus Transition Tags. Therefore, the allocation of such numbers and the official tags bearing such numbers must be offered when Phase I is initiated. Additionally, the use of RFID technology that meets criteria for official devices must be accepted in Phase I. This will allow producers to initiate a tagging system during Phase I that will meet the needs of Phase II.

Identification Guideline: The Transition Tag, or other qualifying method of identification, must be attached to the animal before it leaves its current premises when destined for a premises with a different Premises ID number. Exception to the requirement includes:

- fed cattle moving from a feedlot direct to a slaughter plant
- cattle moved to another premises when they remain under the same person’s control and are not co-mingled with cattle from other premises.

Requirements for implementation of basic system:
- National Premises System (at least at state levels)
- Determination of Transition Tags and their distribution
- Determination of qualifying tags, including information system for linking the individual animal number on qualifying tags to a premises

Requirements for advanced options (if offered):
- Animal Identification Numbering System (allocation of numbers, distribution, and recording of Official ID devices with AIN)
- Official Identification devices with the Animal Identification Number
- Official identification devices using RFID technology (CFR must acknowledge RFID technology.)

Implementation Target Date: July 2004

Phase II—Individual ID
II.A. Visible ID

Phase II.A requires the use of the Animal Identification Number (AIN) on all bovines. The utilization of official visual identification tags will be the standard requirement. However, official RFID tags qualify and may be used when preferred by the producer. Official identification devices with the AIN number must be attached to the animal prior to leaving its current premises when destined to another premises with a different number.

Requirements necessary for implementation (not previously listed):
- Official Identification devices with the Animal Identification Number
- Animal Identification Numbering System (allocation of numbers, distribution and recording of Official ID devices with AIN)

Implementation Target Date: July 2005
LIVESTOCK IDENTIFICATION

Note: Use of Official Tags with AIN number is optional in Phase I

II.B. Radio Frequency Identification (RFID)

Phase II.B. provides the transition to RFID technology by requiring the attachment of RFID Tags to an animal that is leaving its current Premises and destined to another Premises with a different number, unless already tagged with an official visible tag.

Requirements necessary for implementation:
♦ RFID devices

Implementation Target Date: July 2006

Note: Use of Official RFID Tags is optional in Phase I

Phase III – Tracking

The reporting of animal movements and locations provides the necessary data to accomplish animal tracking. As the infrastructure is established throughout the production chain, the options used to automate the collection of such data increases. The completeness of the information will continue to progress and the reliability for 48-hour traceback will increase.

III.A Reporting Interstate Movements

The interstate movements of cattle are reported through the integration of the Electronic Movement Permit System.

Requirements necessary for implementation:
♦ Electronic Movement Permit System
♦ Repository for animal movement data

Implementation Target Date: July 2005

III.B. Reporting Intrastate and Interstate Movements

The intrastate and interstate movement of cattle is reported through the integration of the Electronic Movement System.

Implementation Target Date: July 2006

III.C. Reporting of Animal Locations from management systems

The reporting of animal locations through cooperative alliances with service providers allows for the confirmation of an animal's location on a given date. For example, a producer on the DHIA system might elect to have the cow IDs submitted to the national system to reflect cows at his premises on the date his herd had performance data collected. Many other opportunities can be considered as added-value service providers have their system integrated with the national program. It is understood that only the minimal data needed to track animals needs to be shared with the animal disease management system; i.e., animal number, premises number, and date.

III.D. Automated collection of RFID codes – markets and slaughter plants

Much infrastructure (RFID readers) will be necessary to integrate the collection of animal IDs and premises, but will be justified as more and more cattle are tagged with RFID devices. It is important to realize that these systems can be integrated from "day one" as systems already exist that capture the necessary data for animal disease management. The in-

365
stallation of RFID readers can be initiated in certain markets and/or geographic areas throughout the phase in plan.

**Swine**

(Note: Section III states that this is a producer-driven program. Based on this principle, it must be disclosed that the plan put forth in this section is the result of work by a group of dedicated pork producers, representing the National Pork Board and the National Pork Producers Council, in an attempt to advance swine identification in a reasonable and logical fashion. However, it would be inappropriate to assume that this group can establish policy for the entire swine industry. Pork producers will need to consider the contents of this plan at their annual meeting (March 2003) before industry-wide support by pork producers can be assumed. This section of the document should be considered to be a framework for discussion and refinement.)

The swine industry has had mandatory identification requirements since 1988. These requirements encompass swine movements in interstate commerce and interstate swine movements within a production system. In addition, market swine are identified back to their owner at federally inspected plants. Thus, in regards to swine identification, interstate movements are already being tracked. It should also be recognized that most market swine are tracked as groups for production management purposes and detailed group movement records exist today. Although most producers track group movements, a standard for Group/Lot ID will provide other producers with a mechanism to adopt this concept, give this valid swine identification method national credibility, and embrace the national premises ID system.

Pork producers are aware that certain enhancements can be made to the current identification system to further protect the national herd. Three phases are recommended to improve traceback in pork production for disease management purposes. Implementation is dependent on availability of appropriate resources by state and federal governments to meet their responsibilities.

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<tr>
<th>Phase I</th>
<th>Phase II</th>
<th>Phase III</th>
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</thead>
<tbody>
<tr>
<td><strong>Enhancement</strong></td>
<td><strong>Group/Lot ID</strong></td>
<td><strong>Ext. Tracking</strong></td>
</tr>
<tr>
<td>- Premises ID or qualified # in breeder swine</td>
<td>- Group/Lot ID</td>
<td>- Report Movements</td>
</tr>
<tr>
<td>- ID market swine to last premise</td>
<td>- Record all group movements</td>
<td></td>
</tr>
</tbody>
</table>

**Phase I**

- Premises ID or qualified # in breeder swine
- ID market swine to last premise

**Phase II**

- Group/Lot ID
- Record all group movements

**Phase III**

- Report Movements
Phase I – Enhancement

Phase I addresses improvements that can be made in swine identification for the purpose of disease management. In synergy with the cattle plan, the primary objective of Phase I is to implement the national premises system. This phase will require, as a minimum, the application of premises identification in all replacement breeder swine as they enter the breeding herd. Thus, a standardized national premises identification system must be in place. Alternatively, the replacement supplier may prefer to use official identification tags with the Animal Identification number. Therefore, the allocation of such numbers and the official tags bearing such numbers must be offered when Phase I is initiated.

Identification of market swine to their last premises rather than the owner is an important aspect of efficient disease surveillance at slaughter. This enhancement can be accomplished by providing producers and packers with the tools to record last premises ID at the plant. Again, a standardized national premises identification system must be in place to accomplish this objective.

Requirements for implementation of basic system:

♦ National Premises System (at least at state levels)
♦ Necessary materials and equipment to provide last premises ID at the plant
♦ Determination of qualifying tags, including information system for linking the individual animal number on qualifying tags to a premises

Requirements for advanced options (if offered):

♦ Animal Identification Numbering System (allocation of numbers, distribution, and recording of Official ID devices with AIN)
♦ Official Identification devices with the Animal Identification Number

Implementation Target Date: July 2004

Phase II – Group/Lot ID

II.A. Production Records

In lieu of official Group/Lot ID, Phase II.A requires that production records truly exist within a swine production system to internally track all group pig movements and be able to make those records available to USDA if a significant animal health event occurs. USDA has previously determined production records to be appropriate identification in 9CFR 71.19.

Requirements necessary for implementation:

♦ Producer records

Implementation Target Date: July 2004

II.B. Group/Lot Identification

As described in the standards, Group/Lot ID will be a combination of the Premises ID number identifying the location where the group was created and the date the group was assembled.

Pork producers using production records to track group movements will be encouraged to employ the standard for Group/Lot ID. This practice
will provide a unique number for each group and allow tracking of groups on a national level.

The current vision for this system is a group “passport” system identifying all the premises in which the group has had direct contact.

(Note: A more appropriate term will be developed to describe the “passport” system and will be used when so determined.)

Requirements necessary for implementation:

- National Premises System (at least at state levels)

Implementation Target Date: January 2005 (same target date as the National Premises ID System)

II.B.1 Electronic Identification Option

An electronic ID (EID) system must be designed for groups/lots of animals to ensure data accuracy and provide producers with a seamless and time efficient method to record group data. Essentially, a group of pigs would be electronically identified as a lot similar to EID in an individual animal. One unique EID would be associated with a designated group/lot of pigs. This system would enhance the real-time data recording process.

Requirements necessary for implementation:

- Appropriate EID devices to identify groups
- Standardized Group/Lot ID system

Implementation Target Date: July 2005

Phase III – Tracking

The reporting of animal movements and locations provides the necessary data to accomplish animal tracking. As the infrastructure is established throughout the production chain, the options used to automate the collection of such data increases. The completeness of the information will continue to progress and the reliability for 48-hour traceback will increase. This phase cannot be implemented until confidentiality and data access issues, including FOIA, are properly addressed.

III.A Electronic Reporting Interstate Movements

The interstate movements of swine are reported through the integration of the Electronic Movement Permit System.

Requirements necessary for implementation:

- Electronic Movement Permit System
- Repository for animal movement data
- Confidentiality and data access issues, including FOIA addressed

Implementation Target Date: July 2005

III.B Electronic Reporting Intrastate and Interstate Movements

The intrastate and interstate movement of swine is reported through the integration of the Electronic Movement System.

Requirements necessary for implementation:

- Electronic Movement Permit System
- Repository for animal movement data
- Consistency among State animal health officials for intrastate
VI. Governance

VI. A. Industry Oversight

The implementation of the National Food Animal Identification Plan has been described in phases that extend over several years. In addition, once fully implemented, maintenance of the National Identification System will be an on-going process well into the future. Due to unforeseeable issues, inevitable change in production practices, and vast species differences, continued producer input and oversight will be imperative. As described below, the Review Board will provide input toAPHIS for the administration of the National AIN. Other issues associated with a national ID plan must also be addressed. Thus, in addition to the Review Board, species-specific oversight groups will be appointed by industry to provide APHIS expertise and guidance in regards to identification issues impacting their particular species.

VI. B. Administration of Numbering Systems

Official numbering systems have been proposed for premises, individual animals, and group/lot or “units of animals”. Proper administrative control must be established to ensure the policies that govern the use and/ or allocation of such numbers are adhered to. The following section provides direction to this issue.

VI. B.1. Premises Identification Numbering System

VI. B.2. Individual Animal Identification Numbering System

The National Food Animal Identification Plan, while maintaining existing official animal numbers through a transition period, calls for the establishment of a single national numbering system in the long term. This numbering system is referred to as the Animal Identification Numbering (AIN) system.

It is anticipated that radio frequency identification (RFID) technology will be required in Phase II of the national plan; thus, the U.S. national identification number is based on the international standard for the code structure contained in ISO compliant RFID transponders. The utilization of this code provides the capability for an animal to have one lifetime number that can be printed on a visual tag, encoded on an RFID transponder, or a combination of both.

Recognizing that tags are lost, the system allows for the replacement of tags with another national number that must be cross-referenced to the animal’s original national number.

The Animal Identification Number, state postal code, and the U.S. shield will be imprinted on official identification devices. The record of tag distribution, each containing an Animal Identification Number, provides a key com-
ponent to the foundation of the National Identification System.

Eartags will be the most common method of official identification. The visual ear tag may be metal or plastic and vary in size and shape, as long as it is tamper-resistant for one-time use. Similarly, when the number is encoded in an RFID chip, the tag containing the transponder must be tamper-resistant.

Official identification devices will vary, depending on the needs of producers. Ideally, identification devices will be available from a number of sources and the price for the devices will be market-driven. It is anticipated that market competition will improve the quality of devices in a competitive marketplace.

Producers will purchase identification tags from Animal Identification Number Administrators. AIN Administrators may be state agencies, commercial service providers, DHIA, breed registries, tag companies, etc., that meet the requirements set forth in policies that govern the allocation of Animal Identification Numbers and distribution of official identification devices.

Structure

It is imperative that controls are established to ensure that the uniqueness of the national numbers is achieved and that necessary information relative to the distribution of numbers is maintained. The structure for the administration of Animal Identification Numbers will include several entities. APHIS will administer the AIN System with input from the National AIN Review Board (Review Board). Animal Identification Number Administrators (AIN Administrators), approved by APHIS with input from the Review Board, will issue official identification devices with the Animal Identification Numbers.

Review Board

The Review Board will provide valuable industry participation and input in the AIN System, and such participation will be essential to the success of the AIN System. The National AIN Review Board will be composed of state and federal animal health officials, industry representatives, and individuals involved in the use and/or distribution of official identification devices. APHIS will select the Review Board members through an application process. The Review Board will not have final authority to make decisions regarding the administration of the AIN System.

The Review Board will provide input to APHIS for the establishment of requirements an AIN Administrator must meet, participate in the selection of AIN Administrators, a periodic evaluation of AIN Administrators, and the development of the National AIN web site.

Role of APHIS

Allocation of numbers to approved entities will be the responsibility of APHIS. This ensures that the marketplace maintains fairness to all parties.
No production information is obtained from the administration of the number. The role of APHIS is to assure numbers are uniquely allocated to parties that meet the established requirements for the proper administration of numbers to producers and/or service providers.

APHIS will maintain the National AIN web site, which will allocate a range of Animal Identification Numbers to AIN Administrators. The range of numbers will be reflective of the entity’s business volume to avoid the allocation of excessive numbers to any one entity. It would also provide information about the AIN System and AIN Administrators, as well as provide links to each AIN Administrator’s web site.

APHIS will be responsible for the selection of the Review Board members, the selection of AIN Administrators (with input from the Review Board), the maintenance of National AIN web site, and the allocation of Animal Identification Numbers to AIN Administrators.

**AIN Administrators**

An entity that wishes to provide official identification devices to producers may apply to become an AIN Administrator. To be become an approved AIN Administrator the entity must formally agree to and have the capabilities listed in the following:

- Demonstrate a functioning computer system that ensures the uniqueness of the number and that maintains a database of numbers allocated to each premises.
- Maintain a database storing the manufacturer and tag type (SKU number) that each number was printed on and/or encoded in.
- Update the allocation records of numbers to the National AIN System frequently (weekly).
- Ensure they issue only the AIN’s allocated to them and that those numbers are printed and/or encoded on officially approved devices.
- Furnish official identification devices to producers as prescribed by the policy on official identification devices.
- Educate customers on the proper use of official identification devices.

APHIS, with input from the Review Board, will select AIN Administrators from applications submitted by organizations, agencies, or private enterprises. Applicants for official AIN Administrator would execute an agreement that sets forth the responsibilities and duties of AIN Administrators.

Applicants selected by APHIS to be AIN Administrators will receive an official user identification code and password for the National AIN web site. APHIS would monitor compliance with the terms of the AIN Agreement. An AIN Administrator would be considered noncompliant for such things as failing to keep records on the issuance of American identification numbers, failing to upload required information to the AIN Web site, failing to accurately correlate Animal Identification Numbers with premises, and issuing duplicate numbers.
The Administrator of APHIS, with input from the Review Board, will deny or withdraw the approval of an AIN Administrator upon a determination that the AIN Administrator has not met the conditions of the agreement. Upon the decision to suspend or terminate the noncompliant AIN Administrator, the AIN Administrator would be denied access to the AIN Web site, and the unassigned Animal Identification Numbers allocated to that Administrator would be revoked. A denial or withdrawal of approval of an AIN Administrator could be appealed to APHIS through the standard appeal process.

VI.C. Official Identification Devices

By law of the United States government, no person:

- shall remove an official identification device or cause the removal of one unless the animal is being terminated (exception: unless the national number is illegible or the RFID device malfunctions)
- shall cause the application of an approved tag from an animal to another animal
- shall cause the application of an official tag to an animal that is currently carrying an official tag (exception: unless the second official tag is a Premises ID tag).
- shall alter an official tag to change its national number or to make the national number unreadable
- sell or provide a tag bearing the USDA Shield unless so authorized

VI.D. Tagging Requirements

The responsibility of having the animal properly identified is entirely that of the producer. When proper identification requires a tag, the official tag must be properly attached to the animal prior to it leaving its current premises and destined for another premises with a different number. It is acknowledged that some producers are not set up to tag cattle prior to their movement to another premises. Therefore, the establishment of “approved tagging sites” will be allowed for. Yet, it remains the sole responsibility of the producer holding the cattle to ensure each animal is properly identified.

VII. Resources

The actual advancement and implementation of the National Identification Plan will require significant resources, both in personnel and working funds. While no budget is available at this date, it is acknowledged that minimal progress can be made without adequate funding. The Task Force suggested that the issue of animal health is a national food safety issue and certain national animal identification program costs should be supported by the federal government.

The plan is to continue with the industry’s review of the work plan. When industry has finalized the “framework” plan in early 2003, more details will be prepared, including the defining resource requirements. A specific work group will be appointed to develop budget requirements based
on the final plan. Additionally, the work group will receive direction from another work group relative to system requirements that must be developed prior to each phase of the implementation plan. The work group on resources will account for development costs in its budget plan.

APPENDIX

A. Glossary of Terms

Breeding Cattle
Sexually intact cattle of either sex, with the exception of veal calves and heifers moving direct to a terminal feedlot.

Electronic Identification (EID)
An identification method that utilizes electronic technology, including, but not limited to bar codes, 2-D symbology, and radio frequency.

Group/Lot Identification Number
The identification number used to uniquely identify a “unit of animals” of the same species that are managed together as one group throughout the preharvest production chain.

Individual Animal Identification
A means of identification that provides the capability to differentiate one animal from another. Official individual animal identification uses methods that meet the definition of official identification.

Identification Methods
A means of identifying an animal, including ear tags, brands, breed registry certificates, etc.

ISO
International Organization of Standards.

ISO Transponder
A radio frequency transponder that has been evaluated by the International Committee on Animal Recording and meets the standards defined in ISO 11784 and 11785.

ISO Reader
A transceiver that can read ISO transponders (both FDX and HDX).

Mandatory Identification
A state and/or federal identification requirement that defines which livestock must be identified according to established protocols.

National Identification System
An identification system that, through established standards and defined data elements, allows for the compatibility of systems while providing the efficient availability of agreed-to information across each segment of the industry.

Official eartag
An identification eartag approved by APHIS as being sufficiently tamper-resistant for the intended use and providing unique identification bearing an official identification number.

Official Identification
A method of identification defined in the CFR that is acceptable for the interstate movement of livestock.

Official Identification Numbers
Numbering systems recognized in the CFR; alpha-numeric National Uniform Eartagging system or valid premises identification number that is used in conjunction with the producer’s livestock production numbering system.

Premises
A premises is a location operated by an entity that participates in food animal production and/or commerce that is, in the judgment of the State Animal Health Official or Area Veterinarian in Charge, epidemiologically and/or geographically distinct from other livestock production units. Such premises includes, but not limited to; production operations, markets, assembly points, exhibitions and processing plants.

National Premises Identification System
A means of uniquely identifying a premises and associating it with agreed to information on an information system, including contact information when communication to the premises is necessary. For database purposes, the field specification for Premises Identification is defined as:

- 8 characters (two alpha state postal code plus six characters)

Radio Frequency Identification (RFID)
An ID device that utilizes radio frequency technology. The RFID device or method of identification includes ear tags, bolus, implants (inject), and tag attachments (transponders applied during the tagging process).

Write Once Read Many (WORM)
Distinguishing a transponder that can be part or totally programmed once by the user, and thereafter only read.

B. National Food Animal Identification Task Force Roster

American Association of Bovine Practitioners
Dr. Jim Reynolds, UC Davis, Veterinary Medicine Teaching & Research Center
Mr. Mark Spire, College of Veterinary Medicine, Kansas State University

American Association of Swine Veterinarians
Dr. Tom Burkgren, American Association of Swine Veterinarians
Dr. D.L. Hank Harris, American Association of Swine Veterinarians

American Dairy Goat Association
Mr. Dan Laney, American Dairy Goat Association
Dr. Joan Dean Rowe, American Dairy Goat Association, Scrapie Liaison
Helen Snyder, American Dairy Goat Association

American Farm Bureau Federation
Tom Lyon, American Farm Bureau
Joe Miller, American Farm Bureau
LIVESTOCK IDENTIFICATION

American Meat Institute
Pat Bamrick, Tyson Foods
Ken Bull, Excel Corporation
Mark Dopp, American Meat Institute
Warren Mirtsching, ConAgra Beef Company
Marcine Moldenhauer, Excel Corporation
Art Wagner, Farmland National Beef

American Veal Association
Dr. Dan Catherman, American Veal Association
Michelle Cornman, American Veal Association
Dick Dennis, American Veal Association
Dan Schober, Provimi Veal Corporation
Frank Trapp, American Veal Association/Trapp & Sons

American Veterinary Medical Association
Dr. Rosemary J. LoGiudice, American Veterinary Medical Association

Cooperative State Research, Education, and Extension
Eric Iverson, Beef Specialist, SD Department of Agriculture
Jim McKean, Iowa State University

Council on Dairy Cattle Breeding
Dr. Gordon A. Doak, National Association of Animal Breeders
John Meyer, Holstein Association
Dr. Paul Miller, National DHIA
Chuck Sattler, Select Sires
Ronald Schaufelberger, Holstein Association, Producer—Registered Holsteins
Kevin Steffens, Director, National DHIA, Producer - Dairy

FDA Center for Veterinary Medicine
Dr. Joseph C. Paige, DHHS/FDA CVM Division of Epidemiology

Federation of Animal Science Societies
Dr. Geoffrey E. Dahl, University of Illinois, Department of Animal Sciences
Dr. Thomas J. Lawlor, Jr., Holstein Association
Dr. John A. Paterson, Montana State University
Dr. Max F. Rothschild, Iowa State University
Dr. Tom R. Troxel, University of Arkansas

International Livestock Identification Association
Matt Brockman, Texas and Southwestern Cattle Raisers Association
Dave Horton, Nebraska Brand Committee
Ken Weir, Livestock Identification Services, Ltd.

Livestock Marketing Association
Nancy J. Robinson, Livestock Marketing Association
REPORT OF THE COMMITTEE

National Assembly of State Animal Health Officials
Dr. Andrew Clark, Oregon Department of Agriculture
Dr. John Enck, Jr., Pennsylvania Department of Agriculture
Dr. Richard D. Hull, Illinois Department of Agriculture
Dr. Linda Logan, Texas Animal Health Commission
Dr. Clarence J. Siroky, Wisconsin Department of Agriculture, Trade and Consumer Protection

National Association of State Departments of Agriculture
Dr. Dwayne O’Dell, West Virginia Department of Agriculture

National Cattlemen’s Beef Association
Mr. Allen Bright, Chair, NCBA Animal Identification Subcommittee, Producer - Bright Cattle Company
Dr. Gary L. Cowman, National Cattlemen’s Beef Association
Dr. Gary M. Weber, National Cattlemen’s Beef Association
Mr. Gary Wilson, Chair, NCBA Cattle Health & Well Being Committee, Producer—Registered Angus

National Institute for Animal Agriculture
Dr. Mark Engle, National Pork Board
Neil Hammerschmidt, Wisconsin Livestock Identification Consortium
Dr. Kenneth Olson, NIAA Chairman of the Board
Glenn Slack, National Institute for Animal Agriculture

National Livestock Producers Association
Tod Fleming, Equity Cooperative Livestock Sales Association
Dick Jurgens, United Producers, Inc.
Rick Keith, Producers Livestock Marketing Association
Scott Stuart, National Livestock Producers Association

National Milk Producers Federation
John Adams, National Milk Producers Federation
Velmar Green, Director, National Milk, Producer - Green Meadows Farm

National Pedigreed Livestock Council
Robert Fourdraine, Holstein Association USA
Jim Garrison, Arabian Horse Registry of America, Inc.
Matt Perrier, American Angus Association

National Pork Board
Jon Caspers, Pleasant Valley Pork Corporation
Dr. Fred Cunningham, Swine Veterinary Services
Dr. Robyn Fleck, Schering-Plough Animal Health Corporation
Jay Hawley, National Pork Board, Pork Producer

National Pork Producers Council
Kirk Ferrell, National Pork Producers Council

National Renderers Association
Tom Cook, National Renderers Association
LIVESTOCK IDENTIFICATION

North American Deer Farmers Association
Kevin Grace, Antlers International
Phyllis Menden, North American Deer Farmers Association

North American Elk Breeders Association
Dr. Darrell Franks, North American Elk Breeders Association
Lisa Villella, North American Elk Breeders Association
Ron Walker, North American Elk Breeders Association
M.H. ‘Bud’ Wessel, North American Elk Breeders Association

R-Calf USA
Dr. Richard Bowman, R-Calf USA
Bill Bullard, R-Calf USA
John Lockie, R-Calf USA

United States Animal Health Association
Dr. Bob Hillman, Idaho State Department of Agriculture
Dr. Maxwell Lea, Louisiana Department of Agriculture
Mr. John F. Wortman, New Mexico Livestock Board

USDA, Animal and Plant Health Inspection Service, Veterinary Services
Dr. John Clifford
Dr. Valerie Ragan
Dr. John Wiemers

USDA Food Safety Inspection Service
Dr. Bonnie Buntain, USDA Food Safety and Inspection Service
Dr. Bhabani Dey, USDA, FSIS, Animal & Egg Production Food Safety
Dr. John R. Ragan, USDA, FSIS, Animal & Egg Production Food Safety

USDA, AMS, Livestock and Seed Program
Mr. Herbert C. Abraham, USDA, AMS, LS Program, Standardization Branch
Ms. Cara L. Gerken, USDA, AMS, LS Program, Standardization Branch

—International Resources—
Canadian Cattle Identification Agency
Julie Stitt, General Manager, CCIA

Commercial Animal Identification or Information Technology Companies:
Tod Adams, APEIS Corporation
Paul J. Brown, Anitech Information Systems, Inc.
Tyler R. Brown, Global Animal Management
Glenn Fischer, ALLFLEX USA
Niels Fogt, Digital Angel, Inc.
Marty Goldberg, RMS Research Management Systems, USA Inc.
Richard N. Lytton, LA-CO Industries, Inc.
Kevin Maher, GlobalVetLink, L.C.
Gary F. Marsh, CowTek, Inc.
Bill McCoy, Temple Tag, Ltd.
REPORT OF THE COMMITTEE

Tim Niedecken, Emerge Interactive
Stan Potratz, Premier Sheep Supplies, Ltd.
Dr. John A. Shadduck, Optibrand, Ltd., LLC
Mark J. Shaw, Micro Beef Technologies, Ltd.
Glenn B. Smith, AgInfoLink
Jeb Supple, SFK Technology Inc.
Damon Thorpe, VeriLogik
Dalton Supplies Limited, Dalton House

Business Meeting of The Committee on Livestock Identification—

There were 65 people that signed the committee register. A quorum of the committee was present.

A resolution (Resolution #1 below) was moved by Dr. William Mies and seconded by Mr. J.G. Shoun to accept the National Identification Work Plan and request USDA-APHIS establish, by January 2003, a joint team to use the NIWP as a guide to develop a national animal identification program and system.

There was considerable discussion by the committee and those present. The discussion centered on the timeframe for implementing the plan, many of the details yet to be decided, and other identification systems in place or being developed.

The resolution passed unanimously.

A Recommendation from the USAHA Committee on Sheep and Goats was introduced by Dr. Anita Edmondson and seconded by Dr. Ralph Knowles. The recommendation (Recommendation #1 below) brought attention to the concerns from the Committee on Sheep and Goats that there was not sufficient representation of their industry on the National Food Animal Identification Task Force. There was short discussion about the process the Task Force used to include the various food animal species. It was agreed that as the plan is further developed a concerted effort would be made to include all interested producers. A motion was made and accepted to amend the wording of the recommendation to include the poultry industry in the request for future involvement in the development of the identification plan. There was unanimous consent to accept the amendment and the recommendation.

RESOLUTION NUMBER:  1
SOURCE: Committee on Livestock Identification
SUBJECT MATTER: Establishment of a joint federal and state government, USAHA and Industry Animal identification development team

BACKGROUND:

For many years, USDA-APHIS has met with State animal health officials and representatives of the livestock sector to discuss the need to improve animal disease surveillance, monitoring, control and eradication efforts and the increasing need to be able to more efficiently identify and
trace animals for these purposes. The National Institute for Animal Agriculture (NIAA) coordinated a broad based task force that developed a “National Identification Work Plan”. The NIAA task force work will be completed in December 2002. Industry groups are ready to work more closely with USDA-APHIS, and State animal health officials to refine the animal identification systems necessary to maintain animal disease monitoring, surveillance, control and eradication in the United States.

**RESOLUTION:**

The United States Animal Health Association accepts the National Identification Work Plan (NIWP) report as a guide to establishing a national animal identification program and system. The USAHA requests USDA-APHIS establish, by January 2003, a joint Federal and State government and industry animal identification development team that will use the NIWP as a guide to develop a national animal identification program and system that will enhance animal disease monitoring, surveillance, control and eradication in the United States.

A draft plan should be presented for review to industry and other groups by June of 2003 and for review at the USAHA annual meeting in San Diego California in October 2003.

**RECOMMENDATION #1**

**SOURCE:** The Committee on Sheep and Goats,

Thence

The Committee on Livestock Identification

**SUBJECT MATTER:** Composition of the National Food Animal Identification Task Force

**BACKGROUND:**

Some associations were contacted in Spring 2002 and invited to appoint representatives to the task force. To our knowledge, only the American Dairy Goat Association appointed members to the Task Force. Wider representation is needed to address sheep and goat issues.

**RECOMMENDATION:**

USAHA Committee on Sheep and Goats recommends the Committee on Livestock Identification request that additional producer and veterinary representatives in associations servicing sheep and/or health be appointed to the National Food Identification Task Force. Even if the task force has completed its’ work, future efforts should include greater representation from sheep, goat and poultry industries.

**Identification of Livestock in the State of Sonora—Information Presentation**

Dr. Miguel Angel Cordova, Director of the Committee for the Eradication of Tuberculosis and Brucellosis in Sonora, Mexico, was the final presenter. Dr. Cordova gave a short description of the campaign to eradicate bovine tuberculosis and brucellosis in Sonora, Mexico, and emphasized the methods used to identify cattle in their state and the system to control
movement of cattle during intrastate and interstate transit in Sonora. He
gave an overview of the TB Campaign Committee structure and how it
functions. He described and showed examples of the eartags used to iden-
tify their cattle and the documents required to authorize transport of cattle
in Sonora. His description of the eartags included the numbering system
that they use and the means by which their committee distributes tags to
their producers and tracks their use. Dr. Cordova also discussed their live-
stock inspectors and the system of checkpoints, and quarantine stations
that are placed throughout the State of Sonora for movement control of
livestock.

Dr. Cordova’s report was to inform the USAHA Committee on Live-
stock Identification and therefore no formal action was taken pertaining to
his report.

There was no other business to come before the Committee.
The meeting concluded at 4:00 p.m.
REPORT OF THE COMMITTEE ON NOMINATIONS AND RESOLUTIONS

Chairman: Dr. B. R. Hillman

Dr. J. Lee Alley, AL; Dr. Jones W. Bryan SC; Dr. Jim Logan, WY; Ms. Amy W. Mann, DC; Dr. Richard H. McCapes, CA; Dr. John J. Schiltz, IA; Dr. H. Wesley Towers, DE; Dr. Larry L. Williams, NE; Dr. Ernest W. Zirkle, NJ.

PRESIDENT.................................................Robert Frost, California
PRESIDENT-ELECT.......................................Donald H. Lein, New York
FIRST VICE-PRESIDENT.................................Richard D. Willer, Arizona
SECOND VICE-PRESIDENT.................................Bret D. Marsh, Indiana
THIRD VICE-PRESIDENT.................................Lee M. Myers, Georgia
TREASURER..................................................J. Lee Alley, Alabama

REGIONAL DELEGATES
NORTHEAST.............................................R. J. Eckroade, Pennsylvania
.......................................................V. P. LaBranche, Massachusetts
NORTHCENTRAL...........................................C. W. Geary, Wisconsin
.......................................................J. W. Leafstedt, South Dakota
SOUTH....................................................R. E. Good, Arkansas
.......................................................L. Wayne Godwin, Florida
WEST.....................................................J. F. Wortman, New Mexico
.......................................................C. W. Lum, Hawaii

2002 RESOLUTIONS
St. Louis, Missouri
October 17-24, 2002

RESOLUTION NUMBER: 1
SOURCE: JOINT COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS
SUBJECT MATTER: ELECTRONIC TRACKING

BACKGROUND INFORMATION:

Effective surveillance, monitoring and identification of foreign animal diseases, as well as tracking and controlling the movement of animals, are critical to the efficient and effective management of a foreign animal or emerging disease.

In recent history, this has been accomplished by thorough paper documentation of surveillance areas conveyed to appropriate federal agencies and other parties via the United States postal system.

Utilizing current technology would significantly improve the efficiency of such activities and increase the capability of veterinarians, boards of animal health, and others to address a foreign animal or emerging disease.
RESOLUTION:
United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to:

Seek funding for and support development of a comprehensive electronic livestock movement and tracking system that states can adopt to improve the overall response to a foreign animal or emerging disease;

Provide the necessary standardized operating procedures, appropriate training and proficiency testing needed to bring states into compliance under an electronic tracking system; and

Incorporate such protocols into the electronic system to facilitate the continuation of commerce necessary in the livestock industry throughout a disease event, with appropriate protocols to prevent the further spread of any disease.

RESOLUTION NUMBER: 2
SOURCE: JOINT COMMITTEE ON ANIMAL HEALTH INFORMATION SYSTEMS
SUBJECT MATTER: PARTICIPATION IN THE NATIONAL ANIMAL HEALTH REPORTING SYSTEM

BACKGROUND INFORMATION:
The National Animal Health Reporting System (NAHRS) is a joint effort of the United States Animal Health Association (USAHA), American Association of Veterinary Laboratory Diagnosticians (AAVLD) and United States Department of Agriculture (USDA) to establish a nationwide reporting system for the occurrence of clinical cases of certain monitored diseases in order to meet national and international needs and obligations for animal health surveillance and disease monitoring. Currently the list of diseases are those included in the Office International des Epizooties (OIE) List A and List B reportable diseases.

Currently thirty-five States are reporting with five States in the process of completing plans to report. The thirty-five presently reporting States represent 79% of the cattle, 56% of the swine, 83% of the sheep, 60% of the poultry and 82% of the food fish of the United States national production value. Participation in the NAHRS is voluntary. All fifty States need to participate if the system is to be credible on the international level.

Major trading partners such as Canada, Australia and New Zealand already have comparable systems in place. United States trade negotiators are increasingly called upon to substantiate the animal health status of the United States to gain or regain access to markets. Authority to approve health certificates and other documents relating to international movement of animals and animal products is vested in the USDA. Without adequate knowledge of the health status of commercial animal populations in the United States, the USDA is placed in an untenable position when asked to...
endorse export documents.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) implement in Fiscal Year 2004 Animal Health Safeguarding Review recommendation #98 directing USDA, APHIS, VS to clearly define the National Animal Health Reporting System (NAHRS) as a cooperative, not voluntary, program for all industries and States that request USDA certification of animal products for export.

RESOLUTION NUMBER: 3 NOT APPROVED
SOURCE: JOINT COMMITTEE ON AQUACULTURE
SUBJECT MATTER: STANDARD PROCESSES FOR THE APPROVAL OF DIAGNOSTIC AND PATHOGEN IDENTIFICATION TESTS AND METHODS, DIAGNOSTIC REAGENTS, AND DIAGNOSTIC LABORATORIES

BACKGROUND INFORMATION:

The United States Animal Health Association (USAHA) recognizes the leadership and authority mandated to the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) by the passage of the Animal Health Protection Act of 2002 and the Virus-Serum-Toxin Act of 1913, as amended. Accurate and timely disease diagnostics and pathogen identification are pivotal cornerstones for all responses to animal diseases, including prevention, control, and/or eradication of endemic, emerging, and foreign animal diseases. A uniform approval process for disease diagnostic and pathogen identification tests, reagents and reference materials would substantially contribute to the health and welfare of aquatic animals, and enhanced public health, food safety and environmental health. In order to advance these principles it is vital that approaches to, and processes for, the approval of tests, test methods, reagents and reference materials, and diagnostic laboratories are harmonized at the international, national, state, and local levels.

While this resolution focuses on aquatic animal diseases, the United States Animal Health Association/American Association of Veterinary Laboratory Diagnosticians Aquaculture Committee recognizes the application of these principles to all animal disease diagnostics, in particular to diseases in all wildlife.

RESOLUTION:

The United States Animal Health Association (USAHA) encourages United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to work with other agencies, organizations and entities to develop a uniform process con-
cerning aquatic animal disease diagnostics and pathogen identification, including: 1) Validation and approval of diagnostic and identification tests, and test methods; 2) Approval of standardized diagnostic reagents and reference materials; and, 3) Quality assurance, quality control, and approval of aquatic animal diagnostic laboratories.

RESOLUTION NUMBER: 4
SOURCE: COMMITTEE ON BRUCELLOSIS
COMMITTEE ON PSEUDORABIES
SUBJECT MATTER: BRUCELLOSIS AND PSEUDORABIES IN FERAL SWINE

BACKGROUND INFORMATION:
Feral/wild swine continue to pose an increasing threat of acquiring, harboring and transmitting diseases with significant animal and human health importance and trade impact. There is a crucial need for pertinent research and field studies that address threats related to feral/wild swine.

RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Agriculture Research Service (ARS), Cooperative State Research, Extension and Education Service (CSREES), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), and Wildlife Services (WS) and to recognize the feral/wild swine threat as a high priority and provide long range funding for research, program support and field studies.

In particular, funding is necessary to:
• Conduct population studies needed to support the development of disease threat management strategies.
• Define the role of Brucella strain RB51 and/or VTRS-1 for use as a dual vaccine and conduct field trials to determine its efficacy.
• Conduct further field trials and studies in relation to swine brucellosis and pseudorabies infection in feral swine and their transmission to domestic swine.

RESOLUTION NUMBER: 5
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: EQUINE PIROPLASMOsis SEROLOGIC TESTING

BACKGROUND INFORMATION:
Current data indicates that the Complement Fixation test for Equine Piroplasmosis, though of proven specificity, lacks adequate sensitivity for the detection of all low-titered serologically positive horses. Due to problems associated with the use of the Complement Fixation test, Competitive Enzyme Linked Immunosorbent Assay tests have been developed and
shown to have superior sensitivity to the complement fixation test for the serologic detection of horses infected with Equine Piroplasmosis.

RESOLUTION:

United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to adopt the Competitive Enzyme Linked Immunosorbent Assay a more sensitive test for the post-entry screening of horses for Equine Piroplasmosis and employ the Indirect Fluorescent Antibody test as a referee test at the earliest appropriate opportunity.

RESOLUTION NUMBER: 6
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: OFFICE OF INTERNATIONAL EPIZOOTIES STANDARDS COMMISSION RE: EQUINE PIROPLASMOSIS TESTING

BACKGROUND INFORMATION:

Current data indicates that the Complement Fixation test for Equine Piroplasmosis, though of proven specificity, lacks adequate sensitivity for the detection of all low-titered serologically positive horses. Due to problems associated with the use of the Complement Fixation test, Competitive Enzyme Linked Immunosorbent Assay tests have been developed and shown to have superior sensitivity to the Complement Fixation test for the serologic detection of horses infected with Equine Piroplasmosis.

RESOLUTION:

United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to submit a request to the Standards Commission of the Office International des Epizooties (OIE) that, based upon extensive experimental and field evaluation, the Competitive Enzyme Linked Immunosorbent Assay for Equine Piroplasmosis, having comparable sensitivity and specificity to the Complement Fixation and Indirect Fluorescent Assay tests, be approved by the OIE for the purposes of international trade.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 7
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: UNITED STATES DEPARTMENT OF AGRICULTURE, ANIMAL AND PLANT HEALTH INSPECTION SERVICE, VETERINARY SERVICES MEMORANDUM 555.8 RE EQUINE INFECTIOUS ANEMIA TESTING LABORATORIES

BACKGROUND INFORMATION:
Equine Infectious Anemia is an infectious disease of horses that impacts the equine industry. The Committee on Infectious Diseases of Horses recognizes that improved policies and procedures should be implemented for approved laboratories conducting official Equine Infectious Anemia tests as a component of disease control.

RESOLUTION:
United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), implement the attached VS Memorandum 555.8, as revised by the Committee on Infectious Diseases of Horses at the 106th Annual meeting of USAHA held in St. Louis Missouri, October 20, 2002.

Attachment: VS Memorandum 555.8
Draft Revision, October 20, 2002
United States Animal and Plant Health Inspection Service 20250
Agriculture Service
Current Date, 2002

VETERINARY SERVICES MEMORANDUM NO. 555.8
Subject: Approval of Laboratories to Conduct the Official Tests for Equine Infectious Anemia
To: Directors, VS Regions
Area Veterinarians in Charge, VS

I. PURPOSE
The purpose of this memorandum is to outline policy and procedures for approval of laboratories to conduct official tests for equine infectious anemia (EIA) and requirements for those laboratories when performing official tests.

II. CANCELLATION
This memorandum replaces Veterinary Services (VS) Memorandum No. 555.8, dated April 10, 1997 which is hereby canceled.
III. GENERAL / DEFINITIONS

Official Test:
All EIA tests are official tests and must be conducted at approved facilities by approved personnel in accordance with the procedures outlined in this Memorandum. Only diagnostic agar gel immunodiffusion (AGID) or enzyme-linked immunosorbent assay (ELISA) test kits that have been officially approved and licensed by the United States Department of Agriculture (USDA) will be utilized for EIA tests.

Approved Laboratory:

State, Federal or University Laboratory: Any site (facility) under the direct supervision of the State animal health official, a USDA-APHIS-VS director, a US military director, or university laboratory director, which has met all the requirements outlined in this Memorandum and in which at least one individual has completed the EIA training course at the National Veterinary Services Laboratories.

Private Laboratory:
A singular test site (facility) which has no official supervisory affiliation with a State, Federal or University laboratory and which has met all the requirements outlined in this Memorandum and in which any person conducting an EIA test has completed the EIA training course at the National Veterinary Services Laboratories.

IV. LABORATORY APPROVAL

A. All initial requests for EIA laboratory approval should be made to the appropriate Area Veterinarian in Charge (AVIC).

B. Upon the recommendation of the AVIC and State animal health official, the following actions will be taken:
   1. A Federal or State veterinary medical officer will review with laboratory officials the regulatory and technical responsibilities inherent in conducting and reporting official tests.
   2. The physical facilities of the laboratory will be inspected by a Federal or State animal health official. Inspection results will be recorded on the enclosed laboratory inspection worksheet (Enclosure 1). Laboratory inspection must be completed and the proposed facility found in compliance prior to participation of laboratory personnel in an EIA training course.
   3. Upon completion of the laboratory inspection, the director of the laboratory will sign the enclosed agreement (Enclosure 2) acknowledging his or her understanding of the regulatory and technical responsibilities of the laboratory.

C. The procedures outlined below will be followed by approved laboratories:
   1. Only diagnostic test kits that have been officially approved and licensed by the USDA will be used.
   2. The tests will be conducted according to test protocols as described
in literature accompanying diagnostic test kits unless otherwise directed by official National Veterinary Services Laboratories (NVSL) protocols. Appropriate control samples, as specified in instructions accompanying diagnostic test kits, must be included each time the test is performed. In addition, for AGID tests, a weak positive sample obtained from either NVSL or an approved commercial source must be included each time the test is conducted.

3. Negative test results will be reported to State and/or Federal animal health officials regularly, as instructed by those officials, in both the State where the laboratory is located and the State in which the animals were sampled. State and/or Federal animal health officials shall be notified immediately or in no circumstances more than 24 hours after test completion if horses are positive to the EIA test. When requested by the State or Federal Animal Health Official, reports of monthly totals of EIA AGID and EIA ELISA tests performed by the laboratory shall be provided. EIA test results must be reported within 48 hours of test completion to the veterinarian submitting the sample.

4. Only samples collected and submitted by an accredited veterinarian, State or Federal animal health official, or military veterinarian will be accepted.

5. Each equid sample shall be submitted on a state or federally approved individual animal identification form. Information submitted with the sample(s) shall be legible and shall include the following:
   a. Name, address, and phone number of submitting veterinarian.
   b. Name and address of owner.
   c. Location (including county) of equine(s) at the time of obtaining the samples.
   d. Identification of the equine(s) sampled, including name, color, markings, tattoo, or registration numbers.
   e. Age, breed, and sex of equine(s) sampled.

   **Note:** The signature of the owner or owner’s agent on the individual animal form is required at the discretion of the submitting veterinarian.

6. Reports of test results shall include the name, address, and phone number of the laboratory that conducted the test and the type of test performed.

7. Laboratories shall keep an original copy of each completed EIA individual animal test form for at least 12 months from date of completion.

   Annual proficiency testing conducted by approved laboratory personnel at each approved laboratory is required. NVSL will supply
the samples and evaluate test results. Laboratories receiving approval within 6 months of the proficiency test distribution date are exempt from participating for the approval year only.

Biennial inspections of approved laboratories by a Federal and/or State animal health official of the State where the laboratory is located may be required. During these inspections, one of the items that should be reviewed is compliance with this memorandum. It is also recommended that inspections be conducted on all laboratories that fail an annual proficiency test to determine that tests are being conducted according to official protocols and that personnel conducting the tests are considered qualified by VS.

All EIA positive ELISA tests are to be confirmed by AGID. Confirmation testing must be conducted at a State, Federal, or university laboratory. Samples from tests with discrepant results must be forwarded to NVSL. NVSL may conduct ancillary testing on discrepant samples or request additional samples as they may deem necessary.

D. Training

1. Personnel who perform EIA tests must be recognized as qualified by VS. The AVIC and State animal health official must recommend qualified personnel for training and approval by NVSL. The training outlined below is the minimum required:
   a. For private laboratories: The person(s) responsible for conducting official tests for EIA will be trained at NVSL. This training will include successful completion of an individual proficiency test.
   b. For Federal, State, and university laboratories: At least one individual who is actively involved in EIA testing must have received training at NVSL. With approval of the AVIC and State animal health official, personnel previously trained at NVSL may train others in their laboratory to conduct the tests. Training will include regulatory responsibility. Laboratories will notify NVSL of names of individuals who are being trained, and NVSL will certify training of these individuals by providing individual proficiency tests, which must be completed in accordance with standards established by NVSL.

E. The AVIC, State animal health official, and NVSL will evaluate personnel who do not successfully complete proficiency testing in order to determine if additional training at NVSL is necessary or whether approval of the laboratory should be canceled.

F. Laboratories approved to conduct EIA tests will inform the AVIC and NVSL of any change of address or telephone number and when any personnel trained by NVSL to conduct the tests are no longer employed. If trained personnel are not available to conduct the tests, approval of
V. RECOMMENDATION FOR APPROVAL

Once the procedures in Section IV-B have been completed, the AVIC and the State animal health official may recommend approval of the laboratory. A jointly signed memorandum and the originals of all completed documents (Enclosures 1 and 2) should be to:

Director
National Veterinary Services Laboratories
P.O. Box 844
Ames, IA 50010

VI. APPROVAL OF LABORATORIES

After the requirements in Sections IV-B and IV-D (laboratory inspection and training) have been satisfactorily completed, the laboratory will be approved by the Director of NVSL and will be notified of approval by a letter signed by the Director of NVSL.

VII. MAINTENANCE OF LABORATORY APPROVAL

Laboratories are expected to follow the policies and procedures outlined in this Memorandum at all times. Approved laboratories are subject to inspection by a Federal or State animal health official at any time during the laboratory’s normal business operation.

VIII. REMOVAL OF LABORATORY APPROVAL

Laboratory approval will be withdrawn by the Administrator when any of the criteria for approval have not been met. Approval will be removed in the following situations: 1) The laboratory requests removal, 2) The Director of NVSL recommends removal or 3) The Director of NVSL receives written recommendation for removal by concurrence of the AVIC and State animal health official. In the latter two situations, the laboratory will be informed of recommendation for removal in a letter signed by the Administrator. In all cases, written notification of the removal of laboratory approval will be provided to the laboratory.

VIII. LIST OF APPROVED LABORATORIES

The Director of NVSL will maintain a current list of laboratories approved to conduct official tests for EIA. This list will be updated regularly and available to the Regional Directors, AVICs, State animal health officials and other interested persons via the United States Department of Agriculture, Animal and Plant Health Inspection Services, Veterinary Services website.

Ron DeHaven
Deputy Administrator
Veterinary Services
2 Enclosure

ENCLOSURE 1
VS MEMORANDUM NO. 555.8
LABORATORY INSPECTION FOR EQUINE INFECTIOUS ANEMIA TESTING

Laboratory Name____________________________________________
Telephone No._________________ Facsimile No.__________________
Laboratory Physical Location Address (not P.O. Box):
__________________________________________________________________
__________________________________________________________________
Mailing Address (if different from above):
__________________________________________________________________
__________________________________________________________________
Shipping Address for supplies, proficiency tests (if different from above):
__________________________________________________________________
__________________________________________________________________
Name of person that accompanied inspector

List all persons currently conducting EIA tests at laboratory and date certified for each person
Name
Date Certified
Inspector_____________________________Title_____________________________
Telephone No. of Inspector______________________________________

NOTE: Sections I, II, VI and VII apply to all laboratories. Sections III, IV, and V are applicable only to laboratories that are approved and performing EIA tests.

EIA Laboratory Inspection

ENCLOSURE 2
# REPORT OF THE COMMITTEE

<table>
<thead>
<tr>
<th>Section</th>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Laboratory</td>
<td>Separate room or portion of room being used for testing.</td>
<td></td>
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<tr>
<td></td>
<td>Adequate bench space available to perform test (at least 8 feet)</td>
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<td></td>
<td>Sink available in same area with hot and cold running water.</td>
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<tr>
<td></td>
<td>Laboratory temperature maintained at all times between 68 to 77 degrees Fahrenheit (or 20 to 25 degrees Celsius) or an incubator is available to maintain these temperatures for these tests where required.</td>
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<tr>
<td></td>
<td>Laboratory equipment clean and properly stored</td>
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<tr>
<td></td>
<td>Appropriate disposal facilities available</td>
<td></td>
<td></td>
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<tr>
<td>II. Laboratory</td>
<td>The following is the minimum equipment that must be available and functioning properly for the agar gel immunodiffusion (AGID) test.</td>
<td></td>
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<tr>
<td>Supplies and</td>
<td>High intensity light — must be equal to or surpass American Optical Model 653 (see protocol).</td>
<td></td>
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<tr>
<td>Equipment</td>
<td>Blinds on windows or separate room so light can be reduced to read AGID plates.</td>
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<td></td>
<td>Template (see protocols)</td>
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<tr>
<td></td>
<td>Balance — accurate to plus or minus 0.1 gram</td>
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<td></td>
<td>Suction apparatus - vacuum pump is preferred</td>
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<tr>
<td></td>
<td>Graduate measures, flasks and additional appropriate glassware</td>
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<tr>
<td></td>
<td>Source of heat for buffer and agar preparation</td>
<td></td>
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<tr>
<td></td>
<td>Refrigerator/freezer</td>
<td></td>
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<tr>
<td></td>
<td>Containers for ID plates.</td>
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<tr>
<td></td>
<td>Pipettes or pipette tips for delivery of reagents to wells.</td>
<td></td>
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<tr>
<td></td>
<td>Distilled water and chemicals for buffer (see protocol).</td>
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<tr>
<td></td>
<td>Noble Agar</td>
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<td></td>
<td>Disposable 60 or 100mm Petri dishes</td>
<td></td>
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<tr>
<td></td>
<td>The following is the minimum equipment that must be available and functioning properly for the enzyme linked immunosorbent (ELISA) test.</td>
<td></td>
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<tr>
<td></td>
<td>Incubator (if 37C incubation is required for ELISA test used)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Refrigerator/freezer</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### III. Control of Specimens and Reporting

*(Only applicable for approved laboratories)*

<table>
<thead>
<tr>
<th>Section Item</th>
<th>Yes</th>
<th>No</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash bottles, pipetting devices and plate holders ELISA washer and reader (optional)</td>
<td></td>
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<tr>
<td>Receiving area separate from portion of laboratory where testing is being done.</td>
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<tr>
<td>Laboratory assigns a unique accession number to each sample. The accession is recorded on the official EIA reporting form.</td>
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<tr>
<td>Specimens that are not appropriately identified or in poor condition are not tested.</td>
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</tr>
<tr>
<td>Specimens are received with proper submission form* with name and address of owner, name and address of submitting veterinarian, location of animal at the time the test sample was obtained and complete animal identification and signed by the submitting veterinarian.</td>
<td></td>
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<tr>
<td>The identification of the specimen is maintained on the worksheets and Petri dish and plates</td>
<td></td>
<td></td>
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<tr>
<td>The results are recorded on a worksheet (for AGID) or results of reaction (for ELISA) so that the type of reaction or results can be determined later.</td>
<td></td>
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</tr>
<tr>
<td>The results are recorded on the reporting form* with a copy kept in the laboratory. Results are reported only as negative, positive, or no test.</td>
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</tr>
<tr>
<td>All test are reported regardless of results. No unofficial EIA tests are performed to determine the status of the animals before the “official” test is performed. All EIA tests are official tests.</td>
<td></td>
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<tr>
<td>Official test results are reported to the State and/or Federal animal health officials within the time specified by these officials.</td>
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<tr>
<td>Specimens are held refrigerated or frozen for at least 2 weeks after results are reported and preferably for at least 30 days.</td>
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<tr>
<td>*Some States have specific forms which they require. Otherwise Form 10-11 is to be used.</td>
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</tbody>
</table>

### IV. EIA Antigen / Antiserum

*(Only applicable to approved laboratories)*

<table>
<thead>
<tr>
<th>Section Item</th>
<th>Yes</th>
<th>No</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only reagents licenses by the USDA or supplied by NVSL are being used</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unused portions are being refrigerated</td>
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</tbody>
</table>
### REPORT OF THE COMMITTEE

<table>
<thead>
<tr>
<th>Section</th>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unused portions of antigen and the inoculated EIA AGID or ELISA plates must be appropriately discarded.</strong></td>
<td></td>
<td></td>
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<tr>
<td><strong>V. Test</strong></td>
<td><strong>The procedure as outlined in the appropriate test protocol must be followed.</strong></td>
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<tr>
<td><strong>Immunodiffusion test plates with wells cut in the agar are used within 8 hours. Uncut plates for the EIA AGID test can be stored for up to 1 week.</strong></td>
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<tr>
<td><strong>ELISA or AGID test plates should be examined to see if the protocol is being followed and the results are readable.</strong></td>
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<tr>
<td><strong>VI. Building</strong></td>
<td>The building is in good repair and provides a neat appearance inside and outside</td>
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<tr>
<td></td>
<td>Adequate doors, windows and screens are provided and in good repair</td>
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<tr>
<td></td>
<td>The laboratory is separated from the office, storeroom, and unused areas by partitions with doors</td>
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<td></td>
<td>Adequate lighting—100 foot-candles over the benches is recommended.</td>
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<td></td>
<td>Restrooms available—clean and in good repair.</td>
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<tr>
<td><strong>VII. Cleanliness</strong></td>
<td>Free from rodents, insects or other pests.</td>
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<tr>
<td></td>
<td>All refuse is placed in proper containers and removed daily</td>
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<tr>
<td></td>
<td>Clean laboratory clothes (coats) are provided and being worn</td>
<td></td>
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<tr>
<td></td>
<td>Only laboratory equipment and supplies within laboratories, i.e., NO animals, personal clothing, lawn tools, toys, eating utensils, household goods, etc.</td>
<td></td>
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<tr>
<td></td>
<td>All floors, benches, equipment, etc. are clean.</td>
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</tbody>
</table>

**ADDITIONAL REMARKS**

Laboratory is Satisfactory / Unsatisfactory (circle one).

________________________________________  ________________________
Inspector Signature           DATE
________________________________________
Print Name
VS MEMORANDUM NO. 555.8

AGREEMENT TO CONDUCT EQUINE INFECTIOUS ANEMIA TESTING

I, ______________________________, agree to the following:

1. The person(s) responsible for conducting the tests shall have completed training in proper techniques. This training will be at the National Veterinary Services Laboratories (NVSL), Ames, Iowa; or a person(s) in State, Federal, and university laboratories who was trained at NVSL can train other people in their laboratory if training is approved by the Area Veterinarian in Charge and the State animal health official. All trained personnel will successfully complete an individual proficiency test prior to attempting an official test.

2. All testing shall be conducted in accordance with the official protocol for the test as provided by NVSL or as described in literature accompanying diagnostic test kits.

3. Annual laboratory proficiency tests will be completed satisfactorily and in a timely manner.

4. Samples shall not be accepted unless they are submitted by an accredited veterinarian, military veterinarian on active duty, or animal health official and are appropriately identified.

5. All results of tests conducted shall be appropriately signed and promptly reported to the State and/or Federal animal health officials in the State where the laboratory is located and in the State in which animals were sampled.

6. Only diagnostic test kits that have been approved by the USDA will be used for official tests.

It is understood that if the person(s) trained to conduct the tests is (are) no longer available to conduct or supervise the tests, the laboratory will lose its approval.

Signature: ____________________________________________

Laboratory Director

Laboratory: ____________________________________________

Address: ____________________________________________

Telephone Number: ____________________________________ Date: ______________________

RESOLUTION NUMBER: 8

SOURCE: COMMITTEE ON INFECTIOUS DISEASES
REPORT OF THE COMMITTEE

OF HORSES

SUBJECT MATTER: EQUINE INFECTIONOUS ANEMIA TESTING STANDARDS

BACKGROUND INFORMATION:
Equine Infectious Anemia is an infectious disease of horses that impacts the equine industry. The Committee on Infectious Diseases of Horses recognizes that improved testing standards for both private and institutional laboratories should be implemented to enhance current Equine Infectious Anemia prevention and control programs.

RESOLUTION:
United States Animal Health Association (USHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), review and consider adopting the attached Equine Infectious Anemia Testing Standards through the proposed rule process.

Attachment: Equine Infectious Anemia Testing Standards

DRAFT!! DRAFT!!

EIA Testing Standards

Background: The effectiveness of control programs for equine infectious anemia (EIA) is predicated on the use of accurate and specific serologic tests for the detection of antibodies against EIAV antigens. The agar gel immunodiffusion (AGID or Coggins) test is the only serologic test for EIA that has been proven to correlate with virus presence; as such, it remains the gold-standard serologic test for diagnosis of EIA. The specificity of the AGID test is high. However, in routine testing of field samples the approved ELISA tests for EIA appear to be more sensitive than the AGID test, i.e., a lower number of false-negative samples are noted. This is perhaps most evident in results from periodic check test samples for proficiency where the majority of errors occur due to reporting weak positive AGID samples as negative.

As all ELISA test-positive samples must be confirmed by AGID, we believe that adoption of the following paradigm for testing could markedly improve the accuracy of results. First, the results would be more standardized and less subjective than if based on AGID testing alone. Second, it would provide a standard for development of reference and referral laboratories where further testing would clarify the status of horses whose initial serologic results are questionable. Third, it would help establish a sound basis for the creation of stronger state/regional/federal cooperation on EIA control programs.

Any laboratory testing for Equine Infectious Anemia (EIA) must be approved as per VS Memorandum 555.8 and will be termed an EIA ELISA Laboratory.

The primary test for all EIA testing is an USDA licensed EIA ELISA test, which is the only test run at all EIA ELISA laboratories.
EIA ELISA tests must be read on a spectrophotometer (ELISA plate reader).

A positive and negative control sample must be used on all ELISA test plate runs and on each

A printout with spectrophotometer readings of all tests is required and must be kept on file, with a copy of corresponding EIA test charts, at the EIA ELISA Laboratory for at least three years, available for regulatory scrutiny.

Certified personnel conducting EIA ELISA tests must successfully complete individual proficiency tests annually. If 100% proficiency is not achieved in the time permitted by NVSL, one retest within an additional thirty days, is allowed. Failure of the retest will result in the withdrawal of certification and approval of the individual to perform the EIA ELISA test.

EIA ELISA Laboratories and ELISA test printouts will be inspected annually by state and/or federal animal health officials.

When AGID testing is required for special circumstances (export testing, international movement with specific AGID requirement, etc.) EIA ELISA Laboratories must forward samples to an EIA Reference Laboratory.

ELISA positive samples must be retested in duplicate immediately in the same EIA ELISA Laboratory. If confirmed positive, the sample shall be termed a “Confirmed Positive Sample”.

Confirmed Positive Sample test results must be immediately reported (within twenty-four hours) to the State Veterinarian and AVIC. A second blood sample, termed the “Regulatory Sample” may be collected by a state or federal animal health official or by a licensed, accredited veterinarian upon specific authorization from the State Veterinarian or AVIC.

Confirmed Positive Samples and Regulatory Samples must be forwarded to an “EIA Reference Laboratory”.

An EIA Reference Laboratory must be a state, federal, or university laboratory.

An EIA Reference Laboratory must stock all USDA licensed EIA ELISA test kits.

EIA Reference Laboratory personnel must be trained under NVSL authority as per Memorandum 555.8 in ELISA and AGID testing. Laboratory personnel must pass individual proficiency tests annually.

An EIA Reference Laboratory must commit to a turnaround time of no longer than forty-eight normal business hours after receipt of Confirmed Positive Samples and Regulatory Samples sent to them.

The EIA Reference Laboratory must test both the Confirmed Positive Sample and the Regulatory Sample with all USDA licensed EIA ELISA kits and an AGID test.

Criteria for determination of tests results at an EIA Reference Labora-
Positive results on all USDA licensed EIA ELISA tests and positive AGID = Positive.

Samples with any other combination of results will be forwarded to an EIA National Referral Laboratory and tested with all approved EIA tests.

EIA National Referral Laboratory is either National Veterinary Service Laboratory (NVSL) in Ames, IA or the Kentucky EIA Referral Laboratory at the Gluck Equine Research Center, University of Kentucky, Lexington, KY. EIA Referral Laboratories must commit to a turnaround time of no longer than seventy-two normal business hours after receipt of samples from EIA Reference Laboratories.

All costs associated with testing beyond the initial ELISA tests are to be borne by the national EIA Control Program.

RESOLUTION NUMBER: 9
NOT APPROVED
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF HORSES
SUBJECT MATTER: EQUINE INFECTIOUS ANEMIA: PROPOSED RECOMMENDATIONS BASED ON UNIFORM METHODS AND RULES AND VETERINARY SERVICES MEMORANDA 555.7 AND 555.8

BACKGROUND INFORMATION:

Equine Infectious Anemia is an infectious disease of horses that impacts the equine industry. The current Equine Infectious Anemia Uniform Methods and Rules and Veterinary Services Memoranda 555.7 and 555.8 are in need of revision to reflect contemporary methods of diagnosis, prevention and control for this disease.

RESOLUTION:

United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) initiate a dialogue with industry, state and/or regional representatives on the Equine Infectious Anemia Uniform Methods and Rules and VS Memoranda 555.7 and 555.8 in order to develop a cooperative program for the national control of Equine Infectious Anemia. In that regard, seven (7) recommendations included in the attached Equine Infectious Anemia Subcommittee Report are offered for review and potential inclusion in the Code of Federal Regulations 75.4 through the proposed rulemaking process.

Attachment: Equine Infectious Anemia Subcommittee Report

EIA Subcommittee Report
Equine Infectious Anemia Subcommittee Report
By Ernest W. Zirkle, DVM, Chairman

The Subcommittee on Equine Infectious Anemia (EIA) of the Infectious Diseases of Horses Committee offers the following recommendations to be presented to the parent committee at the annual meeting, Sunday, October 20, 2002.

The subcommittee recommends that USDA-APHIS-VS initiate a dialogue to develop a cooperative program with industry representatives, states and/or regions based on the most current information contained in the EIA UM&R and VS Memoranda # 555.7 and # 555.8, (as revised in this report) to include permanent identification of equids. This recommendation has seven major components:

(A) The subcommittee recommends that consideration of specific elements of the EIA UM&R regarding EIA testing requirements for interstate movement of horses be incorporated into the CFR, title 9, part 75. The CFR currently regulates the movement of EIA reactors only, and there is a need for a federal requirement to have a negative EIA testing status for horses moving interstate. Thus, the sections 2 through 5 and 7 through 10 would be added to part 75.4 as follows:

Part 75—Communicable diseases in horses, asses, ponies, mules, and zebras Equine Infectious Anemia (Swamp Fever) 75.4

1. Definitions
2. General restrictions
3. Certificates and permits for interstate movement of equids
4. Handling in transit of equids moved interstate
5. Restrictions on interstate movement of equids because of EIA
6. EIA reactor equids
7. EIA exposed equids
8. Other interstate movements
9. Testing procedures for EIA in equids
10. Official EIA tests
11. Approval of laboratories, and diagnostic or research facilities
12. Denial and withdrawal of approval of laboratories and diagnostic or research facilities

(Sections 1, 6, 11, and 12 are currently part of 75.4.)

(B) The subcommittee reviewed and updated Memorandum 555.8 strengthening interstate movement testing and laboratory standards as attached.

(C) The subcommittee agrees (there was one negative vote and one abstention) that the need for permanent and unique forms of identification of horses for EIA testing is obvious and inevitable. The subcommittee therefore recommends that permanent and unique forms of equine identification should include, but not be limited to, the following: (a) radio frequency implantable devices
(RFID), known also as “transponders” or “microchips”, (b) biometric applications of iris or facial anatomy, (c) alpha- angle freeze mark, and (d) lip tattoo of a breed registry. Each of these could be linked to a database or integrated circuitry (IC) card, known also as “smart card”.

(D) The subcommittee encourages states to develop quality assurance programs for its EIA laboratories in addition to the USDA proficiency testing. Where states believe more oversight is needed, they could supplement, not replace, existing protocols with additional blind samples or check tests and/or laboratory inspections.

(E) The subcommittee endorses USDA-APHIS-VS offering inspection guidelines and courses for inspection of laboratories for EIA testing. These courses will be offered on a fee-recovery basis. The subcommittee further encourages states to train their own inspectors based on guidelines written by USDA.

(F) With the cooperation of the industry, the subcommittee recommends information about the number of EIA kits sold to each lab be sent to the USDA-APHIS-VS Senior Staff Veterinarian for Equine Programs quarterly for the purpose of monitoring EIA laboratories. This protected information will be available only to the State Veterinarians and AVIC’s for their states only.

(G) The subcommittee endorses EIA testing standards (See attachment).

Respectfully submitted by Subcommittee members Steve Halstead, Bob Harbison, John Irby, Chuck Issel, Ralph Knowles, Maxwell Lea, Amy Mann, Bob Mead, Don Notter, Jim Sprague and Ernie Zirkle. Others who participated in the deliberations and were of great help and resource information contributors are Andrew Clark, Leroy Coffman, Tim Cordes, Jerome Freier, John Green, Burke Healey, Albert Kane, Lee Myers, Eileen Ostlund and Bev Schmitt.

RESOLUTION NUMBER: 10
SOURCE: COMMITTEE ON IMPORT/EXPORT
COMMITTEE ON BLUETONGUE AND RETROVIRUS
SUBJECT MATTER: BLUETONGUE NEGOTIATIONS
BACKGROUND INFORMATION:

Exports of live cattle to the European Union have ceased since 1980 due to bluetongue restrictions on United States cattle and the European Union has adopted regionalization policies that permit the importation of live cattle from countries not entirely free of the disease and/or virus (notably Canada). The scientific community recognizes that live cattle can be exported/imported from regionalized areas of infected countries when following recognized testing and quarantine procedures.
RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) actively continue negotiations with the European Union to open that market to breeders and exporters of cattle from the United States.

RESOLUTION NUMBER: 11
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: BOVIGAMÔ

BACKGROUND INFORMATION:
In 2000, the United States Animal Health Association (USAHA) passed a resolution recommending the conditional approval of the Bovigamô test for a period of two years as an ancillary/supplemental test for diagnosis of bovine tuberculosis. Data collected over the last two years was presented to the Tuberculosis Scientific Advisory Subcommittee by Biocor Animal Health, the manufacturers of the Bovigamô test kit. During the evaluation period, the Bovigamô test kit was licensed by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS). The Comparative Cervical Test and Bovigamô tests were compared in five outbreaks of bovine tuberculosis in the United States that included 121 cattle that were classified as infected based on isolation of Mycobacterium bovis and/or presence of tuberculous lesions with acid fast bacteria on histopathologic examination. The sensitivity of the Bovigamô test ranged from 85.7% to 100%, and the Comparative Cervical Test ranged from 84% to 100% if “suspects” were classified as positive.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) approve the use of the Bovigamô test as an ancillary/supplemental diagnostic test in herds that are known or suspected to have cattle infected with bovine tuberculosis (program herds). The test may be used in parallel with the Comparative Cervical Test or as a replacement for the Comparative Cervical Test at the discretion of designated tuberculosis epidemiologists with concurrence of USDA, APHIS, VS regional tuberculosis epidemiologist. In herds with tuberculosis that are not depopulated, the Bovigamô test may be used in parallel with the Caudal Fold Test for identification of cattle to be removed as part of test and cull programs to eliminate tuberculosis from the herd.

The Bovigamô test may also be used as an ancillary/supplemental test in herds at low risk for tuberculosis, such as those that are tested for movement or sale of cattle. The test may be used in parallel with the Comparative Cervical Test in cattle that respond to the Caudal Fold Test. At the
discretion of the designated tuberculosis epidemiologist and with approval from the area veterinarian-in-charge, regional tuberculosis epidemiologist, and state veterinarians office, the Bovigamä test may be used in place of the Comparative Cervical Test.

Blood samples for the Bovigamä test must be collected by state or federal regulatory personnel or specifically approved accredited veterinarians and the test conducted by laboratories approved by the USDA, APHIS, VS. Blood samples should be collected between three and thirty days after injection of Purified Protein Derivative for the Caudal Fold Test. Results of the test should primarily be interpreted by the method described by Ryan, et al and as used in the New Zealand tuberculosis control program. However, other methods for test interpretation may be used at the discretion of the designated tuberculosis epidemiologist with concurrence of the USDA, APHIS, VS regional tuberculosis epidemiologist.

RESOLUTION NUMBER: 12 NOT APPROVED
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: DAIRY HERD TESTING
BACKGROUND INFORMATION:

Bovine tuberculosis has recently been diagnosed in dairy herds in the states of Texas, California, and New Mexico. The United States Department of Agriculture (USDA) does not have adequate funds to depopulate and indemnify these herds without special requests to the Office of Management and Budget. This creates a situation where each infected dairy herd requires special and extreme measures. This resolution is intended to allow an organized approach to deal with program and financial issues involved with bovine tuberculosis in dairy herds.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Services (APHIS), Veterinary Services (VS) to implement a national dairy herd tuberculosis testing requirement that all dairy herds in the United States be tested for tuberculosis by January 1, 2006, and further request that herd testing be conducted every three years thereafter.

RESOLUTION NUMBER: 13
SOURCE: COMMITTEE ON TUBERCULOSIS
SUBJECT MATTER: STATE AND HERD STATUS FOR CERVID TUBERCULOSIS PROGRAM
DATES: St. Louis, Missouri, October 17-24, 2002
BACKGROUND INFORMATION:

The incidence of tuberculosis in cervidae has been very low in recent years and the interstate movement test requirements have not been amended to reflect state status.
RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) begin implementation of a national program with state and herd status based on the drafts presented at the 105th annual meeting of the USAHA at Hershey, PA.

RESOLUTION NUMBER: 14
SOURCE: COMMITTEE ON INFECTIOUS DISEASES OF CATTLE, BISON AND LAMA
COMMITTEE ON PUBLIC HEALTH AND RABIES
COMMITTEE ON FOREIGN AND EMERGING DISEASES
SUBJECT MATTER: NATIONAL ANIMAL HEALTH LABORATORY NETWORK

BACKGROUND INFORMATION:

Animal disease diagnosis and surveillance in the United States would function most effectively as a shared responsibility of publicly funded state animal health laboratories, represented by the American Association of Veterinary Laboratory Diagnosticians (AAVLD), and federal animal health laboratories administered through the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS).

This partnership is essential for safeguarding the health and well-being of our nation’s livestock and poultry, aquatic species, companion animals, wildlife, zoo animals and exotic species, as well as protecting the public health from diseases common to animals and humans.

A national strategy, melding the nation’s federal, state, and local resources, would be capable of responding to any type of animal health emergency, including bioterrorist events, newly emerging diseases, and foreign animal disease agents that threaten the nation’s food supply and public health.

Multiple reviews and analyses, including the Animal Health Safeguarding Review and the National Research Council Report on “Countering Agricultural Bioterrorism”, have strongly endorsed the importance of a national animal disease diagnostic network.

The USDA has recognized the importance of a national laboratory system through the funding and creation of a pilot National Animal Health Laboratory Network.

RESOLUTION:

The United States Animal Health Association (USAHA) requests the United States Congress to appropriate such funds as necessary, and as authorized through Section 335.a.6 of the Public Health Security and Biot-
errorism Preparedness and Response Act of 2002, to complete the National Animal Health Laboratory Network by involving all fifty states and the federal laboratories.

The USAHA also requests that such funds be distributed to the United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS), Veterinary Services (VS) for coordination of the network, and to the American Association of Veterinary Laboratory Diagnosticians (AAVLD) accredited diagnostic laboratories in each state, or in states without an AAVLD accredited laboratory, to the primary state-funded animal disease diagnostic laboratory in that state.

RESOLUTION NUMBER: 15
SOURCE: COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER: HORSE PROTECTION ACT
BACKGROUND INFORMATION:

“Soring” a horse is the intentional and deliberate infliction of pain and harm to the lower leg and foot in the interest of creating a characteristically exaggerated step or gait. The “soring” of horses is generally recognized as a cruel and inhumane practice. The United States Department of Agriculture (USDA) is responsible for enforcement of the Horse Protection Act.

RESOLUTION:

The United States Animal Health Association (USAHA) supports enforcement by the United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS), Animal Care (AC) of the Horse Protection Act, as intended by Congress, to prevent the cruel and inhumane practice of “soring” horses.

RESOLUTION NUMBER: 16
SOURCE: COMMITTEE ON ANIMAL WELFARE
SUBJECT MATTER: HORSE PROTECTION ACT
BACKGROUND INFORMATION:

“Soring” a horse is the intentional and deliberate infliction of pain and harm to the lower leg and foot in the interest of creating a characteristically exaggerated step or gait. The “soring” of horses is generally recognized as a cruel and inhumane practice. The United States Department of Agriculture (USDA) is responsible for enforcement of the Horse Protection Act.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS), Animal Care (AC) research information on technologies that can determine if a horse has been “sored.” This should include, but not be limited to, collaboration with organizations such as the American Veterinary Medical Association and the American Association of Equine Practitioners to evaluate the effectiveness of the use of technology
in the program as well as using research grants to evaluate new technology.

RESOLUTION NUMBER:  17    NOT APPROVED
SOURCE:  COMMITTEE ON FOOD SAFETY
SUBJECT MATTER:  BIOSECURE DISPOSAL OF ANIMAL BYPRODUCTS AND ANIMAL MORTALITIES

BACKGROUND INFORMATION:

Current trends in the disposal of raw animal byproducts (fat, trim, viscera, meat, bone, blood, feathers, etc.) and animal mortalities give rise to biosecurity issues and may threaten food safety. In a raw or unprocessed state, these animal tissues are likely to harbor various pathogenic organisms, including food pathogens. Rendering has historically been the principal means for disposing of these materials. Rendering companies are required (Code of Federal Regulations 589.2000) to maintain records suitable for governmental agencies to trace animal byproducts back to their source and finished products forward to their disposal or use. However, there are no federal regulations or standards for the disposal of raw animal byproducts and mortalities. Ruminant materials are regulated only when they are rendered. As a result, a significant and ever increasing percentage of these materials are inappropriately disposed of in landfills, low investment ‘compost piles’ and/or left unattended to decompose. This disposal situation may be further exacerbated by proposed additional regulations restricting the use of certain animal byproducts and mortalities in animal feed without also addressing their disposal. As greater amounts of raw animal byproducts and mortalities are inappropriately disposed of, disease vectors will have greater access to decomposing tissues, leading to the proliferation of foodborne and other illnesses. In order to protect the safety of food, animal health, human health and environmental health, it is important that all possible options available for the disposal of raw animal byproducts and mortalities be environmentally friendly, minimize human and animal exposure to biological and chemical hazards and meet the same standards for traceability, biosecurity and pathogen destruction.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) in cooperation with other federal/state agencies, organizations and industry representatives, establish a working group to address this disposal issue, to accomplish a study and evaluation, to determine:

The feasibility of requiring that all raw animal byproducts and mortalities be properly disposed of by licensed operators;

The feasibility of licensing standards for the disposal of animal byproducts and mortalities to assure adequate levels of traceability, biose-
curity and environmental protection;

The economic impacts upon all animal industry segments potentially impacted by such standards and requirements.

RESOLUTION NUMBER: 18
SOURCE: COMMITTEE ON PUBLIC HEALTH AND RABIES
SUBJECT MATTER: A NATIONAL PLAN FOR RABIES CONTROL IN WILDLIFE

BACKGROUND INFORMATION:

The epizootic of raccoon rabies continues to spread into uninfected areas of North America, except where oral raccoon vaccination programs have been implemented. The natural barriers that previously restricted the raccoon rabies variant to the Atlantic coast states have been compromised. This creates the potential for a large portion of the nation to be affected by raccoon rabies. The cost of living with raccoon rabies cannot accurately be determined, but is substantial according to numerous local, state, and federal studies. This epidemic has reached national proportions and control efforts require coordination at the national level.

Rabies vaccine, licensed for use in raccoons and coyotes by the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Services (APHIS), Veterinary Services (VS) is available for delivery to wildlife through bait distribution. The use of oral raccoon vaccination has been successful in the control of raccoon rabies in urban and rural environments, limiting the spread of raccoon rabies to uninfected areas, and dramatically controlling raccoons in coyotes in south Texas. Large-scale control efforts must still be developed and implemented over large areas of the epizootic front to prevent the spread of raccoons throughout the continent. The USDA, APHIS, WS, has provided substantial leadership, funding and program support to assist states with oral raccoon vaccination programs. The USDA, APHIS, WS has also facilitated numerous meetings involving federal, state and provincial agencies to address the potential for coordinated, regional raccoon control efforts, with the goal of developing a national raccoon control program that would complement raccoon control programs in Canada and Mexico. The National Working Group on Rabies Prevention in the United States, coordinated by the Centers for Disease Control and Prevention, has developed recommendations for enhancing raccoon control including wildlife vaccination.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Wildlife Services (WS) to continue to seek additional funding for terrestrial wildlife rabies control programs. The USAHA further encourages state and local governments and regional alliances to support
this activity through appropriate funding channels. The USAHA also strongly encourages the USDA, APHIS, WS, the United States Public Health Service (USPHS) and the Centers for Disease Control and Prevention (CDCP) to allocate appropriated funding and resources to assist states and local agencies in the development, maintenance and expansion of coordinated regional wildlife rabies control and vaccination programs.

RESOLUTION NUMBER: 19
SOURCE: COMMITTEE ON IMPORT/EXPORT
SUBJECT MATTER: TRADE WITH CANADA
BACKGROUND INFORMATION:

The movement of live cattle to Canada has been restricted for many years due to Canadian concerns regarding diseases such as Bluetongue and Anaplasmosis. The cattle industry in both Canada and the United States have been working to find ways to allow more trade with Canada while at the same time protecting the health status of the Canadian cattle herd. Increasing scientific evidence has indicated the risk of Bluetongue and Anaplasmosis spread and disease establishment in Canada through live cattle trade may not be as great as previously thought and the risk may be mitigated with simple, science based measures. It is important for the global future of free and fair trade, based on science, that issues between the United States and Canada be resolved as quickly as possible.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) place a high priority on reducing the impediments to live cattle export to Canada by working in close cooperation with States, representatives of the cattle industry, universities and USDA, Agricultural Research Service (ARS) scientists and Canadian Food Inspection Agency (CFIA) to ensure science-based, free and fair trade between the United States and Canada.

RESOLUTION NUMBER: 20
SOURCE: COMMITTEE ON IMPORT / EXPORT
SUBJECT MATTER: PRE-SHIPMENT NOTIFICATION OF IMPORTED LIVESTOCK AND WILDLIFE

BACKGROUND:

Numerous deficiencies to the present import notification system have been reported, where states receive international shipments of livestock without prior notice.

The current threat of introducing an exotic animal disease, including but not limited to Foot-and-Mouth Disease, into the United States is very real.

RESOLUTION:
The United States Animal Health Association (USAHA) requests that the Secretary of Agriculture take action to measurably improve the notification of states that receive shipments of livestock and wildlife that enter the United States from other countries.

RESOLUTION NUMBER: 21
SOURCE: COMMITTEE ON IMPORT / EXPORT
SUBJECT MATTER: RECOGNITION FOR RESEARCH AFFECTING LIVESTOCK MOVEMENTS

BACKGROUND:
Dr. Anthony E. Wrathall has dedicated much of his career to research involving the study of disease risks associated with the transfer of embryos and has been active in international organizations that promote the study of circumvention of disease transmission through embryo transfer. Dr. Wrathall has recently shown (Veterinary Record, 150:365-378, 2002) that if suitable sanitary protocols are applied, embryos from cattle affected with Bovine Spongiform Encephalopathy do not carry Bovine Spongiform Encephalopathy infectivity even if they are collected at the end-stage of the disease when the risk of maternal transmission is believed to be highest. His research over the years has lead to the exchange of superior genetics worldwide.

RESOLUTION:
The United States Animal Health Association (USAHA) extends its thanks to Dr. Anthony E. Wrathall for his work that promotes the international movement of animal genetics in a safe manner.

RESOLUTION NUMBER: 22
SOURCE: COMMITTEE ON BIOLOGICS AND BIOTECHNOLOGY
SUBJECT MATTER: ANIMAL AND PLANT HEALTH INSPECTION SERVICE POLICY ON REPLACING, REDUCING, AND DEFINING ANIMAL TESTING REQUIREMENTS FOR BIOLOGICAL PRODUCTS

BACKGROUND INFORMATION:
The United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS), Veterinary Services (VS), Center for Veterinary Biologics (CVB) has responsibility for ensuring the purity, safety, potency, and efficacy of all veterinary biological products shipped in or from the United States under the provisions of the Virus-Serum-Toxin Act of 1913, as amended in 1985.

Safety and potency testing for serial release of biological products has historically been conducted in laboratory and host animals. These tests often produce pain and suffering in the animals used for testing. The tests
also result in death of the animals either from the disease-producing organism itself, or by euthanasia after the test is complete. In this age of science and technology and humane concerns, there is an expectation that in vitro assays can be more effectively utilized to accurately determine the potency and safety of veterinary biologics, as well as to reduce animal usage. Center for Veterinary Biologics has been responsive by announcing a policy to replace, reduce and refine animal testing requirements. However, recently published guidelines such as Veterinary Services Memorandum 800.90, "Guidelines for Veterinary Biological Relative Potency Assays and Reference Preparations Based on Enzyme Linked Immunosorbent Assay Antigen Quantification", dated August 5, 1998, and Veterinary Services Memorandum 800.102, "Exemption from Leptospira Bacterin Testing Under 9 Code of Federal Regulations 113.101(c), 113.102(c), 113.103(c) and 113.104(c)", dated May 23, 2002, dramatically increase animal usage and/or substitute one species for another. These appear to contradict the Center for Veterinary Biologics' stated policy.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to encourage the Center for Veterinary Biologics (CVB) to accelerate the implementation of the CVB stated policy to replace, reduce and refine the use of animals in all tests associated with safety and potency of veterinary biologics by actively reviewing and amending all current 9 Code of Federal Regulations, memorandums, and SAMs, to ensure they reflect CVB policy of decreased animal usage.

RESOLUTION NUMBER: 23
SOURCE: COMMITTEE ON PARASITIC DISEASES
SUBJECT MATTER: PREVENTING EXOTIC TICKS AND HEMOPARASITIC DISEASE ESTABLISHMENT IN THE USA

BACKGROUND INFORMATION:

There is an increased risk of the introduction and establishment of exotic animal pests and diseases as a result of the changing dynamics of animal movements and transmission of hemoparasitic diseases. A particular focus on the risks associated with the Mexican and Caribbean Region is required.

Actions to prevent the establishment of exotic ticks that infest livestock and other animals, including wildlife, in the United States of America are a continuous task. Such actions require vigilance, diligence and singleness of focus from scientific, animal (domestic and wild) and regulatory communities.

It is important that these communities join in a common effort and thrust
aimed at effectively preventing the establishment of exotic ticks and hemoparasitic diseases in animals in the United States of America.

RESOLUTION:

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to enter into a joint effort with state animal health officials, animal industries and wildlife interests to define and support a core organization/commission to facilitate the acquisition and allocation of continual funding for preventing the establishment of exotic animal pests and hemoparasitic diseases in the United States of America. The USAHA strongly urges the formation of a “Joint Commission to Combat Ticks and Hemoparasitic Diseases in the United States of America”. There exists a core organization of State Departments of Agriculture known as NFACT (New Mexico, Florida, Arizona, California, Texas) that could serve as the predecessor of the needed commission.

RESOLUTION NUMBER: 24
SOURCE: COMMITTEE ON PARASITIC DISEASES
SUBJECT MATTER: RESTRICTIONS ON THE IMPORTATION OF CATTLE TO CANADA DUE TO ANAPLASMOSIS

BACKGROUND INFORMATION:

Canada is considered free of anaplasmosis in cattle while the disease is endemic in certain areas of the United States. Feeder cattle can be imported into Canada from October 1 to March 31 under provisions that mitigate the risk of both bluetongue and anaplasmosis and the United States Animal Health Association supports the current program. The Canadian Cattlemen’s Association has proposed that the Restricted Feeder Program be modified to allow cattle from low risk states to enter Canada year round under a pilot project.

RESOLUTION:

Based on current scientific knowledge of anaplasmosis, the United States Animal Health Association (USAHA) believes the mitigation measures included in the proposed “Pilot Project for Importing Terminal Feeder Cattle From the United States, April 1 – September 30” are more than adequate to prevent the introduction of anaplasmosis into Canada and that mitigation measures would remain adequate without a requirement for tetracycline treatment. The USAHA urges the United States Department of Agriculture (USDA), Agriculture Research Service (ARS) to identify and fund research on anaplasmosis that will provide additional scientific data to support the elimination of unnecessary restrictions for movement of United States cattle into Canada.

RESOLUTION NUMBER: 25
SOURCE: COMMITTEE ON FOREIGN AND
EMERGING DISEASES

SUBJECT MATTER: THE PLUM ISLAND ANIMAL DISEASE CENTER ADMINISTRATION

BACKGROUND INFORMATION:

There is a need to maintain and enhance a strong collaboration and coordination in relation to the diagnosis, research and education on foreign and emerging animal diseases between the publicly funded state and university animal health laboratories, represented by the American Association of Veterinary Laboratory Diagnosticians (AAVLD) and the federal animal health laboratories administered through the United States Department of Agriculture (USDA), Agricultural Research Service (ARS), and Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS).

The Plum Island Animal Disease Center (PIADC), currently under a joint administrative leadership between ARS and APHIS, VS, has provided services to our nation for nearly half a century in diagnosis, research, and training on foreign and emerging animal diseases.

The USDA has recently created a pilot National Animal Health Laboratory Network (NAHLN) of publicly funded state and university animal health laboratories in which the scientific support of the PIADC is central and fundamental to its success.

The United States Animal Health Association (USAHA) is supportive of the President’s proposal to enhance the protection of our nation’s animal and public health through the creation of a Department of Homeland Security (DHS).

The House of Representatives has passed the bill H.R. 5005 known as the “Homeland Security Act of 2002” in which it is stated that (Sec. 308.a) “the Secretary of Agriculture shall transfer to the Secretary of Homeland Security the Plum Island Animal Disease Center of the Department of Agriculture, including the assets and liabilities of the Center” (meaning the transfer of facilities and equipment but not personnel); with the provision that (Sec 308.b) “Upon the transfer of the Plum Island Animal Disease Center, the Secretary of Homeland Security and the Secretary of Agriculture shall enter into an agreement to ensure Department of Agriculture access to the center for research, diagnostic, and other activities of the Department of Agriculture.”

The above language in H.R. 5005 does not provide the necessary assurances that the activities at the PIADC will continue to be focused on the research, diagnosis and surveillance for foreign and emerging animal diseases vital for the health and productivity of our nation’s animal population.

The Department of Health and Human Services (DHHS) laboratories, namely the Centers for Disease Control and Prevention (CDCP) and the National Institutes of Health (NIH), will not be transferred to the proposed DHS, but instead there will be agreements that the DHS will support the activities of the CDCP and the NIH in regard to public health threats through
additional funding, buildings and personnel.

The Senate is still debating the details of the transfer of many federal units to the proposed new DHS, including PIADC.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Senate support keeping Plum Island Animal Disease Center (PIADC) under United States Department of Agriculture (USDA) administration and that the Congress in general reconsider the transfer of PIADC to the Department of Homeland Security (DHS) to ensure that its multifaceted functions which protect our nation against foreign and emerging animal diseases will continue to be coordinated with the newly created National Animal Health Laboratory Network and other related State and Federal activities.

The USAHA requests that the proposed DHS view and treat the PIADC and other USDA laboratories involved in the surveillance, diagnosis, and response to any domestic, foreign or emerging animal diseases in a manner similar to the way that the Centers for Disease Control and Prevention (CDCP) and National Institutes of Health (NIH) will be treated in their relation to the proposed DHS.

RESOLUTION NUMBER: 26
SOURCE: FOREIGN AND EMERGING ANIMAL DISEASE COMMITTEE
SUBJECT MATTER: USDA SUPPORT FOR ACCELERATED DEVELOPMENT OF RAPID TESTING FOR FOREIGN ANIMAL DISEASES

BACKGROUND INFORMATION:

The intentional or unintentional introduction of a foreign animal disease into the United States would severely impact its animal health and productivity and cause substantial and prolonged economic losses to the livestock industries, with significant economic ramifications felt throughout the national economy.

As described in several national reports by the National Academy of Science, the Royal Society, and the General Accounting Office, prevention of catastrophic losses associated with a foreign animal disease incursion will require very early detection by surveillance systems employing validated, rapid diagnostic testing. Recommendations offered for safeguarding the livestock population include the accelerated development of rapid diagnostic tests and assays.

Nationwide, there is a remarkable depth and breadth of non-United States Department of Agriculture research expertise and resources available to accelerate development of rapid diagnostic testing. Such expertise and resources exist at universities, diagnostic laboratories, and other federal laboratories. The national interests in defending against foreign animal
diseases would be well served by formal involvement of the expertise and resources of these laboratories in efforts to accelerate development of rapid diagnostic testing.

RESOLUTION:

The United States Animal Health Association (USAHA) strongly urges the United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS), Veterinary Services (VS), and the Agriculture Research Service (ARS) and to support funding during the coming year and beyond for cooperative and collaborative efforts with university, diagnostic, and other research laboratories and units aimed at accelerated development of rapid testing methods for use in foreign animal disease surveillance and diagnostic investigations.

RESOLUTION NUMBER: 27
SOURCE: COMMITTEE ON LIVESTOCK IDENTIFICATION
SUBJECT MATTER: ESTABLISHMENT OF A JOINT FEDERAL AND STATE GOVERNMENT, UNITED STATES ANIMAL HEALTH ASSOCIATION AND INDUSTRY ANIMAL IDENTIFICATION DEVELOPMENT TEAM

BACKGROUND:

For many years, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) has met with state animal health officials and representatives of the livestock sector to discuss the need to improve animal disease surveillance, monitoring, control and eradication efforts and the increasing need to more efficiently identify and trace animals for these purposes. The National Institute for Animal Agriculture (NIAA) coordinated a broad based task force that developed a “National Identification Work Plan.” The NIAA task force work will be completed in December 2002. Industry groups are ready to work more closely with the USDA, APHIS, VS and state animal health officials to refine the animal identification systems necessary to maintain animal disease monitoring, surveillance, control and eradication in the United States.

RESOLUTION:

The United States Animal Health Association (USAHA) accepts the National Identification Work Plan report as a guide to establishing a national animal identification program and system. The USAHA requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) establish, by January 2003, a joint federal and state government and industry animal identification development team that will use the National Identification Work Plan as a guide to develop a national animal identification program and system.
that will enhance animal disease monitoring, surveillance, control and eradication in the United States.

A draft plan should be presented for review to industry and other groups by June 2003 and for review at the USAHA annual meeting in San Diego, California in October 2003.

RESOLUTION NUMBER: 28
SOURCE: COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY
SUBJECT MATTER: AVIAN INFLUENZA VACCINES

BACKGROUND INFORMATION:

Biosecurity is the first line of defense against all Avian Influenza viruses. Preventing the introduction of Avian Influenza by eliminating all contact between commercial poultry and wild birds, swine farms, and live poultry markets is a common, routine and successful practice. However, occasionally Avian Influenza gets introduced into a commercial poultry population. Under conditions of high poultry density or multiple poultry enterprises in one area, biosecurity alone is not likely to be a successful control strategy. A successful strategy requires reducing the susceptibility and the density of the poultry population.

Vaccination is the second line of defense against Avian Influenza. As controlled marketing and rescheduling reduce the bird density in an area, controlled immunization with an inactivated vaccine can reduce the susceptibility of the population.

It is well accepted that vaccination of poultry with non-H5 or non-H7 killed influenza vaccine is an effective tool in the prevention and control of Low Pathogenic Avian Influenza.

Concerns about the availability and use of inactivated Avian Influenza vaccines:

The primary concern about the use of H5 or H7 Avian Influenza vaccine is the potential impact on our export markets. Countries may interpret or choose to interpret such use to mean that the United States has uncontrolled Avian Influenza circulating in the industry. Dr. Charles Beard has suggested that vaccination as part of an eradication effort could be justified when that plan incorporated controlled marketing of vaccinated and convalescent flocks before a quarantine was released. Vaccination with inactivated Avian Influenza vaccine may be justified when the poultry industry is trying to eradicate the infection and is isolating vaccinated and convalescent flocks until they are marketed.

There are certain benefits from using Avian Influenza vaccine: a) the vaccine does not spread the disease, b) reduced disease means reduced economic loss, c) reduced virus shed and transmission mean less spread of the disease, and d) vaccinated birds can be detected serologically.

The scientific concerns about Avian Influenza vaccine use have been
adequately addressed: a) because birds have to be individually injected there is increased risk of the vaccine crews spreading disease, b) reduced clinical signs and interference on the Agar Gel Immunodiffusion test may make the disease harder to detect and c) virus shed and transmission may not be completely stopped.

The disadvantage of available influenza vaccines is the political risk of losing export markets.

In spite of political concerns, inactivated Avian Influenza vaccines have contributed successfully to preventing morbidity, mortality and egg production loss, reducing economic loss and controlling the spread of disease.

Avian Influenza vaccine is not a replacement for biosecurity, is only a short-term measure as an adjunct for control of Avian Influenza and should be used only for a short time.

RESOLUTION:

The United States Animal Health Association (USAHA) strongly encourages the United States Department of Agriculture (USDA), Animal and Plant Inspection Service (APHIS), Veterinary Services (VS) to actively communicate to trading partners that vaccine use for Low Pathogenic Avian Influenza (including H5 and H7) is appropriate and that it may be used to control an outbreak.

Vaccination against Medium Pathogenic Avian Influenza, including H5 and H7, should be available as part of a science-based influenza control strategy that includes:

- Enhanced biosecurity
- An eradication plan
- Controlled vaccination for flocks deemed to be at risk
- Suitable monitoring of all flocks at risk and of all vaccinated flocks
- A repopulation plan

The USAHA urges the USDA, APHIS, VS and industry to arrange to bank enough antigen to quickly produce ten million doses of vaccine for both H5 and H7 when needed. In addition the USDA, APHIS, VS is encouraged to facilitate a way to more rapidly produce vaccine.

The USAHA encourages the USDA, APHIS, VS and Agriculture Research Service (ARS) to fund Avian Influenza vaccine research. Included in this research are the needs to evaluate vaccination of birds going into the live poultry markets, to develop tests for differentiating infected from vaccinated animals vaccines and to evaluate potency of vaccines based on hemoagglutination activity (HA).

The USAHA encourages the USDA, APHIS, VS to fund the National Veterinary Services Laboratory (NVSL) for the increased need for Avian Influenza testing, reagents and new tests for differentiating infected from vaccinated animals vaccines.

RESOLUTION NUMBER: 29
The Code of Federal Regulations does not currently require the identification of low risk commercial goats. The Scrapie Working Group recommended in June 2002 that identification be required on all goats. Scrapie has been identified in at least one goat not known to have been associated with sheep. The goat industry does not accept that United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) has adequate data to accurately assess the prevalence of Scrapie in the United States goat population.

The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to determine the prevalence of Scrapie in the United States goat population before finalizing regulations pertaining to identification of low risk commercial goats.

A significant number of sheep in the United States have been identified as Immunohistochemistry positive on tonsil and retropharyngeal lymph nodes and Immunohistochemistry negative on obex. This makes it important that Immunohistochemistry testing on tonsil and lymph nodes be evaluated for approval as an official test.

In addition to the third eyelid, the manibular lymph node and tonsil are accessible in the live animal.

The United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) and Agriculture Research Service (ARS) to evaluate lymphoid tissues for approval as official tests in live and dead animals and to document the relative sensitivity of Immunohistochemistry on each tissue.
NOMINATIONS AND RESOLUTIONS

SUBJECT MATTER: SCRAPIE

BACKGROUND INFORMATION:
At the present time scrapie has not been identified in many goat flocks. However, as more goats are co-mingled with sheep due to the increased interest in goat meat production and their grazing benefits, it is important that genetic resistance be studied in larger numbers of goats. This is important because under current regulation, goats that happen to be in a scrapie infected flock are required to be removed or quarantined with offspring allowed to be marketed by slaughter. There is no approved live animal test for goats.
RESOLUTION:
The United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Agriculture Research Service (ARS) to conduct research to determine if genetic resistance occurs in goats and to develop a live animal test for goats.
RESOLUTION NUMBER: 32
SOURCE: COMMITTEE ON SHEEP AND GOATS

SUBJECT MATTER: SCRAPIE

BACKGROUND INFORMATION:
Scrapie is known to exist in most sheep producing regions of the world. Research has demonstrated that several strains of scrapie have been found to exist in the sheep population of the United Kingdom using a mouse bioassay system. This methodology usually takes a minimum of two years to complete the classification. There has been recent research on using Western Blot glycoform patterns as well as transgenic mice in an attempt to shorten the process of typing scrapie strains. To date, adequate studies have not been conducted to define and determine how many scrapie strains exist in the United States.
RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Agriculture Research Service (ARS) to conduct the appropriate studies to determine how many and what type of strains of scrapie exist in the United States. The USAHA also urges that studies be conducted using samples from scrapie positive sheep acquired through cooperation with USDA, Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS).
RESOLUTION NUMBER: 33
SOURCE: SHEEP AND GOAT COMMITTEE
REPORT OF THE COMMITTEE

SUBJECT MATTER: ECONOMIC ANALYSIS
BACKGROUND INFORMATION:
Diseases and the control, treatment and prevention of them are costly to producers and the public. Many disease issues, even those with low prevalence, can have serious economic consequences because of adverse public perception. Measuring and projecting economic impact helps build perspective as industry and policy-makers are considering and/or executing regulatory actions. A recently completed National Animal Health Monitoring System study and other Center for Epidemiology and Animal Health projects contain valuable and current information on the prevalence and other information on Johne’s Disease, Ovine Progressive Pneumonia and Scrapie in sheep.
RESOLUTION:
The United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Center for Epidemiology and Animal Health (CEAH) to investigate and report on the economic impact in the United States of Johne’s Disease, Ovine Progressive Pneumonia and Scrapie in sheep.

RESOLUTION NUMBER: 34
SOURCE: COMMITTEE SHEEP AND GOAT
SUBJECT MATTER: JOHNE’S DISEASE IN SHEEP
BACKGROUND INFORMATION:
The National Animal Health Monitoring System 2000 sheep study has documented that Johne’s Disease infection exists in the United States sheep population.
RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Agriculture Research Service (ARS), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to develop effective live-animal tests to detect Johne’s disease in sheep in order to control the infection.

RESOLUTION NUMBER: 35
SOURCE: COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: BOVINE TUBERCULOSIS IN MICHIGAN
BACKGROUND INFORMATION:
The state of Michigan has a comprehensive plan to eradicate bovine tuberculosis from livestock and wildlife, and efforts by all involved agencies and other interests in Michigan have been exemplary to date. However, bovine tuberculosis continues to pose an immediate threat to the health of susceptible livestock and wildlife.
RESOLUTION:
The United States Animal Health Association (USAHA) urges the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS), Wildlife Services (WS), Agriculture Research Service (ARS), Michigan Department of Agriculture (MDA), Michigan Department Natural Resources (MDNR) to continue to take all necessary and immediate actions to further reduce the prevalence of bovine tuberculosis in free-ranging cervidae and livestock, and show progressive steps by following the timeline as set forth in the Michigan state plan.

RESOLUTION NUMBER: 36 NOT APPROVED
SOURCE: COMMITTEE ON FEED SAFETY
SUBJECT MATTER: BIOSECURE DISPOSAL OF ANIMAL BYPRODUCTS AND ANIMAL MORTALITIES

BACKGROUND INFORMATION:
Current trends in the disposal of raw animal byproducts (fat, trim, viscera, meat, bone, blood, feathers, etc.) and animal mortalities give rise to biosecurity issues and may threaten food safety. As a result, the potential exists for an increasing percentage of these materials to be disposed of inappropriately. This disposal situation may be further exacerbated by proposed additional regulations restricting the use of certain animal byproducts and mortalities in animal feed without also addressing their disposal. As greater amounts of raw animal byproducts and mortalities are inappropriately disposed of, disease vectors will have greater access to decomposing tissues, leading to the proliferation of foodborne and other illnesses. In order to protect safety of food, animal health, human health and environmental health, it is important that all possible options available for the disposal of raw animal byproducts and mortalities be environmentally friendly, minimize human and animal exposure to biological and chemical hazards and meet the same standards for traceability, biosecurity and pathogen destruction.

RESOLUTION:
The United States Animal Health Association (USAHA) requests the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) in cooperation with other federal/state agencies, organizations and industry representatives, establish a working group to address this disposal issue and to accomplish a study and evaluation to determine:

- The feasibility of developing standards for the disposal of animal byproducts and mortalities to assure adequate levels of traceability, biosecurity and environmental protection;
- The economic impacts upon all animal industry segments potentially impacted by such standards and requirements.
REPORT OF THE COMMITTEE

RESOLUTION NUMBER: 37
SOURCE: COMMITTEE ON JOHNE’S DISEASE
SUBJECT MATTER: REPORT OF THE AD HOC STEERING SUBCOMMITTEE AND RECOMMENDATIONS FOR BUDGET PRIORITIES

BACKGROUND INFORMATION:

The United States Animal Health Association (USAHA) approved resolution number 18 during its 105th annual meeting in Hershey, Pennsylvania, November 1-8, 2001. This resolution directed the President of USAHA to request that the Chairman of the Committee on Johne’s Disease appoint an Ad Hoc Steering Subcommittee. This subcommittee was established and the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) hosted a meeting of this subcommittee in Riverdale, MD September 17 - 19, 2002. The subcommittee was directed by the resolution to recommend priorities that will promote continued progress toward achieving implementation of a comprehensive voluntary national Johne’s Disease control program. The subcommittee presented their report to the Committee on Johne’s Disease at the 2002 annual committee meeting. Several amendments to the report were approved during the committee meeting. The amended recommendations of the subcommittee report are contained within the attached document.

To assist the USDA, APHIS, VS with prioritizing spending for a national voluntary Johne’s Disease control program the committee has attached a suggested spending plan to the report of the subcommittee.

RESOLUTION:

That United States Animal Health Association (USAHA) approve and endorses the amended recommendations of the Ad Hoc Steering Subcommittee and the accompanying suggested spending plan.

Suggested Spending Plan for the Voluntary Bovine Johne’s Disease Control Program

Assumptions

$20 million appropriation for federal fiscal year 2003
17% overhead ($3.4 million)
$16.6 million to be divided as follows:
$7 million for USDA:APHIS:VS
$9.6 million for state programs
USDA:APHIS:VS ($7.0 million)
$2 million for field studies to be organized by the National Johne’s Coordinator
$3 million for staff
$1 million for NVSL
$500,000 for the Center for Epidemiology and Animal Health
$150,000 to adapt the Generic Database for Johne’s Disease
$350,000 for staff to do:
   - Experimental design
   - Data analysis
$500,000 for education and training
State Programs ($9.6 million)
Each state agrees to provide data via the Generic Database requested by the national Johne’s Coordinator.
Federal funds will be used to assist states in meeting the objectives included in the accompanying report.

Base states
- All states receive $60,000.
- Intermediate states
  - These states receive an additional $90,000.
  - These states must have a Johne’s Disease Advisory Committee, a Designated Johne’s Epidemiologist, and have implemented the Program Standards for the Voluntary Bovine Johne’s Disease Control Program, including the herd status program.

Advanced states
- A multiplier will be calculated based on total number of ELISA tests ($6), fecal cultures ($25) and herd risk assessments with herd management plans ($250 –$350). States will be ranked based on the total spent and the remaining funds will be distributed to these states based on that ranking.

**Goal I:** Implement a comprehensive educational and training program
- Objective: Develop a high quality collection of materials for educating cattle producers, herd veterinarians, animal health officials, and associated industry.
  - Recommendation: The NJWG should complete development of an educational CD-Rom and assure adequate distribution. That USAHA endorse the content of the Johne’s CD-ROM and following review and approval by an Ad Hoc subcommittee appointed by the chair of the Johne’s disease committee, that the USAHA office in Richmond provide the Johne’s CD-ROM for sale.
  - Objective: State programs should be structured to encourage producers to buy animals from low risk and test negative herds to develop a market driven program.
  - Recommendation: The NJWG should recommend methods to accomplish this goal.

**Goal II:** Define critical knowledge gaps that influence producer participation and affect Johne’s disease control, prioritize efforts to fill those gaps and secure adequate funding.
- Objective: NJWG should identify critical knowledge gaps.
Recommendation: An annual meeting of scientists from ARS, APHIS, CEAH, CSREES, states and Universities concerned with Johne’s disease should be facilitated and funded by USDA to coordinate efforts to fill those knowledge gaps.

Objective: Foster more collaboration between APHIS, ARS, Universities and CSREES about Johne’s disease investigations

Objective: Develop optimal Johne’s disease test strategies

Recommendation: The USDA should contract with a team of experts to describe the optimal testing system for initial differentiation of presumptively infected and non-infected herds.

Recommendation: The USDA should contract with a team of experts to review and update guidelines for testing strategies to complement management for control of Johne’s disease in infected herds.

Objective: Develop and validate model strategies for control of Johne’s disease

Recommendation: Demonstration farms, clinical field trials, and applied studies are critical and of the highest priority to provide the validated management tools to implement a science-based National Johne’s Disease Program. Specific areas to be evaluated should include, but not be limited to:

Effectiveness of herd management plans, best management strategies without testing in the control of JD
Testing strategies used in control
Aggressive test and cull strategies
Effectiveness of test strategies to eliminate JD from (low prevalence) beef herds
Vaccine use
Risks associated with consumption of colostrum and milk by young calves
Risks associated with fecal contamination of the environment, including feed and water
Age-related differences in transmission
Transmission via natural service (bulls)
Relative importance of in-utero transmission
Risks and best management practices in heifer rearing operations where animals from different status herds are commingled.

Recommendation: The Johne’s Disease Committee should convene a panel of experts to develop guidelines for use of vaccination as a tool for use in control of JD in heavily infected cattle herds.

Goal III: Strengthen a standardized national database to permit measurement of participation and progress in the VBJDHP

Objective: Utilize a national database for Johne’s disease including the following specific measures and assuring that all herd owner identity information remains confidential, unless the owner signs a release to re-
veal the VJDHSP level.

Number of herds tested
Number of cattle tested
Number of herds participating in the Voluntary Bovine Johne’s Disease Control Program and other data to reflect national status of the program as requested by the National Johne’s disease coordinator’s office. The requested data by each state is required to receive APHIS-VS funds for Johne’s disease programs.

Recommendation: The USDA should provide an annual report to the USAHA Johne’s Disease Committee that provides this information.

**Goal IV:** Increase and enhance state implementation of the VBJDCP

Objective: To encourage uniformity of state programs through close coordination of state veterinarians, state Johne’s disease advisory committees, USDA AND USAHA

Recommendation: A task force with USDA coordination should develop standardized national risk assessment forms for dairy and beef cattle to be used as a minimum standard under the Voluntary Bovine Johne’s Disease Control Program. This task force should also develop a recommended training structure for veterinarians performing risk assessments.

Recommendation: Each state should do risk assessments and develop herd management plans in the context of herd biosecurity and animal and public health risks.

Recommendation: The USDA should develop a standardized agreement form between the herd owner and State that would accompany the herd management plan.

Recommendation: In order for cattle herds to receive Federal funds, it is mandatory that herds participating in the herd management phase of the Voluntary Bovine Johne’s Disease Control Program have a risk assessment completed with a current and approved herd management plan in place.

Recommendation: USDA and USAHA should encourage harmonization of control requirements to facilitate interstate cattle movements.

Recommendation: USDA should amend the Code of Federal Regulations so that it is consistent with the program standards for the VBJDCP.

Objective: Develop and expand infrastructure to increase VBJDCP participation and implementation

Recommendation: The USDA should provide resources to increase the number of trained personnel available for risk assessment and herd plan development.

Recommendation: The USDA should provide, where requested, increased field support for State Johne’s disease programs. This could include providing field personnel to assist states, epidemiology support, training, information management/standards/sharing (GDB), education, or web access.
Recommendation: The USAHA and the USDA, working together, should formulate a strategy to increase and fund the nation’s diagnostic capability for Johne’s Disease. This could be done by developing regional diagnostic centers through state partnerships in areas where needed.

Recommendation: The USAHA Johne’s Disease Committee should develop a plan through which the USDA would provide check testing and quality control monitoring for serology and organism detection on a continuing basis as part of the requirement for being an approved laboratory.

Recommendation: USAHA, USDA, and Homeland Security should create a committee, that includes beef and dairy industry representatives along with university representatives, to develop an integrated risk assessment and best management practices model to protect animal agriculture. The USDA should shift from an individual disease focus to an integrated approach that addresses the biosecurity risks of animal agriculture. Also, to be addressed in the model are animal welfare, animal health, food safety and quality, potential zoonotic pathogens, environmental issues, and economic losses derived from failure to implement best management practices that keep animal farms biosecure and profitable.

Recommendation: The USDA should fund field studies and data gathering efforts to:

- Document economic and non-economic benefits and factors that affect participation in the VBJDCP
- Compare Johne’s Disease data from NAHMS 2002 with the previous NAHMS dairy cattle study
- Analyze cattle health and quality assurance programs and herd status programs as models to increase participation.
- Determine whether listing Johne’s disease as a reportable disease is an impediment to participation; and whether listing negative status enhances participation.

Recommendation: States should use Federal funds to provide financial incentives to producers to encourage their participation in the Voluntary Bovine Johne’s Disease Control Program.

Recommendation: The USDA should develop a guidance document for the states to assist them in enacting rules/legislation designed to ensure producer confidentiality with regards to Johne’s Disease and other producer-related issues.

Recommendation: The USDA should revise the Uniform Program Standards for the Voluntary Bovine Johne’s Disease Control Program regarding participation in the VJDHSP and off-site heifer rearing (the current rule regarding off-site heifer rearing discourages participation in the status programs).

Recommendation: The USAHA Johne’s Disease Committee should encourage affected industries to promote producer participation in the Voluntary Bovine Johne’s Disease Control Program.
Objective: Minimize spread of infection between herds
Recommendation: The USDA should require permanent identification of cattle that test positive by an organism detection test before they leave the farm and require that they move only into slaughter channels. Producers should be compensated $50 for each animal so identified.

**Goal V:** Improve budget planning and resource allocation to ensure effective voluntary state Johne’s disease programs

Objective: Justify adequate funding for VBJDCP
Recommendation: The NJWG annual report to the USAHA Johne’s disease committee should include an evaluation of program progress in terms of current budget, including recommended funding levels and reallocation of resources for the upcoming budget cycle.

**RESOLUTION NUMBER:** 38 NOT APPROVED
**SOURCE:** COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE
**SUBJECT MATTER:** COLLABORATION ON ANIMAL HEALTH, FOOD SAFETY AND EPIDEMIOLOGY

**BACKGROUND INFORMATION:**

The proposed Collaboration in Animal Health, Food Safety, and Epidemiology combines the expertise within the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Agriculture Research Service (ARS), Food Safety Inspection Service (FSIS) and coordinates a myriad of ongoing programs including portions of National Animal Health Monitoring System, (NAHMS), AEA research in antimicrobial resistance and FSIS sampling. This integration of agency efforts strengthens the impact of each individual program. The flexibility of the program to change sampling design ensures that Collaboration in Animal Health, Food Safety, and Epidemiology can meet national security issues/priorities to maintain healthy animals and a safe food supply.

Through Collaboration in Animal Health, Food Safety, and Epidemiology, the USDA proposes to establish an on-farm surveillance system (patterned after the NAHMS, which will be extended to include in-plant sampling. Confidentiality will be maintained as in NAHMS and reporting will summarize findings without compromising farm/plant identity. However, an iterative process with cooperators will be established to provide constructive feedback.

Industry input will be solicited for study design and implementation of the program. Collaboration in Animal Health, Food Safety, and Epidemiology will commence in 2003 and the first scheduled commodity will be pork. Additional commodities will be added based on commodity interest and funding. Data from Collaboration in Animal Health, Food Safety, and Epidemiology will provide science based answers regarding factors that impact animal health which may in turn impact human health.
Initial areas of surveillance will include antimicrobial resistance and epidemiology of animal pathogens and potential food borne bacteria. Sample collection will be combined with the collection of herd health/management data, which will be used for risk factor analysis.

The USDA, APHIS, ARS and FSIS has proposed to collaborate and develop a program on Animal Health, Food Safety and Epidemiology which will provide comprehensive science based answers regarding animal health and public health.

RESOLUTION:

The United States Animal Health Association (USAHA) endorses Collaboration in Animal Health, Food Safety, and Epidemiology and urges the United States Department of Agriculture (USDA) to continue to work with industry as the program is designed and implemented. The USAHA requests that the USDA seek immediate budgetary support and appropriate long term Congressional funding.

RESOLUTION NUMBER: 39
SOURCE: COMMITTEE ON WILDLIFE DISEASES
SUBJECT MATTER: SUPPORT FOR NATIONAL CHRONIC WASTING DISEASE MANAGEMENT PLAN

BACKGROUND INFORMATION:

Chronic Wasting Disease (CWD) is a transmissible spongiform encephalopathy that poses a significant risk to the health of both free-ranging and captive cervidae, and it has the potential to impact wildlife populations, limit interest in use of deer and elk, and impact rural economies. A consortium of tribal, state wildlife and federal agencies has developed a National Plan to better manage CWD in both free-ranging and captive deer and elk, and this plan identifies needed funding for managing the risks associated with the spread of this disease. With the detection of this disease in new areas of the country, CWD has emerged as a serious national concern. The costs of CWD research, surveillance, management and public education are very high and no single agency or organization alone has the resources to effectively address this growing problem.

RESOLUTION:

The United States Animal Health Association (USAHA) urges Congress to fully fund the National Plan for managing Chronic Wasting Disease (CWD) and all its components.

RESOLUTION NUMBER: 40
SOURCE: COMMITTEE ON CAPTIVE WILDLIFE AND
NOMINATIONS AND RESOLUTIONS

ALTERNATIVE LIVESTOCK

SUBJECT MATTER: CHRONIC WASTING DISEASE SCREENING TESTS

BACKGROUND INFORMATION:

The United States Department of Agriculture (USDA) has declared Chronic Wasting Disease (CWD), a transmissible spongiform encephalopathy, a serious threat to the health of wild and captive cervidae herds in North America. Immunohistochemistry, which is recognized as the “gold standard” for detection and confirmation of CWD, takes three to five days to report results. Rapid screening Enzyme Linked Immunosorbent Assay tests for CWD are able to report results in four to five hours.

Several laboratories have evaluated rapid Enzyme Linked Immunosorbent Assay screening tests that are pending licensure and found the results to be comparable to Immunohistochemistry results for detection of CWD in deer and elk.

Rapid return of test results will allow wildlife agencies to modify their surveillance targets during the hunting season and significantly reduce the cost of carcass storage, which some state agencies have estimated could exceed $100,000 per month.

RESOLUTION:

The United States Animal Health Association (USAHA) requests that the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) move quickly to evaluate the rapid Enzyme Linked Immunosorbent Assay based tests which may eventually replace Immunohistochemistry for the screening and detection of Chronic Wasting Disease (CWD).

RESOLUTION NUMBER: 41
SOURCE: COMMITTEE ON CAPTIVE WILDLIFE AND ALTERNATIVE LIVESTOCK

SUBJECT MATTER: STANDARD PROCESSES FOR THE APPROVAL OF DIAGNOSTIC AND PATHOGEN IDENTIFICATION TESTS AND METHODS, DIAGNOSTIC REAGENTS, AND DIAGNOSTIC LABORATORIES

BACKGROUND INFORMATION:

The United States Animal Health Association (USAHA) recognizes the leadership and authority mandated to the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) by the passage of the Animal Health Protection Act of 2002 and the Virus-Serum-Toxin Act of 1913, as amended. Accurate and timely disease diagnostics and pathogen identification are pivotal cornerstones for all responses to animal diseases, including prevention, control, and/or eradication of endemic, emerging, and foreign animal diseases.
A uniform approval process for disease diagnostic and pathogen identification tests, reagents and reference materials would substantially contribute to the health and welfare of aquatic animals, and enhanced public health, food safety and environmental health. In order to advance these principles it is vital that approaches to, and processes for, the approval of tests, test methods, reagents and reference materials, and diagnostic laboratories are harmonized at the international, national, state, and local levels.

While this has been partially addressed in traditional agricultural animal diseases, the USDA, Agriculture Research Service (ARS), APHIS, VS are currently planning to address foreign animal diseases, and the approach needs to be equally applied to aquatic animal and wildlife diseases, particularly those of high priority.

RESOLUTION:

The United States Animal Health Association (USAHA) encourages the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS), Veterinary Services (VS) to work with other agencies, organizations and entities to develop a uniform process concerning aquatic animal and wildlife disease diagnostics and pathogen identification, including: 1) validation and approval of diagnostic and pathogen identification tests and test methods; 2) approval of standardized diagnostic reagents and reference materials, and 3) quality assurance, quality control, and approval of aquatic animal and wildlife diagnostic laboratories.
REPORT OF THE COMMITTEE ON PARASITIC DISEASES

Chair: G. Gale Wagner, College Station, TX
Vice Chair: John E. George, Kerrville, TX

J. Lee Alley, AL; Bob H. Bokma, MD; Corrie C. Brown, GA; Gerald M. Bueing, MO; Angel B. Cielo, DC; Joe L. Corn, GA; A.A. Cuthbertson, NV; William C. Davis, WA; Julie Drier, MN; Chester A. Gipson, VA; Will L. Goff, WA; Chris M. Groocock, NY; Rube Harrington, TX; Robert L. Hartin, TN; Thomas J. Holt, NY; Julie Ann Jarvinen, IA; Don Knowles, WA; Tracey S. McNamara, NY; Larry F. Moore, MO; Don L. Notter, KY; James E. Novy, TX; Richard E. Omohundro, AZ; David L. Osheim, IA; William E. Pace, FL; Phillip A. Pickerill, TX; Kelly R. Preston, MD; Robert L. Pyles, NM; Jack L. Schlater, IA; M.G. Scroggs, TX; George P. Shibley, KS; Sherrilyn H. Wainwright, CT; Ken Waldrup, TX; James A. Watson, MS; John Wyss, MD.

Wednesday, October 23, 2002

The 2002 meeting of the Parasitic Diseases Committee continued discussion and debate on the design of workable strategies for protecting livestock from the spread of diseases that can have economic, and in many cases, human disease consequences. A great deal is already known about the mechanics of disease prevention and vector management. The more difficult problems facing decision makers responsible for guaranteeing food safety and trade agreements are policy and human management issues.

One hour into the session, there were 36 people in attendance. The list of attendees included nine current members (out of 36) and 27 visitors, several of whom expressed an interest in joining the committee. The following papers were presented:

Opening remarks
John George, USDA, ARS, Kerrville, and Gale Wagner
Texas A&M University, College Station

The livestock industry in the United States continues to be increasingly vulnerable to ticks and tick-borne diseases, as well as ubiquitous parasites that affect human health. The problems with these parasites have been the topic of several meetings during the year. The progress on a science-based framework for more accurate risk assessment of parasitic diseases is highlighted in this session.

A Foreign Animal Disease Course Module on Tick Biology, Identification and Surveillance
Pete Teel, Texas A&M University, College Station

A module is being prepared in order to raise awareness of the need for tick surveillance. The course will provide relevant instruction in tick biology,
collection and identification, and develop a knowledge base of tick-host utilization. Objectives are to learn developmental cycles of Ixodid ticks, the key characters of post embryonic stages and adult ticks, field identification of these ticks to genus, examination of host animals, the proper removal of attached ticks, and specimen submission to regulatory programs.

Report of a meeting on the anaplasmosis status of cattle destined for Canada
Tom Bunn, USDA, APHIS, Ames

A recent meeting at CEAH discussed restrictions on the importation of cattle to Canada due to anaplasmosis. Canada is considered free of anaplasmosis in cattle while the disease is endemic in certain areas of the U. S. Feeder cattle can be imported into Canada from October 1 to March 31 under provisions that mitigate the risk of both bluetongue and anaplasmosis and the USAHA supports that current program. The Canadian Cattlemen's Association has proposed that the Restricted Feeder Program be modified to allow cattle from low risk states to enter Canada year round under a pilot project.

After reviewing current information and available literature, the session on Anaplasmosis Science and Policy concluded that: 1. The weight of current scientific and historic evidence supports the year round movement of cattle from the northern tier of States in the US to quarantined feedlots in Canada with the mitigations outlined in the proposed pilot program; 2. Research questions related to movement of US breeder cattle to Canada are being addressed, but work needs to be speeded up. Also, historic evidence indicates such movement in the past has not led to the establishment of anaplasmosis in Canadian cattle herds; and 3. Gaps exist in our understanding of the ecology of \textit{A. marginale} in northern latitudes, the absence of anaplasmosis north of the Canadian US border and its presence south of that border. Research should proceed in finding explanations for these phenomena.

The group outlined seven specific actions to be taken to fill gaps in our knowledge of anaplasmosis and the current and proposed movement of cattle from the US to Canada. At the same time, the group set forth in an eighth recommendation that negotiations for the adoption of the proposed pilot program should proceed.

Likely epidemiological scenarios and the potential geographic scope of tick infestations and disease outbreaks
Bob Bokma, USDA, APHIS, Riverdale

There are two risk factors of considerable importance to the establishment of exotic ticks, the role of surveillance in states like Florida and Texas that have the highest vulnerability to the threat of exotic ticks, and clear elucidation of the role of wildlife in the establishment of such ticks.
The U.S. Virgin Islands currently has the tropical bont ticks in four areas. Eradication is underway, but funding is inadequate.

Efforts are underway to revamp the National Tick Survey, especially to identify gaps in knowledge relative to the 80+ tick species that exist in the U.S. and the environmental factors that influence population density and spread. Several databases are being merged to develop the tick survey instrument, which will be available on the web.

An interactive web site for the national tick survey will be available in January, 2003. The web site will provide interactive information of environmental factors that influence tick distribution in the U.S. down to the country level. The site will include a species list linked to distribution, the veterinary importance, and specific information related to location and population density, such as rainfall and temperature.

The impact of web-based information was demonstrated in an analysis of the potential for establishment of exotic Amblyomma and Boophilus ticks. The known distribution of these ticks in other countries and environments was extrapolated to similar environments in the U.S.

The risk of Giardia and Cryptosporidium infections in calves in two NY watersheds was examined. Risk management and risk association studies identified management practices that reduce the risk of infection and economic loss.

The difficulties of surveillance of ticks on wildlife was discussed. Reference studies have involved ticks on elk translocated from the western states to Arkansas and Kentucky. In one instance, tick infestations were not detected for 14 years. The need and problems of organizing a surveillance effort, versus the value of tick collections from hunter-killed deer and elk
during short hunting seasons, was discussed.

**History of tick eradication in Florida and Texas**  
Ralph Knowles, Vero Beach  
A global overview of the establishment of exotic ticks of veterinary importance into the U.S. was presented, primarily to illustrate the public perception of tick-borne disease 50 or 60 years ago compared to the present day.  
The history of an outbreak of *Rhipicephalus evertsi* in a wildlife park in Florida in the mid-1960's was described, as well as other tick introduction related to movement of animals from Africa, the Caribbean, and Latin America.  
The history of “Texas cattle fever” was summarized, as a prelude to discussion on the continued introduction of *Boophilus* ticks from Mexico into the US. Factors that favor the establishment of these ticks in a state like Texas include improved habitat (pasture grasses), dense populations of white-tailed deer (alternate hosts), and acaricide resistance (organophosphates and pyrethroids)..

Discussion included the need for effective alternative acaricides, better methods to detect acaricide resistant ticks, and integrated control strategies in Mexico.

**Perspectives on the preparedness for the introduction of exotic ticks and tick-borne diseases**  
Kelly Preston, USDA, APHIS, Riverdale  
The USDA recognizes that an outbreak of acaricide resistant ticks or a disease such as heartwater would be an emergency of national impact, but the states involved would be the first responders. Discussion concerned the basic elements of a response based on current information.

**Report of a meeting on the potential for the introduction of equine piroplasmosis**  
Ralph Knowles, Vero Beach  
A meeting was held in Florida earlier in 2002 reviewed the history of frequent re-introduction of equine piroplasmosis into the U.S., and the federal efforts to control the introductions.  
The introduction of equine piroplasmosis (*Babesia equi* and *B. caballi* infections of horses) into the U.S. followed the use of jet aircraft as a way to move horses from many places such as the U.S.S.R., India, Yemen and Venezuela. However, the increasing evidence that equine piroplasmosis has been in Puerto Rico for more than a century also argues for the introduction of the babesia from Spain during the time of the conquistadors.  
The efficacy of current serologic tests, the usefulness of tick surveys and collections, and the need for continued vigilance was discussed.
Report of a meeting on the Boophilus tick status of the state of Sonora, Mexico
John George, USDA, ARS, Kerrville

A meeting was held in Hermasillo, Sonora, to discuss current tick control and elimination programs. The purpose was to begin consider that the State of Sonora might be considered free of *Boophilus* ticks, allowing cattle from Sonora to be exported to the U.S. without inspection and dipping.

**Status of the Cattle Fever Tick Eradication Program**
John George, USDA, ARS, Kerrville

Mexico continues to report an increasing problem with *Boophilus* ticks that are resistant to all of the available acaricides - organophosphates, synthetic pyrethroids and amidines. The experience of the Australians in dealing with acaricide resistance was discussed, especially that they were dealing with *Boophilus* ticks that were about 60 times more resistant to organophosphate compounds compared to susceptibles. The current information from Mexico suggests that ticks currently are about 12-13 times more resistant than susceptible populations, suggesting that the acaricide resistance problem is still developing.
REPORT OF THE COMMITTEE ON PHARMACEUTICALS

Chairman: Dr. Roy A. Schultz, Avoca, IA
Vice Chairman: Dr. Joe S. Gloyd, Wilmington, DE

Dr. James R. Bradford, MI; Dr. Myron D. Brown, KS; Dr. Scott A. Brown, MI; Dr. Thomas J. Burkgren, IA; Dr. Eric J. Bush, CO; Mr. Jon D. Caspers, IA; Dr. William H. Fales, MO; Dr. James E. Fox, GA; Dr. R. A. Gessert, MI; Dr. Eric Gonder, NC; Dr. J. Mark Hammer, IA; Dr. Christopher H. Hannafin, RI; Dr. Richard E. Hill, IA; Dr. G. Dean Lindsey, IN; Dr. Patrick L. McDonough, NY; Dr. David J. S. Miller, ; Dr. Bert A. Mitchell, MD; Dr. Larry F. Moore, MO; Ms. Valerie H. Patten, NY; Ms. Tracy A. Raef, IA; Dr. Jane F. Robens, MD; Sarah A. Salmon, MI; Dr. Paul L. Sundberg, IA; Dr. Deepanker Tewari, PA; Dr. Lyle P. Vogel, IL; Dr. Philip W. Widel, MO.

The Pharmaceutical Committee met at 12:30 on Tuesday, October 22, 2002 in the Soulard Room of the Millenium Hotel, St. Louis, MO. Thirty-four participants were present including 13 committee members.

The committee has maintained a continuing emphasis on providing a forum to identify and address issues concerning the availability and the safe use of pharmaceutical products in animals. Continued education at all levels and including proper and effective use of pharmaceuticals has been encouraged as a means of achieving these goals.

Dr. Steve Sundlof, CVM, led off the Pharmaceutical Committee meeting with a presentation entitled “CVM Update”. He spoke on 3 main topics, including Antimicrobial Draft Guidance Document, New Drug Approvals, and Cloning. Concerning the Antimicrobial Draft Guidance Document, it’s currently open for public comment, closing November 2002. The Document was formulated out of public concern that human health may be compromised by antimicrobial use in animals. The Document was designed to provide improved surveillance of antimicrobial use, support judicious use, expand research and revise preapproval assessments. It involves ranking of antimicrobials as high risk (Category I), medium risk (Category II) and low risk (Category III). Assignment to Categories is on the basis of perceived risk to humans. Category I drugs will be limited to single animal prescription use, no extra-label use allowed, and post-approval monitoring required. Category II drugs will be subjected to either prescription or Veterinary Feed Drugs, and would require post-approval monitoring. Category III drugs can be OTC, Rx or VFD and would be subject to post-approval monitoring. According to Dr. Sundlof, most veterinary drugs are likely to end up in the ‘medium risk’ category.

Concerning New Drug Approvals, Dr. Sundlof presented data showing the following activities during the past 2 years:
The 3 new chemical entities that were approved in 2002 were albuterol sulfate for equine, danofloxacin mesylate for beef cattle, and deracoxib for dogs.

Concerning cloning, Dr. Sundlof said FDA/CVM is developing a policy on somatic cell nuclear transfer. He noted that the technology is available to produce cloned animals and their offspring that would then enter the food chain. He stated that the agency believes that animals derived from cloning present little hazard from a food safety standpoint, but that FDA plans to publish White Papers by January 1, 2003 that would probably ask that cloning-derived foods be compositionally equivalent to the ‘natural’ counterpart. Dr. Sundlof went on to say that the next issue to be addressed by FDA would be ‘transgenic’ animals.

Dr. Sundlof said that there are fewer new animal drug applications coming to CVM. In his opinion, this is because human drugs are vastly more profitable to sponsors, plus mergers of animal drug companies have resulted in dropping of approval applications already in process.

The next speaker on the agenda was Dr. Richard Carnevale (AHI). The title of his presentation was “Current Issues on Animal Drugs”. He gave an antibiotic update and then spoke on the New Animal Drug Review Process. Concerning the antibiotic update, Dr. Carnevale spoke on the ongoing Baytril hearing, with participants including FDA, Bayer, and AHI. The hearing was initiated in April 2002, with expert testimony due in December and oral testimony in May 2003. He then discussed the Brown/Kennedy bills which would ban most uses of 8 classes of feed use antibiotics and fluoroquinolones in poultry unless proven ‘safe’ in 2 years. Dr. Carnevale said that AHI’s position is that these bills would essentially deny due process to companies as it would circumvent the normal FDA hearing procedures; they would deny FDA the ability to prioritize their concerns and force expenditure of significant resources; and finally there is no evi-
dence that these products in question present an imminent hazard. Dr. Carnevale speculated that these bills have little chance of passage this year.

Dr. Carnevale also presented AHI’s critique of the FDA Guidance Document which includes a qualitative risk assessment. AHI supports the risk assessment approach as an improvement over previous concepts. However, AHI feels that assumed human exposures are likely to be greatly overestimated, that there is a ‘disconnect’ between drugs categorized as important to human medicine and their link to animals, that if unchanged the likely outcome of the Guidance Document will be to rank many drugs that are of little risk to human health as high or medium risk, that it could prevent approval of new antibiotics or any uses in large numbers of animals. Dr. Carnevale’s conclusion was that the Guidance Document could work if CVM applies more realistic assumptions.

Concerning the New Animal Drug Review Process, Dr. Carnevale talked about the results from an AHI Industry Benchmarking Survey which was first conducted in 1997. It was designed to explore the strengths and weaknesses of the US regulatory framework, and its impact on the competitiveness of the animal drug industry. A repeat survey was conducted from Jan 1, 1998 through May 31, 2000, and evidence that the regulatory environment had deteriorated prompted a new study in 2001. Pharmaceutical companies identified 3 key priorities for CVM: 1) improving administrative efficiency in order to meet timeframes, 2) basing decision-making on ‘sound science’ and risk assessment, and 3) harmonizing US regulatory requirements worldwide. The 2001 survey results for original NADA approvals showed that only 1 was reviewed on time, 9 (90%) were overdue, the average time overdue was 574 days, and the longest time overdue was 862 days. CVM’s stated reasons for overdue submissions were: 1) erosion of resources and personnel, 2) increasing number of submissions, 3) poor quality of submissions, and 4) increased complexity of submissions.

Dr. Carnevale said that AHI is actively supporting the Animal Drug User Fee Act (ADUFA) of 2002. The purpose is to model the existing (and very successful) human drug user fee act to establish specific FDA performance standards tied to user fees. Collected fees are additive to existing funding for review process. The user fee assessment would be reviewed annually for compliance by FDA and reported to Congress. Generic drugs are excluded from fees and standards. According to Dr. Carnevale, ADUFA could be passed before the end of the year.

The next speaker was Dr. Dermot Hayes, Professor of Economics at Iowa State University. The title of his presentation was “Impact of a U.S. Ban on Feed Grade Antibiotics in Pork Production: Lessons from Denmark and Sweden”. Following is the abstract from his presentation:

“This presentation reports on a published study of the impact of a ban on feed grade antibiotics in Sweden. It also updates the Swedish results..."
with more recent developments in Denmark. In both cases an attempt is made to use the results to project what might happen if the U.S. implemented a similar ban. Results from the Swedish study suggest that total antibiotic use would fall if a ban were imposed. The Danish results bear this out, but show that all of the reduction is due to banning feed grade antibiotics at the finishing stage. There is no evidence that a ban on the use of these products in weaned pigs would reduce total use. Cost impacts of such a ban range from approximately $6.00 per animal in Sweden to a low of $4.50 based on the Danish experience. Costs include higher mortality in the post weaning phase as well as slightly lower growth rates at all phases. We also assume that pigs would be weaned one week later, and allow for construction costs created by slightly less productive sows. The Danish and Swedish estimates do not refer to a sort loss caused by increased variability in growth rates but this problem is accounted for in the U.S. projections. An uncertainty associated with the analysis is that the U.S. pork industry exhibits a more diversity in production and management standards than is true for Sweden and Denmark”.

Dr. Hayes also noted that as growth promotant antibiotic usage declined in Denmark, the usage of therapeutics increased, and that many of these drugs are also used in humans.

The next speaker was Dr. Gay Miller, Professor of Veterinary Pathology, University of Illinois. The title of her talk was “Antibiotics Used for Growth Promotion in U.S. Pig Finishing”. A brief paper is presented here: (Authors: Gay Y. Miller, Kenneth A. Algozin, Paul E. McNamara, and Eric J. Bush, Department of Veterinary Pathobiology, University of Illinois, Urbana, IL. The Nature Conservancy – Michigan Chapter, Owosso, MI. Department of Agricultural and Consumer Economics, University of Illinois, Urbana, IL. USDA APHIS, VS, Centers for Epidemiology and Animal Health, Fort Collins, CO. Acknowledgements: This study was funded in part by a grant from the Illinois Council on Food and Agricultural Research (C-FAR). The authors also wish to recognize the contributions of Stephen Ott for his helpful comments, and the USDA/APHIS/VS staff in Ft. Collins, CO for their assistance with the NAHMS data).

“Introduction: Antibiotics have been used at subtherapeutic levels to promote the growth and overall health of livestock for decades. Increasing concern is occurring regarding the diminishing efficacy of antibiotics in human and veterinary medicine. Resistant bacteria can cause antibiotic resistant disease directly or they can pass the genetic material associated with resistance to other bacteria. This paper estimates the value of antibiotics used for growth promotion to swine grow/finish operations using data from the National Animal Health Monitoring System (NAHMS).

The benefits associated with the use of growth promoting antibiotics in swine production have been shown to include improvements in average daily gain (ADG), FCR, farrowing rate, pig survival across multiple stages.
Many studies done in the 1960’s and 70’s documented improvements in these productivity measures. Other studies have examined the economic impacts, but most of these studies use either data from what would now be outdated productivity studies or use estimated productivity impacts from European data.

Given the dramatic changes in the genetics of US pigs and the pork industry in the last few decades, an update of the productivity and economic impacts associated with feedgrade antibiotic use for growth promotion is needed. Thus, the primary objectives of our study were: (1) to use U.S. pork industry data to identify the relationships between antibiotics used for growth promotion and other animal health and management practices on production performance (specifically ADG, FCR, and MR) in the G/F phase of hog production; and (2) to estimate the associated economic impact for pork producers at the farm level.

**Material and Methods**

The 1990 and 1995 NAHMS National Swine Survey data were used. In 1990, sampling occurred in 18 states, representing 84% of the U.S. swine operations and 95% of the nation’s hog population. In 1995, sampling occurred in 16 states, accounting for approximately 75% of the pork producers and 91% of the U.S. hog inventory. Observations from 1990 and 1995 NAHMS surveys were combined.

Regression was used to identify relationships between productivity in the G/F unit, antibiotic use, and other potentially relevant factors of production. Relevant predictors for ADG, FCR and MR were retained if $P < 0.30$ (based on type III SS). Stata (a statistical software package) was used to conduct statistical analyses. Stata’s backward-stepwise maximum likelihood estimation procedure was used. FCR and ADG models were treated as a system of seemingly unrelated regression equations using the SUREG command. A linear regression model was estimated with G/F MR as the dependent variable.

**Results and Discussion**

**ADG and FCR Models**

Summary statistics for ADG, FCR, and MR by NAHMS survey year demonstrate no differences in ADG or FCR between 1990 and 1995. Mean ADG (1.626 and 1.631) of finishers was similar to that reported by PigChamp (1.61) for 1999. Mean FCR (3.179 and 3.268) was also similar to PigChamp reports (3.12). MR (2.28) was somewhat lower than MR reported by PigChamp (2.80).

Examining models for ADG and FCR shows an increase in the number of days that antibiotics were fed during the G/F phase was associated with improvements in both ADG and FCR. In the case of FCR, however, using more than one antibiotic was associated with poorer (higher) feed conversion. Improvements in ADG and FCR were also associated with the feed-
The interaction between antibiotic use and the number of diseases diagnosed in the G/F unit was associated with poorer ADG; this effect may be capturing producer response to use antibiotics as a preventive when there is an increase in the prevalence of disease. Being a medium- or large-size operation was associated with better (lower) FCR. Higher MR (used as a predictor variable in the ADG and FCR models) was associated with poorer ADG and FCR.

**MR Model**

Variables explaining MR suggest that antibiotics being fed over a longer period of time were associated with reduced MR. Using two antibiotics in the presence of disease in the G/F unit was associated with an increase in MR, while vaccination against disease was associated with lower MR. Weaning piglets at an older age was also associated with a lower MR. The average age at weaning was 26.4 days. Increased cull rate was associated with increased MR.

**Increased profits from antibiotic use**

Using the results from the regression models, we estimate the effect of growth promoting antibiotics on the performance of G/F pigs in percentage terms and then on profitability. Predictions represent an independent, medium-sized (between 800 - 3,000 head entering the G/F unit in the last 6 months), mid-western farrow-to-finish producer in 1995. Given various additional assumptions, it was estimated that antibiotics was associated with improved ADG and FCR of 0.5% and 1.1%, respectively, and with better MR.

Combining the improvements to ADG, FCR and MR, the estimated increase in annual returns above total costs from antibiotics for a 1,020-head finishing barn was $1,612, or $0.59 per pig marketed. Compared to the estimated net returns to pig finishing operations as reported by the Illinois Farm Business Farm Management Association, these values suggest that the economic benefit generated from using antibiotics in the G/F unit represents approximately 9% of the net return realized by Illinois pig finishing operations in 2000.

Our results suggest that the economic impact of the use of antibiotics used for growth promotion in G/F units in the U.S. is sufficiently high that pork producers might be reluctant to produce pigs without this input. However, we also found that there is the potential for substantial substitutability with this input and other production inputs that could help overcome the negative influence of removing antibiotics. The potential trade off in applying some alternative inputs may be the added complexity associated with the use of these inputs. This is particularly important if the added complexity is such that the alternatives are excluded or more limited to smaller production units.

Most producers believe their profits are higher with feedgrade antibiotic use; this is suggested by the widespread use of antibiotics used for...
growth promotion. Additional economic research and controlled feeding trials are needed to carefully quantify the relationships between growth promoting antibiotic use and productivity measures that are reflective of current U.S. production systems; such studies need to use current pig genetics and production systems that reflect typical disease and other environmental pressures.

Assessing the risk to human health of the use of growth promoting antibiotics used in swine production is part of the ongoing research being done by our research team. We are combining a risk analyses framework with an integrated bio-economic model for consumers. Our work should provide important and substantial input to the current debate on growth promotant antibiotic use in food animal production, as well as help guide policy decisions on this important topic. Also, we are using 2000 NAHMS data now to estimate new productivity relationships to either validate or provide more current and better estimates of similar types of relationships reflected in the work we have done with the 1990 and 1995 NAHMS data.

Dr. Paul Sundberg, National Pork Board, was the next speaker. The title of his talk was “National Pork Board and Producer Perspectives on Current Issues Regarding Animal Health and Antibiotic Usage”. He focused on National Pork Board’s Pork Checkoff Activities and stated that the key issues for checkoff-funded research and education efforts are Animal Welfare, Food Safety, Animal Health and Environment. To this end, some NPB activities include a continuation of the Pork Quality Assurance Program, development of Judicious Use Guidelines, and research toward alternatives to antimicrobials, including probiotics, diet acidification, and competitive exclusion.

Dr. Sundberg reiterated some key points concerning the ban of subtherapeutic antibiotics in Denmark, and went on to note that to date, there has been no demonstrable effect of the ban on public health in Denmark. He also commented on the National Pork Board’s position relative to the Guidance Documents. NPB is concerned that the ‘bar is now so high for new drug approvals’ that the industry will no longer have timely, cost-effective availability of antibiotics for animals. NPB is also concerned that the Guidance Document implies that antibiotic use in food animals is implicated in resistance of bacteria causing tuberculosis, Legionnaires Disease, and Venereal Disease without any science to support this. Dr. Sundberg also expressed concern that the Guidance Document could allow for sweeping prohibition of extra-label use of drugs in animals. NPB doesn’t feel the Guidance Document recognizes the realities of veterinary care in modern animal production. For example, in reality, early stage mass treatment often results in less total antibiotic use. The Document could also prevent water and feed usages of antibiotics because of its individual treatment vs. mass treatment language. Further, the Document overestimates the risk of eating meat, when 65% of pork products are further processed before reach-
The next speaker was Dr. Eric Bush, APHIS. The title of his presentation was “What is Subtherapeutic Antibiotic Use?” The FDA definition is an antibiotic fed at <200 g/t for 2+ weeks; the Institute of Medicine’s 1980 report defined it as “continuous use of subtherapeutic levels of antimicrobials in animal feeds for growth promotion and disease prophylaxis”; the WHO definition was “antimicrobials used in animals as growth promoters (in subtherapeutic doses), prophylactically for disease prevention or therapeutically for treatment of infections.” Dr. Bush went on to describe the results from the 2000 National Animal Health Monitoring System (NAHMS) survey. The survey included 900 respondents from the 17 major swine producing states and was designed to represent over 90% of the operations and hogs in the U.S.

Survey results showed that the major drugs used in swine grower/finisher feed for usages including subtherapeutic use were bacitracin, tylosin and chlortetracycline and noted that the dose level increased for therapeutic and preventive use compared to subtherapeutic use. More information on the survey results can be found on the APHIS website.

Dr. Sandy Flick (Alpharma Animal Health) next gave a presentation entitled “Antibiotics and the Precautionary Principle: Too Much Precaution and Not Enough Principle?” The focus of her talk was a discussion of the recent ban on the use of Albac (zinc bacitracin) in the E.U. Although the E.U. requirements call for scientific input, the E.U. regulatory agencies apparently can ignore scientific recommendations and make strictly political decisions. The Albac ban decision was made and judicially supported on the rumors of risk and not on a scientific basis.

Dr. Susan Kotarski, Pharmacia Animal Health, was the next speaker. The title of her talk was “Perspectives on Addressing Microbial Safety of Third Generation Cephalosporin Use in Animals”. An abstract of her talk follows:

“One important component in evaluating the safety of antimicrobial use in food animals with regard to resistance emergence is to examine the exposure of bacteria associated with the animal to the drug during and after treatment. This paper provides a retrospective review of data addressing the exposure of commensal, environmental and target bacteria to ceftiofur used for treatment of infectious disease in food-producing animals.

Ceftiofur is a third-generation cephalosporin that has been developed solely as parenteral formulations for therapeutic use in animals. First approved for treatment of bovine respiratory disease in the United States in 1988, ceftiofur has since been registered worldwide for treatment of various gram-negative and -positive bacterial infections in cattle, swine, sheep, horses, dogs, goats and day-old chicks and turkey poults.

National surveys suggest that the incidence of veterinary and food-borne pathogens with decreased susceptibility to cephalosporins is still very low or nil. Non-typhoidal Salmonella enterica serotypes bearing a cepha-
Iosporin resistance determinant have been reported in low prevalence, but prevalence among targeted bacteria is even lower or nil. Most of the resistant *Salmonella* isolates produce a cephalomycinase beta-lactamase encoded by variants of the *bla*cmy gene. Frequently the gene is located on a plasmid encoding resistance to other classes of antimicrobials. All isolates are reported as multi-resistant. It is difficult to determine the major selective pressures for the maintenance and dissemination of these multi-resistant salmonellae, due to the complexities of antimicrobial use in animals, animal distribution and health management practices and the epidemiology of salmonellae endemic to animal populations generally.

The very low/nil prevalence in surveys of resistance among targeted pathogens may be explained, at least in part, by the pharmacokinetics and pharmacodynamics of the drug. Ceftiofur is prescribed for, and is highly active against, bacterial pathogens associated with respiratory diseases in domestic animals, including *Pasteurella* spp., *Mannheimia* spp., *Actinobacillus* spp., *Streptococcus* spp., *Haemophilus* spp., and *Salmonella choleraesuis*. Likewise, these target pathogens are also very sensitive to the principal metabolite, desfuroylceftiofur, which retains the b-lactam ring of the parent molecule. The concentrations of ceftiofur and its active metabolites in plasma profiles exceed the MIC\textsubscript{90} of these organisms beyond the 24-hour dosing interval, and effective concentrations of microbiologically active metabolites also reach the target tissues of the animal.

In contrast to targeted pathogens exposure to ceftiofur in treated animals, the exposure of commensal and environmental bacteria to microbiologically active ceftiofur residues is very low. Residues are eliminated mainly by urinary excretion. Microbiologically active residues constitute a minor fraction of the total residue that is excreted by animals treated with ceftiofur. In *in vitro* models designed to mimic degradation in intestinal content, ceftiofur is inactivated within minutes of addition to anaerobic fecal slurries. Moreover, the active residues that are excreted are readily inactivated and degraded in manures of animals. Cefuroxime is also inactivated and mineralized in soils (i.e., converted to CO\textsubscript{2}) and is subject to photolytic and hydrolytic mechanisms of inactivation. The combination of ceftiofur’s high potency and relative instability upon elimination from the animal may play a pivotal role in the low prevalence of ceftiofur resistance observed 14 years after its first market introduction. Rapid inactivation is an important characteristic of veterinary antibacterial agents, and has potential as an important criterion in the selection of antimicrobials for use in animal medicine”.

The final topic on the agenda was an update by Dr. Joe Gloyd concerning 2001 Resolution Number 1 supporting funding for the construction of facilities for the National Animal Disease Center. Construction is in process. Future funding is needed.

The Pharmaceutical Committee is deeply indebted to AAVLD member Dr. Teddi Wolff for her assistance in compiling the Committee’s report.

The meeting was adjourned at 5 pm.
REPORT OF THE PROGRAM COMMITTEE

Chairman: Mr. Bob Frost, Lincoln, CA
Vice Chairman: Dr. Donald H. Lein, Ithaca, NY

Dr. Bruce L. Akey, VA; Dr. J. Lee Alley, AL; Dr. Paul L. Anderson, MN; Dr. Richard E. Breitmeyer, CA; Dr. Robert J. Eckroade, PA; Dr. Francois C. Elvinger, VA; Dr. James J. England, ID; Dr. David A. Espeseth, PA; Dr. Malcomb G. Fearneyhough, TX; Dr. Steven L. Halstead, MI; Dr. William L. Hartmann, MN; Dr. Bob R. Hillman, ID; Dr. Sam D. Holland, SD; Dr. G. Reed Holyoak, OK; Dr. Scott E. LaPatra, ID; Dr. Maxwell A. Lea, Jr., LA; Dr. Bret D. Marsh, IN; Dr. Charles E. Massengill, MO; Dr. Thomas J. McGinn, III, NC; Dr. James O. Mecham, WY; Dr. Michael W. Miller, CO; Dr. Lee M. Myers, GA; Dr. Kakambi V. Nagaraja, MN; Dr. John C. Reagor, TX; Mr. Paul E. Rodgers, WV; Dr. Mo D. Salman, CO; Dr. Roy A. Schultz, IA; Dr. Robert M. S. Temple, OH; Dr. H. Wesley Towers, DE; Dr. G. Gale Wagner, TX; Dr. M. Randy White, IN; Dr. Richard D. Willer, AZ.

The Program Committee met on Saturday, October 19, 2002. X people were in attendance including (x) Committee Chairs. After thanking the Chairs for their hard work and dedicated service, Chairman Frost reviewed the mission of USAHA and briefly reported on the hot topics for this year’s meeting. Frost discussed a number of items related to committee operations including the importance of the Chairs and their work products; namely, the committee report from the annual meeting and the resolutions and recommendations that arise from that meeting. Frost pointed out that the Operating Procedures Manual for Committees was distributed to Chairs this past spring. He then discussed procedures and deadlines for committee reports and resolutions including the need to pay close attention to language and ensuring that the wording actually makes sense. He also mentioned the need for feedback from Chairs after the annual meeting relative to their committee meeting.

USAHA Webmaster/PIO Larry Mark stressed the importance of the Chairs meeting with him after the committee meeting in order to give him a brief summary of the main issues discussed. The issue of adding and dropping committee members was discussed and it was decided there was a need for a mechanism to communicate with members who do not register for the annual meeting asking if they want to remain on their assigned committees. It was pointed out that while the President appoints committee members, Chairs have the responsibility to make recommendations to the President on who should be a committee member. Chair Frost said he would ensure that this process was reviewed and a procedure incorporated into the operating manual.

Use of audio-visuals in committee meetings was discussed and whether
there was a need to have an overhead, a-v stand and screen in every room. It was suggested that the Chair could ensure that a computer projector was available if one was needed. Finally, Dr. Bob Hillman, Chair of the Committee on Nominations and Resolutions, reviewed the operation of his committee and the procedures for committee resolutions and recommendations.
REPORT OF THE COMMITTEE ON PSEUDORABIES

Chairman: Dr. Bret D. Marsh, Indianapolis, IN
Vice Chairman: Mr. James W. Leafstedt, Alcester, SD

Dr. Paul L. Anderson, MN; Dr. John K. Atwell, NC; Dr. C. Carter Black, GA; Mr. Neal F. Black, MN; Mr. Philip E. Bradshaw, IL; Dr. Donald R. Bridgewater, CO; Dr. Max E. Coats, Jr., TX; Dr. Debra C. Cox, MD; Dr. Gene A. Erickson, NC; Dr. Thomas W. Freas, IN; Dr. Michael J. Gilsdorf, MD; Dr. Larry M. Granger, MI; Dr. Thomas J. Hagerty, MN; Dr. Edwin C. Hahn, IL; Dr. J. Mark Hammer, IA; Dr. Robert M. Harbison, AR; Dr. Howard T. Hill, IA; Dr. Sam D. Holland, SD; Dr. Richard D. Hull, IL; Dr. John P. Huntley, NY; Dr. Charles L. Kanitz, IN; Dr. C. Fred Kirkland, NC; Dr. John P. Kluge, IA; Dr. David T. Marshall, NC; Dr. Charles E. Massengill, MO; Dr. Thomas J. McGinn, III, NC; Dr. James D. McKeen, IA; Dr. I. Lee McPhail, OH; Dr. F. J. Mulhern, CA; Ms. Nancy J. Robinson, MO; Dr. John J. Schiltz, IA; Mr. Jeff Schnell, IA; Dr. George P. Shibley, MD; Dr. Michael T. Staton, Sr., WY; Mr. James E. Stocker, NC; Dr. Paul L. Sundberg, IA; Dr. Arnold C. Taft, MD; Dr. Paul O. Ugstad, CA; Mr. Willard H. Waldo, NE; Dr. Larry L. Williams, NE.

Dr. Marsh called the meeting to order at 12:30 PM on Tuesday, October 22, 2002. Approximately 32 people attended the meeting. The meeting was adjourned at 5:00 PM.

Dr. Marsh reviewed the Resolution from the 2001 meeting in Hershey, PA and the responses from the specified agencies.

**National Pseudorabies Control Board**—Mr. Phil Bradshaw, Chairman of the Board, reported the actions of the Board. Indiana was advanced to Stage V. The following states were reapproved: Washington (Stage V), South Dakota (Stage IV), Arizona (Stage V), Montana (Stage V), South Carolina (Stage V), and Oregon (Stage V). The recent Pseudorabies (PRV) breaks in Pennsylvania, which resulted in the state status being reduced to Stage III/IV, and Minnesota were discussed by the Board. Pennsylvania’s Stage IV status can be reinstated 60 days after cleanup and all quarantines have been released. Mr. Bradshaw indicated the Board is very pleased with the national progress, but we must remain diligent to eliminate any infected herds.

**USDA Report**—Dr. Mike Gilsdorf gave the report for Dr. Arnold Taft. At the beginning of FY 2002, there were 12 pseudorabies quarantined premises in the United States—9 in Iowa and 3 in Nebraska. FY 2002 ended with only one premises under quarantine for pseudorabies. The herd was located in Pennsylvania and was depopulated the following week.

During FY 2002, six newly infected herds were discovered: two in Iowa discovered in February and July, one in Minnesota discovered in April,
and three in Pennsylvania discovered in July and September. The year started with 12 herds under quarantine. All were depopulated, and the last quarantine was released January 14, 2002 in Iowa. This was a historic day, as it was the first time that the United States had no known pseudorabies-infected domestic swine herds. The six newly discovered herds were depopulated within days of discovery. Therefore, for most of the time since January 2002, there was no known pseudorabies infection in the United States.

The following States advanced in program status during FY 2002 in the listed months:

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One State, Pennsylvania, reverted from Stage V to Stage III/IV. At the end of FY 2002: 40 States, Puerto Rico, and the U.S. Virgin Islands were in Stage V; 8 States in Stage IV; 1 State in Stage III/IV; and 1 State in Stage II/III.

Goals for the future are as follows: 48 States, Puerto Rico, and the U.S. Virgin Islands will be in Stage V by the end of FY 2003; all States plus Puerto Rico and the U.S. Virgin Islands will be in Stage V by the end of FY 2004.

The Accelerated Pseudorabies Eradication Program (AEP) has provided the necessary funds to continue the depopulation of infected herds with indemnity and to continue enhanced surveillance in high-risk areas and at slaughter for both breeding swine and “finisher” swine. AEP has also provided vaccine reimbursement funds to high-risk areas.

Indemnity of $1,848,787 was paid to owners of 17 herds with 32,394 swine. The producers received an average price per head of $57.07 plus the salvage value received from slaughter. Enhanced surveillance funds of $8,453,637 were provided for herd testing in high-risk areas, for slaughter
collection, and for laboratory expenses. Vaccine reimbursement funds of $7,688,800 were furnished to the high-risk areas of Iowa, Minnesota, Indiana, and Nebraska.

Slaughter surveillance of cull breeding swine continues to play an important role in identifying newly infected herds. Thirty-six States are now participating in major packer surveillance. Numbers surveyed continue to increase due to increased emphasis on tagging. A greater degree of surveillance could be attained if: (1) all cull sows and boars were identified; and (2) all slaughter plants were collecting blood samples for testing.

Slaughter surveillance of “finisher” swine at slaughter was initiated in FY 2001 and has continued during FY 2002. This is based upon the testing of “meat juice” that is recovered from muscle tissue taken from the diaphragm of an identified carcass, frozen, and then thawed. Further surveillance of “finisher” swine would be available if all serological diagnostic tests for finisher swine were required to include testing for pseudorabies in addition to the requested test. Random sampling on farms could provide further surveillance.

A Veterinary Services Notice has been prepared that requires laboratories to fax, on the day tested, any pseudorabies-positive test results from slaughter animals to officials in the State of origin, the State Veterinarian, and the Area Veterinarian in Charge.

**Impact of feral/wild swine**

A National feral/wild swine program is necessary in order to be able to declare domestic swine free of pseudorabies and swine brucellosis while the diseases still exist in feral/wild swine in some areas of our country. The Office International des Epizooties (OIE) states that measures should be implemented to prevent transmission of disease from feral/wild swine.

At the National level, a feral/wild swine program must provide the following:

1. A national budget which provides funding for research and aid to State programs;
2. A staff to coordinate the program;
3. Minimum guidelines for State programs; and
4. Educational materials and training as needed.

At the State level, feral/wild programs should be formed (in conjunction with a National program) that at a minimum provide the following:

1. An advisory committee;
2. Authority over any or all management plans;
3. Population studies;
4. Disease surveillance;
5. Quarantines of all feral/wild swine, free-ranging swine, and exposed swine in States with infected feral/wild swine;
6. A separate marketing system for feral/wild swine with compliance that provides surveillance with identification and traceback.
7. A depopulation plan, and
8. An educational program.

States may advance program status to Stage IV and V if no new cases of pseudorabies have been confirmed during the year prior to application. If a positive herd is identified and depopulated within 15 days, it will not prevent advancement of status or change existing status, provided there is no spread to other herds. Feral/wild swine should be handled in a separate program. Feral/wild swine are not considered domestic swine.

States or areas with infected feral/wild swine will have to require additional testing of their domestic swine to ensure other States of their disease “Free” status. Such additional testing and/or surveillance will need to be added to the Pseudorabies Eradication Program Standards.

**Pennsylvania Report**—Dr. John Enck, Pennsylvania State Veterinarian, reported to the Committee on the recent PRV break in his state. Pennsylvania had been free of PRV since 1999. A slaughter traceback resulted in the quarantine of a farrow to finish operation. One positive sow unit, 3 off-site nurseries, 2 finishing floors and a gilt isolation unit were determined to be positive. Efforts were made to respond quickly to preserve the state’s Stage V status. The sites were eventually depopulated, but a second slaughter traceback to a neighboring herd resulted in the loss of status. The second positive herd was a waste food feeder approximately 5 miles away. The second and associated sites were depopulated and all circle tests were conducted. Over 19,500 pigs were depopulated at an expense of $1.2 M. Dr. Enck is hopeful that this will be the last of the infection, and Stage IV status can be regained.

**Minnesota Report**—Dr. Paul Anderson, Minnesota Board of Animal Health, reported on the recent positive herd in Minnesota. The 80 sow farrow-to-finish operation was identified following a slaughter traceback. Nine sows were found to be positive on the herd test. Although the nursery and finisher were negative, the entire herd was depopulated. Circle tests were conducted on 63 premises. The state status was maintained since the herd was depopulated within 15 days.

**Meat Juice Study**—Dr. James McKean, Iowa State University, gave a report on the status of the Meat Juice Study to detect PRV in finishing swine presented for slaughter. The program is working well, although there are continuing efforts to improve the efficiency of the Study. Currently, the cost per sample is $4.82, and to date 436,135 samples have been tested at a cost of $2.1 M. Yield reports are being evaluated and comparisons among the participating plants are made. Database development is ongoing to track to sample results and the producer information. Other applications of the procedure are being evaluated including testing for Toxoplasma, Salmonella, and Trichina.
Use of Radio Frequency Phase Shift (RFPS) Technology to Detect PRV—Dr. Richard Van Deusen, President of Intellignostics, Inc., reported on his USDA funded research. His new technology provides a disposable sensor that is highly sensitive and specific, easy to use and interpret, provides results in minutes, eliminates the need for reagents and a lab setting for results, and is therefore, cost and time effective. The goal of the project is to show the feasibility of using RFPS technology to develop a relatively inexpensive instrument and disposable sensors for performing rapid in vitro diagnostic tests. The targeted application is for detecting antibodies to wild-type PRV in slaughter swine. The technology can be applied to detecting a wide variety of diseases using various types of test samples.

New Discoveries in PRV Research—Dr. Ned Hahn, University of Illinois, reported on recent information gained from his research. The specifics of his work are detailed in the Feral Swine Working Group Report found later in this Committee Report.

Wildlife Services Activities—Mr. Noel Myers, Wildlife Biologist, USDA, APHIS-WS, reported on the agency’s recent activities. The specifics of his report are detailed in the Feral Swine Working Group Report found later in this Committee Report.

Feral Swine Working Group Report—Dr. Max Coats, Chairman of the Working Group, reported on the Group’s activities.

The Feral Swine Working Group met on Saturday afternoon from 1:00 to 4:00 PM. There were 30 persons attending representing industry, state, and federal agencies. One international guest also participated.

Dr. Debbie Cox, USDA, APHIS, VS presented a view of the feral swine situation from the National Level. The USDA feels that there needs to be a national level national budget to study population dynamics, implement disease management strategies; aid state programs; provide staff to coordinate program; set minimum guidelines for state programs; and provide education material and training as needed. In addition, there continues to be a need for concerted effort needs to work with wildlife people.

USDA’s view was that the minimum components needed for a state level program included:
1. Advisory Committee
2. Authority established for any and all management plans
3. Have population studies in place
4. Disease surveillance in place
5. A separate marketing system in place
6. Education program in place

State Reports

Dr. Jones Bryan stated that in South Carolina, the feral pig is not a game animal. There is no season but hunting license is needed. South Carolina also has no restriction on intrastate movement of feral swine. There are tremendous hunting opportunities available to property owners so de-
population is not an option.

There are Russian Boar hunting operations in the state, in which the animals are totally confined, that were infected to both pseudorabies and swine brucellosis. These herds were cleaned up in 5 to 6 years. He also observed that when hogs are cheap, they are released, even on public land so that the owners could go back and hunt them at a later time. Quarantines are not practical due to swamp-like terrain in a portion of the state.

Dr. Ashby Green stated that Florida is developing a Feral Swine UM&R in Florida. Copies were distributed to participants. Dr. Green encouraged committee to send comments, via, e-mail, to Tommy Dees at deest@doacs.state.fl.us. Florida has less than 10,000 domestic swine but have several million feral swine. Florida has 17.4 million people. The urban/rural interface is spreading resulting in less area to hunt. Politics is a big part of the problem. “Niche” or backyard pigs are a great concern. Feral hogs are being moved out-of-state to the North (Georgia, SC). The labor force, associated with the agricultural production areas in the State, has increased the ethnic demand for feral swine. The ethnic market has a high demand for 30-40 lbs. roaster pigs. Feral swine in Florida are required to be tested before moving. However, this rule is almost impossible to enforce. Show pigs from out-of-state are coming in great numbers. The regulations were written to benefit the kids (exhibitors) and the producers.

As a point of information, some animal groups have challenged the use of gestation crates in Florida and a well-financed effort is underway to pass a constitutional amendment in Florida to make the use gestation crates illegal.

Dr. Maxwell Lea stated that free-roaming swine are owned by somebody. They are commingled and move about on the vast acreages of timberland. Forestry, Agriculture, and wildlife people do not want feral swine. Whenever a PRV positive animal is detected, during the mandatory first point testing, a field vet conducts an epidemiological investigation. The premise is inspected and fills out a list of criteria are used to determine if swine are domestic or feral. The show pigs industry and domestic swine industry use the livestock markets as a terminal sale (one-way marketing) system, culls consigned to slaughter. Dr. Lea recommends States need to get their agriculture departments and wildlife departments to get together concerning wild/feral swine issues. The domestic swine industry is in good shape in Louisiana.

Dr. Max Coats stated that Wildlife Services has provided assistance managing feral swine in more than thirty two states and described some examples of the variation in which state government agencies regulate feral swine. In Texas, feral swine are a non-regulated game species. There are an estimated 1.5 – 2.0 million head of feral swine in Texas. Texas ranks 15th in the number of domestic swine Most of the domestic swine in Texas are in the northern Panhandle. Most of the feral swine live in other parts of
the state. There is PRV infection in feral swine in most areas of the state. Two herds were found to be infected with PRV in CY 2002, both had feral involvement. Texas has feral swine holding facilities to assist in legally marketing of trapped feral animals.

**USDA Wildlife Services**

Noel Meyers from USDA Wildlife Services provided some information about the capabilities that his agency could bring to bear on feral/wild swine issues. His agency has a mandate to conduct research and field operations relating to animal disease and damage control. He reported that feral swine have been documented in more than 30 states. The main problems created that have drawn his agency into feral swine activity have been related to environmental degradation, crop damage, and predation on other animals. They have only recently become involved as a result of animal disease issues. Currently, WS is recruiting a national disease coordinator as concerns related to disease spread between domestic animals and wildlife assumes greater significance.

Current USDA-WS research projects include oral contraceptive studies, barriers, repellants, acoustic, sensory stimulus, and density management.

Dr. Bill Stoffergen, USDA/ARS, gave a report concerning the efficacy of vaccinating against swine brucellosis. A research project used RB51 vaccine in feral swine in South Carolina. They are also looking at the use of vaccine in domestic swine. Vaccine does not infect animals permanently. Could be transient infection but cell-mediated immunity keeps infection under control. ARS is also looking at DNA vaccines. Dr. Coats stated that development of a gene-probe to detect disease resistance in the boar needs to be developed and evaluated.

Dr. Ned Hahn, University of Illinois gave a presentation on molecular markers for PRV. Molecular epidemiology can be used to differentiate feral source virus from domestic swine origin PRV organisms. The differentiation is based on segments of virus material from feral swine that are absent from PRV strains affecting domestic swine. PCR can be used if virus is not isolated. Marker libraries are being developed for domestic and feral strains. A panther, found in Southern Florida, had the feral swine strain. There has been some evidence disclosed that feral and domestic strains can recombine.

**SCWDS**

Dr David Stallknecht gave a brief report on research projects that he felt more clearly address crucial question.

What information do we really need?

i.e.,

Where are the animals? vs. What is the population density?
Where is the disease? vs. What is the prevalence of disease?
What are we trying to control?
Feral swine, or
The disease in feral swine, or
Spread of disease from feral to domestic swine?
Wouldn’t the best strategy be to control the interface between the populations?

Dr Stallknecht research confirmed that once a population becomes infected, infection will persist and that the optimal target animal to evaluate the population for presence or absence of infection is an older animal, especially the boar.

Dr Phil Elzer, LSU, reported gave an update on his vaccine research. Several newly configured novel vaccines are now available for trials and field studies.

Last year’s resolution from this subcommittee through the parent committee was reviewed, discussed, and modified. The working group unanimously supported forwarding a modified resolution to the parent committee with a recommendation for adoption. This resolution was also presented at the meeting of the Swine Brucellosis subcommittee.

Program Standards:
The following changes to the January 2000 Program Standards were approved by the Committee:

Stage IV Surveillance (page 19)

E. Swine import requirements shall be as follows:
Slaughter swine
Infected or exposed swine may only be shipped through or into a Stage IV State/Area with prior written approval from the state veterinarian and must move directly to a recognized slaughter establishment or to an approved slaughter market. Such swine must be accompanied by a shipping permit (VS Form 1-27), and be conveyed in sealed vehicles, and be unloaded under the supervision of state or federal officials to ensure that biosecurity measures are observed.

Stage IV (G) Duration of status (page 20) and Stage V (C) Duration of status (page 21)

In the event of a confirmed case of pseudorabies, the national program coordinator for Veterinary Services shall be notified immediately, and the county or counties within a 2 mile radius of the new case will revert to Stage III status (except as noted below) until 60 days following cleanup and quarantine release. During the 60 days following quarantine release, and before Stage IV status is reinstated, all exposed herds and all swine herds within 2 miles of the new case must be tested with an official random sample test (95/5) and be found negative.

The national pseudorabies coordinator and officials from the state where a confirmed case occurs must notify all 50 states within 24 hours after test results are reported. Such notification is to include the location of the break.
and the circumstances surrounding the case including herd size, clinical signs and type of herd.

If one or more counties revert to Stage III, officials from the state where a confirmed case occurs must immediately notify producers and veterinarians that breeding swine from the affected counties must again be tested for pseudorabies within 30 days prior to interstate shipment.

If the newly infected herd is isolated and disposed of within 15 days after test results are reported and there is no spread to additional premises as determined by testing of all exposed herds and all swine herds within 2 miles of the new case with an official random sample test (95/5), Stage IV status may be maintained. Testing of the above herds must be accomplished with negative results no earlier than 30 days and no later than 60 days after cleanup.

Stage V – Free (page 21)
B. In addition, the State must document that:

2. Surveillance of breeding herds continued at one-half the rate required for Stage III and Stage IV. Once all states have achieved Stage IV or V status, surveillance will no longer be required to maintain Stage V status in states that: have maintained Stage V status for five consecutive years, have had no confirmed cases of pseudorabies during the same period, and have demonstrated that no feral swine exist in the state.

4. Vaccination is not permitted except by permit from the State Veterinarian in certain high-risk herds.

6. States with feral swine must have measures in place that ensure separation of feral swine from the domestic swine population.

Other Business—The Committee approved a proposal to combine the Swine Brucellosis Subcommittee of the Brucellosis Committee with the Feral Swine Working Group. The issues addressed in these two groups are very similar and many of the speakers are the same. The position of the Committee will be forwarded to the President for action.

The Committee approved a Resolution regarding Feral/Wild Swine.
The Committee met at 12:50 p.m., October 22, 2002, in the Jefferson E Room, the Millennium Hotel, and St. Louis, Missouri. The meeting was called to order at 12:50 pm. Dr. John Sanders, Veterinary Epidemiologist with the Center for Food Safety and Applied Nutrition, FDA, College Park, MD made a brief introduction. Thirty two people attended the meeting. 7 were committee members, and 11 requested to join.

Dr. Lisa Ferguson, TSE Coordinator, VS, APHIS, Riverdale, MD presented an update on the TSE situation worldwide. Dr. Ferguson described US efforts on TSE surveillance, including sampling and targeting specific groups. APHIS set a goal of 12,500 national total samples. In FY2002, close to 20,000 samples were collected, which exceeded their goal. The Harvard Risk Assessment Report concluded that the US is very resistant to BSE. The feed ban is a key element of protection. USDA made the commitment to increase surveillance, which it has done.

CWD was first recognized in 1967. APHIS has proposed a captive crevice program.

For Scrapie surveillance 2,711 sheep necropsies were performed. 1,343 third eyelid biopsies were done for validation and 546 regulatory third eyelid biopsies were done. Slaughter surveillance has been started, with 7151 animals collected in phase 1 & 11. 15 positive animals were found on slaughter surveillance. Additional information can be found at www.aphis.usda.gov/oa/bse.

Dr. Ken Waldrup, support epidemiologist, Texas Animal Health Commission, Clebune, TX presented information on the Texas CWD program and CWD. The following is an abstract of his presentation. There are conflicting messages for persons interested in chronic wasting disease (CWD)
in cervids. Wildlife managers must decide if CWD is simply another density-dependent mortality factor or a potential population eliminator. Is CWD a common disease at low prevalence in free-ranging populations or is it a devastating epidemic that will wipe out entire herds of deer or elk? Hunters must decide if venison is a human health risk or not. Public health officials must decide if CWD is indeed a public health risk. Farmed deer and elk producers must decide if CWD is a disease worth depopulating their entire herd or not. Further research is crucial to answering these questions, but, until the answers are found, a single message would be appreciated. Texas will start doing hunter-kill surveillance this autumn (2002). Hunters may send heads directly to TVMDL.

Dr. William D. Hueston, DVM, PhD, College of Veterinary Medicine and School of Public Health, St. Paul, MN presented Public Health Implications of Chronic Wasting Disease. The question that needs to be answered: Is CWD a zoonotic disease? Dr. Hueston started by reviewing the current information and human prion diseases. He pointed out that we have not seen an increase in CJD or clustering in the endemic area CO. But CJD is a rare disease with a long incubation period, so it may be hard to detect with mobile populations and widely dispersed “exposed” group. One way to potentially detect cases is by looking for unusual cases such as young cases with evidence of consumption of deer or elk, or other unusual exposures. Atypical cases with unusual clinical presentations, genotype or neuropathology should be investigated. In six cases involving unusually youthful patients (25, 26, 28, 28, 28, and 31) who consumed deer or elk meat, there was no unique clinic presentation or neuropathology. No unique characteristics of prions were isolated in the biochemical fingerprint (glycosylation patterns). Two cases were found to be GSS, not CJD. There was no strong evidence for a causal link with CWD.

Other studies include in vitro conversion studies by mixing abnormal prion protein with normal prion protein from various species and looking for conversion. They examine the efficiency with which abnormal prion induces in vitro conversion of normal neural protein of another species. The CWD prion readily converted cervid PrP, while it had a lower conversion of non-cervids. It converted human and cattle far less efficiently than cervid, but the human conversion rate was similar to that seen with BSE and scrapie. State initiatives supporting public health risk assessment include strengthening human TSE surveillance to ensure that cases are discovered and investigated, and to address public apprehension. Surveillance to define the prevalence of CWD in free-roaming animals can include hunter-requested testing of individual deer, which provides information on stage of disease. Personal risk management by the public can be addressed by avoiding exposure to high risk tissues and cross-contamination. The pathogenesis of TSE is the accumulation of abnormal prion in brain and lymphatic tissue. Currently, no prions have been detected in muscle meat. The
public is advised not to eat suspect animals displaying signs such as debili-
tation and odd behavior. Tissues where CWD infectivity accumulates if the
animal is affected, i.e., brain, spinal cord, lymph nodes, or spleen should
not be eaten. The following is from the CDC:

“Although it is generally prudent to avoid consuming food derived from
any animal with evidence of a TSE, to date, there is no evidence that CWD
has been transmitted to humans under natural conditions”.

It is vital that we develop risk communication to address potential hu-
man concerns for a new disease with lots of unknowns: potential exposure
to infectivity, continued media attention to BSE/vCJD, and lay press “Mad
Deer Disease”. Risk communication is part of risk analysis. It is critical to
involve public health agencies and stakeholders in decision-making and
policy discussions. There is a need for coordinated educational efforts, media
events, and fact sheets. We should not underestimate the need for exten-
sive education and communications. Dr. Hueston emphasized the follow-
ing points:

- There is a tremendous interplay between animal and human health!
- It is critical to involve all affected government agencies EARLY: agri-
culture and public health
- An open and proactive risk communications plan will be more
effective than reactive “catch-up”
- Principles of risk communication must be applied

Sources of Information

USDA:  www.aphis.usda.gov
CWD Alliance www.cwd-info.org

During the discussion the following question was asked
What is the meaning of negative test? Response, we can not define
safety that is an individuals decision. Testing of hunter harvested deer pro-
vides them more informative to make their safety risk assessment.

Dr. Dennis Slate, USDA-APHIS-Wildlife Services

Dr. Slate provided an update of the status of the National Oral Rabies
Vaccination Program. Assessment was made that rabies has caused few
human death but, due to the public health threat and high cost of living with
an expanding rabies epizootic, there has been increased political support
for funding programs. Evaluation of the future rabies control efforts will in-
clude application of site-specific management tools, population suppres-
sion, contraception, and vaccination of wildlife. Dr. Slate has several maps
showing where ORV was being deployed in 2000, 2001, and 2002 and the
planned deployed in 2003. It was stressed that success will depend on an
interdisciplinary approach.

Dr. Don Lein presented two resolutions
1. National Animal Health Laboratory Network

Both resolutions were passed unanimous with some minor changes.
Dr. Sanders presented information on Public Law 107-188 “PUBLIC HEALTH SECURITY AND BIOTERRORISM PREPAREDNESS AND RESPONSE ACT OF 2002”

There being no further business, the Committee adjourned at 4:30 p.m.
The USAHA Committee on Public Relations and Information Technology met at 3:00 PM on Saturday, October 19, 2002 in the Board Room of the Millennium Hotel, St. Louis, MO.

The Chairman called the meeting to order and introductions of the members present were made, and the Committee welcomed Dr. Quita Bowman, USDA, APHIS to the meeting. Mr. Larry Mark, USAHA Public Information Officer (PIO) and Webmaster gave his report. He shared copies of the press release sent to a wide variety of media outlets announcing the meeting in St. Louis. Mr. Mark also reported on the USAHA website which has received a cumulative total of 63,424 hits since its inception in November 1997. A variety of features are offered on the website, and the membership has been responsive to the ability to access the information. Committee reports and resolutions are offered on the website, as well as proceedings, a membership list and officer biographies.

The Committee discussed actions to determine the breakdown of the membership to include the numbers of veterinarians (state and federal), allied members, individual members, academicians and life members. This will assist the Committee in targeting information to the membership. Further, the Committee agreed to conduct a three-pronged effort to survey the membership regarding their preferences for an electronic or print newsletter and comments on the website. The three methods include, 1.) Informal survey of the membership at the USAHA/AAVLD General Session at the 2002 Meeting, 2.) Brief survey in an issue of the newsletter, and 3.) An email survey of the membership. The informal survey was conducted at the General Session, and approximately 15% of those in attendance responded to the survey. Seventy-two per cent of the respondents preferred to receive the newsletter electronically. The additional information received via the survey will be analyzed by the Committee.

Mr. Mark was congratulated on the success of the website. The meeting adjourned at 5:00 PM.
REPORT OF THE COMMITTEE ON SALMONELLA

Chairman: Dr. Kakambhi V. Nagaraja, St. Paul, MN
Vice Chairman: Dr. David M. Castellan, Sacramento, CA

Dr. Robin C. Anderson, TX; Dr. Joan M. Arnoldi, MI; Ms. Deanna L. Baldwin, MD; Dr. Marilyn F. Balmer, MD; Dr. David H. Baum, IA; Dr. Charles W. Beard, GA; Dr. Charles E. Benson, PA; Dr. Fred D. Bisplinghoff, FL; Dr. Richard E. Breitmeyer, CA; Dr. Max Brugh, GA; Dr. Jones W. Bryan, SC; Dr. Hector M. Cervantes, GA; Mr. Kevin G. Custer, GA; Dr. Dave Dargatz, CO; Dr. Sherrill Davison -Yeakel, PA; Dr. Nicholas M. Dorko, Jr., CT; Dr. Richard L. Dutton, NE; Dr. Robert J. Eckroade, PA; Mr. Kevin M. Elfering, MN; Dr. John I. Enck, Jr., PA; Ms. Kathleen E. Ferris, IA; Dr. James M. Foppoli, HI; Ms. Rose Foster, MO; Dr. Don A. Franco, FL; Dr. Anthony G. Frazier, AL; Dr. Richard K. Gast, GA; Dr. G. Yan Ghazikhanian, CA; Dr. Hashim M. Ghorai, AR; Dr. Eric N. Gingerich, PA; Dr. Robert D. Glock, AZ; Dr. Eric Gonder, NC; Dr. Cheryl Hall, MD; Dr. David A. Halvorson, MN; Dr. Michael Hellwig, AR; Dr. William W. Hewat, NC; Dr. G. Thomas Holder, MD; Dr. Keith A. Honeyger, IN; Dr. William O. James, VA; Dr. Hailu Kinde, CA; Dr. Glenn E. Kolb, WI; Dr. David C. Kradel, PA; Dr. Kenton S. Kreager, IA; Dr. Elizabeth A. Lautner, IA; Dr. Joan Leonard, KS; Dr. Jerry D. Maiers, NC; Dr. John Mason, NY; Dr. Patrick L. McDonough, NY; Dr. Armando Miranda, GA; Mr. Donald S. Munro, PA; Dr. Thomas J. Myers, DC; Dr. Robert L. Owen, NC; Dr. Gary G. Pearl, IL; Dr. Jean Petter, GA; Mr. Ronald E. Plylar, KS; Dr. Benjamin S. Pomeroy, MN; Mr. Albert E. Pope, GA; Dr. G. Donald Ritter, DE; Dr. John P. Sanders, Jr., MD; Dr. H. L. Shivaprasad, CA; Dr. William M. Sischo, CA; Dr. Martin A. Smeltzer, NC; Dr. Bradford P. Smith, CA; Dr. Jill A. Snowdon, MD; Dr. Thomas J. Stabel, IA; Dr. David E. Swayne, GA; Dr. H. Fred Troutt, IL; Dr. Stanley A. Vezey, GA; Dr. W. Douglas Waltman, GA; Dr. Gary L. Waters, MT; Dr. Scott J. Wells, MN; Dr. Ronald D. Welsh, OK; Dr. David H. Willoughby, CA; Dr. Nora E. Wineland, CO; Dr. Richard R. Wood, IL; Dr. Ching-Ching Wu, IN.

The USAHA Committee on Salmonella met from 12:30 p.m. to 5:30 p.m. October 20, 2002 with 76 members and guests. One resolution was proposed at the end of the meeting, however the required quorum of members was not present and no resolution was advanced.

K.E. Ferris from the National Veterinary Services Laboratory in Ames, Iowa presented serotyping results for 18,153 Salmonella isolates from animals and epidemiologically related sources reported during July 1, 2001 through June 30, 2002. A total of 227 serotypes were identified from isolates recovered from animals, their environment, or feed in 43 states and the District of Columbia. The 10 most common serotypes account for 67% of the total isolates reported. S. heidelberg was the most common serotype for the first time.
The most frequently identified serotypes were *S. heidelberg*, *Salmonella typhimurium*, *S. newport*, *S. Kentucky* and *S. montevideo*. Thirty-six percent of the isolates were from clinical disease. *Salmonella typhimurium* was the most common serotype isolated from animals with clinical disease. *Salmonella heidelberg* was the most common serotype identified from monitor samples. *Salmonella newport* isolations continued to increase. This year, 7% of the total submissions were *S. newport*. The majority of isolates of *S. newport* (58%) were of bovine origin.

The percentage of isolates identified as *S. typhimurium* dropped to 15% this year from 20% last year. *S. typhimurium* continues to be among the 5 most frequently identified serotypes from cattle, chickens, swine, horses, and turkeys from both clinical and monitor samples.

There were 25 different serotypes isolated from feed from a total of 45 submissions. The most common serotypes were *S. senftenberg*, *S. typhimurium*, *S. agona*, *S. hadar*, *S. heidelberg* and *S. livingstone*.

Andrew R. Rhorer, the Senior Coordinator of the National Poultry Improvement Plan—USDA APHIS, presented the “National Plan’s Status Report” on pullorum-typhoid status. In the Calendar year 2001, there was one isolation/outbreak of *S. pullorum* reported to the National Poultry Improvement Staff. There was one isolate of *Salmonella pullorum* reported during the Calendar year 2002 from January to October 1, 2002. There have been no isolations of *S. gallinarum* since 1988 in any type of poultry.

Dr. Jennifer Nunnery of the Center for Disease Control and Prevention, National Center for Infectious Diseases presented recent trends in serotypes isolated from humans in USA. The top 5 Salmonella species isolated from humans (and their related % change in prevalence from the previous year) were *S. typhimurium* (decline of 24%), *S. enteritidis* (decline of 22%), *S. Newport* (increase of 32%), *S. Heidelberg* (increase of 34%), and *S. javiana* (increase of 228%). Sporadic human illness related to *S. enteritidis* is associated with the consumption of meat rather than eggs. *S. Heidelberg* is highly associated with eggs, *S. Newport* is associated with alfalfa sprouts and other produce and *S. javiana* is associated with exposure to amphibians in the southeastern USA. Dr. Nunnery said that multi-drug resistant *S. newport* (CCSSuT) is resistant to Amicillin/Clavulinic Acid and that resistance is plasmid-mediated. Dr. Nunnery also stressed the need for animal producers to consider animal feed as an important source of human food borne pathogens.

Dr. Hector Cervantes from Phibro Animal Health in Georgia presented the debate on antibiotic resistance and the industry perspective on the use of Virginiamycin in poultry and livestock. He quoted a number of references on the controversial reports on the use of Virginiamycin in livestock and development of resistance by bacteria to it.

Dr. Paula Fedorka Cray and coworkers from USDA ARS discussed a
multi-agency public health Action Plan that has been developed to address the antimicrobial resistance of food borne bacterial pathogens and its surveillance. They presented a program outline for conducting these studies.

Dr. Anderson, and his co-workers from the USDA-ARS presented results of in vitro and in vivo experiments on the use of experimental preparations containing sodium chlorate in the pre-harvest control of enteric pathogens in broilers, turkeys and pigs. Cattle studies show that experimental sodium chlorate was effective in reducing fecal *E. coli* concentrations. No adverse effects on feed or water intake were noted. The authors said that at present, further cooperative research and development of this technology is underway with an industry partner for application of this product in the field.

Dr. Fossler CP and his co-investigators from the University of Minnesota, Michigan State University, University of Wisconsin, and Cornell University and the Minnesota Department of Health presented results of subtyping of *Salmonella enterica* serotype Typhimurium and Newport isolates from dairy cattle by pulsed-field gel electrophoresis in comparison with subtype patterns from human and ill cattle populations. Their study showed that although *Salmonella* is present on most dairy farms, *S. Typhimurium* and *S. Newport* were less common serotypes on farms in the Midwest and Northeast U.S. Diverse PFGE subtype profiles were identified across a number of farms, with some PFGE subtypes being found on more than one farm. They concluded that subtyping of serotypes play an important role in understanding pathogen movement on farms and through the food system. They said that plans are in place to compare the subtype patterns and antimicrobial susceptibility of these on-farm isolates to clinical isolates from cattle and isolates from ill people.

Dr. Alice M. Thaler and Nathan E. Bauer from FSIS said that regardless of what changes lay ahead with regard to food safety, we need to remember that everyone is accountable when it comes to ensuring food safety; industry, government, and consumers. Industry is responsible for establishing validated and verifiable systems that successfully control hazards. Government is responsible for establishing science-based policies that ensure hazards are controlled and are verified through proper inspection. And consumers have a responsibility to follow safe food handling and preparation practices. With respect to meeting pathogen reduction goals, four FSIS risk management strategies were discussed:

1. Inspection
2. HACCP
3. Performance Standards
4. Microbial Testing

The prevalence of Salmonella on young chicken carcasses in the U.S. from 1999-2000 prepared by Denise Eblan and Victor Cook, OPHS, FSIS, USDA were discussed. The Salmonella Test Results for the Calendar Year 2001
were reviewed. They said that during the last year (CY 2001), Salmonella prevalence in all product categories with performance standards was lower than in agency baseline studies and surveys conducted before PR/HACCP implementation. The results of four years of testing showed that the majority of completed code “A” sample sets met the Salmonella performance standard. A brief update on the FSIS Egg Safety Action Plan and rulemaking was discussed.

Dr. Christopher R. Braden and Dr. Jennifer Nunnery from the Centers for Disease Control and Prevention, Atlanta, GA reviewed Food Vehicles in *Salmonella* Serotype Enteritidis outbreaks of human infections. The number of reported human isolates of *Salmonella* serotype Enteritidis (SE) has declined 45% since the peak of the epidemic in 1995. However, the incidence rate and the number of outbreaks have not declined since 1996. An estimated 213,332 cases of SE infections occurred in the United State in 2001. Though the major vehicle of infection has been identified as shell eggs internally contaminated with SE, other foods may be important vehicles. To describe food vehicles, they reviewed outbreaks of SE reported to CDC through the SE outbreak surveillance system. They concluded that human SE infections continue to be a major foodborne public health problem in the United States. Many of the non-egg foods vehicles identified in outbreaks included multiple items, indicating that SE often contaminates multiple foods during preparation. Of single item food vehicles, poultry was most commonly identified, though the numbers were small. Poultry as a food vehicle for SE was identified in a large sporadic case-control study.

Dr. Mike Opitz from Cooperative Extension /Animal & Veterinary Science Department, University of Maine discussed SE Program Implementation for 14 Years on poultry farms in Maine. The objective of the program was to:

1. Identify SE contaminated premises,
2. Identify risk sources of SE and
3. To clean up these premises and to re-stock these premises with birds coming from SE test negative premises (SE clean birds into SE clean houses).

During the 14-year period participating flocks produced about 15 billion eggs. No egg-associated outbreak of food poisoning in humans was confirmed to be associated with these eggs or flocks. This includes about 3 billion eggs from 230 flocks from houses, which were contaminated with SE at the end of production. Attempts to eliminate SE from the environment has cost the industry a conservative estimate amount of $ 13 million. Their experiences included

1. Elimination of environmental SE contamination from single free-standing houses by standard sanitation, which included wet cleaning, disinfection, rodent control and a down period of approximately 2 weeks or more allowing complete drying out of
the building. SE contamination was not detected in succeeding flock environments. No SE vaccination was done in replacement flocks.

2. Laying flock exposure to SE was primarily due to apparent residual SE contamination of the house or of in-line houses in proximity.

3. Vertical transmission of SE, which persisted into the laying cycle, was the second most common source of flock exposure.

4. Rodents can be a major reservoir of residual contamination and required continuous implementation consisting of facility scouting, rodent sealing and building repair, manure management, adaptive baiting programs and verification by rodent indexing.

5. SE vaccinations reduced fecal shedding and internal organ infection. Field observations strongly suggested their effectiveness in reducing detection of environmental contamination. Some SE-bacterins caused strong reactions that in may affect the onset of egg production. We have seen very inconsistent results with various sanitation procedures and the evaluation of these procedures in combination with effective rodent control and vaccinations is in progress. Third party inspection of houses for adequacy of cleaning, rodent sealing and control is a critical part of our program.

Drs. Gregg Cutler and Rich Dutton presented Field reports on Salmonella enteritidis. Dr Cutler stated that isolates of S. enteritidis (SE) have remained very low in California. Dr. Cutler does not use SE vaccine and stresses that egg producers adhere to strict biosecurity practices, with emphasis on rodent control. Dr. Dutton presented data that illustrated the unpredictable and intermittent isolation of SE from houses with previous history of SE as well as houses without any previous history. Contaminated equipment also plays an important role in the transmission of SE. All positive eggs are diverted for pasteurization.

Dr. Richard K. Gast from USDA-ARS, Southeast Poultry Research Laboratory, Georgia presented research data on effect of in vivo Passage on the frequency of egg contamination by Salmonella enteritidis in an experimental oral infection model in laying hens. The incidence of egg contamination was determined in groups of hens inoculated orally with either a phage type 13a S. enteritidis strain or with derivatives of this strain obtained by serial passage and re-isolation from tissues of infected hens. Passaged S. enteritidis isolates, especially those recovered from reproductive organs, were associated with a significantly higher incidence of egg contamination than the parent strain.

Dr. Brett Hopkins from Biomune vaccines discussed colonization data on live salmonella vaccine from field application techniques. He stated that with live salmonella vaccines the spread of the vaccine between birds is minimal and will not be enough to initiate intestinal colonization, so proper administration of the live salmonella vaccine was extremely critical for suc-
cessful and consistent salmonella control. He said that culturing birds 5-12 days post vaccination could monitor the success of application of live salmonella vaccine. With good application 80 % or more of vaccinates will be colonized with the salmonella vaccine. In cases where there has been 25% or less of the chicks colonized with the salmonella vaccine there have been inadequate administration techniques.

Drs. Sims and J.D. Maiers from Fort Dodge Animal Health presented a 7-week floor pen study that evaluated a live *Salmonella typhimurium* vaccine in commercial Broilers. The study was designed to compare the performance of broilers vaccinated with the Fort Dodge Animal Health’s salmonella vaccine Poul-Vac ST® to non-vaccinated broilers (salmonella only) on a BMD/Stafac feed shuttle program. Mortality and flock homogeneity were not significantly (p>0.05) affected by the use of the salmonella vaccine. Final average live weights were heavier for the group receiving Poul-Vac ST® in each paired comparison and when data were pooled. Final average weights were significantly heavier (p=0.05) when Poul-Vac ST® was administered to broilers on the growth promotant shuttle program. Their data suggested that Poul-Vac ST® vaccine administered at the hatchery followed by a booster at 14 days possibly provides substantial protection to broilers allowing performance to be minimally to not affected by salmonella organisms.

Dr. Sherrill Davison from the University of Pennsylvania presented the results of a study that evaluated the effectiveness of dry cleaning in conjunction with vaccination with *S. enteritidis* bacterins and live *S. typhimurium* vaccines in flocks being placed in 11 poultry houses historically positive for *S. Enteritidis*. Each house previously wet-cleaned, acted as its own control and was assessed after being dry-cleaned and fumigated. She compared cleaning and disinfection of poultry houses using dry cleaning, wet wash down and/or formaldehyde fumigation. There is a concern in the poultry industry that a wet wash down is not an adequate and cost effective method for reducing *S. Enteritidis* and that it may be increasing the amount of *S. Enteritidis* in historically positive houses. After dry cleaning, 5/11 houses remained positive for SE, whereas 6/11 houses remained positive after fumigation. Vaccination with the killed products (bacterins) was considered by the Pennsylvania poultry industry to be a useful and cost effective addition to the *S. Enteritidis* control program.

Drs. Hailu Kinde and David M. Castellan from California reported on current status, research and development on *S. enteritidis* in California. They reported that, between 1998 and 2000, 133 commercial egg-laying ranches were surveyed for *S. enteritidis* using manure drag swabs. Fourteen out of 133 premises sampled were positive for *S. enteritidis*, resulting in a prevalence of 10.5%. *S. enteritidis* phage type 4 was isolated from 11 of 14 (79%) poultry ranches. The remaining 21% was comprised of phage types 1, 5a, 6b, 7, 8, 28 and 35. There were 8 outbreaks reported in 2000—
2001 in California. None of these outbreaks implicated egg or egg related food items. There were no outbreaks reported in 2002 (until October) and only one reported in 2001 in the state. *S. enteritidis* remains one of the tops 5 *Salmonella* isolates recovered from people in California in 2000. The rate of *S. enteritidis* infections has steadily decreased to 3/100,000 in 2000 from 7/100,000 in 1996. The California Department of Food and Agriculture and the Department of Health Services have adopted short term and long-term control strategies for *S. enteritidis*. The short term control measure involves the identification of *S. enteritidis* infected egg laying flocks recognized through trace back investigations from human *S. enteritidis* outbreaks and then diverting contaminated eggs to pasteurization until eggs show four consecutive negative results. The long-term prevention measure is based on the implementation of CEQAP (California Egg Quality Assurance Plan). This voluntary pathogen reduction program initiated in 1994 is comprised of egg producers, egg association representatives, private veterinarians, university researchers, as well as state and federal health and agricultural officials. They commented on their various research and development projects involving *S. enteritidis*.

Michael Jolly from Diachemix Corp, presented recent developments in the use of fluorescence Polarization Assays (FPAs) for the detection of *Salmonella* spp Groups D1 (SE, SP), B (ST, SH), C1 (SM, SC), and C2 (SN) in Chicken Field Isolates. Several panels of samples from vaccinated and unvaccinated chickens from commercial houses were tested by plate, tube, MAT assays, and culture, and compared to FPA results for the above four groups.

Dr. Jean Guard-Petter from USDA-ARS Southeast Poultry Research Laboratory in Georgia presented on an assay of shell quality to increase the safety of the egg supply by decreasing contamination of *salmonella enteritidis*. She said that it is important to improve detection methods so that flocks that are producing contaminated eggs are identified in a timely fashion. She said current approaches for detection do not facilitate real-time detection of contaminated eggs within a time frame that diverts tainted product from market. Her research showed that SE produces a capsule like LPS that mitigates signs of illness in hens by altering the response of the avian reproductive tract to infection. However, it appears possible to detect altered shell quality following infection, because high incidence egg contamination appears to involve co-infection of birds with multiple phenotypes. She concluded that a detection system that focuses on shell quality thus has the potential to improve the safety of the egg supply.

Dr. Johnny Braddy from the Regulatory Public Branch of the Center for Food Safety and Applied Nutrition, US Food and Drug Administration reviewed the egg safety action plan for reducing human illnesses due to SE in eggs. He said that in 1999 the President’s Council on Food Safety identified egg safety as one component of the public health issue of food safety.
that warrants immediate federal and interagency action. The Egg Safety Action Plan identified the systems and practices that must be implemented to reduce and, ultimately, eliminate eggs as a source of human SE illnesses. The risk reduction measures outlined in the plan at all levels of the farm-to-table continuum, along with consumer education and new knowledge gained from research efforts, will combine to make the public health goal of the Council (the elimination of egg-associated SE illness by 2010) a reality. He said that the Food and Drug Administration (FDA) is proposing to require that shell eggs be produced under a Salmonella Enteritidis (SE) risk reduction plan designed to prevent SE from contaminating eggs during production. Production is the first step in the farm-to-table continuum and the successful prevention of SE contamination of eggs at this point is the most efficient and effective way to ensure that public health is protected. The proposed egg safety regulation is part of a broader, interagency food safety program to reduce food-borne illness.
SUMMARY
Serotyping results for 18,153 Salmonella isolates from animals and epidemiologically related sources are reported for July 1, 2001, through June 30, 2002. The most frequently identified serotypes were Salmonella heidelberg, S. typhimurium, S. newport, S. kentucky, and S. montevideo.

INTRODUCTION
Salmonella isolates submitted by animal disease diagnostic laboratories throughout the United States are received at the National Veterinary Services Laboratories (NVSL) for serotyping. The Salmonella are isolated from cases of clinical disease and from herd and flock monitoring. Data are included on Salmonella isolated by the Food Safety and Inspection Service as a result of HAACP testing. Information provided by other laboratories serotyping Salmonella is listed in Table 7.

As in last year’s report, data generated from the serotyping of research isolates are not included in this report. Also, there are two tables presenting serotype information by source, one from cases of clinical disease (listing primary or secondary infection as the clinical role). The other table presents serotypes by source data from monitor samples, environmental samples, feed, and those listing “other” as the clinical role.

DISCUSSION
Serotyping results are presented for 18,153 isolates; a 4% decrease from the 18,923 cases reported last year. A total of 227 serotypes were identified from isolates recovered from animal, their environment, or feed in 43 states and the District of Columbia. The 10 most common serotypes (Table 1) accounted for 67% of the total isolates reported. Salmonella heidelberg was the most common serotype for the first time.

Thirty-six percent of the isolates were from cases of clinical disease. Table 2 lists the 5 most common serotypes from all sources from cases of clinical disease and those from monitor samples (including environmental, feed, and “other”). Salmonella typhimurium is the most common serotype isolated from animals with clinical disease, with S. heidelberg the fourth most common. S. heidelberg is the most common serotype identified from monitor samples. Three serotypes, S. typhimurium, S. heidelberg, and S. senftenberg, are included in both lists.
Isolations of *S. newport* continued to increase. The increase is especially apparent when the percentage of *S. newport* to the total submissions is examined. This year, 7% of the total submissions were *S. newport*, while *S. newport* accounted for 5% last year, and 2% the year before. *Salmonella newport* was the second most common serotype from cases of clinical disease (Table 2) and 14.5% of the isolates from animals with clinical disease were *S. newport*. The percentage of isolates of *S. newport* in cattle from cases of clinical disease increased from 20% last year, to 26% this year. The majority of *S. newport* isolates, 731 (58%), were of bovine origin with 128 (10%) isolated from horses, 79 from chickens, and 68 from companion animals (Tables 5 & 6). The increase in *S. newport* from last year is especially notable in chickens (4 reported last year) and companion animals (17 last year).

As the number of isolations of *S. newport* has continued to increase, isolations of *S. typhimurium* have decreased. This year, *S. typhimurium* was the second most common serotype for the first time since 1994 when *S. enteritidis* was the most common serotype. Twenty percent of all submissions were *S. typhimurium* last year, down from 23% the previous year, compared to 15% this year. The decrease in *S. typhimurium* from cases of clinical disease was similar, with 30% of all submissions last year compared to 24% this year. *Salmonella typhimurium* continues to be among the 5 most common serotypes from cattle, chickens, horses, swine, and turkeys from both clinical disease and monitor samples (Tables 3 and 4).

There were 25 different serotypes isolated from feed from a total of 45 submissions. Fifteen of the serotypes were identified just once. The most common serotypes were *S. senftenberg* (5 isolates), *S. typhimurium* (4), and 3 isolates each of *S. agona*, *S. hadar*, *S. heidelberg*, and *S. livingstone*.

References
Table 1.
Salmonella Serotypes Identified Most Frequently from
July 1, 2001 through June 30, 2002 with Comparison Data for 5 years
(All sources)

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Heidelberg</td>
<td>3043*(1)</td>
<td>3382(2)</td>
<td>3669 (2)</td>
<td>2317 (2)</td>
<td>2113 (2)</td>
<td>1561 (2)</td>
</tr>
<tr>
<td>Typhimurium**</td>
<td>2760(2)</td>
<td>3862 (1)</td>
<td>5221 (1)</td>
<td>4818 (1)</td>
<td>4500 (1)</td>
<td>2915 (1)</td>
</tr>
<tr>
<td>Newport</td>
<td>1271(3)</td>
<td>978 (3)</td>
<td>405 (12)</td>
<td>312 (17)</td>
<td>169 (22)</td>
<td>106 (30)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1203(4)</td>
<td>803 (5)</td>
<td>1239 (3)</td>
<td>1589 (3)</td>
<td>893 (4)</td>
<td>977 (3)</td>
</tr>
<tr>
<td>Montevideo</td>
<td>1025(5)</td>
<td>742 (6)</td>
<td>633 (9)</td>
<td>859 (5)</td>
<td>496 (12)</td>
<td>702 (5)</td>
</tr>
<tr>
<td>Senftenberg</td>
<td>937(6)</td>
<td>703 (7)</td>
<td>722 (7)</td>
<td>839 (6)</td>
<td>902 (3)</td>
<td>465 (10)</td>
</tr>
<tr>
<td>Agona</td>
<td>613(7)</td>
<td>858 (4)</td>
<td>730 (6)</td>
<td>539 (10)</td>
<td>523 (11)</td>
<td>688 (6)</td>
</tr>
<tr>
<td>Muenster</td>
<td>458(8)</td>
<td>578 (8)</td>
<td>442 (11)</td>
<td>492 (11)</td>
<td>340 (15)</td>
<td>322 (14)</td>
</tr>
<tr>
<td>Anatum</td>
<td>454(9)</td>
<td>495 (9)</td>
<td>732 (5)</td>
<td>611 (8)</td>
<td>573 (8)</td>
<td>712 (4)</td>
</tr>
<tr>
<td>Enteritidis</td>
<td>427(10)</td>
<td>272(14)</td>
<td>697(8)</td>
<td>662(7)</td>
<td>630(7)</td>
<td>414(12)</td>
</tr>
</tbody>
</table>

* Number of times serotype was identified
** Includes S. Typhimurium and S. Typhimurium var Copenhagen
() Rank beginning with the most common
### Table 2.
#### MOST COMMON SEROTYPES FROM ALL SOURCES
#### 7/01-6/02

<table>
<thead>
<tr>
<th>Serotype</th>
<th>CLINICAL CASES</th>
<th>MONITOR SAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>1612</td>
<td>Heidelberg 2737</td>
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<tr>
<td>Newport</td>
<td>956</td>
<td>Typhimurium 1148</td>
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<td>Agona</td>
<td>318</td>
<td>Kentucky 1079</td>
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<tr>
<td>Heidelberg</td>
<td>306</td>
<td>Montevideo 800</td>
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<tr>
<td>Senftenberg</td>
<td>295</td>
<td>Senftenberg 642</td>
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<tr>
<td>Total</td>
<td>6606</td>
<td>Total 11547</td>
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### Table 3.
#### MOST COMMON SEROTYPES FROM CASES OF CLINICAL DISEASE
#### 7/01-6/02

<table>
<thead>
<tr>
<th>Animal</th>
<th>CATTLE</th>
<th>CHICKEN</th>
<th>HORSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Typhimurium</td>
<td>713</td>
<td>Heidelberg 63</td>
<td>Agona 135</td>
</tr>
<tr>
<td>Newport</td>
<td>701</td>
<td>Kentucky 33</td>
<td>Typhimurium 134</td>
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<tr>
<td>Montevideo</td>
<td>131</td>
<td>Enteritidis 31</td>
<td>Newport 128</td>
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<td>Dublin</td>
<td>129</td>
<td>Typhimurium 18</td>
<td>Anatum 46</td>
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<tr>
<td>Uganda</td>
<td>89</td>
<td>Senftenberg 16</td>
<td>Muenster 22</td>
</tr>
<tr>
<td>All Others</td>
<td>885</td>
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<tr>
<td>Total</td>
<td>2648</td>
<td>Total 217</td>
<td>Total 757</td>
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<table>
<thead>
<tr>
<th>Animal</th>
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<th>TURKEY</th>
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<tr>
<td>Typhimurium</td>
<td>472</td>
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<td>Choleraesuis</td>
<td>266</td>
<td>Heidelberg 78</td>
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<td>67</td>
<td>Bredeney 55</td>
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<td>All Others</td>
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<tr>
<td>Total</td>
<td>1393</td>
<td>Total 666</td>
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### Table 4.
**MOST COMMON SEROTYPES FROM MONITOR SAMPLES**
**7/01-6/02**

<table>
<thead>
<tr>
<th>CATTLE</th>
<th>CHICKEN</th>
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<tr>
<td>Montevideo</td>
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<td>Kentucky</td>
<td>183 Kentucky</td>
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<td>Typhimurium</td>
<td>158 Typhimurium</td>
<td>168 Typhimurium</td>
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<td>Anatum</td>
<td>78 Schwarzengrund</td>
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<td>Cerro</td>
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<td>All Others</td>
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<td><strong>Total</strong></td>
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<td><strong>3109</strong></td>
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<tr>
<td>Typhimurium</td>
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<tr>
<th>Serotype Name</th>
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<th>Compan</th>
<th>Envir</th>
<th>Horse</th>
<th>Mixed</th>
<th>Reptile</th>
<th>Sheep</th>
<th>SWINE</th>
<th>Turkey</th>
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<th>Wild</th>
<th>Zoo</th>
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### Notes:
- The table lists Salmonella serotypes from various animal and related sources reported during July 2001 to June 2002.
- The data includes counts for each serotype across different animal categories including Avian, Cattle, Chicken, Compan, Envir, Horse, Mixed, Reptile, Sheep, SWINE, Turkey, Unknown, and Zoo.
- The total counts are provided at the bottom of the table.
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RECENT DEVELOPMENTS IN THE USE OF FLUORESCENCE POLARIZATION ASSAYS (FPAS) FOR THE DETECTION OF SALMONELLA SPP GROUPS D1 (SE, SP), B (ST, SH), C1 (SM, SC), AND C2 (SN) IN CHICKEN FIELD ISOLATES

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Abstract

Fluorescence polarization assays (FPAs) and fluorescence polarization inhibition assays (FPIAs) have shown their utility for decades. FPAs have high sensitivity and specificity, and can be used equally well in a laboratory environment or for field use. We, and others, have shown the utility of FPAs in the detection of antibodies to *Salmonella enteritidis* and *pullorum* (SE, SP; Group D1) and *Salmonella typhymurium* (ST) and the subsequent detection, by FPIA, of SE and ST cells in broth culture, in experimentally infected chickens, in a laboratory environment. In order for FPAs and FPIAs to be accepted “in the field” it was necessary to prove the assays “in the real world”. We have also expanded our portfolio to include the specific detection of Groups C1 (e.g., *S. montevideo*, SM and *S. choleraesius*, SC) and C2 (e.g., *S. newport*, SN).

Several panels of samples from vaccinated and unvaccinated chickens from commercial houses were tested by the *S. pullorum* plate test (“plate test”), the *S. pullorum* tube test (“tube test”; PT), the *S. pullorum* MAT test (“MAT”), and culture, and compared to FPA results. The FPA for Group D1 antibodies was found to be more sensitive than those based on agglutination. In addition, where Group D1 was cultured from infected birds (N = 39), The Group D1 FPA identified exposure significantly more often (N = 29) than the PT test (N = 10).

Furthermore, FPIAs were shown to be very useful for the rapid and specific grouping of *Salmonella* spp. (Groups D1, B, C1 and C2) from colonies on culture plates.

Introduction

FPAs have been shown to be useful for the rapid and sensitive detection of antibodies to *Brucella* spp. (1-14), *Mycobacterium bovis* (15,16), and equine infectious anemia (17). We have recently reported on FPAs for *S. enteritidis* (SE; Group D1) and *S. typhimurium* (ST; Group B) in chicken sera and egg yolks (18,19). Since these latter studies were performed with experimentally infected chickens, under laboratory conditions, it was thought necessary to validate the assays on field samples. This report is a prelimi-
nary summary of the data to date. It must be pointed out that the purpose of these studies was to compare the performance of the FPAs with those assays currently in use and not to comment on the efficacy of vaccination.

**Materials and Methods**

The O-polysaccharides (OPSs) from SE and ST were prepared and labeled with fluorescein as previously reported (18,19). Two isolates of *S. newport* (SN1 and SN2; NVSL Salm. #02-13997, bovine, and NVSL Salm. #12621, equine) and two isolates of *S. montevideo* (SM1 and SM2; NVSL Salm. #12495, chicken, and NVSL Salm. #12487, chicken) were kind gifts from K. E. Ferris (NVSL, Ames, IA). The lipopolysaccharides (LPSs) from SN1, SN2, SM1 and SM2 were isolated by phenol-water extraction (20), and the OPSs prepared and labeled with fluorescein in the usual manner. Antisera (rabbit anti Groups D1, B, C1 and C2) were obtained from Difco.

**Panels**

A number of panels, comprising unvaccinated “negative”, vaccinated “negative” and unvaccinated “infected” flocks were tested by the FPAs (Groups D1 and B). Some panels also comprised SE challenged birds. These panels were also assayed by currently employed agglutination-based assays. Birds were also cultured for the presence of *Salmonella* spp.

**Instrument**

The instrument employed was the Sentry™ (Diachemix LLC). It is a single well machine, employing 10 x 75mm borosilicate glass test tubes. It is controlled by a lap top computer and hence can be employed either in the field or in the laboratory.

**FPA (Antibody) Protocol**

20ul of serum was added to 1 ml of buffer (PBSA; 0.01M sodium phosphate, pH 7.4, containing 0.9% sodium chloride and 0.1% sodium azide) and vortexed. The fluorescence of the diluted sample (called “the blank”) was then taken. 10 ul of the appropriate fluorescein-labeled OPS (“tracer”; approximately 100nM) was then added and the mixture vortexed. After two minutes (or longer) the blank-subtracted fluorescence polarization of the tracer was determined.

**FPIA (Antigen) Protocol**

A colony was picked from a culture plate and added to 1ml of water. The mixture was then boiled for five minutes. 100ul of the suspension was added to 1ml of prediluted antiserum (1:50 if not otherwise stated) and vortexed. The background fluorescence was determined and 10ul of the appropriate tracer (approximately 100nM) was added and vortexed. After two minutes (or longer) incubation, the blank-subtracted fluorescence polarization of the tracer was measured.

**Results and Discussion**

Normally in FPAs one uses a cutoff of 10mP delta (the sample gives a reading 10mP ,or more, higher than the mean of the negative controls).
USE OF FLUORESCENCE POLARIZATION ASSAYS (FPAS) FOR THE DETECTION OF SALMONELLA

This corresponds to 5 standard deviations above that of the negative control. However, since these studies involved vaccinated birds, it is more useful to divide the data into populations of birds. Therefore “population A” (centered at approximately 3mP delta) refers to those birds which are clearly negative. “Population B” (centered at approximately 10mP delta) refers to those birds which are either weakly positive or strong suspects. “Population C” (20-40mP delta) refers to those birds which are clearly moderately positive. “Population D” (greater than 40mP delta) refers to strong positives and greater (150mP delta is not uncommon in an infected flock). It must be pointed out that the Group D1 and Group B FPAs are not totally specific. In fact, there is an approximately 30% cross-reaction between the two. Therefore both assays must be performed in order to determine the (probable) status of the bird in question, and therefore the flock status.

Figure 1 shows the distribution of delta mPs for the Groups D1 and B FPAs in an unvaccinated “negative” flock. The plate test was negative on these samples. It can be seen that the vast majority of samples (approximately 80%) fell into population A. Of cause for concern is the presence of a small population falling into population B, and especially the single sample which fell into population C. This latter sample was repeatedly positive by the Group D1 FPA but fell into population A (negative) in the Group B FPA. Furthermore, one sample fell into population B in the Group B assay. This sample was in population A in the Group D1 FPA. These observations imply that this flock, although called “negative” by the plate assay was, in fact, in the early stages of seroconversion for both Groups D1 and B.

Figure 2 shows the distribution of delta mPs for the Groups D1 and B FPAs in a vaccinated “negative” flock. The difference in the Group D1 distribution between this and the unvaccinated flock is remarkable. The vast majority of samples now fall into population B (approximately 80%); population A is virtually absent. This would indicate that vaccination has had a significant impact on the Group D1 status of this flock. The presence of members of population C is consistent with this observation. One sample (population B) was positive by the plate test, but negative by the tube test. The Group B distribution is interesting in that approximately 70% of samples still fall into population A, indicating that vaccination did not have a significant impact the flock’s Group B status. Furthermore, those samples in population D were clearly group B only (population B in Group D1). This might indicate that a true Group B infection has occurred in this flock.

Figure 3 shows the distribution of delta mPs for the Groups D1 and B FPAs in an unvaccinated “infected” flock. The remarkable observation here is that, even though heavily exposed to Group D1, approximately 30% of samples fall into population A. Of the 57 samples represented here, 19 were positive by the plate test. Of these, 16 were also positive by FPA, two of which were MAT positive, with 4 MAT suspects. The three plate test positives fell into population A, indicating plate test false positives (these
samples were grossly hemolyzed – gross hemolysis does not interfere with FPAs). In addition, 5 population C samples were negative by the plate test as were a further 5 population B samples.

Tables 1-3 summarize some preliminary findings from an ongoing study at The Georgia Poultry Laboratory. For the purposes of the study described here, vaccine status is irrelevant. Table 1 shows that of 39 birds in whom D1 was cultured, 29 showed exposure to D1 by FPA; only 10 did so by PT (tube test). There were no samples positive by PT and negative by FPA. Tables 2 and 3 divide the birds into non vaccinates and vaccinates, respectively, and compare PT and FPA results with culture status. In no case was anything cultured from a PT positive, FPA negative bird. Interestingly, there were a significant number of PT positive, FPA positive, culture negative birds. A possible explanation for this is that the high level of antibody present had cleared the organism. An interesting observation is the number of PT negative, FPA positive birds where something other than D1 was cultured. In addition, a large number of birds were PT negative, FPA positive, culture negative. Again, clearance of the organism could be the explanation. Finally, a small number of birds were culture positive and both PT and FPA negative. This could be explained by early seroconversion, where shedding of the bacterium would be expected.

| Table 1. Comparison of PT and Group D1 FPAs with Group D1 Culture positives, all ages, non vaccinates and vaccinates, SE challenged and unchallenged (N=39). |
|-----------------|---------|---------|
|                 | PT –ve  | PT +ve  |
| FPA –ve         | 10      | 0       |
| FPA +ve         | 19      | 10      |

| Table 2. Comparison of PT, Group D1 FPA and culture on samples from non vaccinated birds of all ages, SE challenged and unchallenged (N=117). |
|-----------------|---------|---------|---------|---------|
|                 | PT–ve FP-ve | PT–ve FP+ve | PT+ve FP-ve | PT+ve FP+ve |
| Culture –ve     | 38      | 28      | 1       | 6       |
| Culture +ve C1,B,E | 9       | 16      | 0       | 3       |
| Culture +ve D1  | 3       | 5       | 0       | 8       |
USE OF FLUORESCENCE POLARIZATION ASSAYS (FPAS) FOR THE DETECTION OF SALMONELLA

Table 3. Comparison of PT, Group D1 FPA and culture on samples from vaccinated birds of all ages, SE challenged and unchallenged (N=124).

<table>
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<tr>
<th>Culture –ve</th>
<th>PT–ve FP–ve</th>
<th>PT–ve FP+ve</th>
<th>PT+ve FP–ve</th>
<th>PT+ve FP+ve</th>
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</thead>
<tbody>
<tr>
<td>36</td>
<td>47</td>
<td>0</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Culture +ve C1,B,E</td>
<td>3</td>
<td>8</td>
<td>0</td>
<td>1</td>
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<tr>
<td>Culture +ve D1</td>
<td>7</td>
<td>14</td>
<td>0</td>
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Table 4. FPIAs for Group D1 (STy21a) and Group B (Lexington).

* = 1/25 Dilution of Antiserum. ** = 1/50 Dilution of Antiserum

<table>
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<tr>
<th>Sample</th>
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<th>Group D1 Delta mP</th>
<th>Group B mP</th>
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<td>Group B/10</td>
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Table 4 and Figures 4 and 5 show that the FPIAs are very useful in grouping Salmonella spp. by colony picking. Referring to Table 4, STy21a is the human vaccine strain of typhoid (Vivotif Berna), grown on BBL Brilliant Green Agar. The Lexington Group B was a recent isolate from Lexington KY. Since we are now dealing with inhibition assays, a delta mP of -10 or less is considered positive. A number of agars were tried, since there was a concern that the various dyes added to the media could interfere (i.e., be fluorescent). No interference was observed. As can be seen, there was no question, in any case, as to the group to which the colony belonged.

In conclusion, FPAs and FPIAs are very useful tools for the detection of exposure to Salmonella spp. in chickens and also for the grouping of colonies. They are rapid, very sensitive and specific and quantitative. They are simple to perform and therefore require minimal training. They are very versatile in that the same tracer can be utilized for an FPA or an FPIA and they can be performed one at a time or 1000 per hour (96 wells). They are direct binding assays and therefore cannot prozone. In addition, they are species independent. Finally, the reagents are stable and so FPAs are...
Fig. 1 Panel #9368 (Unvaccinated "Negative").
A) Response to the Group D1 FPA.
B) Response to the Group B FPA
USE OF FLUORESCENCE POLARIZATION ASSAYS (FPAS) FOR THE DETECTION OF SALMONELLA

Fig. 2 Panel #10706 (Vaccinated "Negative").
A) Response to the Group D1 FPA.
B) Response to the Group B FPA.
Fig. 3  Panel #6089 (Unvaccinated "Infected").
A) Response to the Group D1 FPA
B) Response to the Group BFPA.
USE OF FLUORESCENCE POLARIZATION ASSAYS (FPAS) FOR THE DETECTION OF SALMONELLA

Fig. 4 The Specific Detection of C1 and C2 Colonies from Green Agars

Fig. 5 The Specific Detection of C1 and C2 Colonies from Red Agars.
equally at home in the field as they are in the laboratory.

References


Scrapie Research Update (Don Knowles): Four (4) areas were reviewed. First—preliminary glycoform analysis did not show a difference among natural sheep scrapie isolates tested. Continued surveillance of U.S. sheep shows scrapie in sheep with prior genetics of 171QQ. Recently a single case of scrapie in a sheep with 171QR and 136AV genetics was confirmed. An improved method of collecting third eyelid samples was presented. The method uses lidocaine and histamine. Finally, continued studies show that in sheep fetal genetics control PrP-Sc accumulation in the placenta. Fetuses with 171QR do not accumulate PrP-Sc in the placenta of an infected ewe.

Evaluation of various lymphoid tissues for presence of PrP-sc in Scrapie positive sheep (Marie S. Bulgin): Immunohistory chemistry evaluation of lymphoid tissues and brains of 47 sheep determined to be positive for scrapie was done.

These sheep were all of QQ genotype, which were from a naturally exposed research flock. They may or may not have died of clinical scrapie. Of 47 positive animals, 57% were positive by the 3rd eyelids lymphoid tissue, 64% were positive by the mandibular lymph node, 76% by tonsil, 79%
by retropharyngeal lymph mode, 66% mesentoree lymph node and 79% brain. In the case of the eyelid samples, 13% were unreadable. In the case of the mandibular lymph node, only one sample was unreadable. The mandibular lymph node is a fairly easy sample to collect from a live sheep. Since the mandibular lymph node is fairly easy to sample and due to its usefulness in diagnosing scrapie, it should be validated as an acceptable live animal test by APHIS.

**Scrapie Prevalence in Mature Sheep (Nora Wineland):** The Scrapie Ovine Slaughter Surveillance effort was initiated in a start up mode on 4/1/01. The phase 1 for this effort was aimed at refining the approaches and methods for use in phase 2, which is the actual prevalence determination data collection effort. The study includes 12 states with 23 mature sheep slaughter plants and 1 market involved in actual sample collection. Identification on animals sampled is used to determine region of origin for the animal in order to meet the objective to estimate the regional prevalence of scrapie in sheep. Results from phase 1 and phase 2 as of 10/1/02 were presented and discussed. To date we have found 15 positive animals (2 of these were found prior to the 4/1/02 start of phase 2) and have collected samples from over 7,000 animals. We expect to sample approximately 14,000 sheep for phase 2 between 4/1/02 and 3/31/03. Additional data that are being gathered in this effort include age (based on teeth), face color (as a surrogate for breed), region. Tests conducted as part of this effort include Prp Codon 171 genetics and IHC on tonsil, retropharyngeal lymph node, and obex.

**TSE testing at NVSL (Mark Hall):** NVSL is expanding the laboratory network to meet the demands of scrapie testing. 15 contract labs will be running by year-end. NVSL will continue to evaluate other tests as they become available with input from the USAHA Scrapie Test Validation Subcommittee when appropriate, but currently are recommending testing of BOTH brain and lymphoid tissue by immunohistochemistry.

**Scrapie Test Validation (Nora Wineland):** An update of progress on the collaborative ARS/APHIS effort to validate the third eyelid test according to standards defined by OIE was provided. This effort would not be possible without the efforts of many dedicated folks including those producers who agreed to wait for test results and animal selections for necropsy and quarantine. OIE requirements for validation stipulate a blinded trial approach of testing at least 300 known disease positive and 1,000 known disease negative animals. As part of the validation effort, selected animals are being placed in long-term quarantine facilities to allow determination of true disease status without confounding results by continued/additional exposure. To date 168 flocks have been involved in testing for this effort and 3,830 animals have been sampled used the third eyelid test.

**Scrapie Flock Certification Program (Dianne Sutton):** As of 9/30/02, 1533 flocks were participating in the Scrapie Flock Certification Program.
SHEEP AND GOATS

(SFCP), of which 78 are at the certified level; 1,446 are complete monitored; and 9 are selective monitored flocks. During FY1997 thru 2002, substantial increases in enrollments into the program occurred with 641 flocks joining in FY 2002.

Scrapie Infected and Source Flocks (Dianne Sutton): As of 9/30/02, there was 42 scrapie infected and source flocks. In FY 2002, 94 infected flocks were newly detected and over 259 scrapie cases were confirmed and reported by NVSL. Eighty-six flocks have been released from infected or source status or put on clean-up plans in FY 2002. Five cases of scrapie in goats were reported in FY 2002. During FY 2002, 11,751 animals were tested for scrapie. Laboratory testing has been taking 10 to 11 days on average. During FY 2002, 9.9 million plastic and 6.0 million metal tags were distributed by APHIS.

NAHMS sheep 2001 study (Katherine Marshall): The presentation described the genotyping, OPP, Johne’s and biosecurity results from the NAHMS Sheep 2001 study. Overall, 16% of the 11,754 samples, which were genotyped, had the RR allele, 44% were QR, and 39% were QQ and 1% of the samples had the H allele. There was a difference in genotype distribution between the black faced and white-faced breeds. The black-faced breeds had a greater percentage of animals with the QQ genotype than the white-faced breeds, 44% verses 36% respectively. All breeds tested had the R allele, and some of the non-British origin black faced breeds had a much higher percentage of animals with the RR genotype than the general population. Blood samples were collected from 682 operations for OPP testing. Overall, 36.4% of operations were seropositive for OPP, and 24.2% of animals were seropositive. A similar number of operations (682) and samples (21,357) were tested for ovine Johne’s disease. The overall operation level seroprevalence for ovine Johne’s was found to be between 4.7 and 10.9% depending on whether a positive flock was defined as having at least one or at least two positive samples. The overall animal level seroprevalence for ovine Johne’s was 0.8%. With regard to biosecurity practices on US sheep operations, 84% of sheep operations allowed visitors to have access to their sheep grazing areas. Of these, only 22.6% had any biosecurity requirements for the visitors to their operations. Perhaps the low level of Johne’s seroprevalence indicates a window of opportunity for Johne’s control in the sheep industry. However, there is a need for a broad industry educational effort to control not only Johne’s and OPP but also for general biosecurity issues on sheep operations. More importantly, there is a need for better tests, which can provide accurate detection of Johne’s in sheep.

Livestock Insurance (John Green): The Risk Management Agency, USDA and the APHIS, USDA have contracted to investigate the feasibility of livestock insurance programs in the U. S. The contract has three (3) basic goals:
1. Conduct listening sessions with producers groups to learn of their major perils, management plans and insurance needs.
2. Conduct an international/domestic livestock insurance conference to be held November 5-7, 2002 in Ft. Collins, Colorado.
3. Determine data needs/actuarial requirements for insurance companies to define policies and determine premium levels.

Results from listening sessions with National Pork Board/producers, NCBA and Delmarva Producers were reported.

**Anthelmintic Resistance in Sheep (Bill Shulaw):** Anthelmintic resistance in sheep and goats has been documented worldwide and has been observed in the southern United States for at least ten (10) years. Recent incidental reports and documented investigations suggest that it is occurring in other parts of the United States as well. In Ohio we have documented ivermectin resistance in two flocks of sheep and have evidence that the cold winter environment poses no barrier to establishment of ivermectin resistant *Hemonchus contortus*. Of universal concern is the obvious lack of new chemical classes of anthelmintic in the drug approval process or in the investigational stages to address this concern. Apparent widespread animal movement of animals carrying resistant parasites, extra label use of persistent drugs in the avermectin class, and almost complete dependence on anthelmintics for parasite control by producers of sheep and goats are considered to be important reasons contributing to the increasing occurrence of anthelmintic parasites. Alternate approaches to control parasitism in flock settings typical of US flocks must be developed and validated.
The committee met on October 21st and 22nd, with 147 attendees and the following reports were presented:

1. Update on APHIS

   **Live Bird Market Activities in the Northeastern US 2001 - 2002**
   
   Prepared by Dr. L.L. Bulaga, USDA, APHIS, Veterinary Services
   
   Presented by Dr. Linda Detwiler, USDA, APHIS

   The second phase of an epidemiologic study of the live bird marketing system was conducted in August–November 2001. The descriptive and
surveillance cross-sectional study of suppliers to the New York and New Jersey live bird markets (LBMs) had 83 per cent participation with no H7 or H5 virus detected on participating premises. The study showed current biosecurity practices could permit entry of the avian influenza virus (AIV) to supplier premises. Lapses included one third of premises never being empty of birds, loading and unloading directly from houses, and direct contact with LBMs by 25% of producers included in the study. From April 8 – 10, 2002 all LBMs in NY, NJ, PA, and New England were closed, depopulated of all animals, cleaned and disinfected (C&D). Markets were permitted to re-open after C&D approval by veterinary regulatory officials. Environmental samples were collected after C&D; all were negative for H5 and H7 by virus isolation. Some markets had birds retested off of supply trucks at restocking. H7N2 was isolated from birds entering the market; tracing revealed the birds originated from AIV test-negative flocks in Pennsylvania. Follow-up studies to the closure indicated markets stayed H7N2 negative for about one month post closure, even with the maintenance of excellent sanitation. To periodically break the virus cycle, mandatory quarterly depopulation, C&D of LBMs is being considered in NY and NJ. While the LBMs are sentinels for viruses in the live bird marketing system, virus is entering the markets from supply channels, some birds come to the markets from outside of the northeastern US, and positive birds cannot be accurately traced to the flock of origin. Regional programs to eliminate H7 and H5 from the LBMs have not prevented re-entry of the virus. A national program of H7 and H5 control and certification is needed.

2. OIE Report on Avian Influenza

**OIE Plans to Review the Definition of Avian Influenza**
Presented by Dr. James Pearson

A report on OIE plans to review the definition of avian influenza and the process by which it may be changed was given.

3. Avian Influenza Workshop—Recent Outbreaks

**Outbreak of Low Path H7N2 in Virginia**
Prepared by Thomas J. Holt, USDA, APHIS, VS
and Bruce L. Akey, VDACS
Presented by Thomas J. Holt

This paper is found in the Proceedings on page XXX.

**Avian Influenza in Virginia – An Industry Veterinarian’s Perspective On Prevention and Control**
Dr. Daniel Karunakaran, Cargill Turkey Products

The first case of Avian Influenza in commercial poultry was reported on March 7, 2002. It lasted for four months with a last case diagnosed on July
2, 2002. During this period 197 farms got infected with the virus. The poultry industry in Virginia incurred in excess of 120 million dollars in losses from this outbreak. The virus involved in this epidemic was a low pathogenic H7N2 strain very similar to the one that has been circulating in the live bird markets system of Northeast United States.

The virus proved to be highly infectious to turkey flocks in the area with over 75% of the infected farms happened to have commercial meat type or breeder turkeys. The disease affected 31.2% of all commercial turkey farms, 62% of all breeder turkey farms, 3% of all broiler farms and 15% of all broiler breeder farms in the area. The symptoms include upper respiratory signs with very low mortality. The egg production was very severely affected in turkey breeder hen. Most infected flocks recovered and returned to normal health with in 2 weeks.

The response of an USDA accredited veterinarian working for the company with the index case and the following response was critical. With in a week of diagnosis, the breeder hens at the index farm were humanely euthanized and buried on the farm and the farm was depopulated. With in 4 working days NVSL isolated the agent, identified it to be a low-path H7N2 virus and finger printed the gene sequence to be similar to the virus circulating in the LBMS of the northeast. The infection continued to spread in spite of control efforts. Best Biosecurity procedures prevalent on breeder farms failed to stop the introduction of this highly infectious virus. The use of a killed vaccine was approved by USDA-APHIS in breeders in Virginia, however the state did not approve the use.

This virus from the live bird markets gained entry first in to commercial turkeys in North Carolina through quail operations in the area. One of the infected turkey flock transported to Virginia became the source of infection. To prevent future AI introduction to commercial poultry aggressive efforts should be made to clean up the virus at its source, namely the LMBS. This virus has been progressively changing since 1994 to a gene combination required being a highly pathogenic type. This makes it all the more urgent for this virus to be eradicated NOW. The recent efforts made by the NE states and the USDA in the clean up of the LBMS has paid big returns. Immediate resources need to be made available to maintain this momentum to accomplish this goal and reduce the risk of this virus to the poultry industry.
REPORT OF THE COMMITTEE

Summary of Avian Influenza in North Carolina:
March – April 2002
Prepared by Jo Anna Quinn, DVM, MAM, NPIP Coordinator
and David Marshall, DVM, State Veterinarian
North Carolina Department of Agriculture
Presented by David Marshall

1. Demographic information

North Carolina has a large and diverse poultry population. The state ranks forth in the nation in broiler production, producing over 712 million broilers in 2001. North Carolina’s commercial turkey production in 2001 was 43 million birds, ranking second in the nation. The state produces approximately 15% of the nation’s chicken hatching eggs with over 12 million chicken breeders. There were over 1.4 million turkey breeders raised in the state in 2001 that produced over 30% of the nation’s turkey hatching eggs. The state also has a large number of backyard and exhibition poultry flocks as well as quail and other game bird producers. The number of birds in those flocks is not known. There are over 5800 poultry farms of all types located in the state.

In the avian influenza outbreak that occurred in North Carolina in March and April of 2002, there were 12 premises affected with a total of 63,605 birds.

2. The chronological history of the cases of Low Path Avian Influenza in North Carolina

On March 6, 2002, North Carolina Department of Agriculture & Consumer Services (NCDA & CS) was notified by the Virginia Department of Agriculture and Consumer Services that a North Carolina turkey flock processed in Virginia was positive for AI on serum collected at processing. The farm of origin was quarantined immediately although there were no turkeys left on the farm. Surveillance was initiated within a 2 mile radius area. From the serum NVSL was not able to determine the hemagglutinin type. The neuraminidase was determined to be N2. No samples were taken for virus isolation prior to processing. There were no birds available for sampling after they were known to be infected with avian influenza. No clinical signs were reported prior to processing but, in retrospect, there were some very mild respiratory signs in the flock. Mortality was within normal limits.

Increased surveillance for avian influenza in the area of the positive flock was initiated. As a result of the increased area surveillance, NCDA & CS detected one additional positive turkey flock and a positive quail flock at a nearby shooting preserve. Both were diagnosed on March 20, 2002 and the premises were quarantined. The turkey flock was exhibiting respiratory signs but no unusual mortality. Virus was isolated from this flock and was identified as a low pathogenic strain of H7N2 subtype. The quail showed no
clinical signs. Serology was positive for H7N2 influenza but virus was not isolated. All birds on both farms were depopulated on March 23, 2002. Surveillance was extended to a six mile radius.

Source flocks for the shooting preserve were identified and tested. One breeding quail flock was found to be positive and was quarantined on March 22, 2002. This flock exhibited no clinical signs or unusual mortality. The virus subtype was identified as H7N2 from serum samples. Virus was not isolated. The flock was depopulated on March 26, 2002. Movement of quail out of this flock was traced for the previous 3 months. Seven premises in North Carolina were identified as having birds that originated from the positive farm. All were tested. Four premises had positive birds and were depopulated on March 29, 2002.

Area testing around the quail breeding flock identified a positive backyard mixed poultry flock on adjacent property March 29, 2002. The flock was depopulated the same day. The owner of this flock made regular trips to the market in New Holland, PA to sell goats. Two additional backyard chicken flocks with connections to the mixed poultry flock were identified as positive on April 8 and April 25. Virus was isolated from one of the flocks. It was identified as low pathogenic AI, subtype H7N2. The flocks were depopulated on April 12 and April 30.

A broiler flock in the area of the initial positive turkey flocks was identified as positive on pre-slaughter surveillance testing on April 22, 2002. There were no clinical signs to indicate that they were infected with AI. The flock was depopulated on April 24, 2002. Virus isolated from the flock was identified as low pathogenic AI, subtype H7N2.

None of the infected flocks exhibited the characteristic signs of highly pathogenic avian influenza nor did they exhibit high mortality.

Although these cases involved a low pathogenic strain, NCDA & CS implemented aggressive control measures including quarantine, depopulation, cleaning, disinfection and increased surveillance. State monitoring and biosecurity measures were implemented.

There have been no positive flocks identified since April 25, 2002.

A summary of positive flocks and significant dates follows.

* Indicates commercial flocks. All others are non-commercial flocks.

3. Strategies used in managing the outbreak in North Carolina

- Immediate quarantines on positive farms.
- Depopulation of positive flock as soon as possible following confirmation. Disposal occurred on or near the farm.
- Epidemiological investigation performed following confirmation.
- Area maps were generated when an infected flock was suspected. The NCDA & CS has an extensive database on poultry farms. Poultry locations and farms are identified by QBSP and GPS locations.
- Maps showed the positive farm and the farms located within a 2 mile
and 6 mile radius. Lists of these farms were generated and used to monitor testing in the area of the positive farms. The commercial poultry farms identified as positive were in very close proximity to one another (within 2 miles).

- All farms within a 2-mile radius were tested within 48 hours of finding a positive farm.
- All farms within a 6 mile radius were tested within 1 week of finding a positive farm.
- Surveillance was conducted on all farms within a 6 mile radius at 2 week intervals.
- All farms within a 6 mile radius were tested within 72 hours of movement.
- A permit was required to move birds out of the 2 mile radius.
- Farms within a 6-mile radius were required to dispose of all mortality on the farm.
- Placements within the 2-mile radius area were delayed in order to reduce the susceptible population in the area.
- Cancellation of all poultry exhibitions, sales and auctions.
- Enhanced biosecurity practices.
- Monitoring of rendering sites.

4. Origin of AI in North Carolina

This virus sequences were the same as the low pathogenic avian influenza virus that has been circulating in live bird markets (LBM) in New York and viruses recently isolated in Pennsylvania and Virginia. While no direct ties to the LBM’s in New York were identified, they are suspected. A link from one North Carolina backyard chicken flock to a Pennsylvania market was identified.

5. Surveillance and control of this disease: National vs. the affected State’s responsibility

The NCDA & CS Diagnostic Laboratory System performs agar gel precipitin testing on serum samples. The National Veterinary Services Laboratory (NVSL) provides reagents. The NCDA & CS Diagnostic Laboratory System also has the capability to perform an antigen capture ELISA test (Directigen®) and virus isolation. Positive serum samples are sent to NVSL for subtyping; viral isolates are sent to NVSL for subtyping and pathogenicity typing. Isolates of high pathogenicity are handled under Federal emergency programs. Low pathogenicity strains are the state’s responsibility.

North Carolina has a surveillance program that has been in effect for over 18 years. The program consists of the following testing:

a. Testing a portion of all blood samples submitted to the Animal Disease Diagnostic Laboratory System one week each month.
b. Testing all samples for AI when the submitter requests it.
c. Testing all birds submitted to the Animal Disease Diagnostic Laboratory System that show signs compatible with AI as well as testing any bird over 4 weeks of age from which a blood sample
may be obtained.

d. Testing eggs for yolk antibody on all commercial layer flocks in the state every 3 months.

With the development and approval of an Avian Influenza Clean program for meat-type chicken breeders, turkey breeders, and exhibition poultry in the National Poultry Improvement Plan, we are actively encouraging participation. Response has been excellent.

The NCDA & CS Animal Disease Diagnostic Laboratory System has tested a large number of samples for AI. For the six month period beginning January 1, 2002 and ending June 30, 2002 the laboratory tested 78,828 samples by the agar gel precipitin (AGP) test. Following is a chart indicating the number of samples tested in the previous five years.

6. Summary and Lessons Learned

• Immediate response and action is necessary in controlling the disease. Despite LPAI not being officially an OIE Foreign Animal Disease (FAD), the contagious nature of the virus, integration of today’s poultry industry, and potential negative trade ramifications dictate aggressive response. Immediate activation of the state’s emergency FAD response plan is beneficial.

• Daily communication with the industry is important. If logistics allow, an immediately convened meeting in a central location is desirable. Electronic daily Situation Reports (Sit Reps) and Incident Action Plans (IAP’s) promote maximum communication and coordination of efforts. A minimum of one designated industry liaison in addition to the Incident Commander is necessary.

• Geographical Information System (GIS) capabilities are necessary to manage movement restrictions, surveillance, and epidemiology. An LPAI incident underscores the importance of an integrated laboratory and GIS database system. Mapping capabilities are necessary for identifying positive and dangerous contact traceout farms, establishing restricted and control zones, and tracking surveillance testing.

• Even in a small outbreak, existing state and federal regulatory personnel will rapidly become overwhelmed. Additional resources capable of support should include other division employees with regulatory experience, private practitioners and extension agents previously trained in emergency response, and Veterinary Medical Assistance Teams (VMAT’s).

• Laboratory surge capacity must be available in response to increased demand from surveillance and interstate movement testing requirements secondary to a confirmed positive.

• Immediate, timely, and accurate information exchange must be conveyed between the affected state and other state and federal regulatory officials, as well as the USDA-Veterinary Services.
Low Pathogenic H6 N2 Avian Influenza in California
David M. Castellan, DVM, MPVM, Diplomate ACVPM, CDFA

During the second week of February, 2000 chickens were submitted to the California Animal Health and Food Safety Laboratory (CAHFS) from two separate veterinarians on behalf of a backyard chicken owner in Ventura County and a commercial egg producer from San Bernardino County. Low Pathogenic H6 N2 Avian Influenza Virus (AIV) was isolated from chickens at both premises, representing the first recorded cases of Low Pathogenic H6 N2 AIV associated with chickens from California. Subsequent laboratory analysis indicated both viruses were closely related with no epidemiological link, indicating that migratory waterfowl or water birds may have been the original source of the virus. The primary pathological effects involved the respiratory and digestive systems.

A positive case was defined as a premise with positive virus isolation of H6 N2 AIV or one with positive serology for AIV by A.G.I.D. Eight of fifteen egg layer premises tested were positive for H6 N2 AIV out of a total of 15 ranches. Epidemiological findings of these investigations follow:

- A mild increase in mortality from 0-2% above expected values over a 2 week period with consideration for strain and stage of production
- A decrease in egg production ranging from 0-30% over a two week period

Risk Factors Identified Included:
- Movement of Layers, Equipment, People
- Proximity to Live Bird Market or Positive Premises
- Owner Observed Waterfowl or Water Birds on Premises During Preceding 90 Days

The role of concurrent disease in accounting for mortality, morbidity and decrease egg production requires further study.

Veterinarians and egg producers began implementing more rigid biosecurity measures as a result of the incursion of Low Pathogenic H6 N2 AIV. More notably, a vaccine pilot project was initiated on an egg production premises using a killed H6 N2 vaccine with the support of the U.S.D.A. and the C.D.F.A. It is foundational, that successful prevention and control of H6 N2 AIV using vaccine depends on a coordinated flock health plan that stresses biosecurity.

During 2001, H6 N2 AIV was detected on 6 occasions including the first isolate from Northern California. A second H6 N2 AIV subtype was identified at several of these locations. Two additional egg layer premises were also enlisted in the vaccine pilot project during 2001.

In February of 2002, a new series of related outbreaks of H6 N2 AIV occurred in San Diego County. A pathological tropism for the reproductive system resulted in more severe egg production drops of up to 60% over a 5-day interval on some affected premises. By mid-March, the H6 N2 AIV was disseminated to Northern California layer and meat bird premises (Tables 1 & 2). The case definition was expanded to include premises with a positive Directigen test. Molecular interpretations indicated a common
source for all H6 N2 AIV isolates, however some heterogeneity became evident by 2001 and by 2000 with the identification of at least 2 and possible three subtypes related to genetic re-assortment. Thirty-seven commercial layer premises and 55 commercial meat bird flocks representing approximately 31 premises are considered incident cases in California thus far in 2002. Both externally and internally derived sources have been responsible for virus introduction onto premises previously negative for H6 N2 AIV.

Both H6 N2 and H6 N8 killed AIV vaccines have been used in conjunction with heightened biosecurity, to reduce the prevalence of H6 N2 AIV and associated production losses. Previously positive and high-risk premises are currently enlisted in the H6 N2 AIV Vaccine Pilot Project. Over 8 million doses have been administered to date, using an initial dual series protocol. Field challenge is being assessed through the judicious use of sentinel birds in vaccinated flocks. Data is being collected that will assess vaccine efficacy and biosecurity. Variables to be assessed include details of the vaccination process, characteristics of vaccinated and sentinel birds as well as laboratory results.

Ongoing cooperative efforts among all shareholders are being directed in the areas of communication, research, education and outreach using a science-based approach to support decision-making. Research is aimed at both broad as well as focused studies including case-control methods, field research during and following clinical outbreaks as well as experimental studies. Industry leaders are developing sound, market-based strategies to further prevent and control H6 N2 AIV, utilizing aggressive biosecurity measures and vaccination.

### Table 1
2002 California H6 N2 Incident Commercial Layer Premises (n = 37)

### Table 2
2002 California H6 N2 Incident Meat Bird Flocks (n = 55) on 31 Premises

The Role of APHIS in the Control of Low Path H5 and H7 subtypes of Avian Influenza and the Status of APHIS funding
John R. Clifford, DVM, APHIS, VS
National Animal Health Policy and Programs

The basic roles of APHIS will continue to be support for our two key programs of the National Poultry Improvement Plan (NPIP) and the National Veterinary Services Laboratory (NVSL). The NPIP in its capacity to certify/authorize laboratories to conduct screening tests for avian influenza (AI) and to certify flocks as AI-clean; and NVSL in its capacity as the reference laboratory for AI virus isolation and pathotyping and as the major source of AGID antigen.
APHIS has tried to carefully consider the proposals from AI working groups of this USAHA committee on transmissible diseases of poultry and the NPIP working groups in drafting core budget documents that outline a national H5 and H7 low pathogenic avian influenza (LPAI) for FY 2004. However, the first public discussions of all these proposals will be today in this committee which APHIS will duly note and record. APHIS will then take these State-Federal-Industry discussions and reconfirm details with various poultry industry groups thru the NPIP and the Veterinary Services Management Team.

For clarification, APHIS will have national LPAI program goals of controlling and eradicating H5 and H7 subtypes of LPAI from live bird markets and of encouraging States and industry to continue surveillance for AI, in spite of unjustified and unscientific trade bans. (It would be a serious mistake and irresponsible to de-emphasize AI surveillance and later try to confront a major H5 or H7 outbreak of low or high pathogenic AI that had already spread extensively.) The APHIS national program would propose 50 per cent indemnity of market value of poultry destroyed due to H5 or H7 LPAI. An initial focus and priority start-up activity will be to control and prevent the circulation of the H7N2 virus currently found in northeastern USA live bird markets.

In a related activity, APHIS will work with USDA, Agricultural Research Service (ARS) in the upcoming rewrite of the OIE Animal Health Code on Highly Pathogenic Avian Influenza to try to ensure that the lack of significant risk for LPAI in international trade is duly noted and that references to incubator/hatchery contamination not be confused with true vertical egg-transmission.

The status of APHIS funding for a national H5 and H7 LPAI program is that we are looking at any and all means to fund the program in FY2003 before our new official line-item program begins in FY2004.

Key Updates on Poultry Trade Problems
K. Preston, USDA, APHIS, VS
National Center for Import and Export

Trade Bans due to Exotic Newcastle Disease in CA:
As of 10/11/02, the following countries had some level of ban on U.S. poultry: Canada, European Union, Japan, Korea, Nigeria, Poland, Tahiti (French Polynesia) and Taiwan.

Russian Federation:
The Russian Federation officially adopted a new Food Safety Inspection Service (FSIS) Bilingual Export Certificate for Poultry Meat. Its more controversial statements for APHIS cover on-farm inspections, very restrictive requirements on all (15) subtypes of avian influenza (AI) and complicated low pathogenic avian influenza (LPAI) statements. The FSIS Library
of Export Requirements contains the most explicit instructions for AVICs and State Veterinarians for the Monthly State Certification Letter that should be co-signed. Their web site is www.fsis.usda.gov/OFO/export/explib.htm. The USA Poultry and Egg Export Council at www.usapeec.org also has key information on when and where the Russian Federation veterinary inspection teams will be in the USA to recertify all (350) FSIS poultry plants that export to Russia. The first group is currently scheduled to begin inspections the week of Oct. 21, 2002.

Everyone in the AVIC chain-of-command and in the State Veterinarian’s offices should be “conversant and knowledgeable” on the different avian influenza status levels that a State may be classified into by the Russian Federation. Additionally, State diagnostic labs and APHIS, VS, National Poultry Improvement Plan (NPIP) authorized labs along with Official State Agency contacts should be familiar with the APHIS, VS (Schematic) Document “Communication of AI Testing Required for Reports to the Russian Federation”. (Both NPIP Approved Laboratories and Official State Agencies can be found on the NPIP web site of www.aphis.usda.gov/vs/hpip.) Key personnel should be able to find and explain this document to any of the Russian review teams. Each lab plus AVICs and State Veterinarians should remember that after a positive non-H5 or H7 serological case is diagnosed at the National Veterinary Services Lab (NVSL) a temporary State-wide 15 bird/flock sampling program, in FSIS plants that export to Russia, would be required. Also some compliance oversight must be done to make sure the index county and adjacent counties are alerted that they would be ineligible to export to the Russian Federation for 30 days.

Currently only CA, CO, TX, VA and WV are under some level of Russian trade ban due to LPAI. At any time, the status of a State’s eligibility can be confirmed by consulting the web site of the FSIS Library of Export Requirements. (Under “Country Requirements Chronological” one can see the date and country for the latest export requirements.) Also, under the current Russian Federation requirements, it is mandatory that APHIS immediately notify Russia of every single AI serological diagnosis from NVSL. Additionally, Veterinary Services has had to dedicate an e-mail account in Riverdale to assist in getting the new regulations implemented. The e-mail address is AI@aphis.usda.gov.

Japan:

US poultry industries and some US govt. officials strongly contend that if Japan had been dealt with firmly in early 2002 and their precedent-setting LPAI restrictions defeated—then the worsening LPAI restrictions from Russian, Korea, India, Mexico and other countries could have been avoided.

Japan continues to apply their import protocol that dictates a “stamping out” or depopulation regulatory response to all H5 and H7 detections, including live bird market supplier flocks. They also have a premise cleaning & disinfection requirement as well as a requirement for increased surveil-
lance around all detections. Under this current import protocol, it is mandatory that APHIS immediately notify Japan of all H5 and H7 AI detections. Japan continues to automatically ban ALL U.S. poultry and poultry products anytime they are notified of an H5 or H7 detection. All U.S. poultry continues to be held at Japanese ports until APHIS furnishes very detailed information including presence or absence of clinical signs, diagnostic techniques used, source of infection, names of counties affected and type of farm or premise. Only after the final NVSL pathotyping by amino acid sequencing data or chicken inoculation will Japan allow any US poultry or product to enter. Currently only VA, NY and CA are banned due to LPAI. A possible emerging issue, that the Japanese delegation raised during their review of VA in September 2002, may be West Nile Fever Virus in poultry.

**Mexico:**

Mexico continues to have confusing AI hemagglutinin inhibition (HI)
testing requirements on table eggs, hatching eggs, day-old chicks and live poultry. Mexico has also raised the issue of West Nile Fever virus in poultry.

Three Critical APHIS, VS, CEAH Studies on LPAI:
1. A LPAI prevalence study by State has been formally requested by Japan’s Ministry of Agriculture, Forestry and Fisheries (MAFF). It is due as soon as possible and will form the basis of calculating the level of risk that MAFF will use in their calculations to maintain LPAI restrictions on the USA.
2. A LPAI Risk assessment on the AI risk of US poultry meat to Japanese wild waterfowl is needed for a Dec. 2002 OIE Arbitration Panel. Currently, it is thought that a complete risk assessment would actually consist of several interrelated steps. APHIS would provide hazard identification and release assessments. MAFF-Japan would have to calculate the exposure assessment and the consequence assessment. The OIE Arbitration Panel members are Dr. D.J. Alexander (UK), Prof. E.F. Kaleta (Germany) and Dr. Ilaria Capua (Italy). The panel will be chaired by Dr. David Wilson, Head of OIE International Trade Dept. Presenters for USDA may be Dr. Cristobal Zepeda, Dr. David Swayne and others.
3. A joint US-Russia avian influenza risk analysis/research is to be developed with the USDA, Agricultural Research Service (ARS) to try to get the overly restrictive Russian LPAI regulations changed. This was to be completed within 6 months of the effective date (Sept. 2002)
Development of a Proposed Plan for the Control of Low Path H5 & H7 Avian Influenza

The following documents were presented to the committee in order to provide the background statement of purposes and objectives, and the framework for discussion for the proposed national plan for control of low pathogenic avian influenza of subtypes H5 and H7. A subcommittee was appointed consisting of two representatives from each of the broiler, layer, and turkey production industries, one representative each from the broiler, layer, and turkey primary breeder industries, two representatives from NPIP, and advisory members from USDA/APHIS/VS and USDA/ARS. This subcommittee is to further develop the final document for review by the Transmissible Diseases of Poultry Committee at large and submission to the USDA, representing the desires and advice from the industry on the structure of a National Plan. The subcommittee was given a deadline of February 1, 2003 for the completion of the final document. All communications among the subcommittee are to be shared with the general membership of the committee, and continued input from the general membership was solicited. The individual items in the section entitled “Agenda” were discussed and adopted by a vote of the committee, and represent the charge to the subcommittee. The final section, entitled “A Proposed Plan for the Development of a Model Control Program for Low Pathogenic Avian Influenza of Subtypes H5 and H7” was recommended by the committee as a template of the final document.

Avian Influenza Control Measures
Dr. John Smith and Dr. David Swayne
Discussion led by John Smith

Background
All known cases of highly pathogenic Avian Influenza (HPAI) have been associated with subtypes H5 and H7. Not all H5 and H7 isolates are highly pathogenic, and many isolates of H5 and H7 are classified as low patho-

<table>
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<th>Year</th>
<th>Samples tested (AGP)</th>
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<td>2001</td>
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<td>1999</td>
<td>67,716</td>
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<td>1998</td>
<td>62,594</td>
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<tr>
<td>1997</td>
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genic Avian Influenza (LPAI). However, a mounting body of historical experience seems to indicate that continued circulation of H5 and H7 LPAI in dense poultry populations is associated with the eventual mutation of these strains and the emergence of HPAI. Four serious epornitics have arisen in the last 20 years in the US, Mexico, Italy, and Chile from this exact set of circumstances. The risk seems especially great when multiple avian species are present such as occurs in the live bird market system. Most researchers, producers, and regulators would now agree that allowing the circulation of H5 or H7 LPAI within or even near dense populations of poultry is unwise.

HPAI is an OIE list A disease, and is federally reportable. While the funding and degree of support is oftentimes uncertain, the approach to an outbreak of HPAI in the US would be a federally-directed eradication campaign. LPAI, even when due to the H5 or H7 subtypes, is not an OIE List A or B disease, and there is currently no federal control plan. Other subtypes of AI are of less concern, and will not be considered in this discussion. A proposal has been made to the Scientific Advisory Committee of the European Union that all H5 and H7 AI viruses be classified as eradicable viruses eligible for indemnity funds. Such a change in EU policy would be similarly proposed for OIE code changes. If that resolution is adopted by the OIE, then this discussion is moot. Until that time, LPAI of the H5 and H7 subtypes remains a major concern.

The Commonwealth of Virginia recently experienced an outbreak of LPAI, H7 subtype, in a mixed population of turkeys, broilers, and layers. Commonwealth authorities elected to pursue an eradication campaign. This campaign proved to be a massive undertaking, and the Commonwealth requested and received assistance from the USDA on an emergency basis. As a result of this experience, USAHA sponsored a meeting in San Antonio, TX, on May 29, 2002 to solicit input from industry, state regulatory officials, and other stakeholders on the desired approach to H5 and H7 LPAI. Three separate but related issues were considered at this meeting:

1. Is Federal involvement in the control of H5 and H7 LPAI desired, and if so, what form should it take?
2. Should vaccination be allowed for H5 and H7 AI, and if so, in what context?
3. What approach should be taken to control the circulation of H5 and H7 LPAI in the northeastern live bird markets?

Agenda items 2 (vaccination) and 3 (live bird markets) have been sent to you as separate documents. The session on control measures was an open forum, and while no resolutions were passed, a general consensus appeared to be reached on a number of issues regarding possible control schemes.

The following items seemed to be areas of general agreement:

1. A federally-directed control program for LPAI of the H5 and H7 subtypes
is needed and desirable.

2. Such a program should be industry-driven, and should meet the needs of the varied industries and geographical locations involved.

3. Local (state) control and autonomy should be preserved to the maximum extent possible.

4. While individual state control is critical, it must be recognized that, in order for USDA to commit federal funds to control and eradication programs, certain minimum standards must be met to insure that local surveillance and initial control measures are adequate for early detection and containment. It would not be reasonable to expect a federal guarantee of a bailout for an inadequate local program that allowed an outbreak to proceed to epidemic proportions before detection and notification of federal authorities.

5. From these principles, it appears that the most desirable program would be one in which local (state) authorities are responsible for most surveillance and initial quarantine and eradication measures. These local programs must meet certain minimum federal standards in order to qualify for immediate federal assistance in the event of an outbreak.

6. The importance of firm, pre-existing local standards and reciprocal guarantees of immediate federal assistance with eradication, and especially indemnity, was emphasized. The rapid identification and elimination of the first few cases would likely be the key to rapid and economical control. Local authorities need the assurance of federal backing at the earliest stages in order to proceed with all due speed in containment and eradication.

This model is similar in some respects to the Uniform Methods and Rules (UM&R) model used in cooperative federal-state disease control programs for the eradication of certain endemic diseases. An H5 and H7 LPAI control program would be somewhat unique in that it must address the threat of a non-endemic sporadic disease with definite epidemic propensities.

There were obviously many areas where no consensus was reached. For example, the question of voluntary versus mandatory participation was not resolved. The practice of holding affected flocks until seroconversion, followed by controlled marketing, is advocated by some, while others maintain that immediate depopulation is necessary.

The NPIP also was suggested as a mechanism to develop a control program, and the Biennial Conference that followed the AI meeting passed several resolutions on AI. Those resolutions included one creating a sub-committee to devise an AI control program, and others requesting NPIP participation in future AI plans devised by USDA. There is an existing AI Clean classification within NPIP for breeder flocks or individual flocks for export. It consists of a surveillance program, designed to provide federal certification of flock freedom from AI to certain foreign trading partners. The
advantages of the NPIP model are that it is industry-driven, involves considerable local (state) control, and is voluntary. As with the UM&R model, the NPIP model would need substantial modification. NPIP likewise was initially designed to control endemic, vertically transmitted diseases. Eradication of a sporadic, epornitic disease would be a new undertaking for NPIP. The voluntary nature of NPIP also creates concern when dealing with a highly contagious, potentially devastating disease with nationwide implications, particularly regarding foreign trade. As proponents of the NPIP approach have observed, the benefits of participation and the consequences of abstaining are great enough that acceptance should be almost universal in large poultry producing states. NPIP also commands considerable international respect and recognition.

The present discussion and any proposals that result should not be regarded as being in competition with NPIP. The development of two parallel tracks will allow APHIS to select the best components of each. Whether a new program under the direction of NPIP, or a new UM&R type program under the direction of APHIS (perhaps with NPIP as the monitoring and surveillance arm) is the result, the goal is to obtain a control program that
meets the needs of the varied poultry industries, effectively controls the disease, and satisfies foreign trading partners.

**Proposed Objectives**

There are two compelling reasons to control H5 and H7 LPAI. First, the circulation of H5 and H7 LPAI is a threat to the economic health of the domestic poultry industries. A reprise of the 2002 Virginia LPAI or the 1983 Pennsylvania HPAI outbreaks in a larger, denser poultry-producing region could be disastrous. Failure of early detection or a slow initial response will potentiate the initial spread of the infection. What could have been an easily and economically controllable situation then becomes an expensive epornitic. Second, these viruses are becoming an international trade issue. We recognize that our network of industry, university, state, and federal veterinarians has been quite effective in detecting and controlling disease outbreaks, and probably is as efficient as any in the world. As observed by T. J. Myers, “Taken together, the current system of AI surveillance in the United States, while not centrally coordinated, provides a risk-based and needs-based approach to AI surveillance.” Nevertheless, foreign trading partners rightly charge that we have only a passive surveillance system, and they are demanding a transparent, active monitoring and control program. This lack of central coordination is becoming problematic in the area of foreign trade. We may need some degree of central coordination, and the stamp of federal approval, to satisfy foreign trading partners while maintaining the risk-based and needs-based approach that has served us well. A voluntary program may not be sufficient to satisfy the demands of foreign trade.

Some foreign trading partners have indicated a willingness to regional-
ize AI on a state basis. This willingness has often been exhibited in a back-handed manner, such as the quarantine by foreign countries of individual US states that have reported AI. In addition, many state and industry stakeholders are understandably reluctant to commit to discussions of mandatory programs when the details are not known. The details cannot be known until the programs are constructed, and those details in a program such as this are myriad. An initial option to consider, in an effort to advance the development of a control program for H5 and H7 LPAI, would be a voluntary, cooperative state-federal program. States can participate in the final program or not, once they have been able to examine the details. If a state participates, it will reap the benefits, which consist mainly of guaranteed federal assistance, with minimal federal interference, in surveillance, monitoring, initial containment, and eradication programs. Monetary and logistical assistance would be available for the initial case, and through to eradication. Such participating states would have a transparent, federally approved and monitored control program that should satisfy foreign trading partners. Participating states will enjoy relaxed and more open interstate commerce, such as that currently afforded by being an NPIP Pullorum-Typhoid Clean State or an Accredited Brucellosis Free State. The trade-off is that participating states must meet certain minimum federal standards for surveillance, monitoring, and initial containment plans. Foreign trading partners could specify participation in the program in order to be eligible for export of poultry products. Participating states would be justified in placing absolute quarantines on poultry movements against nonparticipating states when those nonparticipants experience outbreaks of H5 or H7 LPAI.

Some segments of the poultry industry may prefer a mandatory program. For instance, the primary breeders have often suffered embargoes on all of their products when AI has been diagnosed in any state, regardless of the source of the breeder stock. Furthermore, the willingness of all trading partners to regionalize AI by state cannot be guaranteed. The OIE is not likely to accept most state lines as sufficient barriers to transmission of disease for regionalization purposes. Another compelling reason for the commercial industry to adopt a mandatory control program involves the political and legal situation with the live bird marketing systems. A mandatory system could give USDA the authority to eradicate the H5 and H7 LPAI in the live bird marketing systems without charges of preferential treatment of the commercial industry. However, in an effort to move this program forward, it is suggested that the initial effort be designed as a voluntary program.

In addition to the structural characteristics of the ideal federal control program for H5 and H7 LPAI proposed at the San Antonio meeting, the following elements are felt to be essential:

1. An active surveillance/monitoring program in each participating state should be mandatory for that state to qualify. Many international trading
partners will accept nothing less. Minimum standards for the tests used and for the sampling plans should be specified. Sampling plans, including frequency of testing, numbers of birds tested, definitions of flocks and premises, and so forth should be based on sound epidemiological and statistical principles. At the same time, the system should remain flexible, adaptable to local needs, and based on relative risk. All segments of the industry should be included, including primary breeders, commercial production flocks, and non-commercial (backyard) flocks of both chickens and turkeys, game birds, ducks, geese, etc.

2. An active diagnostic protocol for cases of respiratory disease, egg production drops and high mortality, systemic diseases should be included in the surveillance plans. These protocols should include examinations for both AI virus and antibodies, not just antibodies.

3. Each participating state should be required to develop a plan of action for the first seropositive or virus positive flock identified. Minimum standards for these plans should be specified, such as the minimum size of the initial quarantine areas, handling of the positive flocks, minimum quarantine measures to be taken (movement restrictions, disinfection procedures, etc.), increased surveillance plans in surrounding areas, and so forth.

4. As emphasized in San Antonio, states should be able to take immediate action, and be assured of federal funds for indemnity and logistics after the fact.

5. The final phase of the control program would be a federal eradication campaign.

It must be emphasized that the USAHA Transmissible Diseases of Poultry Committee is not authorized to formulate an official program. The result of this effort is to be a suggested model program for consideration by APHIS. APHIS may elect to adopt all, none, or portions of any proposed model program that results. If no federal action results, the model program would still be useful for consideration by any states that have not already done so who desire to promulgate their own programs.

**Agenda**

A very limited amount of time will be available at the Transmissible Diseases of Poultry Committee (TDPC) meeting to advance this initiative. It will not be possible to approach the development of a detailed program in that forum or in the time available. In order to proceed expeditiously, we propose that a motion be made to accept the following agenda. The motion would be only for following the order of topics of discussion, not for acceptance of any of the principles proposed in this document. If the agenda is accepted, each item will be considered in turn, with an allotted period for discussion, at the end of which appropriate motions will be considered.

1. Does the TDPC agree that a federally sanctioned control program for
H5 and H7 LPAI, whether mandatory or voluntary, is desirable and necessary? If not, then this agenda is terminated and the committee will proceed to other items of new business, unless there is felt to be a need to state the opposition of the TDPC to a federal program in the form of a resolution. After any such resolutions are disposed of, the committee will then proceed to other items of new business. If, however, a federal program is deemed desirable, then this adopted agenda should proceed.

2. At this point, the TDPC should entertain 4 options:
   a. Do nothing, unless a general resolution urging APHIS to develop a program for the control of H5 and H7 LPAI is felt to be in order. If option a is elected, this agenda is terminated once any resolutions are disposed of and the committee will proceed to other items of new business.
   b. Defer to NPIP. If the committee desires, the Chairman can compose a letter to the Senior Coordinator of NPIP, urging the speedy development of a program and offering support. If option b is elected, this agenda would be terminated and the committee would move on to other items of new business.
   c. Appoint a subcommittee to work with NPIP to develop a model program for recommendation to APHIS. If option c is elected, the adopted agenda continues.
   d. Alternatively, TDPC could appoint a subcommittee to work with NPIP to develop a program within NPIP, and the adopted agenda would continue.
   e. Are there other options to consider?

3. If option 2.c is adopted (a unilateral effort by TDPC), certain logistical and procedural items should be agreed upon:
   a. Should there be a deadline for submission of the final plan? A deadline of February 1, 2003 was approved by the Committee.
   b. Will the TDPC defer to the judgement of the subcommittee and accept the plan in advance without review, or will review and formal adoption be necessary? If a formal adoption is needed, can this be accomplished via mail or email between meetings, or is consideration at the 2003 annual meeting needed? Formal adoption via email will be done.
   c. Is it agreed that the subcommittee should include members from the various groups at risk as well as those charged with implementing the plans? Efforts should be made to include members from the various industries (primary breeder, layer, turkey, and broiler) and state agriculture officials from several major poultry states. APHIS and ARS personnel should be included for advice and guidance. An academic advisor will be included.
   d. Is it agreed that the Senior Coordinator of NPIP should be an ex-
officio member of the subcommittee?
e. It may be desirable to have three subcommittees with an overall coordinator. The obvious areas are: surveillance and monitoring, initial containment and control and live bird market.

4. If either option 2. c (a unilateral effort) or option 2. d (a joint effort with NPIP) is elected: Does the TDPC agree with, and charge the subcommittee to follow as faithfully as possible, the general tenets of agreement enumerated at the San Antonio meeting, and the essential components listed above? The following specific points should be considered briefly and individually:

1. Local (state) control should be preserved to the maximum extent consistent with scientific disease control and international acceptance of the plan.

2. Minimum uniform standards must be met in order to guarantee federal support. Beyond these minimum standards, states should retain the flexibility needed to meet local needs.

3. States will administer monitoring and surveillance plans (recommended under NPIP), and be responsible for initial response plans. Minimum standards should be promulgated for surveillance plans and initial containment plans.

4. Immediate federal assistance for stated with qualified plans, including indemnity, must be guaranteed in advance to allow local authorities to execute response plans as rapidly as possible.

5. The subcommittee should seek the advice of epidemiologists and experts in avian influenza in designing surveillance and monitoring plans. These plans should consider the structure, needs, and opportunities provided by the various industry segments in designing efficient monitoring plans to rapidly detect signal cases as well as satisfying foreign trading partners. The turkey, layer, and broiler industries must all be considered, and the primary breeders, multiplier breeders, and production birds in all three industries should be included in surveillance plans. Active surveillance of respiratory disease and egg production drop cases via state and university diagnostic systems should be included. Frequency of sampling, number of samples, definitions of flocks, premises, or other units, and types of tests and methods used must be included.

6. Minimum standards for initial responses to positive tests must be clearly defined.

7. Recommendations for implementation of the eradication phase should be made.

8. The subcommittee is urged to consult existing state programs as examples.

5. If the TDPC agrees most of the tenets in item 4, and agrees to pursue
a voluntary state-federal cooperative program, a proposed plan for developing such a model program, which includes the considerations in item 4, is appended for consideration. The TDPC may wish to consider this plan and possibly adopt it, with or without modifications, as a more specific template for the Subcommittee(s) to follow. This template could be applicable to either option 2. c or 2. d.

6. Once the agenda has been accomplished and all motions disposed of, Subcommittee(s) can be appointed.

A Proposed Plan for the Development of a Model Control Program for Low Pathogenic Avian Influenza of Subtypes H5 and H7

The Resulting Model Control Program to be Submitted to USDA for Consideration in Development of a National Control Program for H5 and H7 Avian Influenza

The Plan Would Be Based on the following Tenets:

a. The Cooperative State—Federal Program to Control and Eradicate Low Path H5 & H7 Avian Influenza Infections of Commercial Poultry and Backyard Flocks Would be State Based and Coordinated at the National Level

b. Participation in the Plan Would Guarantee Federal Assistance When Requested Including Adequate Indemnity (Market Value of the Birds)

I. Commercial Poultry and Backyard Flocks

1. The NPIP would promulgate and administer an enhanced AI surveillance and monitoring program. This program would contain provisions for certification of individual flocks, production complexes, and states, with an official designation such as “Clean”, “Monitored”, or similar terminology. For states to qualify, a specified level of participation of flocks and complexes, statistically and epidemiologically consistent with early detection of the infection, (but possibly less than 100%) would be required. USAHA Transmissible Diseases of Poultry Committee’s (TDPC’s) AI Monitoring and Surveillance Subcommittee would work with NPIP to develop these programs. Minimum standards for the tests used and for the sampling plans should be specified. Sampling plans, including frequency of testing, numbers of birds tested, definitions of flocks and premises, and so forth should be based on sound epidemiological and statistical principles. At the same time, the system should remain flexible, adaptable to local needs, and based on relative risk. All segments of the industry should be included, including primary breeders, multiplier breeders, commercial production flocks, and non-commercial (backyard) flocks of both chickens and turkeys. (A traditional NPIP program relying on testing of primary and multiplier breeders only is not likely to be adequate.) An active
diagnostic protocol for cases of respiratory disease, egg production drops and high mortality, systemic disease should be included in the surveillance plans. These diagnostic protocols should include examinations for both virus and antibodies, not just antibodies. Laboratory systems in participating states would be expected to demonstrate compliance with these active diagnostic protocols as part of the NPIP state certification. If collaboration with NPIP fails to yield an acceptable plan, the TDPC AI Monitoring and Surveillance Subcommittee are free to develop a plan unilaterally.

2. Each participating state must have an initial containment and control plan. Some suggested minimum requirements are listed below. This plan must be written, and would be subject to approval by USDA.

3. States that qualify for the NPIP “Monitorèd” or “Clean” status (or similar terminology) and which have a USDA-approved initial containment and control plan would be certified by USDA with an appropriate designation, such as Accredited AI Free (or similar terminology). It is anticipated that these states would enjoy advantages such as more open interstate commerce and recognition by foreign trading partners, who may specify participation to be eligible for trade. In addition, qualifying states would have a guarantee of immediate federal assistance with an eradication campaign, including indemnity and both financial and material support with emergency management logistics, upon request by the participating state, at that state’s determination.

4. The USAHA TDPC AI Control Plan Subcommittee (possibly in conjunction with NPIP) will develop suggested minimum standards for state initial control plans. These minimum standards should consist of guidelines only, not specific requirements, which should be left up to the discretion of the states. After review and approval by USDA, USDA would use the guidelines in assessing individual state plans for adequacy, including the specific provisions that the state developed. Consequently, the guidelines should be used by states in developing those plans. Suggested state containment and control provisions should include the following areas.

a. An emergency management committee or poultry disease task force should be designated in advance and kept up to date. It should include industry, laboratory, and state agricultural officials. The USDA APHIS VS AVIC should be included as at least an ex-officio member.

b. Each state’s industry should have a written, minimum biosecurity and emergency disease awareness program in place, including ongoing producer and public education efforts. Growers and flock supervisors should know what to do if an unusual disease situation is suspected.

c. Detailed procedures for initial quarantine and investigation of
suspicious cases. The document “Procedures to be followed for Management of an Outbreak of an Emergency Poultry Disease in the Tri-State Area” provides excellent examples of the measures needed to satisfy parts a, b, and c. The TDPC AI Control Subcommittee may develop more detailed minimum standards if deemed necessary. The state would be free to design the exact measures, which would be evaluated by USDA for adequacy.

d. Initial strict quarantine of all presumptive and confirmed index cases. Exact, detailed measures should be specified by the state, including, for example, plans for movement control, utilization of law enforcement, etc. The TDPC AI Control Subcommittee may develop more detailed minimum standards if deemed necessary. The state would be free to design the exact measures, which would be evaluated by USDA for adequacy.

e. Immediate construction of geographically appropriate infected and control/monitoring zones, conduct of epidemiological surveys for contacts, and details of the movement and other disease control measures taken. The TDPC AI Control Subcommittee may develop more detailed minimum standards if deemed necessary. The state would be free to design the exact measures, which would be evaluated by USDA for adequacy.

f. Details of the nature of the increased monitoring activity in these infected and control zones should be specified, including tests used, frequency, number of tests per unit, and definition of units (houses, flocks, premises, etc.). The TDPC AI Control Subcommittee may develop more detailed minimum standards if deemed necessary. The state would be free to design the exact measures, which would be evaluated by USDA for adequacy.

g. Detailed plans for disposal of infected flocks. States would be free to choose methods appropriate for their industries and geographical areas. Options may include strict quarantine, followed by rigorous testing for virus by specified, sensitive methods, and controlled marketing of virus-negative flocks. Alternatively, some states may elect depopulation and disposal. Detailed plans for biosecure and environmentally sound disposal of carcasses must be in place, including pre-existing agreements with other regulatory agencies, pre-identified disposal sites, and specific sources for all needed materials for the methods chosen. The TDPC AI Control Subcommittee may develop more detailed minimum standards if deemed necessary. USDA would evaluate the state’s plans for adequacy.

h. Detailed plans for cleaning, disinfection, and down time and plans for repopulation, and quarantine and monitoring of repopulated flocks must be specified. The TDPC AI Control Subcommittee may
develop more detailed minimum standards if deemed necessary. The state would be free to design the exact measures, which would be evaluated by USDA for adequacy.

i. The TDPC AI Control Subcommittee should consider the controlled use of vaccine as part of a science-based influenza control strategy as outlined in the report of the USAHA TDP AI Vaccine Group (sent separately)

j. States would make the determination to request federal assistance. Some states may wish to design initial indemnification plans in order to preclude federal involvement, and still be eligible for federal certification for trading purposes. Others may opt for the guarantee of immediate indemnification. In this case, clear rules must be established for diagnosis before depopulation or quarantine, if indemnification is to be granted after the fact. Depending on funding, USDA may require some sort of indemnification plan for initial cases. If this is the case, it is suggested that each participating state be expected to cover initial indemnity in proportion to the size of its total commercial poultry industry (broilers, layers, turkeys, and primary breeders). Whether voluntary or required, such initial indemnification plans could be industry-supported, cooperative state-industry programs, or state-supported, at the discretion of the participating state. Texas has an example of an industry-supported, state-administered indemnity plan.

A number of states have plans in place (Texas, Minnesota, South Carolina, and the Tri-State consortium of Arkansas, Missouri, and Oklahoma are examples) or are well on the way to developing plans (Virginia, Georgia, probably others). The Subcommittee should utilize these plans in developing any minimum standards beyond those specified here.

II. Live Bird Market System

The Cooperative Federal-State Program to Control Low Path H5 & H7 Avian Influenza Infections in the Live Bird Market System would be Federally Based and State Assisted.

Participation in the Plan would Guarantee Federal Assistance Including Adequate Indemnity (Fair Market Value of the Birds).

Recommendations for the Control of AI in the Live Bird Market System has been outlined in a separate report.

Live Bird Market Subcommittee
Low Pathogenic Avian Influenza Control Program
John Huntley, Bill Robinson, co-chairs
Discussion led by John Huntley

Low path avian influenza is frequently isolated from the poultry offered into the live bird marketing system in the United States. Concern has been
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raised that the serial passage of the virus between naïve birds of the same or different species may create conditions favoring the development of genotypes associated with increased virulence and high pathogenicity. Current biosecurity measures are insufficient to prevent the escape of avian influenza viruses from the market system to the commercial poultry industry. The health and economic viability of the commercial poultry industry is, consequently, placed at risk.

The charge to the Live Bird Market avian influenza control subcommittee was:
1. Analyze the current system and identify deficiencies in the current control effort
2. Propose a practical plan that would significantly reduce the avian influenza risk posed by the live bird marketing system
3. Identify resources required to accomplish the implementation of the plan

Program Analysis:
The live bird marketing system is not a linear system. The LBMS is a complex web of interlocking activities that provide ample opportunity for the introduction of unqualified and potentially infected birds. The prevalence of avian influenza in the supply bird channel is low, based on the results of recent surveillance samples. The impact of such introduction, however, is amplified within the system to result in significant levels of end state (market) prevalence. System components include the following:
1. Hauler: Transports birds from farms to retail live bird markets (LBM) or to wholesalers
2. Producer: Raises birds that go to the LBM; may be raised for LBM specifically or as an outlet for birds previously used for other purposes (eg., spent fowl; may be up to 50% of birds sold in the market were not specifically raised for that)
3. Poultry auctions: Birds come from many sources, variable lots and lot sizes. May come from farm or from another auction market. Birds sold to multiple type buyers, including the live bird markets
4. Flea market, swap meets: Birds (lot or lots) sold via private treaty. Most of these birds are not sold for slaughter. LBM collectors may visit swap meets to assemble loads for delivery to the live bird market system.
5. Dealers: Gather birds from multiple sources, may go to wholesalers or directly to LBM
6. Wholesaler: Supplier to LBM that has a fixed facility and contracted suppliers
7. Retail live bird markets: Custom-kill facility that sells live birds to consumers for slaughter. Birds may be slaughtered and dressed on site, or be given to the consumer for home slaughter. There are regional differences in the live bird markets (birds sold live eg. FL botanicas,
farm-type facilities in NJ)

8. USDA approved poultry slaughter plants: Those that purchase from suppliers in the LBMS and are under FSIS or contract state inspection. The current system in place in the Northeast United States requires the establishment of a negative avian influenza status of the source flock as a condition for access to the markets. Wholesalers and haulers must keep records and maintain appropriate biosecurity. In spite of these efforts, avian influenza is prevalent in the live bird markets. The following discussion identifies deficiencies in the existing system that may promote the establishment of avian influenza infection in the live bird markets. The discussion is categorized by major live bird market system components.

Growers/Producers
Concerns: Current test procedures may be inappropriately applied resulting in a sample that is not representative of the flock's avian influenza status.

Multiple load outs in large commercial facilities increase the opportunity for the introduction of avian influenza to the remaining population. This infection would go undetected in the birds subsequently delivered to the live bird markets since the delivery would be based on the initial qualifying test.

The blending of avian influenza monitored birds with unqualified birds nullifies the value of this crucial control point in the avian influenza control effort. Birds at market lose their identity to farm of origin by virtue of the assortment and reconfiguration of loads.

Poultry dealer/wholesaler
Poultry dealers may be involved in collecting and assembling loads from multiple sources for delivery to the live poultry market. They may also visit poultry auctions to meet their customer demand. This is inherently a high risk process for spreading avian influenza virus. Strict biosecurity procedures must be enforced to manage this risk.

Retail Live Bird Markets
A reservoir of avian influenza virus may be established within the live bird retail markets, resulting in continuous pressure for the virus to adapt to poultry and the possibility of the development of enhanced virulence. Currently, markets may operate in a manner that is inconsistent with proper cleaning, disinfection, and market sanitation. Markets may, in effect, operate continuously. This factor was identified as one of the largest risk factors for virus survival, maintenance and evolution. Mitigating this risk is a key to successful avian influenza control.

Auctions
Auctions accept birds from random sources and deliver birds to multiple destinations. The operation of open auctions is inconsistent with any effort to control avian influenza unless all source birds are from AI moni-
Essential Elements of a Live Bird Market Control Program

- The avian influenza control program established for the live bird marketing system must be mandatory and uniform nationally.
- Cost sharing must be established between USDA and participating states to provide resources for monitoring, compliance, and indemnity.
- Education and training will be an important and ongoing requirement. Development of materials supporting avian influenza control and biosecurity must continue.
- Vaccine use may be considered to mitigate risk if international trade issues are resolved.
- All supply flocks offering birds to the live bird market system must participate in an avian influenza monitoring program. The avian influenza monitoring program shall be specified by USDA APHIS to ensure uniform national flock classification. A minimum avian influenza monitoring program should include a test on 20 birds conducted every month for the first 6 months. Test frequency can be reduced to a 60 day interval after 6 months successful participation.
- All retail poultry markets must depopulate, clean, disinfect, and receive approval to reopen at least once every two weeks.
- All poultry haulers, wholesalers, dealers and markets must be licensed.
- All birds that are offered for entry into the live bird marketing system must be individually identified to the premise of origin.
- Direct marketing of poultry to the live bird market system is not allowed unless the producer/grower has approval from the state veterinarian in the state of origin and an appropriate written biosecurity plan (to include crate washing facilities or arrangements) is developed and implemented.
- Qualifying test samples must be taken by accredited veterinarians or certified testers to maintain third party validation.
- All poultry dealers and wholesalers must:
  1. Possess a license to operate (USDA or state?)
  2. Establish and use an approved crate washing facility – possess and present CW documentation when obtaining birds from grower
  3. Keep and Maintain Records
  4. Accept only AI documented birds
  5. Accept only individually ID’ed birds
  6. Accept NO returns
- No birds may enter the live bird marketing system from a poultry auction unless such auction is approved by the state in which it resides. An auction can be avian influenza approved if it will accept only avian influenza monitored birds, keeps records, and provide avian influenza surveillance samples.
- Consider separating quail and waterfowl from gallinaceous birds.
• Compliance activity is essential to the success of a program of this nature. USDA must be prepared to augment existing staff to ensure that the regulatory presence is visible and effective.
• Low path avian influenza monitoring programs must be consistent. This requires the establishment of a national standard.
• USDA must support the dissemination of avian influenza rapid test technology to the regional level and to provide some financial support for the ongoing testing at the regional centers.
• Multiple load out scenarios require enhanced surveillance due to increased risk of introducing avian influenza into the remaining birds. Avian influenza monitored status must be renewed weekly for source flocks meeting the multiple load out criteria.

**National Poultry Improvement Plan**

Andy Rhorer, USDA, APHIS
Discussion led by Alan Sharpton

The following document describes the current status of NPIP’s efforts to develop an AI monitoring program. This document was presented by Dr. Alan Sharpton. The document was discussed by the committee and further action was deferred to the subcommittee for incorporation into the overall AI control plan.

It is recommended that U.S. H5 and H7 Avian Influenza Clean State and U.S. H5 and H7 Avian Influenza Monitored State classification be developed for broiler, egg layers, and turkeys.

**Broilers**

**Proposed H5 and H7 Avian Influenza Surveillance Program**

**Avian Influenza (all subtypes) Surveillance Program**

**Meat-Type Breeding Flocks**

It is recommended that both primary and multiplier breeding pullets should be tested within two weeks of movement to the production house and that primary and multiplier spent fowl be tested within two weeks of movement to slaughter.

**U.S. Avian Influenza Clean**

This program is intended to be the basis from which the breeding-hatchery industry may conduct a program for the prevention and control of avian influenza. It is intended to determine the presence of avian influenza in primary breeding chickens through routine serological surveillance of each participating breeding flock. A flock and the hatching eggs and chicks produced from it will qualify for this classification when the Official State Agency determines that they have met one of the following requirements:

1. It is a primary breeding flock in which a minimum of 30 birds have been tested negative for antibodies to avian influenza when more than
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AND OTHER AVIAN SPECIES

4 months of age. To retain this classification:
  i. A sample of at least 30 birds must be tested negative at intervals of 90 days; or
  ii. A sample of fewer than 30 birds may be tested, and found to be negative, at any one time if all pens are equally represented and a total of 30 birds is tested within each 90-day period.

2. It is a multiplier breeding flock in which a minimum of 30 birds have been tested negative for antibodies to avian influenza when more than 4 months of age. To retain this classification:
  i. A sample of at least 30 birds must be tested negative at intervals of 180 days; or
  ii. A sample of fewer than 30 birds may be tested, and found to be negative, at any one time if all pens are equally represented and a total of 30 birds is tested within each 180-day period.

Egg Type Layers

Proposed H5 and H7 Avian Influenza Surveillance Program

Avian Influenza (all subtypes) Surveillance Program

Egg-Type Breeding Flocks

U.S. Avian Influenza Clean. This program is intended to be the basis from which the breeding-hatchery industry may conduct a program for the prevention and control of avian influenza. It is intended to determine the presence of avian influenza in breeding chickens through routine serological surveillance of each participating breeding flock. A flock and the hatching eggs and chicks produced from it will qualify for this classification when the Official State Agency determines that they have met one of the following requirements:

1. It is a primary breeding flock in which a minimum of 30 birds have been tested negative for antibodies to avian influenza when more than 4 months of age. To retain this classification:
   i. A sample of at least 30 birds must be tested negative at intervals of 90 days; or
   ii. A sample of fewer than 30 birds may be tested, and found to be negative, at any one time if all pens are equally represented and a total of 30 birds is tested within each 90-day period.

2. It is a multiplier breeding flock in which a minimum of 30 birds have been tested negative for antibodies to avian influenza when more than 4 months of age. To retain this classification:
   i. A sample of at least 30 birds must be tested negative at intervals of 180 days; or
   ii. A sample of fewer than 30 birds may be tested, and found to be negative, at any one time if all pens are equally represented and a total of 30 birds is tested within each 180-day period.
U.S. Avian Influenza Clean. This program is intended to be the basis from which the breeding-hatchery industry may conduct a program for the prevention and control of avian influenza. It is intended to determine the presence of avian influenza in breeding turkeys through routine serological surveillance of each participating breeding flock. A flock and the hatching eggs and poultts produced from it will qualify for this classification when the Official State Agency determines that they have met one of the following requirements

1. It is a primary breeding flock in which a minimum of 30 birds have been tested negative for antibodies to avian influenza when more than 4 months of age: Provided, that if they are vaccinated with a killed influenza vaccine, other than H5 and H7 subtypes, a minimum of 30 unvaccinated sentinel birds have been tested negative for antibodies to avian influenza. To retain this classification:
   i. A sample of at least 30 unvaccinated sentinel birds must be tested negative at intervals of 90 days; or
   ii. A sample of fewer than 30 unvaccinated sentinel birds may be tested, and found to be negative, at any one time if all pens are equally represented and a total of 30 unvaccinated sentinel birds are tested within each 90-day period.

2. It is a multiplier breeding flock in which a minimum of 30 birds have been tested negative for antibodies to avian influenza when more than 4 months of age: Provided, that if they are vaccinated with a killed influenza vaccine, other than H5 and H7 subtypes, a minimum of 30 unvaccinated sentinel birds have been tested negative for antibodies to avian influenza. To retain this classification:
   i. A sample of at least 30 unvaccinated sentinel birds must be tested negative at intervals of 180 days; or
   ii. A sample of fewer than 30 unvaccinated sentinel birds may be tested, and found to be negative, at any one time if all pens are equally represented and a total of 30 unvaccinated sentinel birds are tested within each 180-day period.

Proposal 2

There is no scientific evidence of egg transmission of influenza under commercial (NPIP Sanitation Monitored) conditions. Lacking scientific evidence of transmission, movement and/or use of hatching eggs and progeny from influenza positive breeder flocks should not be restricted.

Proposal 3

The Turkey Industry supports (on a national basis) the following vacci-
nation policy:
1. Vaccination of high-risk flocks or breeding stock against the appropriate “H” type should be permitted (by flock or by company) in the event of an AI break.
2. The state veterinarians should establish (based on predetermined objective standards) where vaccination would be used and when it would begin.
3. Records of flocks vaccinated would be maintained at the company office with a copy maintained on file at a location designated by the state veterinarians.
4. Use of appropriate means to assure the ability to certify the vaccinated flocks are AI free.
5. Vaccine use must stop no later than 90 days after the last field break has been resolved.

Report of the USAHA Vaccine Group: Vaccination for H5 and H7 Low Pathogenic Avian Influenza
David Halvorson, DVM, ACPV and Tom Holder, DVM, ACPV
Discussion led by Dr. Dave Halvorson

Introduction
Biosecurity is the first line of defense against all AI viruses (Beard, 1981). Preventing the introduction of AI by eliminating all contact between commercial poultry and wild birds, swine farms and live poultry markets is a common, routine and successful practice. However, occasionally AI gets introduced into a commercial poultry population. When it does, most routine biosecurity is inadequate and a heightened level of biosecurity is necessary to control the spread.

Under conditions of high poultry density or multiple poultry enterprises in one area, the highest level of biosecurity may not be adequate to control the spread of AI. These two factors (high bird density and multiple enterprises) were characteristics of the low pathogenic (LPAI) outbreaks in Pennsylvania, Mexico and Italy that resulted in mutation to highly pathogenic (HPAI) viruses. Dense populations of susceptible birds under multiple management are the conditions most likely to promote spread of AIV. Under these conditions, biosecurity alone is not likely to be a successful control strategy. A successful strategy requires reducing the susceptibility and the density of the poultry population.

Poultry density in an area is reduced by changes in the placement schedule (Poss, 1986). Placing susceptible poultry into an active AI area is “adding fuel to the fire” and counters the positive impact of biosecurity. AI transmission is not associated with sero-positive flocks (Kradel, 1992). Leaving infected, sero-positive flocks in the building until they are ready to market and leaving poultry buildings empty until the immediate area is free
of active infection are ways to reduce the density of the susceptible population. There are limits, however, to this procedure because growers cannot tolerate, for long periods of time, the financial impact of empty buildings.

Vaccination

Vaccination is the second line of defense against AI (Beard, 1981, 1992). As controlled marketing and rescheduling reduce the bird density in an area, controlled immunization with an inactivated vaccine can reduce the susceptibility of the population.

Because birds are susceptible to all 15 hemagglutinin subtypes, preventive vaccination prior to an outbreak is not practical. Once a subtype is identified in poultry and biosecurity practices appear to be inadequate, however, controlled vaccination is a tool to reduce the susceptibility of poultry populations and to help bring the outbreak under control.

The goal of vaccination is to prevent LPAI from going to Highly Pathogenic AI.

It is well accepted that vaccination of poultry with non-H5 or non-H7 killed influenza vaccine is an effective tool in the prevention and control of LPAI. In the United States, H1N1 is perhaps the most widely used AI vaccine subtype (Halvorson, *et al*., 1997). Its use in turkey breeders is reported in states with large swine populations.

A discussion of the role of vaccination in influenza control must begin with the conclusion that uncontrolled LPAI may allow the emergence of HPAI (Halvorson, 1997; Capua & Marangon, 2000). At the First International Symposium on Avian Influenza, Beard stated, “With the ubiquitous nature of AI viruses in free flying birds, it may be that vaccination...may be the most feasible tool...to soften the sting of AI” (Beard, 1981). Killed vaccines against influenza have been used successfully in a wide variety of species.

**Concerns about the availability and use of inactivated AI vaccines**

The primary concern about the use of AI vaccine is their potential impact on our export markets. Beard has suggested that vaccination as part of an eradication effort could be justified when that plan incorporated controlled marketing of vaccinated and convalescent flocks before a quarantine was released (Beard, 1986). Vaccination with inactivated AI vaccine may be justified when the poultry industry is trying to eradicate the infection and is isolating vaccinated and convalescent flocks until they are marketed.

**Advantages of avian influenza vaccines**

The advantages of avian influenza vaccines are in the scientifically demonstrated effectiveness:

1. AI vaccines for the most part are inactivated products in a mineral oil adjuvant. There is a pox-vectored influenza vaccine for the H5 subtype. Both of these products have to be injected into each bird and there is no threat of spread of vaccine virus.
2. AI vaccines reduce morbidity, egg production loss and mortality associated with AI infection.
3. AI vaccines reduce virus shed if a vaccinated flock is challenged.
4. AI vaccines reduce virus transmission if a vaccinated flock is challenged.
5. Inactivated oil emulsion AI vaccines cause serum from vaccinated birds to react on the agar gel immuno diffusion (AGID) test and ELISA. This is not true for the pox-vectorred H5 vaccine.

From these advantages come the benefits from using AI vaccine: a. the vaccine does not spread the disease, b. reduced disease means reduced economic loss, c. reduced virus shed and transmission mean less spread of the disease, and d. vaccinated birds can be detected serologically.

From the advantages listed above also come the concerns: a. because birds have to be individually injected there is increase risk of the vaccine crews spreading disease, b. reduced clinical signs and interference on the AGID test may make the disease harder to detect and c. virus shed and transmission may not be completely stopped. These concerns have been scientifically addressed adequately.

Disadvantages of avian influenza vaccines
The disadvantage of available influenza vaccines is the political risk of losing export markets.

Recommendations
In spite of political concerns, inactivated AI vaccines have contributed successfully to preventing morbidity, mortality and egg production loss, reducing economic loss and controlling the spread of disease. There was unanimity that AI vaccine is only a short-term measure as an adjunct for control of AI and should be used only for a short time. Vaccination is not a replacement for biosecurity.

Recommendation 1
USDA is strongly encouraged to actively communicate to trading partners that vaccine use for LPAI (including H5 and H7) is appropriate and that it may be used to control an outbreak. US trade representatives, FAS, IS, all should communicate the message we are trying to get across. (Precedent has been set by EU in Italy.) Controlled use of vaccine within a region would facilitate maintaining trade.

Recommendation 2
Vaccination against MPAI, including H5 and H7, should be available as part of a science-based influenza control strategy that includes:
- Enhanced biosecurity,
- An eradication plan,
- Controlled vaccination for flocks deemed to be at risk by cooperative efforts of industry, state and USDA veterinarians,
Suitable monitoring of all flocks at risk and of all vaccinated flocks,
Suitable monitoring should be determined according to the vaccine used and the presence or absence of sentinel birds.
Isolation and disposition of vaccinated and convalescent flocks should be determined by industry and state.

- A repopulation plan.

**Recommendation 3**
Vaccine should be available when needed. The USDA and industry should arrange to bank enough H5 and H7 antigen to quickly produce 10 million doses of vaccine for both H5 and H7. In addition the USDA should facilitate a way to rapidly produce more vaccine. One way to facilitate rapid vaccine production would be for USDA to withdraw the requirement for SPF eggs in production of inactivated AI production.

**Recommendation 4**
USDA should fund AI vaccine research. Included in this research are the needs to evaluate vaccination of birds going into the live poultry markets, to develop tests for differentiating infected from vaccinated animals (DIVA) vaccines and to evaluate potency of vaccines based on HA activity.

**Recommendation 5**
USDA should fund the increased need for AI testing, increased need for antigens and need to add new tests for DIVA vaccines.

**References**
NAHRS Report
S. H. Kleven, University of Georgia

The NAHRS steering committee met in Fort Collins, Colorado, on Sept. 30 – Oct. 2, 2002 to review progress and make future plans. The poultry sector was represented by Bob Good and Stan Kleven.

A major subject of discussion was how to get the remaining non-reporting states on board. A critical need is to have all 50 states and Puerto Rico reporting in order to have a creditable system. As of now, there are 16 non-reporting states. Of these, 6 states are preparing for participation. Of the remaining states, Georgia, Maryland, Iowa, Kentucky, Oklahoma are the only poultry states have not indicated that they will begin reporting.

During the meeting, the following actions and recommendations were made:
• A proposal will be made to USAHA to support implementation in FY 04 of Animal Health Safeguarding Review recommendation #98 which states: Direct USDA to clearly define the National Animal Health Reporting System (NAHRS) as a cooperative, not voluntary, program for all industries and states that request USDA certification of animal products for export.
• Need to stress to nonparticipating states that there has been no negative impact expressed by states or industry from participation in NAHRS.
• Committee recommendation that NAHRS staff continue developing cooperative relationships with Regional/Area VS and State Veterinarians to improve NAHRS reporting and usefulness.

We owe special thanks to Dr. Bob Good for his efforts in convincing states to begin the reporting process.

5. ADOL Stakeholders Meeting Report
The Need for a Stakeholders’ Meeting to Discuss ADOL

<table>
<thead>
<tr>
<th>Type of Bird</th>
<th>When to Test</th>
<th>Number and Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial Egg Layers</td>
<td>Annually</td>
<td>30 eggs or blood samples per egg processing plant</td>
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</tbody>
</table>
Effort Launched to Keep ADOL Open. The U.S. President’s FY03 budget has eliminated the funding of the poultry retrovirus project conducted at the Avian Disease Oncology Laboratory (ADOL) in East Lansing, Michigan, has redistributed the Marek’s disease project and immunogenetics/genome mapping project to Athens, GA and Beltsville, MD respectively, and has left no provision for the maintenance of irreplaceable genetic lines of chickens. This is cause for concern among the state and national groups representing the $22 billion poultry industry with a joint effort by the national groups seeking the restoration of funding to keep ADOL operating until a stakeholders’ meeting could be convened.

Effort Launched to Keep Sciences Together. The Agriculture Research Service (ARS) rated the retrovirus research project in May 2001 among the top 17% of all ARS Animal Health Research Projects reviewed. To eliminate this important research through budgetary cuts sent a shockwave through the poultry industry. Research at ADOL helped in the identification of the avian leucosis virus as the causative agent of lymphoid leucosis resulting in the development of diagnostic reagents essential for an eradication program.

Marek’s disease vaccines were developed at ADOL resulting in a $200 million estimated savings due to the reduction in bird condemnation or loss of egg production. The Animal Health Review Panel rated this project in May 2001 as the #1 proposal of all ARS Animal Health Research projects reviewed. The continuation of this research is targeted for Athens, GA. The poultry industry believes that the Marek’s disease research and the chicken immunogenetics/genome mapping project, slatted for ARS in Beltsville, MD, should continue to be conducted on a common site. The ADOL was instrumental in the generation of the first transgenic chicken and documented the effectiveness of genetically-derived pathogen resistance. To separate the sciences would result in a loss of the synergies between the research projects.

The ADOL facility maintains 39 different genetic lines of poultry, some of which are 30 years old. These have been instrumental in the development of the chicken genome used for identifying disease resistance genes. There is no repository for maintaining these lines at other facilities and this important research will be lost without better planning and execution for continuing them.

| Meat Turkeys | At least a minimum of 60 birds per processing plant will be tested each month. It is recommended to collect samples from flocks over 10 weeks of age with respiratory symptoms, depression, or drops of food &/or water intake. |
**Political Issues.** Senator Debbie Stabenow and Senator Carl Levin, the two U.S. Senators from Michigan have pressed to keep this research at the ADOL in East Lansing. Rep. Jack Kingston is expected to press for the research to be conducted at the Southeast Poultry Research Laboratory in Athens, GA. Senator Thad Cochran will most likely make a case for the research to be conducted at the Mississippi College of Veterinary Medicine Poultry Research and Diagnostic Laboratory in Pearl, MS. This stakeholders’ meeting will allow all interested parties, including the political and scientific community, to express their views as to the best way to maintain this research.

More than 100 state, national and professional organizations signed onto a letter urging the Secretary of Agriculture to conduct this stakeholders’ meeting in Washington, DC before the end of the year. It is unlikely that the Secretary will take any action that could be construed as contrary to the President’s budget, so the poultry industry will sponsor a stakeholders’ meeting. Tentative plans are to hold this meeting in early December in College Park, MD. Details are still being worked out, but notices will be given to allow for all parties concerned to arrange their schedules to attend this important meeting.

6. Diseases of Importance and Related Issues

**Update on Research Grants Funded by the U.S. Poultry & Egg Association**

Dr. C.W. Beard, USP&E

Active Research Projects

There are currently 86 active research projects representing an investment of $3,208,155. Of these 86, 38 deal with poultry disease subjects.

Two competitions are held annually, beginning with one-page preproposals. About half of those are selected and invited to submit full research proposals. Historically, approximately 30% of the full proposals are selected to receive funds.

These selections are made by a committee of poultry industry-employed professionals representing all the major industry disciplines.

**Current health and industry issues**

**General Trends in the Industry – Broilers**

Dr. Bruce Stewart-Brown, Salisbury, MD

**Housing Improvements**

The most current housing in the industry in general involves the following: tunnel ventilation, dark curtains or windowless sides, and computer driven controllers.

This type of housing allows more precise light control, air quality, temperature control, litter condition, and humidity control.
Weights
Weights are generally up for the broiler industry. We are deboning more birds—therefore, heavier birds are going to market.

Drug Use
There are some general trends towards decreasing use of antibiotics in hatchery and feed. The industry will likely lose about 0.3% in 7-day mortality in pulling the hatchery antibiotics. Results from flocks that do not have feed antibiotics are variable. There is likely a significant cost in the loss of efficiency, perhaps an increase in therapeutic use, and if GI tract microbial balance is adversely affected—there may be some detrimental effect on live side Salmonella load.

Trends in the Bird Itself
A tendency to move to higher yielding birds brings on some issues. They tend to be difficult to incubate and hatch—therefore, chick quality suffers, 7-day mortality elevates, and grower relationships are strained. They grow somewhat differently—giving a different growth curve and different physiological stress periods.

Coccidiosis/Enteritis issues
Diclazuril introduction showed most integrators how subclinical coccidiosis is perhaps more important (and more significant) than previously recognized. In addition, coccidiosis vaccination—although appealing—is difficult to manage. Necrotic enteritis caused by *Clostridium perfringens* is relatively common—especially if not using antibiotic in feed.

There has been some discussion and investigation into Reovirus (reovirus variants) caused stunting (again). This has been inconclusive—to date.

Respiratory—ILT
There continue to be the threat of export ramifications from ILT outbreaks. It is also still somewhat controversial as to the significance of so-called “Silent LT”. The broiler industry continues to need an affordable, non-spreading vaccine for use in meat chickens.

Infectious Bursal Disease
Although this disease is considered to be under control, there is tremendous pressure to be as “well-protected” as possible against any new or antigenically different viruses. There is a desire and need to have autogenous products made quickly and to an integrators specifications.

Plant condemnations
In general, this has been an excellent year throughout the industry as it relates to plant condemnations.

Food Safety Issues
Although we can claim some success in moving from the bag rinse baseline of 20% to 10%, progress beyond this will be quite difficult and
expensive. It seems almost obvious that an approach that targets the Salmonella that causes the majority of human disease would better serve the public and the industry. The broiler industry needs a good, affordable, and effective CE product—if one exists.

**Poultry Welfare Issues**

Guidelines are coming from everywhere. Experts are coming from everywhere. We have some opportunities to pursue and we will pursue them with our customers (those that buy chicken).

**Avian Influenza**

Biosecurity holes were exposed in the past year and we have learned from them. It is obvious that there is an ongoing need for Federal, State, and Industry Relationships (in the middle of a crisis is no time to get to know each other). It is also obvious that different countries have their own opinion of how AI should be treated. There is even within our own country a fundamental difference in State to State philosophy on AI. There is generally a fundamental difference in business and disease approach in the Turkey Industry and the Broiler Industry. Finally, this past year is making poultry companies, within the US, carefully study the structure of their business and decide how and where they will play in the export business.

**Antibiotic resistance**

There has been a focus on pounds of drug used. This from almost every perspective is ridiculous. However, it is very important to understand that safe food at the top of the list for most consumers. Poultry companies will attempt to maintain a balance between consumer trust and science. The government and the industry need to go down this road together. To date, this has been difficult.

There is a need for definition of Antibiotic Use Philosophy. NCC has worked on one that generally addresses the following areas:

1. Antibiotic use is appropriate—for stated conditions and situations
2. Antibiotic use should be under strict oversight using basic sound principles and guidelines
3. Resistance should have third party oversight
4. There is general support for the existing FDA process for drug approval and general respect for the process by which an approved drug might be reevaluated—but the criticism in this process comes when it goes on for 3 years plus, and allows the drug to be tried and judged in the newspaper well before the “official’ process has taken place.

**Antibiotic availability**

Clearing a new drug for food animal use is quickly becoming a loosing proposition for Pharmaceutical companies. The FDA exercise of risk analysis for each drug is hopefully debatable
FDA Proposed Classification of Several Drugs

Autogenous Vaccine—use and issues

A tool for improved overall health, autogenous vaccine use, needs to be simplified. Federal code needs to be written that allows appropriate and safe use in the poultry industry. It appears that the government is open to a discussion on this.

Plant Issues

HIMP (HACCP-based inspection models project) transition continues in some plants. DOA’s are an area of discussion and research opportunity. The advances in housing have surpassed the advances in transport and holding (heat tolerance when raised in tunnel housing).

Government Research Facilities

ADOL’s future is important to us. It is necessary to keep tumor virus research intact and up-to-date—even when the industry is not having an emergency. The people, their expertise, the chicken lines, the genomics program, the tumor research have all been a tremendous resource and we need that to continue.


Eric Gingerich, DVM, diplomate ACPV, University of Pennsylvania

The present transmissible disease situation of the table egg industry remains relatively stable. To follow is a summary of diseases of interest to the layer industry from my own experiences and information from my colleagues who are members of the Association of Veterinarians in Egg Production (AVEP):

Fowl coryza—The first break of coryza in Pennsylvania in over 20 years occurred in north central Pennsylvania in a fertile egg production flock. The break was associated with gross error in biosecurity associated with a backyard flock. Breaks in small backyard flocks in Maine, a different bacterial type than the commercial flock outbreak in 2001, were reported.

Avian Pox—The number of pox breaks has been very minimal due to the improvements made in vaccination technique and the use of pigeon pox in addition to fowl pox vaccine.

Infectious laryngotracheitis (ILT)—Minor outbreaks due to vaccine strains of ILT have occurred and are felt to be due to inadequate immunization with vaccination methods other than eye drop. Mixing of more than one pullet source in a layer house also appears to lead to breaks due to varying levels of immunity of the pullet sources. Of interest is the licensure of a recombinant Pox-ILT vaccine being used which would reduce the use of chick embryo origin vaccines thus reducing the source of many of the breaks observed in broiler and egg layer flocks.
Marek’s disease—Very few problems are being seen with Marek’s likely due to the continued use of the Rispen’s Marek’s vaccine. Certain strains of birds show a signs and lesions of mild Marek’s disease during growing. Some flocks with higher than expected mortality due to Marek’s are seen due to a high challenge from poor C&D efforts between flocks or the close proximity to neighboring, older pullet flocks in multi-age pullet growing facilities.

Salmonella enteritidis (SE)—SE is still a concern and many producers are participating in state programs for monitoring and organizing their best management practices to reduce the risk of SE infections. The impending FDA national program is in the final stages of being proposed with implementation perhaps in 2003. Ongoing interest in the use of vaccination, especially using live, gene deleted Salmonella typhimurium (ST) vaccine, is being done in the areas where SE has been a consistent problem due to persistently positive houses in multi-aged complexes. There are now three live ST vaccines available for use in young chickens and are being tried by some producers in pullet flocks to provide immunity against SE. Where SE has been identified on a farm, the SE bacterin is still considered the vaccine of choice. Live vaccination, prior to the use of bacterin, is being tested by some firms in an effort to improve the immunity provided by the bacterin. Rodent control continues to appear to be the key factor in preventing SE problems.

Mycoplasma gallisepticum (Mg) infection—Problems due to Mg infection are occurring due to older, vaccinated flocks losing immunity and resulting in minor production losses and mortality due to secondary bacterial infections. In addition, some complexes are experiencing problems due to strains of Mg that are apparently not being prevented by either Ts-11 or 6/85 vaccines given during growing. The commercial F-strain vaccine is being used successfully to control this infection. Some states have reported breaks of Mg in previously negative complexes.

Avian influenza (AI)—In the past year, two outbreaks of H5 or H7 non-pathogenic AI have occurred in egg layer flocks. One occurred in the huge H7N2 outbreak in Virginia (197 flocks involving over 4 million birds, mostly turkeys) and the other in Texas, an H5N3 virus. Both flocks were depopulated.

H6N2 low pathogenic AI is still present in California. It is has spread to several companies in both southern and central California producing varying problems associated with the reproductive tract with very little effect on the respiratory tract as it did originally. Control by using autogenous vaccine is considered successful.

Infectious bronchitis (IB)—Spotty breaks of variant viruses are being reported in various parts of the country resulting in secondary bacterial infections early in lay or reduced egg production and increased mortality late in lay.
Pneumovirus infection—Pneumovirus infection continues to be prevalent in Minnesota turkey flocks but to date, no commercial layer flocks have been reported to experience infection.

Colibacillosis—Breaks are being seen commonly in some complexes between 23 and 30 weeks of age felt to be due to mycoplasma and infectious bronchitis virus exposure.

Fowl cholera—As an increase in free-range and cage-free egg production flocks occurs, fowl cholera in commercial layers has been seen in some parts of the country. Routine vaccination of growing birds for these premises is becoming more prevalent.

Coccidiosis—The number of problems with coccidiosis in cage reared pullets is minimal due to the routine feeding of coccidiostats to pullets and young layers is being used for control where problems have been encountered in past flocks. Floor reared flocks continue to either use coccidiostat feeding or coccidial vaccine successfully.

Focal duodenal necrosis (FDN)—This enteric malady is being found in Pennsylvania resulting in loss of egg weight or a failure to attain egg weight goals. Egg production losses are nil to minor. This problem has been reported on occasion in other states. Lesions are found in the mucosa of the duodenal loop and characterized grossly by gray, round foci on the mucosa. Ulceration of the tips of the villi associated with Gram-negative rods is seen histologically. At this point, a definitive cause has not been found although it is felt to be bacterial in nature as the condition responds well to antibacterial therapy.

Ornithobacterium rhinotracheale—This bacterium has been isolated from upper respiratory disease cases in Iowa and California.

Other issues of importance:
• Animal Welfare—Changes in management practices involving complying with the recommendations of animal welfare committees of various organizations is ongoing.
• Economics—Nationwide import embargoes placed on the US by our trading partners due to non-pathogenic H7 avian influenza resulted in significant losses of income for egg products producers. Research to show that pasteurization of egg products effectively eliminates any risk of AI contamination is underway.
• Economics—Cost of production has risen recently due to corn and soybean price increases and egg prices have been at or below cost of production for most of the last year.

Current Health and Industry Issues Facing the Turkey Industry
Prepared by Dr. Steven Clark, Alpharma Animal Health, NC
Presented by Dr. James Barton, Cargill Inc., AR

Turkey Health subcommittee chairman of the United States Animal Health Association Committee on the Transmissible Diseases of Poultry &
TRANSMISSIBLE DISEASES OF POULTRY
AND OTHER AVIAN SPECIES

Other Avian Species.

In preparation for this report to the USAHA Committee on the Transmissible Diseases of Poultry & Other Avian Species, the subcommittee chairman, Dr. Clark, and turkey industry colleague, Dr. Barton, contacted several US turkey industry professionals and veterinarians involved in turkey production, to inquire about the health status of turkeys produced in October 2001 through October 2002. The turkey industry reports several disease challenges for this 12 months. These various challenges may vary by geographical regions within a state and across the United States. This report will list, in alphabetical order, the challenges by disease.

Turkey production in 2002 is estimated to be 274.8 million head (26.8 average liveweight, pounds, unofficial estimate; NTF Sourcebook), which is up from the previous year (272 million head and 26.4 pounds). Birds are heavier and head numbers are slightly more, adding to increased overall production potential.

The lack of effective therapeutic agents remains to be a concern of the industry, including the loss and potential loss of efficacious treatments for bacterial diseases. The judicious use of antibiotics, including fluoroquinolone, appears to be reducing mortality in many turkey flocks. The turkey industry wants to ensure that any CVM antibiotic resistance policy is scientific and results in no loss of available drugs unless there are clear scientific evidence those drugs pose a danger to human or animal health.

Avian Influenza: The US remains free of High Path AI. An outbreak of Low Path AI (H7N2) was diagnosed and controlled in the Southeast, mainly confined to Virginia. Sporadic, yet unrelated, cases of Low Path AI (Orthomyxovirus) were diagnosed in the Southeast, Midwest and Western states.

Avian Metapneumovirus: Infection in turkeys causes respiratory disease of all ages. Avian Pneumovirus was recently reclassified as Avian Metapneumovirus; Avian Metapneumovirus in the US is distinct from TRT virus in other countries. It is limited to the upper Midwestern states and is a common cause of secondary colibacillosis. In 2002 the incidence is reported to be about the same as the previous year.

Avian Paramyxovirus Serotype 1 (APMV-1): Newcastle Disease Virus (NDV) was recently reclassified. APMV-1 describes avirulent ND infection. APMV-1 is a diagnosis of what was previously called lentogenic strains of NDV. Throughout the US, APMV-1 is a common cause of mild, even asymptomatic, respiratory disease in both turkeys and chickens.

Blackhead: The sporadic incidence of histomoniasis in turkeys was less across the US in 2002, than in 2001. In the Southeast and West, particular locations reported Blackhead both in commercials and breeders. Control of this disease was impaired by not having available an effective, approved treatment.

Bordetella avium: Coryza, caused by Bordetella avium, is known by
many names, including BART, Bordetella, ART, Snick, etc. Turkeys between 2 - 8 weeks of age are most severely affected, though any age bird is susceptible. In 2001 Bordetella continued to be a sporadic problem and cause of respiratory disease and subsequent immunosuppression on poorly managed farms.

**Cellulitis**: *Clostridium septicum, C. sordellii, C. colinum, C. perfringens,* or *Staph. aureus* can cause cellulitis. *E. coli* and *Strep.* have occasionally been isolated from birds diagnosed with cellulitis. Cellulitis in turkeys appears as excess mortality in older birds, around 16-18 weeks of age. It has been reported as early as 7 weeks of age. Some cases present with dead birds having “bubbly tail”, fluid filled blisters associated with broken feather follicles around base of the tail. Other cases will have dead birds with a gelatinous accumulation of fluid under the skin, usually along the thighs and breast. The dead birds decompose very quickly. Culturing the organism is difficult. In the Midwest cellulitis of the tail and lower abdomen continued to be a sporadic occurrence on a few farms.

**Cholera**: *Pasteurella multocida* infections were reported as problems in the Southeast, lower Midwest and upper Midwest. A lower incidence of Cholera occurred compared to previous years, and the severity of the disease was muted. Cutaneous manifestations were interestingly common this year. It was a sporadic problem on a limited number of farms.

**Coccidiosis** is a disease that is caused by the Eimeria protozoan parasites that develop within the intestine. The efficacy of currently used approved anticoccidial medications and vaccines has controlled, to a large degree, severe clinical coccidiosis in the field. Subclinical disease and the presence of oocysts are commonly diagnosed.

**Colibacillosis**: *E. coli* continues to be a cause of mortality in turkeys. The only approved, efficacious product for the control of mortality associated with *Escherichia coli* is enrofloxacin, a fluoroquinolone.

**Erysipelas** continues to be a sporadic diagnosis.

**Heat Stress** and associated mortality was only a sporadic problem this year.

**MG**: *Mycoplasma gallisepticum* (MG) in turkeys can cause a severe respiratory disease and subsequent airsacculitis condemnations at processing. Few cases of MG were reported in 2002. The primary breeders have remained free of MG.

**MM**: *Mycoplasma meleagridis* continues to be a sporadic diagnosis.

**MS**: MS is caused by *Mycoplasma synoviae*. *Mycoplasma synoviae* (infectious synovitis) is one cause of synovitis. It may be present in flocks 10-12 weeks of age with typically low mortality and low morbidity. MS was sporadically reported this year. The primary breeders have remained free of MS.

**NDV**: Newcastle Disease Virus (NDV) was recently reclassified; it is limited to mesogenic and velogenic ND infection. NDV is a diagnosis of
what was previously called Exotic NDV infection or Velogenic Newcastle. NDV was not diagnosed in the US.

**ORT:** *Ornithobacterium rhinotracheale* has been diagnosed throughout the US. Management systems, such as brood-and-move have increased the exposure of ORT-naive birds to ORT in the finisher barns, resulting in respiratory disease and mortality in some operations. ORT was a frequent, but seasonal contributor, to mortality in some Southeast and Upper Midwest commercial flocks.

**PEMS:** Poult Enteritis Mortality Syndrome (PEMS) is defined as an infectious, transmissible disease of uncertain, but probable viral etiology, which typically affect young turkeys between 7-28 days of age. Astrovirus has been implicated as a cause of poult enteritis and may be involved in PEMS. USDA-ARS scientists are actively researching turkey astrovirus. PEMS is characterized by diarrhea, dehydration, weight-loss, anorexia, immunosuppression, growth depression (>40%), and mortality (>2% between 7 and 28 days). Two clinical forms of PEMS have been recognized; the most severe is called Spiking Mortality of Turkeys (SMT) while the milder form has been named Excess Mortality of Turkeys (EMT). Turkey Coronavirus (TCV) has been associated with some of the PEMS cases. PEMS, complicated with TCV, has affected a few flocks, in localized geographical areas, in the lower Midwest and Southeast.

**Poult Enteritis:** Poult enteritis of unknown etiologies has been less of a problem this past year. Some cases of enteritis are diagnosed as TCV and others progress to be identified as PEMS (mortality). But many cases are still not diagnosed with a specific cause, although viral etiologies are commonly suspected. It is typically observed between 2 - 5 weeks of age. Some areas have associated enterovirus, rotavirus and/or astrovirus, sometimes complicated by enteric flagellate protozoa, with their poult enteritis cases. In the Southeast viral enteritis is still a problem in young poults and associated mortality in some cases reaching the level compatible with a diagnosis of PEMS. Overall enteritis was much improved throughout the US compared to the previous year.

**Protozoal Enteritis:** Enteric protozoa (*Cochlosoma, Trichomonas* and *Hexamita*) are common in the summer months throughout the Southeast and Midwest. Protozoa severely complicate TCV, PEMS and other enteric diseases. The University of Missouri is actively researching *Cochlosoma* infections in turkeys to determine the pathology and production effects of a pure *Cochlosoma anatis* infection and to study the mechanism by which *Cochlosoma* causes production losses.

**Round Worms** (*Ascaridia dissimilis*) infestations are common.

**Salmonella** has been a problem for some producers. It has been associated with poor poult quality issues, resulting in excessive poult mortality. Sporadic diagnosis of this disease has been made this past year.

**TCV:** Turkey Coronavirus (TCV), also known as Bluecomb disease or
mud fever, is a highly infectious and acute enteric (intestinal) viral disease of turkeys. Serologic diagnostic tests for TCV are available from several of the State poultry diagnostic laboratories. TCV is a significant economic problem, mainly due to poor flock performance, causing financial losses for both growers and processors. In 2001, the incidence of TCV was low in the Southeast despite a few cases localized to one small area. In the lower Midwest TCV incidence was similar to the past few years with sporadic cases. Regions reported a reduction in severity relative to previous years.

Current Health and Industry Issues facing the Heavy Breeder Industry
Dr. Robert Owen, Hubbard ISA

The following is compiled from responses received from veterinarians in both the primary breeding and broiler industries.

Overall, there are no major changes in the health issues facing the Heavy Breeder Industry this year. The biggest challenge facing both the primary breeding and broiler industries is dealing with the effects of low path H5 and H7 avian influenza. The concerns are three-fold: how to control the virus that is circulating in certain live bird markets, how to find breaks early and deal with them in a humane and environmentally friendly manner, and how to stop unjustified trade embargoes from some of our trading partners.

Other concerns remain as they have been in other years including:
1. Chick quality arising primarily from issues surrounding incubation of yield type birds.
2. Control of cholera remains an issue. This is especially true in yield type males because of the inability to vaccinate them with the harsher vaccines due to unacceptable post-vaccinal reactions.
3. Peritonitis caused by E. coli in young breeder hens just coming into production is more of problem and will be even more significant if we lose the ability to use antibiotics.

<table>
<thead>
<tr>
<th>Drug Class/Drug</th>
<th>Human Importance Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural penicillins</td>
<td>H</td>
</tr>
<tr>
<td>3rd Generation Cephalosporins</td>
<td>H</td>
</tr>
<tr>
<td>Fluoroquinolones</td>
<td>H</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>M</td>
</tr>
<tr>
<td>Spectinomycin</td>
<td>M</td>
</tr>
<tr>
<td>Erythromycin</td>
<td>H</td>
</tr>
<tr>
<td>Tetracyclines</td>
<td>M</td>
</tr>
<tr>
<td>Streptogramins</td>
<td>H</td>
</tr>
<tr>
<td>Bacitracin</td>
<td>L</td>
</tr>
<tr>
<td>Trimethoprim/sulfamethoxazole</td>
<td>H</td>
</tr>
</tbody>
</table>
TRANSMISSIBLE DISEASES OF POULTRY
AND OTHER AVIAN SPECIES

4. Breaks of coccidiosis are being reported. This is most likely due to lack of proper management following vaccination or early re-exposure.
5. Cases of Histomoniasis and Botulism have been reported sporadically.
6. Productivity continues to be lost due to musculoskeletal problems including synovitis caused by Staphylococcus and tendon rupture.
7. As always, biosecurity, or lack thereof, remains a major concern.
8. Calcium tetany—sudden death is being seen in breeders just coming into production.

Characterization of a Novel Highly Pathogenic H7N3 Avian Influenza Virus from Chile

Dennis A. Sennea, Janice C. Pedersena, David L. Suarezb, Christian Mathieuc, Patricia Avalosb, Brundaban Panigrahya
aU.S. Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services, National Veterinary Services Laboratories, Ames, Iowa 50010
bU.S. Department of Agriculture, Agriculture Research Service, Southeast Poultry Research Laboratory, Athens, Georgia, 30605
cServicio Agricola Y Ganadero (SAG), Santiago, Chile

Presented by Dennis Senne

Highly pathogenic avian influenza (HPAI) was diagnosed for the first time in Chile in July 2002. The outbreak was limited to two premises; one with broiler breeders and the second with turkey breeders. Approximately 110,000 of 610,000 broiler breeders died of the disease before the farm was depopulated. The outbreak was caused by H7N3 subtype of avian influenza virus (AIV). In May 2002, an H7N3 of low pathogenicity was isolated from chickens in Chile. The amino acid (a.a.) sequence at the hemagglutinin (HA) cleavage site (cs) was PEKPKTR/GLF. In June 2002, additional isolates were made that were highly pathogenic by the chicken pathogenicity test. The HPAI isolates had a 10 a.a. insertion (in bold) with two motifs at the HA cs: PEKPKTCSPLSRCRKT/GLF and PEKPKTCSPLSRCRET/GLF. The a.a. sequences are unusual and do not conform to the multiple basic a.a. motif characteristic of other HPAI H7 viruses. The finding will have a significant impact on the molecular definition used to identify HPAI viruses.

7. Status Reports

Avian Import Activities
Presented by Dennis Senne, NVSL

A. Poultry and Hatching Eggs
There were 17,627,388 poultry, including day old chicks, and 21,457,067 poultry hatching eggs imported into the United States during fiscal year
B. Commercial Birds

The imports of commercial birds are limited to those that are exempt from the Wild Bird Conservation Act, serviced by the U.S. Fish and Wildlife Service. There were 6,244 birds released from USDA-operated commercial bird quarantine facilities in FY 2002. There were 251,262 commercial birds released from USDA-supervised private bird quarantine facilities.

C. Pet Bird Program

There were 1,534 pet birds imported into the United States and quarantined at a USDA-operated animal import center during FY 2002.

D. Ratite Importations

During FY 2002, no ratites or hatching eggs of ratites were imported into the United States. The current price of ratites and hatching eggs of ratites does not justify the costs of importing such animals.

Avian Influenza

Live-bird Markets (LBMs). During FY 2002, 8,112 specimens from LBMs in eight states were tested for presence of avian influenza virus (AIV). The high level of testing is a result of increased efforts by States to reduce the high prevalence of low pathogenic H7N2 AIV in the LBM system in northeastern United States since 1994. The H7N2 AIV was isolated from 6 of 204 specimens in 21 submissions from Massachusetts, 144 of 1,670 specimens in 118 submissions from New Jersey, and from 595 of 6,024 specimens in 342 submissions from New York (Table 1). Specimens (in parentheses) collected from LBMs in Connecticut (70), Maine (30), Rhode Island (40), Pennsylvania (20), and Florida (54) were negative for AIV. The six isolates of H5N2 and the single isolate of H5N4 AIV from New York LBMs appeared to be isolated events because follow up surveillance in the H5-positive markets did not yield additional H5 isolates. Pathogenicity of the H5 isolates and representative H7N2 isolates were determined by the chicken pathogenicity test and deduced amino acid profile at the hemagglutinin cleavage site; all viruses were characterized as low pathogenic. Other AIV subtypes isolated from NY LBMs were H3N6, H3N8, H4N6, H6N2, and H6N6. In addition, two isolations of H10N7 were made from LBMs in NJ.

Premises Other than LBMs. Subtypes of AIV isolated from gallinaceous birds in premises other than LBMs are shown in Table 2. During FY 2002, several notable events involving low pathogenic avian influenza occurred in the United States. In late December 2001, and January 2002, seven commercial farms in Pennsylvania were infected with low pathogenic H7N2. The infections were linked to live-bird market (LBM) activities in the north-
east United States. In March 2002, a low pathogenic H7N2 AIV was isolated from turkey breeders in Virginia. The disease quickly spread through the densely populated poultry farms in the Shenandoah Valley and adjacent states. From March to July 2002, 197 farms in Virginia (VA), 3 in North Carolina (NC), and one in West Virginia (WV) were diagnosed as having infection. Over 4.7 million birds were destroyed in an effort to control the outbreak. In the control efforts, the National Veterinary Services Laboratories (NVSL) tested over 40,000 samples for isolation of AIV or detection of AIV RNA by the real-time reverse transcriptase-polymerase chain reaction (RRT-PCR) procedure. The virus responsible for the outbreak in VA, NC, and WV was shown to be related to the low pathogenic H7N2 virus that has been circulating since 1994 in the LBM system in the northeast United States. It should be noted that specimens collected from 93 backyard flocks (324 samples) and 300 non-migratory Canada geese located near the affected commercial poultry flocks in Virginia were negative for H7 virus and H7-specific antibodies. In May 2002, an infection with low pathogenic H5N3 AIV was diagnosed in commercial chickens in Texas (TX). The infection was limited to 2 premises. The H5N3 infected premises were depopulated. The origin of this virus is not known, but a link was established between the first infected farm through dealings of poultry with LBMs in Houston, TX. In Colorado, several meat turkey flocks were infected with a strain of low pathogenic H8N4. Affected turkeys showed signs of respiratory disease but recovered and were marketed. The H8 subtype has rarely been detected in poultry in the United States. The low pathogenic H6N2 AIV that has been circulating in California since 2000 infected several turkey and broiler flocks in 2002, but infection has been found mostly in table-egg layers in southern and central California. An autogenous, killed vaccine was used to help in the control of the disease in table-egg layer flocks. Also in California, an H5N2 low pathogenic AIV was isolated in September from a grandparent flock of turkey breeders in a single premise. No additional spread of the H5N2 AIV has been detected.

**Birds Seropositive for AIV.** Table 3 shows AIV subtype-specific antibodies detected in avian species originating from 19 states. Several of the antibody-positive submissions are associated with outbreaks from which AIV of the same subtype was isolated (see Table 2). There were three instances where antibodies were detected in commercial flocks that were negative for AIV by virus isolation. One was a chicken flock in Connecticut that was positive for antibodies to H7N2 AIV. The second and third flocks were turkeys in Michigan positive for antibodies to H5N1 AIV. In Minnesota, antibodies were detected to three subtypes of AIV: H1N1, H9N9, and H10N7 (4 flocks). The H1 subtype continues to be the predominant subtype of AIV in the United States. Antibodies to H1 AIV were detected in 10 states.

**AI Diagnostic Reagents Supplied by the NVSL.** As the number of AIV infections in FY 2002 increased, so was the demand for reagents to per-
form serologic surveillance. In FY 2002, the NVSL produced and distributed 13,257 units of agar gel immunodiffusion (AGID) reagents to state and private laboratories in the United States. The quantity is sufficient to perform approximately 1.59 million tests, and accounts for a 60% increase over FY 2001 requests for AGID reagents. In addition, 1,357 units (162,840 tests) of AGID reagents were sent to international laboratories.

**Newcastle Disease**

During FY 2002, exotic Newcastle disease was isolated from 2 domestic sources and 1 lot of imported pet birds in a private import quarantine facility in California. In April 2002, exotic Newcastle disease virus was isolated from one parrot in a pet store in California. Tracebacks failed to detect additional infections. In late September 2002, exotic Newcastle disease virus was isolated from several backyard game birds in Los Angeles, California. The incident was reported to the Office International des Epizooties (OIE) on October 3, 2002. Epidemiologic investigations are being done to determine the source of the infection. No commercial poultry was involved. In November 2001, exotic Newcastle disease virus was isolated from several psittacine birds quarantined in a private quarantine facility in California. The birds were refused entry into the United States.

**Table 1**

<table>
<thead>
<tr>
<th>State</th>
<th>Species of Bird</th>
<th>Subtypes of AIV (Number of Isolates)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massachusetts</td>
<td>Poultry</td>
<td>H7N2* (6)</td>
</tr>
<tr>
<td>New Jersey</td>
<td>Poultry</td>
<td>H7N2* (144), H10N7 (2)</td>
</tr>
<tr>
<td>New York</td>
<td>Poultry</td>
<td>H3N6 (1), H3N8 (1), H4N6* (17), H5N2* (6), H5N4* (1), H6N2* (1), H7N2* (595)</td>
</tr>
</tbody>
</table>

*The AIV were characterized as low pathogenic.

**Table 2**

<table>
<thead>
<tr>
<th>State</th>
<th>Specie of Bird</th>
<th>Subtypes of AIV (# Submissions)</th>
</tr>
</thead>
</table>

564
<table>
<thead>
<tr>
<th>State</th>
<th>Species of Bird</th>
<th>Antibodies (# Submissions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>Chicken</td>
<td>H1 (1), H6N2 (12)</td>
</tr>
<tr>
<td></td>
<td>Duck</td>
<td>H5N3 (1), H6N5 (2), H9N2 (1)</td>
</tr>
<tr>
<td></td>
<td>Turkey</td>
<td>H5N2 (3)</td>
</tr>
<tr>
<td>Colorado</td>
<td>Turkey</td>
<td>H8N4 (5)</td>
</tr>
<tr>
<td>Connecticut</td>
<td>Chicken</td>
<td>H7N2 (1)</td>
</tr>
<tr>
<td>Florida</td>
<td>Pelican</td>
<td>H1N2 (1)</td>
</tr>
<tr>
<td>Iowa</td>
<td>Turkey</td>
<td>H1N1 (1)</td>
</tr>
<tr>
<td>Illinois</td>
<td>Turkey</td>
<td>H1N1 (1)</td>
</tr>
<tr>
<td>Maryland</td>
<td>Chicken</td>
<td>H1 (1)</td>
</tr>
<tr>
<td>Michigan</td>
<td>Turkey</td>
<td>H5N1 (2)</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Turkey</td>
<td>H1 (1), H1N1 (1), H9N9 (1), H10N7 (5)</td>
</tr>
<tr>
<td>North Carolina</td>
<td>Turkey</td>
<td>H1N1 (11), H7N2 (1)</td>
</tr>
<tr>
<td></td>
<td>Chicken</td>
<td>H7N2 (3)</td>
</tr>
<tr>
<td></td>
<td>Quail</td>
<td>H7N2 (2)</td>
</tr>
<tr>
<td>North Dakota</td>
<td>Turkey</td>
<td>H1N1 (1)</td>
</tr>
</tbody>
</table>

*The AIV were characterized as low pathogenic

**There were 197 Virginia flocks infected with low pathogenic H7N2 AIV

Table 3

<table>
<thead>
<tr>
<th>State</th>
<th>Species of Bird</th>
<th>Antibodies (# Submissions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>California</td>
<td>Chicken</td>
<td>H1 (1), H6N2 (12)</td>
</tr>
<tr>
<td></td>
<td>Duck</td>
<td>H5N3 (1), H6N5 (2), H9N2 (1)</td>
</tr>
<tr>
<td></td>
<td>Turkey</td>
<td>H5N2 (3)</td>
</tr>
<tr>
<td>Colorado</td>
<td>Turkey</td>
<td>H8N4 (5)</td>
</tr>
<tr>
<td>Connecticut</td>
<td>Chicken</td>
<td>H7N2 (1)</td>
</tr>
<tr>
<td>Florida</td>
<td>Pelican</td>
<td>H1N2 (1)</td>
</tr>
<tr>
<td>Iowa</td>
<td>Turkey</td>
<td>H1N1 (1)</td>
</tr>
<tr>
<td>Illinois</td>
<td>Turkey</td>
<td>H1N1 (1)</td>
</tr>
<tr>
<td>Maryland</td>
<td>Chicken</td>
<td>H1 (1)</td>
</tr>
<tr>
<td>Michigan</td>
<td>Turkey</td>
<td>H5N1 (2)</td>
</tr>
<tr>
<td>Minnesota</td>
<td>Turkey</td>
<td>H1 (1), H1N1 (1), H9N9 (1), H10N7 (5)</td>
</tr>
<tr>
<td>North Carolina</td>
<td>Turkey</td>
<td>H1N1 (11), H7N2 (1)</td>
</tr>
<tr>
<td></td>
<td>Chicken</td>
<td>H7N2 (3)</td>
</tr>
<tr>
<td></td>
<td>Quail</td>
<td>H7N2 (2)</td>
</tr>
<tr>
<td>North Dakota</td>
<td>Turkey</td>
<td>H1N1 (1)</td>
</tr>
</tbody>
</table>
### Mycoplasma and Salmonella Activity
#### NVSL 2002

**B.M. Flugrad, B.S. and K.E. Ferris, B.S., M.S.**

#### Mycoplasma

**Summary**

During a twelve month period (October 1, 2001 through September 30, 2002), the National Veterinary Services Laboratories (NVSL) performed 999 avian *Mycoplasma* hemagglutination inhibition tests. During this same period, clients requested and were provided 1415 ml of hemagglutination antigen and 1116 ml of control antiserum.

Reagents supplied for the period of October 1, 2001 to September 30, 2002

<table>
<thead>
<tr>
<th>Mycoplasma Product</th>
<th>Number of vials</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Mycoplasma gallisepticum</em> HA antigen, 5 ml</td>
<td>114</td>
</tr>
<tr>
<td><em>Mycoplasma meleagridis</em> HA antigen, 5 ml</td>
<td>57</td>
</tr>
<tr>
<td><em>Mycoplasma synoviae</em> HA antigen, 5 ml</td>
<td>112</td>
</tr>
<tr>
<td>Total vials of HA antigen supplied</td>
<td>283</td>
</tr>
</tbody>
</table>

*Mycoplasma gallisepticum* turkey positive control antiserum for HI test, 2 ml | 28 |
*Mycoplasma gallisepticum* chicken positive control antiserum for HI test, 2 ml | 97 |
*Mycoplasma meleagridis* turkey positive control antiserum for HI test, 2 ml | 28 |
*Mycoplasma synoviae* turkey positive control antiserum for HI test, 2 ml | 46 |
*Mycoplasma synoviae* chicken positive control antiserum for HI test, 2 ml | 83 |
**TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES**

*Mycoplasma gallisepticum* plate test turkey
positive control antiserum, 2 ml 15

*Mycoplasma gallisepticum* plate test chicken
positive control antiserum, 2 ml 91

*Mycoplasma meleagris* plate test turkey
positive control antiserum, 2 ml 11

*Mycoplasma synoviae* plate test turkey
positive control antiserum, 2 ml 11

*Mycoplasma synoviae* plate test chicken
positive control antiserum, 2 ml 77

*Mycoplasma* negative plate and HI negative
chicken control antiserum, 2 ml 58

*Mycoplasma* negative plate and HI negative
turkey control antiserum, 2 ml 13

Total vials of control antiserum supplied 558

Avian *Mycoplasma* serology
MG, MM, and MS hemagglutination inhibition 999 tests

**Salmonella**

**Summary**

During the period of July 1, 2001 through June 30, 2002, the National Veterinary Services Laboratory serotyped 18,153 Salmonella isolates recovered from animals, their environment, or feed. Of these, 3326 were isolated from chickens or their environment and 2608 were isolated from turkeys or their environment. The most common serotypes found in poultry are listed in Tables 1 and 2. During this same period, 55 antisera were tested for Pullorum-Typhoid using the microagglutination test.

**Table 1**

<table>
<thead>
<tr>
<th>MOST COMMON SEROTYPES FROM CHICKENS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLINICAL DISEASE</td>
</tr>
<tr>
<td>Heidelberg</td>
</tr>
<tr>
<td>Kentucky</td>
</tr>
<tr>
<td>Enteritidis</td>
</tr>
<tr>
<td>Typhimurium</td>
</tr>
<tr>
<td>Senftenberg</td>
</tr>
<tr>
<td>All Others</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

**Table 2**

<table>
<thead>
<tr>
<th>MOST COMMON SEROTYPES FROM TURKEYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLINICAL DISEASE</td>
</tr>
<tr>
<td>Senftenberg</td>
</tr>
<tr>
<td>Heidelberg</td>
</tr>
</tbody>
</table>
REPORT OF THE COMMITTEE

Typhimurium 69  Muenster 201
Montevideo 60  Hadar 198
Bredeney 55  Typhimurium 76
All Others 160  All Others 634
Total 666  Total 1942

National Poultry Improvement Plan
National Plan’s Status Report
Presented by Andrew R. Rhorer, USDA, APHIS, VS, NPIP

Pullorum-Typhoid Status:
In Calendar Year 2001, there was one isolation/outbreak of *Salmonella pullorum* reported to the Poultry Improvement Staff. There was one isolation of *Salmonella pullorum* reported during Calendar Year 2002 from January to October 1, 2002. There have been no isolations of *Salmonella gallinarum* since 1988 in any type poultry.

Both isolates were Standard strain *Salmonella pullorum*.

The number of birds in *Salmonella pullorum* positive flocks (January 1, 2001- October 1, 2002) were as follow:

<table>
<thead>
<tr>
<th>Number of birds</th>
<th>Flocks Breed</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;25  &lt;50 birds</td>
<td>= 1 mixed game chickens</td>
</tr>
<tr>
<td>&gt;200 birds</td>
<td>= 1 mille fleur bantam and guinea fowl</td>
</tr>
<tr>
<td>Total</td>
<td>= 2</td>
</tr>
</tbody>
</table>

Newcastle Disease (ND) World Situation – 11/1/01 to 10/20/02
Presented by Dr. Jack King, USDA, ARS, SEPRL, Athens, Georgia

The Office International Des Epizooties (OIE) reports of ND outbreaks worldwide included information from the following countries: Algeria destroyed flocks from 4 outbreaks on layer farms involving 280,000 birds. Australia reported an outbreak involving 250,000 chickens on a layer farm in the state of Victoria 7 months after being declared free of ND from prior outbreaks in New South Wales. The virus was characterized as being identical or almost identical to the 1999 Mangrove mountain isolate of virulent ND virus of Australian origin. The intracerebral pathogenicity index (ICPI) of the isolate was 1.61. The infected flock was destroyed. Outbreaks in 126 primarily layer flocks, 118 backyard and 8 commercial, were reported in Denmark. Spread was due to trade of infected birds. The ICPI of one of the isolates was 1.75 and all positive flocks were destroyed. Japan reported isolated outbreaks in several prefectures involving commercial layers, pigeons, and pheasants. Taipei China had one outbreak involving 30,000 chickens - initial mortality included 4,000 and remaining birds were destroyed. Venezuela had an outbreak involving 760,000 chickens and 120 fighting cocks. An epidemiological investigation revealed a significant association between the poultry farms and the fighting cock owners. The iso-
TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

late ICPI was 1.87. An outbreak in backyard game fowl was reported during late September in the United States.

Summaries of disease occurrence in all OIE member countries are available at the OIE web site http://www.oie.int. This is a more detailed reporting than was previously available bimonthly in the OIE Bulletin. The information includes last occurrence for countries currently free of disease as well as disease control measures being utilized and can be viewed by country, region, or world for monthly, annual, or multi-annual periods.

The current OIE definition of ND was adopted in 1999 (OIE Bulletin, vol. 111, p. 266-7, 1999) and was summarized in this committee’s proceedings most recently in 2001 (M. David and J. King). A new ND chapter for the OIE International Animal Health Code has been drafted but is being revised and therefore has not been adopted.

Newcastle Disease Outbreak in California
Dr. David Castellan, CDFA

A short report on the recent Newcastle Disease outbreak in California was presented.

8. Subcommittee Reports

Research Update on H7N2 Avian Influenza Virus in Turkeys and Chickens
David E. Swayne, Terrence M. Tumpey and David L. Suarez
USDA, Southeast Poultry Research Laboratory

The outbreak of H7N2 low pathogenicity avian influenza (LPAI) in Virginia during 2002 raised questions about the susceptibility of turkeys versus chickens to the virus and the potential of vaccines to provide protection. The virus A/turkey/Virginia/158512/02 (H7N2) replicated from day 2 through 7 post-intranasal inoculation (PI) in 4 week-old White Plymouth Rock chickens with peak mean titer of virus recovered from the oropharynx at day 3 PI ($10^{4.5}$ EID$_{50}$/ml of swab media). Virus recovery from the cloaca was inconsistent and of a lower mean titer ($10^{1.5}$ EID$_{50}$/ml). In contrast, turkeys shed virus from the respiratory tract at higher mean peak titer ($10^{6.0}$ EID$_{50}$/ml), but the length of shed was similar. In comparing infectivity, turkeys were at least 20-50x more susceptible to H7N2 LPAI virus infection than chickens based on seroconversion rates following intranasal inoculation with 10 fold dilutions of virus. Using a commercially available H7N2 inactivated vaccine, neither sham- nor H7N2-vaccinated turkeys developed clinical signs or death following challenge with H7N2 LPAI virus. The inactivated vaccine groups (1x and 2x vaccinated) had a significant reduction in titers of challenge virus shed from the oropharynx when compared to sham-vaccinated groups for days 1-7 PI. This mean reduction ranged from $10^{1.2-4.1}$ EID$_{50}$/ml. These studies suggest that turkeys were more susceptible to infection with the H7N2 LPAI virus and shed more virus from the respiratory tract when
infected. However, current vaccines can provide protection.

**Report on the 5th International Symposium on Avian Influenza**

David E. Swayne, Southeast Poultry Research Laboratory, USDA

The Fifth International Symposium on Avian Influenza was held at the Georgia Center for Continuing Education, The University of Georgia, Athens, Georgia, USA, April 14-17, 2002. Fifty-six oral and 25 poster presentations were given during 11 sessions by international experts from North America, Europe, Asia, and Australia. In attendance were 204 persons representing 6 continents and 25 countries. This conference brought together scientists, biologists, veterinarians, and government regulators from all over the world to exchange and discuss current scientific information on avian influenza. The symposium addressed national and international issues including global reports on influenza; outbreaks in Italy and Hong Kong; ecology and epidemiology; advances in molecular biology and epidemiology; impact on public health; pathobiology and pathogenesis; risk assessment, regulations and trade issues; field experiences in control and eradication; vaccines and antibody-based diagnostics; molecular diagnostics; and late breaking issues. The program gave all who attended a broader understanding of the global nature of avian influenza and a framework was developed to foster international cooperation in solving problems. Professionals were able to exchange research data and ideas, and build closer ties with colleagues worldwide. A proceedings book containing contents of oral and poster presentations and the discussion sessions will be published in early 2003 as a special issue of *Avian Diseases*.

8. Old and New Business

New Resolutions

A resolution on the use of AI vaccines was discussed and approved by the committee.

Definition of “Commercial Poultry”

A proposal to define commercial poultry was heard by the committee. The objective of this proposal is to allow NVSL to categorize diagnoses of AI and NDV as originating from commercial or non-commercial flocks in their report for public consumption. The committee will attempt to develop a definition of “commercial poultry”. In addition, an effort should be made to encourage all poultry diagnostic laboratories to provide an identification of commercial status on all submissions sent to NVSL for AI or NDV.
## HATCHERY PARTICIPATION IN THE NATIONAL POULTRY IMPROVEMENT PLAN

### TESTING YEAR 2002

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Capacity—Eggs</th>
<th>Average per Hatchery</th>
<th>Participating Dealers</th>
<th>Participating Independent Flocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg and Meat—Type Chickens Participating</td>
<td>311</td>
<td>714,393,816</td>
<td>2,357,735</td>
<td>747</td>
<td>43</td>
</tr>
</tbody>
</table>

### TESTING YEAR 2000

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
<th>Capacity—Eggs</th>
<th>Average per Hatchery</th>
<th>Participating Dealers</th>
<th>Participating Independent Flocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkeys: Participating</td>
<td>54</td>
<td>34,748,626</td>
<td>709,156</td>
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<th>Number</th>
<th>Capacity—Eggs</th>
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<th>Participating Dealers</th>
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<tbody>
<tr>
<td>Waterfowl, Exhibition Poultry, and Game Birds Participating</td>
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<td>28,422,639</td>
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## Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year 2000

<table>
<thead>
<tr>
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<th>U.S. Pullorum-Typhoid Clean: Participating- Number</th>
<th>Birds in Flocks- Number</th>
<th>Average per Flock</th>
<th>Primary Breeding Flocks</th>
<th>Flocks-Proportion of Total</th>
<th>Birds- Proportion of Total</th>
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<tr>
<td></td>
<td>261</td>
<td>3,307,335</td>
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## Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year 2000

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<th>U.S. Pullorum-Typhoid Clean: Participating- Number</th>
<th>Birds in Flocks- Number</th>
<th>Average per Flock</th>
<th>Primary Breeding Flocks</th>
<th>Flocks-Proportion of Total</th>
<th>Birds- Proportion of Total</th>
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<tr>
<td></td>
<td>4,991</td>
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## Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year 2000

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<th>U.S. Pullorum-Typhoid Clean Participating- Number</th>
<th>Birds in Flocks- Number</th>
<th>Average per Flock</th>
<th>Primary Breeding Flocks</th>
<th>Flocks-Proportion of Total</th>
<th>Birds- Proportion of Total</th>
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<tr>
<td></td>
<td>648</td>
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TRANSMISSIBLE DISEASES OF POULTRY
AND OTHER AVIAN SPECIES

Waterfowl, Exhibition Poultry and Game Breeding Flocks
in the National Poultry Improvement Plan
Participation and Testing Summary-2000

<table>
<thead>
<tr>
<th></th>
<th>Participating- Number</th>
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<tr>
<td>U.S. Pullorum-Typhoid Clean</td>
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<tr>
<td>Average per Flock</td>
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<tr>
<td>Primary Breeding Flocks-</td>
<td>26.0</td>
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</tr>
<tr>
<td>Proportion of total</td>
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<tr>
<td>Birds- Proportion of Total</td>
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*Mycoplasma gallisepticum, Mycoplasma synoviae, and Mycoplasma meleagris* status 2001-2002

No. of Positive Breeding Flocks (Primary and Multiplier)

<table>
<thead>
<tr>
<th></th>
<th>Egg-Type Chickens</th>
<th>Meat-Type Chickens</th>
<th>Turkey</th>
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<tbody>
<tr>
<td>Mycoplasma gallisepticum</td>
<td>0</td>
<td>5</td>
<td>1</td>
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<tr>
<td>Mycoplasma synoviae</td>
<td>10</td>
<td>8</td>
<td>3</td>
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<td>Mycoplasma meleagris</td>
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*U.S. Salmonella enteritidis Monitored - Egg-Type Chickens*

No. of flocks and birds in the flocks with *Salmonella enteritidis* isolates, 1990-2002

<table>
<thead>
<tr>
<th></th>
<th>Environmental</th>
<th>Dead Germ</th>
<th>Bird</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flocks</td>
<td>54</td>
<td>6</td>
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</tr>
<tr>
<td>Birds in Flocks</td>
<td>579,871</td>
<td>77179</td>
<td>181342</td>
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## U.S. *Salmonella enteritidis* Monitored- Egg-Type Chickens

No. of flocks and birds in flocks by State with *Salmonella enteritidis* isolates, 1990-2002

<table>
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<tr>
<th>State</th>
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<tbody>
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<tr>
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<tr>
<td>Birds in Flocks</td>
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<td>Flocks</td>
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<tr>
<td>Birds in Flocks</td>
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<tr>
<td>Illinois</td>
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<tr>
<td>Flocks</td>
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<tr>
<td>Birds in Flocks</td>
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<td>3700</td>
<td>1200</td>
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<tr>
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<tr>
<td>Birds in Flocks</td>
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<td>Birds in Flocks</td>
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<tr>
<td>Flocks</td>
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<td>Birds in Flocks</td>
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<td>17,950</td>
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</tr>
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REPORT OF THE COMMITTEE ON TRANSMISSIBLE DISEASES OF SWINE

Chairman: Dr. Paul L. Anderson, St. Paul, MN
Vice Chairman: Dr. Thomas J. Burkgren, Perry, IA

Dr. Arthur A. Andersen, IA; Dr. Gary A. Anderson, KS; Mr. Neal F. Black, MN; Mr. Philip E. Bradshaw, IL; Dr. Corrie C. Brown, GA; Dr. William L. Brown, KS; Dr. Eric J. Bush, CO; Dr. James E. Collins, MN; Dr. Gerald E. Duhamel, NE; Dr. Gene A. Erickson, NC; Dr. Thomas W. Freas, IN; Dr. Anthony M. Gallina, PA; Dr. Joel Goldman, LA; Dr. Larry M. Granger, MI; Dr. J. Mark Hammer, IA; Dr. Robert M. Harbison, AR; Dr. D. “Hank” L. Harris, IA; Dr. Howard T. Hill, IA; Dr. Richard D. Hull, IL; Dr. Wade L. Kadel, KY; Dr. Charles L. Kanitz, IN; Dr. John P. Kluge, IA; Dr. Elizabeth A. Lautner, IA; Mr. James W. Leafstedt, SD; Dr. Charles E. Massengill, MO; Dr. James D. McKean, IA; Dr. F. J. Mulhern, CA; Dr. Phillip A. O’Berry, IA; Dr. Richard E. Omohundo, AZ; Dr. Gary D. Osweiler, IA; Dr. Kurt D. Rossov, MN; Dr. Mo D. Salman, CO; Dr. Roy A. Schultz, IA; Dr. George P. Shibley, MD; Dr. Rick L. Sibbel, IA; Dr. Harry Snelson, NC; Mr. James E. Stocker, NC; Dr. Paul L. Sundberg, IA; Dr. H. Leon Thacker, IN; Dr. Teddi Wolff, MO; Dr. Paul Yeske, MN.

USAHA Transmissible Diseases of Swine Committee—Wednesday, 7:00 am-12:00 noon; Jefferson D Room.

Chair Dr. Paul Anderson called the meeting to order at 8:03 am. He provided an overview of the agenda for the meeting. He then reviewed Resolution #10, which was passed by the Committee in 2001. Resolution #10 focused on the possibility of testing for foreign animal diseases (FAD) at state diagnostic laboratories. The USDA response indicated that in an outbreak situation consideration to allow State diagnostic laboratories to test for FAD’s would be given. Dr. Sabrina Swenson updated the Committee on the progress of dealing with “surge capacity” and considering disease surveillance by state diagnostics laboratories. The surveillance will not necessarily be for FAD’s, but will be for diseases that may be confused with FAD’s (e.g., septicemic Salmonella infection). She indicated that the process for both has just started.

Dr. Robert Glock (Arizona Veterinary Diagnostic Laboratory) provided an update on diagnostic laboratories and a perspective on testing for FAD’s at state laboratories. He explained that the present system of FAD diagnosis is somewhat cumbersome and that an enhanced system involving state laboratories could provide a faster response as well as some routine surveillance. Some funding from the USDA has been allocated to state laboratories to establish the “Animal and Plant Disease and Pest Surveillance Network.” He explained the expectations for the use of these funds, dis-
Dr. Paul Sundberg (National Pork Board) provided a history and technical review of the regulation on *Interstate Movement of Swine within a Production System*. The process to develop this regulation started in 1996. The final rule was published in December 2001. A Veterinary Services (VS) notice (No. 02-22) was issued in October 2002 to clarify the requirements for regular inspection of premises and swine under the movement plan.

Dr. Paula Cray (USDA/ARS/ARRU & National Antimicrobial Resistance Monitoring System) provided an overview of a proposed program for monitoring antimicrobial resistance entitled the Collaboration for Animal Health, Food Safety and Epidemiology (CAHFSE). This will be a surveillance system that provides for centralized collaboration between NAHMS and NARMS. Proposed start date will be in 2003 and pork will be the first commodity (25 farm operations with 75 samples per operation; slaughter plants to be added later). Monitoring may include animal pathogens of interest as well as potential food borne bacteria. Detailed data about each operation will be gathered via questionnaires for both the farms and the plants. Participating USDA entities will include ARS, APHIS and FSIS. USDA is ready to begin design and implementation.

Dr. Paul Sundberg presented a technical review of the areas of antimicrobial resistance and alternatives to antibiotics in pork production. He provided information concerning the effects of a feed antibiotic ban in Denmark, including increased use of therapeutic antibiotics and increased disease in weanling pigs. He reviewed the FDA’s Draft Guidance Document #152, *Evaluating the Safety of Antimicrobial New Animal Drugs with Regard to Their Microbiological Effects on Bacteria of Human Health Concern*, with respect to possible implications for the swine industry. He also highlighted ongoing efforts by the pork industry, including the Pharmaceutical Issues Task Force and the Non-antimicrobial Production Enhancers Working Group.

Dr. Liz Wagstrom (National Pork Board) updated the Committee on parasites of concern in swine, including toxoplasma, taenia and trichinae. Toxoplasma infections in humans remain a concern. There are indications that the involvement of pork in these infections is decreasing. Producer education, monitoring, and research are continuing. Important areas of research include the identification of other risk factors and a national meat case study (chicken, pork and beef). Taenia solium (human tapeworm) infection is a concern because of the potential for neurological implications, however it is extremely rare in the US. Trichinae prevalence is dropping in the US swine herd. There is a corresponding decrease in human cases, with most cases related to consumption of wild game. The Trichinae Certification pilot program (pre-harvest certification) is continuing and will serve
as a model for other certification programs. Monitoring is done at the slaugh-
ter plant and is statistically based on the US swine herd. Interventions have
been designed to minimize risk factors. Plans are underway to expand the
program to an industry-wide basis.

A resolution was brought forth to endorse the proposed USDA program
on Collaboration on Animal Health, Food Safety and Epidemiology
(CAHFSE), encourage the USDA to continue to work with industry on the
design and implementation, and request immediate USDA budgetary sup-
port and appropriate long-term Congressional funding. It was moved and
seconded to adopt this resolution. Motion carried. The adopted resolution
will be forwarded to the Resolution Committee of the USAHA Board of Di-
rectors.

The committee adjourned at 11:28 am.
The Committee on Tuberculosis met on Monday, October 21, 2002. Over 126 people attended.

Dr. Robert Meyer, Regional Epidemiologist for USDA, APHIS, VS Western Region, gave a report on TB cases detected at slaughter during Fiscal Year 2002. Slaughter surveillance for bovine TB in the United States during FY 2002 continued to identify new cases of TB in both adult and immature cattle. One hundred two cases of *M. bovis* were found in cattle and elk in U.S. slaughter plants. These findings represent a continuing increase in the total number of positive cases from the previous two years when 71 and 23 total cases were detected respectively.

Ten cases (9.8%) of the 102 positive slaughter cases were found in adult cattle or elk two years of age or older. Ninety-two (92) cases (90.2%) were detected in fed or immature steers or heifers. Results of investigations of the 10 cases from adult cattle or elk showed the following results:

- 1 adult cattle case traced to lot of slaughter beef cows from Manitoba,
Canada—Investigation is in progress;

- 1 adult beef cattle case with a TX eartag was reported by Mexico. Cow was slaughtered in Tamaulipas, Mexico. Investigation is in progress in TX;
- They were unable to locate the origin for 1 adult beef cattle case in TX after extensive testing was completed on the most probable origin herd, neighboring herds, & all other consignors to the slaughter lot;
- 1 recent adult cattle case was found in a CA slaughter plant. Investigation as to the origin for this cow is now being conducted by animal health officials in CA;
- 5 adult cases resulted in the finding of 4 infected cattle herds in the United States during FY2002. Three were dairy herds located in TX, CA, and NM FY03. One beef herd in MI was found by slaughter surveillance conducted in a PA plant;
- 1 case was detected in an adult cow elk in CO. The origin herd for this elk is being depopulated, and the epidemiology for the source for this infection is in process.

There can be little doubt that recent improvements to the TB Performance Awards Program has directly resulted in locating more newly infected TB herds in the United States during this past year.

Investigations completed to date in 73 of the 92 immature (fed) cattle cases showed that 44 cases from steers or heifers wore official Mexican eartags at the time they were slaughtered. The epidemiologic investigation of 24 other cases clearly showed the origin of the cattle to be from Mexico. 93% (68 of 73 closed cases) of the immature cattle cases closed to date traced to Mexico. Five (5) cases were unable to be effectively traced past the feedlot. Four (4) cases were found in steers previously used for roping or rodeo events. 19 cases are still being investigated.

Efforts have been made during the past few years to communicate the need to collect all identification from animals for which a granuloma submission is being made. Seventy-eight (78) of the 102 (76%) cases found at slaughter during FY 2002 had some form of ID collected. This is an improvement since last year. Twenty-four cases (24%) had no ID of any type.

A closer examination of cattle importations and positive TB cases with Mexican origin eartags is warranted especially since 93% of FY 2002 fed cattle cases closed to date indicate their origin to be from herds somewhere in Mexico. Significant increases in the numbers of positive TB cases from the Mexican states of Durango, Tamaulipas, Nuevo Leon, Coahuila, and Sonora were identified.

Investigation activities related to cases of bovine TB detected at slaughter increased dramatically during this past year. 102 total cases required efforts and significant resources in at least 25 U.S. states. Considering that 62 TB cases over the past two years were identified with Mexican eartags, the resulting effort that must be expended to investigate these cases taxes
our animal health infrastructure to some degree that other disease prevention activities are surely compromised.

Cattle importations from all states in Mexico subsided last year largely as a result of a change in the U.S. tuberculosis testing requirements for the importation of Mexican cattle that took effect in April, 2002. Mexican SAGARPA officials reported that 826,550 total cattle were exported to the U.S. last year.

An analysis of Mexican State TB case rates, based on the number of feeder animals being exported from each state, reveals: Case rates exceeding 5 positive TB cases for each 100,000 animals exported were shown in Nuevo Leon, Durango, Tamaulipas, and Aguascalientes.

Dr. Joseph VanTiem, USDA, APHIS, VS National Center for Animal Health Programs, reported on the status of the state/federal cooperative bovine TB eradication program. Fiscal year 2002, was a year that proved how effective increasing surveillance for bovine tuberculosis is at finding long-standing cases of disease. At the end of the FY 2002, 48 States, Puerto Rico, and the US Virgin Islands were free of bovine tuberculosis in cattle and bison. The entire State of Texas was downgraded during the year to a status of Modified Accredited Advanced. The State of Michigan remained classified as Modified Accredited. However, Michigan has submitted a split status request that is under consideration. Current regulations have assigned status for captive cervids at Modified Accredited status for every State. This status will be a temporary level for most States, and Veterinary Services (VS) will work with all States to develop improved, measurable surveillance for tuberculosis in those species.

During FY 2002, 11 newly infected cattle herds were disclosed. There were three newly infected captive cervid herds disclosed during the year. Six beef herds and two dairy herds were identified in northeastern lower Michigan. These herds are associated with the endemic infection of white tailed deer in that area.

One large dairy herd was identified in California. This herd is still being investigated to determine the source and spread of infection. VS plans to depopulate this herd when the necessary indemnity funds are secured. In Oregon there was a herd of roping cattle that were exposed to bovine TB being part of an infected elk herd.

In Texas a dairy herd was identified through slaughter surveillance during FY 2001. This herd was depopulated during FY 2002 and has been investigated to determine the source and spread. A source of infection for this herd is not conclusive, but there is some indication that Mexican roping steers of unknown status were in contact with this herd. There are no indications that bovine TB has spread from this herd to other herds within Texas or to other States.

Only two States do not have Accredited-free status: Michigan and Texas. The status of Texas was reduced to Modified Accredited Advanced during
the fiscal year. This change in status has prompted many comments on the movement requirements of our current status levels. VS is evaluating these comments and will propose changes to the existing movement regulations during the upcoming FY 2003. Michigan is currently classified as Modified Accredited for the entire State. VS is working with Michigan officials to initiate a comprehensive split status plan that was developed during FY 2002.

In Michigan, transmission of TB is occurring by the more traditional transmission route from infected to a susceptible species of animal. Transmission of bovine TB from deer to deer is predominately by way of the artificial manipulation of wild populations. Congregation of deer occurs to be associated with the supplemental feeding of deer. Control of the artificial feeding can reduce the congregation of deer and decrease TB transmission among deer. Eradication of TB from the free-ranging white tailed deer will take several years. However, the increase in prevalence and geographical distribution of infected deer may be curtailed if more rigorous control measures are taken. Since June 1998, there have been 22 infected beef herds in Michigan, three infected dairy herds, and one infected captive cervid herd.

Currently there are 38 States that have maintained Tuberculosis Free status for over ten years and 45 States that have been free for more than five years. Of these, only three have had singleton cases of bovine tuberculosis, California, North Dakota and Kansas.

Three captive cervid herds were affected with bovine tuberculosis during FY 2001. These were the first infected captive cervid herds in more than two years. One herd in Oregon was most likely infected by exposure to elk that originated from a previously infected elk herd. An infected elk herd in Colorado originated from a slaughter trace and an infected elk herd in Wisconsin originated from routine testing. The source of these infections is still under investigation, however there doesn’t appear to be additional spread of disease at this time.

Since 1991, there have been 40 cervid herds in the U.S. identified with bovine tuberculosis. All States are currently Modified Accredited for bovine tuberculosis in captive Cervidae. In order to maintain this status, every State will be required to review of their program and surveillance plan. Veterinary Services is proposing general surveillance measures for use in the program. These standards will allow a State to tailor a surveillance plan based on the industry present in that State. Additionally, based on a review of the testing done in States and responses to surveys on captive cervid programs within States, VS will propose to upgrade the status of 24 States to Modified Accredited Advanced during FY 2003.

The primary means of TB surveillance for cattle and bison is slaughter surveillance and this form of surveillance has significantly increased over the last FY. During FY 2002, there were 4,842 submissions from slaughter plants across the country, and 102 tuberculosis cases were diagnosed from
these submissions. This represents a 63 percent increase over FY 2001. Over 65% of these submissions were samples taken from adult animals. There is also a marked increase in submissions from regions in the country that were previously under reported. Adult submissions remained high from plants that are traditionally high submitters. However, there was an increased number of submissions from adult kill plants that kill a large number of adult cattle from all over the country.

Mexican origin finished fed cattle continue to be a source of tuberculosis cases seen at slaughter in the U.S.. Ninety-three percent of the closed feedlot investigations had direct evidence of a Mexican origin. This is an increase in absolute number from previous years. For more than ten years, the percentage of all cases from finished fed cattle in the U.S. were of Mexican origin, and this has been relatively steady for 75 percent of all cases seen in this type of cattle.

The TB eradication program is taking steps to prevent additional cases of bovine tuberculosis being imported into the U.S. Regulations were recently finalized in the tuberculosis program to reinforce risk-based interstate and international movement. With the addition of these rules in the domestic program, the importation of livestock from our foreign trading partners can better be evaluated. Conversely, our trading partners will be assured that livestock exported from the U.S. is of the highest quality and of minimal risk for bovine tuberculosis infection.

An interim rule published on April 20, 2001 followed by VS Notice No. 02-11, dated March 29, 2002, resulted in effective entry requirements to exclude tuberculosis infected and exposed steers and spayed heifers from Mexico. As a result of the VS Notice and after review team visits, findings, and recommendations in late 2001, several major exporting states in Mexico were required to have herd of origin tests plus a test on the animals being exported to the U.S. This greatly reduced the numbers of cattle crossing the border since last April. For example, in 2001, calendar year (CY), 1,123,891 head of cattle legally crossed into the U.S. So far this year, only 467,387 head have legally crossed; a 58 percent decline. These Mexican origin cases would have crossed into the U.S. prior to the more stringent entry requirements of this interim rule and VS Notice. Therefore, we may continue to see a significant number of TB cases attributed to Mexican-origin cattle for the next 12-18 months.

Following findings by APHIS, State, and Industry review team members in latter 2001, several Mexican States did not receive favorable recommendations that would allow them to continue to export under the new regulations. These recommendations stimulated a greatly renewed effort and commitment directed at the control and eradication of TB in those Mexican States. During this period, the major exporting states, with two exceptions, improved their TB programs and corrected program deficiencies documented in the findings and recommendations of the review teams.
Reviews completed during the past 90 days have found that necessary commitments are being made to add professional expertise, personnel, funding, and other resources, plus the authority to carry out effective measures for livestock movement control. This increased and intensified effort has brought most of the Mexican state programs to a level of equivalency with the U.S. TB Accreditation Preparatory status.

Over the past 80 years, the bovine tuberculosis program has spent over $700 million ($350 million in federal funds and $375 million in nonfederal funds). Without a comprehensive eradication program in place for the eradication of bovine tuberculosis from domestic livestock, computer models have predicted that the annual losses to the United States could be up to $1 billion. On October 23, 2000, the Secretary of Agriculture declared an emergency in connection with an opportunity for the USDA to accelerate the eradication of tuberculosis from the United States. This declaration is still in effect and continues to allow the U.S. livestock industry to become more competitive in the global market, and further protect the public health from this zoonotic disease.

The elimination of bovine tuberculosis from the United States will make the U.S. cattle industry more competitive in the global market and minimize consumer concerns regarding the presence of bovine tuberculosis in the Nation’s cattle population. The accelerated plan for tuberculosis eradication required additional resources for implementing enhanced surveillance and for depopulation of the herds found as a result of this surveillance. Therefore, APHIS has made emergency funding requests to cover those needs.

These emergency funding requests will supply the necessary resources to jump-start our surveillance measures for bovine tuberculosis and assure that herds are depopulated as soon as possible. The TB line item has also been increased to a level of approximately $14 million where surveillance activities can be met on an ongoing basis. However, the depopulation of large herds infected with tuberculosis will still require additional emergency funds. Experience indicates a few herds missed by traditional surveillance methods are often found towards the end of an eradication program. However, improved methods and increased TB surveillance efforts have helped VS find these herds sooner, rather than later.

The past FY 02 was a very active year in the bovine TB eradication program. In as much, the current trend of new tuberculosis infected herds found in the United States during this eradication effort is disturbing. Given the current number of herds found infected in FY 2002, the projected eradication date will go well beyond the 2003 eradication goal. Still, if our TB surveillance efforts remain high, we expect to see a marked decrease in the number of newly found infected herds in the near future. Recent collected data shows VS surveillance for tuberculosis in all livestock needs
<table>
<thead>
<tr>
<th>Yr</th>
<th>Prov</th>
<th>Herds affected</th>
<th>species/type</th>
<th>Description</th>
<th>Most Likely Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1994</td>
<td>Quebec</td>
<td>3</td>
<td>mixed bison/cervid</td>
<td>detected during trace-out testing; 1 bison only &amp; 2 bison/cervid; all 3 bought animals from infected zoological collection detected in 1993</td>
<td>exposed to infected zoological collection</td>
</tr>
<tr>
<td>1996</td>
<td>Manitoba</td>
<td>1</td>
<td>cattle beef</td>
<td>detected during test for export to US; CFT reactor not held for CCT; NVL &amp; histoneg &amp; M. bovis; no inter/intra-herd spread;</td>
<td>residual latent infection</td>
</tr>
<tr>
<td>1997</td>
<td>Manitoba</td>
<td>1</td>
<td>cattle beef</td>
<td>detected at routine slaughter in US; low level intra-herd spread; no inter-herd spread; 1 exposed trace-out herd in MB depopulated;</td>
<td>residual latent cattle infection, OR exposure to infected wildlife</td>
</tr>
<tr>
<td>1999</td>
<td>Sask</td>
<td>1</td>
<td>cattle beef</td>
<td>detected at routine slaughter in Canada; closed herd; single lesion in 15yr natural increase cow; no inter/intra-herd spread;</td>
<td>residual latent infection</td>
</tr>
<tr>
<td>2001</td>
<td>Manitoba</td>
<td>1</td>
<td>cattle wildlife</td>
<td>detected during area surveillance testing around RMNP; CFT reactor &amp; CCT +ve; no intra/inter-herd spread;</td>
<td>residual latent cattle infection, OR exposure to infected wildlife</td>
</tr>
<tr>
<td>2001</td>
<td>Alberta</td>
<td>1</td>
<td>bison</td>
<td>detected at routine slaughter in Canada; 20yr cow from QC in 1997; no intra/inter-herd spread; depop included exposed reindeer &amp; WT-deer</td>
<td>exposed to infected zoological collection in Quebec in early 1990s</td>
</tr>
<tr>
<td>2002</td>
<td>Ontario</td>
<td>1</td>
<td>cattle PB dairy</td>
<td>detected during diagnostic investigation of clinical disease; 7mo Jersey calf (NI); significant intra-herd spread; no inter-herd spread; partial depopulation of 1 exposed trace-out herd;</td>
<td>residual long-standing latent infection</td>
</tr>
</tbody>
</table>
enhancing to make certain the country is ready to declare freedom. The projected eradication date bovine tuberculosis can only be met if our emergency actions for are followed with continued commitments for better surveillance.

Dr. Maria Koller, Canadian Food Inspection Agency, gave an update on the TB program in Canadian cattle and farmed bison. They continue to near the complete eradication of bovine TB from cattle & farmed bison. During the 10-year period from October 1992 through September 2002, *M. bovis* was confirmed in 9 herds of cattle & farmed bison in 7 separate outbreaks in 5 of Canada’s 10 provinces: (see chart on previous page)

No cases of bovine TB were found in cattle or farmed bison in 1993, 1995, 1998 and 2000.

All 9 infected herd & one exposed herd were depopulated. All exposed susceptible animals were traced from the infected herds, investigated, tested and destroyed. Tissues from all exposed trace-outs were submitted for histopathology & culture. Federal compensation was paid for all animals ordered destroyed up to maximum prescribed amounts. All potential sources of infection, including all sources of animals were investigated & tested. Other contact herds & all herds in a 10 kilometer perimeter zone were investigated & tested. Standard cleaning & disinfection measures were applied. Re-populated herds were tested over several years following re-stocking.

**Surveillance**

Surveillance for bovine TB in Canadian cattle & farmed bison herds is based on routine inspection at slaughter and submission of granulomatous & other suspect lesions for laboratory examination, with traceback investigation of all histopathologic diagnoses of mycobacteriosis, as well as targeted on-farm testing of cattle & routine on-farm testing of farmed bison.

**Slaughter surveillance in cattle in Canada:** Of the 3.27 million cattle slaughtered in Canada in 2001, 499,949 were mature cattle. In 2001, 202 granulomatous lesions were observed in cattle at routine slaughter & submitted for laboratory examination. This represents an increase of 27% from the 159 lesions submitted in 2000. With a target submission rate of one lesion per 2000 adult culls, the submission rate in 2001 reflects achievement of 81% of the target, up from 64% in 2000.

In 2001 and during the period from January through September 2002, slaughter surveillance in Canada has resulted in no findings of bovine TB in cattle.

**Slaughter surveillance in cattle in the US:** In 2001, 232,757 of the more than one million slaughter cattle exported to the U.S. were mature cattle. These animals were subjected to slaughter surveillance under the State-Federal Cooperative TB eradication program in the U.S.

Slaughter surveillance in the U.S. (Minnesota) in 2001 resulted in the finding of bovine TB in a mature cow which originated from Manitoba. No
Identification was collected from this animal. Traceback investigation identified 19 possible herds of origin (approximately 2400 cattle) which were all investigated & tested in the early 2002.

- 11 herds were all negative
- 8 herds had one or more caudal fold reactors
- 3 of these 8 herds were of particular interest because of proximity to Riding Mtn National Park and, in the case of 2 herds, a reactor rate of approximately 10%
- all caudal fold reactors except 2, were negative on the comparative cervical tuberculin (CCT) test
- the 2 CCT suspects, as well as 2 caudal fold reactors from each of the other 2 herds of interest were slaughtered & found to have no lesions suggestive of TB, and tissues were collected for lab examination, with negative histopathology & culture results reported.

In the autumn of 2002, the 8 herds with one or more caudal fold reactors, as well as their immediate neighbors, will be retested. Any caudal fold reactors will be investigated using the CCT & Bovigam™ assay.

**Slaughter surveillance in farmed bison:** In 2001, 43 granulomatous & other suspect lesions were observed in farmed bison at routine slaughter in Canada and submitted for laboratory examination. This represents an increase of 100% from the 21 lesions submitted in 2000.

Slaughter surveillance in farmed bison in Canada in 2001 resulted in the finding of a single positive lesion in an aged bison cow that was traced to a herd in Alberta that consisted of bison, reindeer & white-tailed deer. All susceptible species on the farm, as well as those traced from the herd, were destroyed & examined, with no evidence of TB found.

**On-farm surveillance testing** of farmed bison continued to be used in 2001 to augment the relatively small numbers of mature cull bison available for routine slaughter inspection. In 2001, on-farm surveillance testing of cattle also continued in the area around Riding Mountain National Park in Manitoba, where 10 TB-infected wild cervids have been found since 1997, involving the testing of all cattle & farmed bison herds in a 10-kilometer zone around positive wildlife findings, and testing cattle & farmed bison herds in a 6-kilometer buffer zone around the western part of the park.

In 2001, approximately 50,000 tuberculin tests of cattle & farmed bison were conducted by federal inspectors.

In 2001, on-farm surveillance testing of cattle resulted in the finding of an infected beef breed bull in a cattle herd located within the 10-kilometer buffer zone established around a positive wild elk. All susceptible species on the farm, as well as those traced from the herd, were destroyed & examined, with no evidence of TB found.

**Other forms of surveillance** for bovine TB include the diagnostic investigation of animals with clinical disease. This surveillance identified the single TB infected herd found in Canada in 2002 – a small purebred Jersey dairy
herd in Ontario. All susceptible species on the farm, as well as those traced from the herd, were destroyed & examined. One trace-out heifer calf was found infected, necessitating partial depopulation of one exposed herd as a result of a determination of low risk of indirect contact/exposure.

**Farmed Cervids**

Canada continues to near the complete eradication of bovine TB from farmed cervids, which consist mainly of elk, red deer, elk/red hybrids, fallow deer & white-tail deer.

During the first 10 years (1989 through 1998) following extension of the National Bovine TB Eradication Program to farmed cervids, 35 infected herds were found in 5 provinces (British Columbia, Alberta, Saskatchewan, Ontario & Quebec).

During the last 4 years (1999 to Oct. 2002), 2 infected herds were found in Ontario & Quebec in 1999.

All 37 infected cervids herds, except one, were completely depopulated of all exposed susceptible species of animals. Compensation, quarantine, investigation, trace-outs, trace-ins, contacts, perimeter premises, cleaning & disinfection, and restocking were all carried out in the same manner as for infected cattle & farmed bison herds. In the one exception, a zoological collection, a number of primates & endangered species were placed under permanent quarantine. After 9 years of observation, repeated tuberculin testing, and necropsies on all deaths, no evidence of tuberculosis has been found in these animals.

**Surveillance:**

Because relatively few mature cervids are routinely slaughtered, surveillance for bovine TB in farmed cervids in Canada is based on the testing, every 3 years, of all cervid herds involved in the commercial trade of these species. In 2001, approximately 25,000 tuberculin tests were conducted on farmed cervids in Canada under this program. In 2001, 31 granulomatous or other suspect lesions were observed at routine slaughter & submitted for laboratory examination, with negative results. This represents a 200% increase from the 10 lesions submitted in 2000.

**Reservoirs of M. bovis**

Bovine TB & bovine brucellosis are endemic in a free-roaming herd of approximately 2,000 wood bison in & around Wood Buffalo National Park, which straddles the northern boundary between Alberta & the Northwest Territories. This herd poses its greatest threat to adjacent disease-free wild bison herds. A bison management plan is in place that includes no-bison buffer zones, the killing of stray bison, and other measures to minimize the risk of disease spreading to wild bison, farmed bison, or cattle. These measures are based on a risk assessment carried out in 1998.

A free-roaming herd of approximately 4,000 elk in & around Riding Mountain National Park (RMNP) in Manitoba is believed to represent a risk
of spread of bovine TB to surrounding livestock. TB has been confirmed in 9 elk & one white-tailed deer through a hunter-kill surveillance program around the park which began in 1997. The 2 infected cattle herds found in Manitoba during the past 5 years (1997 & 2001) were located close to the park boundary, and in areas where infected wild elk were killed. A multi-agency Wildlife Health Action Plan has been developed & implemented to further define the disease problem, prevent spread of the infection to cattle & other farmed livestock, and eliminate the infection in the wild cervids. Its major elements include:

• routine surveillance area testing of cattle herds around the park every 3 years;
• continuing surveillance of wild cervids to determine the geographic & species distribution of the infection, and to further define prevalence;
• separation of wild elk from farmed livestock in the area through barrier fencing of forage/feed & cattle feeding yards, prohibition on elk feeding, encouraging producers to remove hay from fields into fenced areas, and public awareness & education;
• elk population management through increased hunting opportunities outside the park & habitat improvement inside the park;
• research & field studies, including radio-collar studies of elk movements, improved population survey methods, and investigation of other possible TB vectors/reservoirs in the area.

**TB Accreditation Status**

**Cattle & Farmed Bison:** All provinces in Canada except Manitoba, are classified as TB-Free according to current Canadian standards for bovine species. Manitoba is classified as TB-Accredited according to current Canadian standards.

Regulatory amendments have been proposed that will harmonize Canadian accreditation classification levels & their criteria with those in the U.S. These amendments will be finalized & come into effect by the end of 2002. Immediately upon coming into force, Manitoba will be split into 2 eradication areas: an area around RMNP designated as a TB-accredited-advanced area, and the remainder of the province designated a TB-free area. In conjunction with the establishment of split-status for Manitoba, a movement permit, based on a negative herd test &/or individual animal testing, will be required to remove cattle & farmed bison from the RMNP eradication area into the rest of the province, or other provinces. A testing campaign has commenced in the RMNP area to qualify as many herds as possible for movement permits prior to the effective date.

**Farmed Cervids:** Currently, there are no Canadian standards for cervid species. The regulatory amendments, which are being finalized to come into force by the end of 2002, will establish area accreditation classifications for farmed cervids. Under the proposed standards, all Canadian provinces except Ontario & Quebec would be classified as TB-Free areas.
Ontario & Quebec would be classified as TB-accredited-advanced areas.

**Bovine Tuberculosis Eradication Program In Mexico**

MVZ Luisa Pamela Ibarra Lemas  
Director of Animal Health Programs  
SAGARPA

Dr. Pamela Ibarra Lemas, SAGARPA (Mexico Department of Agriculture), gave a report on the bovine TB eradication program in Mexico. The Mexico bovine TB eradication program currently recognizes seven states in the Eradication Phase and the remainder of the country in the Control Phase. The USDA recognizes one region as modified accredited advanced, one region as modified accredited, eight regions as accreditation preparatory with waiver of the whole herd test requirement, five regions as accreditation preparatory without waiver of the whole herd test, and the remainder of the nation, including eleven zones within accreditation preparatory states, classified as non accredited.

The TB eradication campaign in Mexico tested 3.5 million head of cattle in 2001 and over 2 million head of cattle up to October 2002. The 2002 testing up to October has included 44,927 herds with 5.99% positive and 2,007,966 head with 1.22% positive.

Mexico exported 1,278,462 head of feeder cattle to the U.S. in 2001. Of those cattle, 44 head have been found to be infected with bovine tuberculosis. The rate per 100,000 head exported is 3.44. The number of infected cattle traced to Mexico increased from nine head in 1998/1999, 19 head in 1999/2000, to the current rate of 44 head for 2000/2001.

**Report of Bi-National Committee Activities**  
2001-2002  
Billy G. Johnson, D.V.M.

Dr. Billy G. Johnson, Facilitator of the U.S. Mexico Bi-National Tuberculosis and Brucellosis Committee (BNC), gave an update of the BNC activities. The BNC was formed in 1993 based on a recommendation from the USAHA with responsibility to provide oversight to the tuberculosis eradication programs in each country and to establish minimum requirements for the exportation of Mexican cattle into the United States. Brucellosis responsibilities were added to the Committee at a later time. At the time the Committee was formed APHIS was in the process of developing new regulations for the entry of steers and spayed heifers from Mexico into the U.S. but because of concerns by the Border States Officials those proposed regulations were withdrawn. The Border States Officials then developed the Consensus Document under which animals were imported until recently. This document outlined a three-tier program under which states in Mexico
could qualify to ship steers and spayed heifers into the U.S. The program stages were Stage I, Stage II and Free. Each state was given time to progress through Stage I and then qualify for Stage II. The BNC assumed the responsibility for conducting reviews in each state as they progressed through these stages. The BNC conducted more than thirty reviews since the Consensus Document was implemented. Each review required from three to five days with at least four or five reviewers from the U.S. as well as participation from Mexico. The reviewer’s expenses were paid by their employer or their supporting organization. As a result of those reviews, ten states were approved for stage II and nine additional states were approved for stage I.

During the past year the Committee has held three meetings and has concentrated on evaluating the progress of the tuberculosis eradication programs in each country and in providing input to APHIS as they developed new international regulations governing the movement of cattle from Mexico into the United States. APHIS published an Interim Rule that provides for the classification of importing countries and then developed a waiver system for States in Mexico that have implemented satisfactory programs to continue exporting steers and spayed heifers into the U.S. until the new International Regulations are published. APHIS worked closely with the BNC in developing the waiver conditions so they would recognize the progress made by those states in stage II of the Consensus Document. Each state that had been in stage II initially received a waiver to allow them to ship steers and spayed heifers to the U.S. until April 1, 2002. After that time each state must have been reviewed by APHIS to assure they were meeting the waiver conditions. In addition, several stage I and zero states desiring to export to the U.S. or that wanted to ship cattle to the approved Mexico states have also been reviewed. The BNC had an active role in the development of the waiver process, in the review procedures that are being used to conduct the reviews and both Committee members and technical support personnel have participated in the reviews. APHIS is continuing to maintain close working relationship with the BNC during this process.

In the 1993 Tuberculosis Status Report presented to this Committee by APHIS, it was reported there were 438 cases of tuberculosis found at slaughter in immature feedlot cattle that year. The goal of the Border States Officials and the BNC was to significantly reduce that number by reducing the amount of tuberculosis in the exporting herds in Mexico. As reported last year at this Committee meeting, there had been a significant decrease in the number of tuberculosis positive cases found at slaughter in the US during past years as the Mexico exporting states reduced their infection levels. Unfortunately, that number began to increase last year and has continued to increase this year. The BNC has spend a considerable amount of time reviewing this situation. The concern was that the states approved to ship cattle to the U.S. have either had an increase in their infection levels
are cattle from unapproved states have been moving through the approved states. Both of these concerns have been considered by APHIS during their reviews.

The Committee continues to be concerned with the level of identification collection at U.S. slaughtering establishments. Dr. Robert Meyer has provided the Committee with information about new procedures being implemented in the U.S. surveillance program that has resulted in both an increase in the number of samples being collected as well as the amount of identification retrieved. However, there continues to be reactors disclosed with no identification collected making it impossible to determine whether the animals originated in the U.S. or Mexico. Special export blue tags are put in the ears of all steers or spayed heifers exported from Mexico to the U.S. It is critical to their program that these tags remain in the ears of these feedlot cattle until they are slaughtered and then collected from any animals found to have lesions. Mexico continues to provide traceback information on reactors from Mexico that were slaughtered in the U.S. With the increased amount of identification being collected at the U.S. slaughter plants, their traceback capabilities have improved. A certificate of herd of origin is required by APHIS for all steers and spayed heifers presented at the border for importation into the U.S. This is required to assure that traceback capabilities are present. The state of Sonora has a system in place requiring that any animal leaving a herd in that state to be identified with a special yellow tag that identifies the animal to that particular herd. That yellow tag information is then matched up with the blue export tag providing accurate traceback information when the blue eartag is collected at slaughter from animals with Tb lesions. APHIS has been requested to accept this system in lieu of the herd of origin certificate.

The importation of steers and spayed heifers from Mexico will continue under the interim rule and the waiver system until APHIS publishes their new international regulations based on the regionalization concept. The BNC expects to continue evaluating the programs in the meantime. Progress has been made up to this point but the Committee realizes there is still much work to do. This will particularly be true as Mexico moves forward in the harmonization of their regulations and as the U. S. moves closer to their goals of eradication of tuberculosis and brucellosis. It was the goal of the USAHA when recommending that the BNC be formed that the livestock industries of both countries, the appropriate government officials and the research organizations could work cooperatively under this arrangement in developing procedures that would lead to the eradication of tuberculosis and brucellosis. It is difficult to imagine the two countries operating under a procedure such as that outlined in the Consensus Document without the coordination that has been provided by the BNC. There will be a similar period during the next two years as APHIS implements their final international regulations during which the BNC can continue in it’s coordinating
Mr. Bob Frost, President-Elect of USAHA and a representative of the Camelid industry from Lincoln, California, presented an update on llamas and alpacas. Since bovine tuberculosis is close to being eradicated in the United States, regulatory officials are rightly concerned about known infected species. Bovine tuberculosis (*Mycobacterium bovis*) is known to infect a broad range of mammals. South American camelids (SAC) have been infected, but are known to be quite resistant to the disease, even when cohabitating with infected cervids. There is no evidence that SAC in North or South America have bovine tuberculosis. In 1992 USDA published the “Assessment of Risk Factors for *M. bovis* in the U.S.” and stated that the “current evidence indicates that camelids have not been a factor in the spread of *M. bovis.*” To date there is not a documented case of transmission of *M. bovis* infection to any other animal that has been traced to a SAC. SAC are not a pocket of infection to thwart control programs in livestock species.

Mr. Charly Seale, Executive Director of the Exotic Wildlife Association, the EWA was founded in 1967 and is the oldest association of its type in North America. An estimated $30 million has been spent by the industry for tuberculin testing since 1995. There is no estimate available for the loss of animals occurring during the testing process. Since the two test requirement was instituted in 1995, Texas has performed 75,000 tuberculin tests on alternative livestock without a single tuberculosis infected animal being identified. Seventeen other states surveyed account for approximately 355,020 tests on alternative livestock during the same time period with a single positive animal disclosed. The EWA strongly supports the proposed program standards for cervids which allow many animals to move interstate with a single tuberculin test depending on the status of the state.

Ms. Diana L. Whipple, USDA, ARS and Chair of the Scientific Advisory Subcommittee (SAS) of the Committee on Tuberculosis gave the TB-SAS report. TB-SAS members are Dr. Robert Meyer, Dr. Janet Payeur, Dr. Dan Baca, Dr. L. Garry Adams, and Dr. Charles Thoen.

The TB-SAS was asked to review data on the use of an interferon gamma assay (Bovigam™) as an ancillary/supplemental test for diagnosis of bovine tuberculosis. The request was in response to USAHA 2000 Resolution No. 8, which stated the following:

USAHA requests that USDA, APHIS should grant conditional approval for a period of 2 years of the Bovigam™ for use as an ancillary/supplemental test for diagnosis of bovine tuberculosis. The assay should be used for detection of interferon gamma in blood samples collected from cattle 3 to 30 days after injection of PPD for skin testing and should be used in conjunction with the CCT. Designated tuberculosis epidemiologists should be given the authority to use test results at their discretion to make decisions on the final classification and disposition of cattle. The method for interpre-
tation of the assay should be the same as that used in New Zealand. Laboratories conducting the assay should include an antigen, such as pokeweed mitogen, as a positive sample control during the evaluation period. The approval period should be used to gather additional data on the performance of the test under field conditions in the United States.

Data collected over the last two years were presented to the TB-SAS by Biocor Animal Health, the manufacturers of the Bovigam™ test kit. During the evaluation period, the Bovigam™ test kit was licensed by USDA, APHIS. The CCT and Bovigam™ tests were compared in five outbreaks of bovine tuberculosis in the United States that included 121 cattle that were classified as infected based on isolation of *M. bovis* and/or presence of tuberculous lesions with acid fast bacteria on histopathologic examination. The sensitivity of the Bovigam™ test ranged from 85.7% to 100% and the CCT ranged from 84% to 100% if “suspects” were classified as positive results.

Therefore, the TB-SAS recommends the use of the Bovigam™ test as an ancillary/supplemental diagnostic test in herds that are known or suspected to have cattle with bovine tuberculosis (program herds). The test may be used in parallel with the CCT or as a replacement for the CCT at the discretion of designated tuberculosis epidemiologists with concurrence of the USDA, APHIS regional tuberculosis epidemiologist. In herds with tuberculosis that are not depopulated, the Bovigam™ test may be used in parallel with the CFT for identification of cattle to remove as part of test and cull programs to eliminate tuberculosis from the herd.

The Bovigam™ may also be used as an ancillary/supplemental test in herds at low risk for tuberculosis, such as those that are tested for movement or sale of cattle. The test may be used in parallel with the CCT in cattle that respond to the CFT. At the discretion of the designated tuberculosis epidemiologist and with approval from the area veterinarian-in-charge, regional tuberculosis epidemiologist, and state veterinarians office, the Bovigam™ test may be used in place of the CCT.

Blood samples for the Bovigam™ test must be collected by state or federal regulatory personnel and the test conducted by laboratories approved by USDA, APHIS, VS. Blood samples should be collected between 3 and 30 days after injection of PPD for the CFT. Results of the test should primarily be interpreted by the method described by Ryan, et.al and as used in the New Zealand tuberculosis control program. However, other methods for test interpretation may be used at the discretion of the designated tuberculosis epidemiologist with concurrence of the USDA, APHIS regional epidemiologist.

The TB-SAS also was provided with an update on the evaluation of the fluorescent polarization assay (FPA) for diagnosis of bovine tuberculosis. Although there were not enough data presented for the TB-SAS to make recommendations regarding the use of the FPA for the eradication pro-
gram, the developers are encouraged to continue work on improving

Dr. Ralph E. Slaughter, BIOCOR Animal Health, reported in the use of the Bovigam™ test for TB. Following the approval of United States Animal Health Association (USAHA) for Bovigam™ TB to be used as an ancillary test for tuberculosis subject to its registration by United States Department of Agriculture—Center for Veterinary Biologics (USDA-CVB) and further field evaluation, Biocor Animal Health has undertaken to collect together the necessary data to support full approval.

Registration for Bovigam™ TB was completed in December 2001. The product has been evaluated in comparison to the CCT, in bovine TB eradication and control programs in North Dakota (1 herd), Texas (2), California (1), and Michigan (38). Data from the first three herds, is complete and shows a sensitivity to Bovigam™ ranging from 85.7% to 100% and for the CCT from 84% to 100%, if ‘suspects’ were classified as positive results.

Data from California is currently being evaluated, but early results show sensitivity for Bovigam™ over 90%. When results from the first adult group of animals were analyzed and both Bovigam™ and CCT are combined, only one animal out of a total of 38 confirmed infected was missed by the two tests.

Additional data from the very large herd involved in the California outbreak (over 6000 animals) and the infected area in Michigan are still being collected, but the data evaluated to date clearly show:

• When results from the first adult™ TB is at least comparable with the Comparative Cervical Test (CCT).
• The test has a major advantage in quickly eliminating false positive reactions to the Caudal Fold Test (CFT).
• The test has a distinct advantage in being able to be used on the day the CFT is read.
• Combined use of Bovigam™ TB with the CCT results in increased sensitivity and speedier removal of infected animals from the herd than with either test on its own.

In conclusion, the Bovigam™ TB has a valuable role to play as an ancillary test in Bovine TB diagnosis and is recommended for full approval by USAHA.

Dr. Steve Bolin, Michigan State University, Veterinary Diagnostic Laboratory gave a report on work to evaluate the effect on Bovigam™ of: sample handling and transport and concurrent Johnes disease. The research included holding blood samples at 0, 4, 15, 23, 37, 40, and 43°C. Holding times of 0, 2, 4, 6, and 24 hours were also investigated. Mixed time and temperature experiments were included in the research. The extreme temperatures had a clear negative effect on the sample quality, however temperatures of 4 and 15°C had no negative effect over the times used in the study. The report also included data on the use of Bovigam™ under field conditions and in comparative cervical test positive cattle from Michigan. The study
included 1587 from 41 herds with blood samples collected the day the caudal fold test was read. The sample included 172 animals which were positive on the caudal fold test. Fourteen of the animals were Bovigam™ positive. The paratuberculosis study indicated that concurrent Johnes disease was not confounding to interpretation on the Bovigam™ test.

Dr. Dorothy Davidson-York, California Department of Food and Agriculture (CDFA), gave an update on the TB situation in California. The state of California was declared Tuberculosis Accredited Free in 1999. The last tuberculosis affected herd was released in 1993, after undergoing a test and removal program. In 1994, California modified the tuberculosis surveillance program from an area test program to a slaughter surveillance program. However, in 1998, regular kill slaughter house submissions reached an all-time low of 38 submissions per 889,700 total animals slaughtered. This represented a submission rate of 0.1 submissions/2500 total animals slaughtered, when the minimum submissions expected to detect a prevalence rate of 2% is 1 submission/2500 total animals slaughtered. In 1999, California embarked on an ambitious program to enhance the surveillance for tuberculosis in slaughter establishments. In less than 2 years, the slaughter house regular kill submissions increased by 600%, and for fiscal year 2002, 647 tuberculosis suspicious lesions were submitted for laboratory analysis.

In May, 2002, a cow sent directly to slaughter from a Tulare county dairy was detected with a tuberculosis compatible lesion at the CAHFS laboratory, Tulare. PCR technology at NVSL, Ames, Iowa confirmed M. tuberculosis complex. A subsequent CFT test of 3,733 head yielded 89 CFT responders. The CCT test results yielded 46 reactors and 10 suspects, 27 of which were off the scattergram for bovine response. Slaughter inspection of the 56 reactors and suspects identified 27 TB histopathology compatible animals. The remaining 33 CCT negative animals were subsequently slaughtered yielding 4 additional TB lesioned animals. A total of 38 animals were subsequently identified with tuberculosis by histopathology or culture results.

Upon the discovery of a newly infected herd after nearly 10 years, the state veterinarian of CA implemented a self-imposed tuberculosis test requirement for all breeding dairy cattle leaving the state.

The infected herd subsequently implemented management strategies to reduce transmission of tuberculosis, and was put on an aggressive 90 day interval CFT test schedule. The second test results of 5,800 head yielded 81 CFT responders in animals over 16 months of age, and 167 CFT responders in animals under 10 months of age. All adult CFT responders were slaughtered, and 10 CCT suspects in animals under 10 months of age were also slaughtered. Tuberculosis lesioned animals were identified in 9 adult animals upon slaughter. The CFT response in young animals was determined to be caused by cross reaction with M. avium or a saprophytic
mycobacterium spp. 2500 adult CFT negative animals were also blood tested with the IFN-γ test. A screening procedure was employed using one Bovine and one Avian well, measuring the B-A response. 70 animals were detected with a B-A response > 0.05. Confirmatory testing of these 70 animals using the protocol developed by Bovigam™ yielded 20 animals with a response of B-Nil and B-A > 0.05. Four of these 20 animals were detected with tuberculosis lesions at slaughter. The IFN-γ test was determined to have increased the sensitivity of the caudal fold test in this infected herd. The owner of the herd subsequently requested depopulation after the results of the second herd test.

CDFA and USDA mounted a joint effort to respond to the tuberculosis case by designating a TB task force in Tulare, CA with the charge of tracing animal movements in and out of the herd, testing herds associated with the infected herd, and determining possible spread and origin of disease. As of October 15, 2002, 293 animals had been traced out of the herd, 200 of which were recovered and slaughtered. 46 CA herds and one AZ herd were identified as trace outs, and 18 CA herds had been traced as potential sources of infection. 99,907 head in 68 herds have been tested to date, finding no evidence of spread of TB. The source of infection is still under investigation.

Dr. Larry Granger, Michigan Department of Agriculture, gave an update on their TB situation. In August 2002, MI applied for split-state status requesting that the 11 northeastern counties be designated as Modified Accredited (MA) and the remainder of the state as Modified Accredited Advanced. Action on their application is still pending. The MA area includes counties that are infected surrounded by high-risk counties that are in turn surrounded by disease free counties, including six in the MA area.

Currently, there are 26 positive herds, including 3 dairies, 22 beef herds and one captive cervid herd. Since the initiation of intensive statewide testing, over 30,000 herds have been tested. Surveillance in the disease free zone’s 10,000 herds, the herds for testing are selected at random at a statistical sampling rate that should detect infection at a 0.2% prevalence. The surveillance will be conducted in three two-year cycles with herds that are tested during the preceding two years added back to the pool for random selection of herds over the next two years. A risk factor survey will be conducted at the same time as the random surveillance with the goal of refining future surveillance activities. The benefits of this strategy is that it provides for a scientific based surveillance focused on herd testing, they will know exactly how many herds to be tested annually, testing can be preplanned to efficiently use resources, it is a defined program that may be more easily fundable, and it eliminates the need for additional individual animal testing for intrastate movement in the disease free zone.

Dr. Granger also discussed Michigan’s electronic identification (EID) program initiated in November 2001 whose goal is to be able to rapidly
locate and trace the livestock population from the farm to market and on to slaughter, and to maintain on farm inventory control. Each farm is assigned a premises number and each animal is assigned an American ID number. They use the National Farm Animal Identification and Records Program to record and track animal movement. Information is maintained in USDA's Generic Database. EID readers are installed in both livestock markets and packing plants. Since the beginning of the program, they have identified 432 herds.

The advantages of having identification information in a database are it affords greater accuracy and efficiency. Costs are projected to decrease nearly $20,000 per year. Tracebacks can be done in a day rather than weeks and enables them to prevent potentially exposed animals from leaving state. Reduced costs for traceback activities are estimated at $5,000-$50,000 per year. Use of EID eliminates the need to catch the animal's head to read the tag, less time is spent in the chute, there is lower chance of injury to the animal, product losses are decreased, there are fewer chances for human injury. In addition, the time required to conduct the second annual test is reduced by up to 50%, it encourages producers to keep accurate records, time is saved identifying cattle, and there is increased producer cooperation.

Dr. Dan Baca, Texas Animal Health Commission, gave an update on the TB situation in Texas. The TB status of the state was downgraded in June 2002 as a result of confirming TB in two cattle herds during the previous year. Both affected herds were discovered following tracebacks from slaughter of adult cattle at Texas plants. The initial herd of purebred beef cattle was depopulated after confirming infection in 27% (7/26) of the adult cattle. The second herd of dairy cattle was depopulated after confirming infection in 45% (60/132) of adult cattle. A beef, sheep and goat ranch operated by the owner of the dairy was declared a high-risk herd due to management practices where dry dairy cows were historically grazed at this premise. All livestock on this premise were depopulated after confirming infection in 2% (2/123) of cattle. No infection was detected in approximately 700 sheep and goats at slaughter during the depopulation. Epidemiological traces associated with the affected herds resulted in testing of 115 herds with 9346 cattle. No additional herds were found to be infected. Total USDA costs for compensation to destroy infected and exposed livestock in the index herds was $755,000.

The Texas livestock industries formed a TB Task Force to address the issues involved with impending loss of TB Free status. The TAHC and APHIS were included as a resource to the working group. The TB Task Force presented a plan to APHIS staff in July 2002 that outlines six points critical to resolving TB issues in Texas. The plan: (1) supports the interstate movement requirements for identification and testing of breeding cattle from Modified Accredited Advanced States, (2) identifies deficiencies in surveil-
lance in plants that slaughter adult cattle as a critical factor that must be corrected in order to eradicate TB in the US cattle industry, (3) proposes to enhance surveillance in dairy and purebred beef herds in Texas by requiring herd testing, (4) proposes to address the problem TB in Mexico origin feeder cattle by requiring controlled movements to Approved Feedyards or Approved Pastures when received in Texas, (5) proposes to address the problem of TB in Mexico origin rodeo cattle by requiring similar entry regulations to breeding cattle, and (6) requests that APHIS consider amending current rules to base downgrades of status and associated interstate movement requirement on disease prevalence and risks. The Task Force concludes that direct costs to the Texas cattle producers range from an estimated $260 to $899 million over a five and ten year horizon. The majority of that cost is a result of restrictions on export of feeder cattle although analysis of current data clearly indicate that this class of cattle is not a risk. The report further concludes that the Texas industry feels strongly that the federal government should not continue to sacrifice the states TB status and the biosecurity of domestic cattle herds because of national trade policy.

Analysis of Interferon-gamma Production by *Mycobacterium bovis* Infected White-tailed Deer (*Odocoileus virginianus*) using an In-vitro Blood Based Assay

Dr. M.V. Palmer, NADC,ARS,USDA, Ames, IA

Tuberculosis due to *Mycobacterium bovis* in captive Cervidae was identified as an important disease in the U.S. in 1990 and prompted the addition of captive Cervidae to the USDA uniform methods and rules for the eradication of bovine tuberculosis. As well, *M. bovis* infection was identified in free-ranging white-tailed deer in northeast Michigan in 1995. Tuberculosis in both captive and free-ranging Cervidae represents a serious challenge to eradication of *M. bovis* from the US. Currently, the only approved ante-mortem tests for tuberculosis in Cervidae are intradermal tuberculin skin testing and the blood tuberculosis test (BTB). The BTB is presently unavailable in North America. Tuberculin skin testing of Cervidae is time consuming and involves repeated handling and risk of injury to animals and humans. A blood based assay for tuberculosis in Cervidae would decrease animal handling, stress, and losses due to injury. Additionally a blood based assay could provide a more rapid diagnosis. Twenty, 6-9 month old, white-tailed deer, male and female, were experimentally inoculated by instillation of 300 CFU of *M. bovis* in the tonsillar crypts. Seven, age-matched uninfected deer served as controls. Blood was collected on days 90, 126, 180, 210, 238, 263 and 307 after inoculation and analyzed for the production of interferon-g (IFN-g) in response to incubation with *M. bovis* PPD, *M. avium* PPD, pokeweed mitogen (PWD), or media alone. Production of IFN-g was
significantly greater (P<0.05) at all time points in samples from M.bovis infected deer as compared to uninfected control deer. Production of IFN-gamma to PWM was significantly greater than response to media alone, but did not differ significantly between infected and control deer. Measurement of IFN-g production to M.bovis PPD may serve as a useful assay for the antemortem diagnosis of tuberculosis in Cervidae.

Dr. Terry Beals, USDA, APHIS, VS Staff Veterinarian, led a discussion on proposed changes to the UM&R. Copies of the proposed changes in the program standards were distributed to committee members in early October. A lengthy discussion of the proposed changes in the Bovine Tuberculosis Uniform Methods and Rules parts V, VI, VII, and Definitions resulted in the appointment of a subcommittee. The subcommittee will include representatives of industry, state, and federal organizations. The subcommittee is charged with providing a consensus document of proposed changes for distribution to the Committee on Tuberculosis for review and action prior to August 1, 2003.

Committee Action Items

The Committee considered and passed three resolutions. The first resolution encouraged the USDA to move promptly to establish state and herd status plans as presented at the 105th meeting of the USAHA and that a subcommittee be appointed by the Tuberculosis Committee Chair to work on the details. The second resolution encouraged the use of the Bovigam™ be used as an ancillary or supplemental test in bovine herds known or suspected to have bovine tuberculosis infection. The third resolution requested that USDA implement a national dairy herd tuberculosis testing program.
The USAHA Committee on Wildlife Diseases met on Tuesday, October 22, 2002 in St. Louis, Missouri; at least 18 committee members and 34 guests participated. The committee meeting was a continuation of a USAHA Workshop on chronic wasting disease. Presentations given during the CWD Workshop are summarized in the Workshop portion of the Proceedings. Several reports regarding ongoing and emerging wildlife health issues of interest to USAHA and its members were presented during the ensuing committee meeting. Summaries of these reports follow:

**West Nile virus update**

Dr. Daniel Mead of the Southeastern Cooperative Wildlife Disease study (SCWDS) briefly updated the committee on the spread of West Nile virus (WNV) in the United States. Dr. Mead stated that while most experts predicted the virus would spread throughout the United States, the speed at which it has done so was not expected. First identified in the U.S. in 1999, the mosquito-borne virus has now been detected in 43 of the lower 48 states and in four of Canada’s 10 provinces.

Between 1999 and 2001, WNV infected was detected in 149 persons. There were 18 human deaths reported during this period. Between January and October of 2002, WNV infection has been detected in over 3,052 people. Human infections have been detected in 34 states and the District
of Columbia. The median age of patients with confirmed infection is 56 years, 54% of cases have been males, and the dates of illness onset range from June 10 to October 7. Through mid-October 2002, there have been reports of 146 human deaths (60% male, median age 79 years).

According to Dr. Mead, most attention during 2002 has been directed on human morbidity and mortality associated with WNV infection with less attention directed toward the deaths of thousands of birds. So far this year, WNV has been detected in over 10,585 wild birds.

Recently, SCWDS has received numerous questions regarding WNV infection in non-corvid avian species and in wild and domestic mammalian species. Since the introduction of the virus into the United States, WNV infection has been detected in over 121 avian species and in a variety of other animals (sheep, goat, llama, alpaca, wolf, dog, cat, rabbit, squirrel, and bat). It is probably safe to assume that any type of bird or mammal is susceptible to WNV infection. However, WNV does not appear to pose a significant morbidity or mortality factor for species other than birds, horses, and humans since reports of clinical disease due to WNV infection in other animals have been few to date. Animals (including humans and horses) that have an underlying health condition and/or a compromised immune system seem to have a higher risk of developing clinical disease following WNV exposure.

In the discussion following Dr. Mead’s presentation, Drs. Scott Wright of the National Wildlife Health Center, Todd Cornish of the Wyoming Veterinary Diagnostic Laboratory, and George Luterbach of the Canadian Food Inspection Agency provided additional information on the incidence of WNV infection in other avian and mammalian species.

Avian Vacuolar Myelinopathy

Dr. John Fischer of SCWDS provided an update on avian vacuolar myelinopathy (AVM). The cause of AVM remains undetermined despite extensive diagnostic and research efforts. Evidence of infectious agents has not been detected and a natural or manmade neurotoxin is suspected. The disease was first recognized in 1994 when it killed at least 29 bald eagles at DeGray Lake, AR. AVM also has been detected in numerous American coots and it has been hypothesized that eagles are exposed to the agent of AVM via ingestion of affected coots. This was proven experimentally by SCWDS researchers in 2001 when AVM lesions developed in unreleasable, rehabilitated, red-tailed hawks that were fed tissues from coots with AVM. In the winter of 1998-99, AVM was detected in bald eagles from Georgia, North Carolina and South Carolina, and in mallards and a ring-necked duck from North Carolina.

From October 2001 through February 2002, AVM was diagnosed or suspected in 7 dead bald eagles at Clarks Hill Lake/Lake J. Strom Thurmond on the Georgia/South Carolina border. This brings to 90 the number of dead bald eagles in which AVM has been confirmed or suspected since it
was first recognized in 1994. Lesions of AVM also were found in large numbers of coots and in 14 Canada geese. A beaver with neurological signs was captured at Lake Thurmond during the AVM outbreak. Unfortunately, postmortem decomposition precluded confirmation of a diagnosis of vacuolar myelinopathy in this animal.

To further evaluate the potential susceptibility of mammalian species to the agent of AVM, SCWDS researchers fed tissues from coots with AVM to young pigs under a protocol very similar that of the previous year’s red-tailed hawk feeding trial. Pigs did not show signs of clinical disease during the month-long study and no significant lesions were apparent in microscopic sections of neural tissues of the pigs. Additional field and laboratory projects are necessary to further assess the species susceptibility range.

Additional studies are in progress at SCWDS, the National Wildlife Health Center, North Carolina State University, and other organizations with the ultimate objective of determining the cause of AVM and potential management actions to reduce the impact of this disease on bald eagles and other birds.

**Hemorrhagic Disease of Deer: Epidemiology & Research Update**

Dr. David Stallknecht of SCWDS provided two reports on hemorrhagic disease of deer and other wild ruminants:

Temporal patterns of hemorrhagic disease in Georgia white-tailed deer.

Hemorrhagic disease (HD), which is caused by viruses in both the blue-tongue and epizootic hemorrhagic disease serogroups, is the most important viral disease affecting white-tailed deer in North America. Outbreaks of hemorrhagic disease cannot be predicted, but appear to occur on long-term cycles (8-10 years) and short-term cycles (2-3 years) depending on geographic location. In Georgia and many other Southeastern states, both cycles appear to occur. In order to investigate the hypothesis that HD is occurring on concurrent long-term and short-term cycles, we developed a simple model based on serologic data from Georgia collected from 1981 to present. In general, the model predicted activity trends and provided very reasonable estimates of herd immunity. In order to test this model, we have been comparing predicted and actual changes in herd immunity since 1997. This work will continue through 2004. To date, discordance between predicted and actual antibody prevalence trends was observed only in 1999, but based on preliminary data from this year, it appears that such discordance will also be observed in 2002. These inconsistencies may provide a means to identify the drivers of this system, that is, the risk factors or conditions that result in an HD outbreak. Preliminary data suggest that both herd immunity and climatic conditions (specifically severe drought conditions) may be involved. Herd immunity represents a logical explanation for a short-term cycle, and to date, increased HD activity has been detected in every year where herd immunity fell below 30%. Regional drought conditions also appear during outbreak years and may represent one of the long-
term drivers of this system.

**HD activity in 2002: SCWDS**

An abundant amount of HD activity has been reported to SCWDS. To date, we have over 80 viral isolates. With the exception of three isolates of BTV-10 (GA, NC, VA) all viruses have been identified as EHDV-2. Deer affected with EHDV-2 have been confirmed in AL, GA, KS, LA, MD, NC, SC, TN, TX, VA, WI, and WV.

**Bovine Tuberculosis in Michigan White-tailed Deer: Current Status and Emerging Issues**

Dr. Stephen Schmitt provided an update on progress being made in the management of an endemic focus of bovine tuberculosis (TB) in free-ranging white-tailed deer. Since 1994, the state of Michigan has recognized a problem with TB, caused by *Mycobacterium bovis*, in wild white-tailed deer from an eleven county area in northeastern Lower Michigan.

During the year 2001, surveillance activities for *M. bovis* continued statewide. In white-tailed deer, 60 animals cultured positive from 24,276 deer submitted for testing. Thus far in 2002, 0 deer are positive of 1,845 tested. Apparent prevalence in the core area of the outbreak was 2.3% in 2001. In the remainder of the five county area of northeast Michigan where TB is most prevalent, apparent prevalence was 0.5%. Prevalence in the core area remains essentially unchanged since 1998, but is about half the 1997 rate. Prevalence continues to remain highest in older bucks. Of 398 positive deer found since 1994, 67% have come from only 8 townships, suggesting foci of relatively higher prevalence surrounded by broad areas of much lower prevalence. To date, 1,411 non-cervids of 17 species have been cultured for the disease; 36 have been positive. Thirteen of those have been coyotes. Gross lesions have been quite rare in non-cervids, and none of the positives has shown extensive pathology. Since 1996, 1,064 elk have been tested for TB. The first positive elk was found in 2000, at the eastern edge of the elk range, near the core outbreak area in deer. This animal likely was infected by feeding at a bait or feed site contaminated by infected deer. A second elk taken during the September 2001 hunt was found to be positive. This second elk was killed just 9 miles from the first positive elk. A total of 25 cattle herds (22 beef and 3 dairy) have been found to be positive for bovine tuberculosis. In 2001, an elderly man from the TB area in northeastern Michigan was diagnosed with bovine tuberculosis. DNA analyses of isolates from infected animals of all species continue to implicate a single strain of *M. bovis*.

Strategies for eradication of TB from Michigan wildlife focus on:

1. reducing deer population densities, and
2. reducing man-made aggregations of deer by restriction or elimination of baiting and recreational feeding.

These strategies have been implemented through provision of extra rifle seasons and unlimited antlerless permits in the former case, and by banning
or restriction of deer baiting and feeding in the latter. In the five county area most affected by TB, deer numbers have declined by approximately 35% since 1995, but persistent focal areas of high density, particularly on private land, remain problematic. For 2002, baiting and feeding are prohibited in seven counties. Compliance with restrictions has been uneven, and enforcement continues to pose a challenge, although the overall scope of large scale baiting and feeding has declined substantially since 1997.

A number of research studies have or are currently being carried out by DNR scientists and collaborators from Lincoln University (New Zealand), Michigan State University, North Carolina State University, the U.S. and Michigan Departments of Agriculture, the Michigan Department of Community Health, and the National Institute for Occupational Safety and Health.

To better understand the biology of bovine TB, efforts are underway to:

- Determine the routes of transmission of bovine TB between wildlife and domestic animals
- Determine which wild animals are capable of being infected with and transmitting bovine TB
- Develop new diagnostic strategies and techniques
- Determine what influences the spread of bovine TB in wildlife
- Evaluate what determines how the disease is manifested in wildlife

To better understand the impact of bovine TB on farm families, communities and society efforts are underway to:

- See the program from the perspective of farm families
- Determine how various stakeholder groups respond to and are affected by the bovine TB situation in MI
- Establish the factors influencing public perceptions and behaviors that would enhance efforts to manage associated issues and conflicts
- Document the economic impact of the bovine TB situation in MI on private property values
- Observe the attitudes, behavior and efforts of hunters in areas of MI where bovine TB has been found

To understand the distribution and determinants of bovine TB within populations efforts are underway to:

- Monitor the occurrence of bovine TB in wild cervids
- Monitor the occurrence of bovine TB in wild carnivores and omnivores
- Conduct risk analyzes related to bovine TB

To determine if bovine TB can be diagnosed by a single blood test, instead of the comparative cervical test, which requires that cattle be handled twice (injection and reading) studies examining gamma interferon are also being conducted.

Completed studies include:
REPORT OF THE COMMITTEE

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In addition, studies are ongoing to:
- Develop a farm-level biosecurity model
- Incorporate epidemiology and spatial aspects into a state level risk analysis
- Understand attitudes, behavior, and effort of hunters in bovine TB areas of Michigan
- Survey hunter preferences for deer herd size
- Understand deer migration and movement patterns before and after baiting and feeding ban
- Determine harvest efficiency of hunting over bait –vs- non-bait hunting
- Examine the relatedness among TB positive deer compared to the rest of the population
- Understand white-tailed deer population characteristics and landscape use patterns in southwestern lower Michigan.
• Examine the efficacy of deer repellents derived from plant species
• Examine the effect of Johne’s disease status on the reliability of caudal fold TB test

Brucellosis in wildlife in the Greater Yellowstone Area

Dr. Tom Thorne of the Wyoming Game and Fish Department (WGFD) provided a brief update regarding the status of litigation concerning resumption of wild elk vaccination at the National Elk Refuge in northwestern Wyoming. Previous legal decisions continue to be reviewed; however, a possibility exists that the WGFD may resume elk vaccination at this site in early 2003.

Dr. Mark Drew of the Idaho Departments of Agriculture and Game and Fish provided a brief summary of the recent occurrence of bovine brucellosis in an Idaho cattle herd associated with a seropositive herd of wild elk. The owner had been feeding wild elk at the cattle ranch for several years and the livestock had been tested previously for *Brucella* antibodies. Following the finding of seropositive cattle in the herd in early 2002, investigations ensued that included *Brucella* cultures of cattle and elk at the site as well as thorough epidemiological traces of cattle from the herd. *Brucella abortus*, biovar 1, was cultured from seropositive cattle and elk, and testing of trace-outs failed to reveal other potential sources of infection for the cattle herd. These findings indicate that brucellosis spread from wild elk to cattle at this site where the feeding of known seropositive elk was occurring.

Resolutions

Dr. Tom Thorne provided a brief summary of a proposed USAHA resolution encouraging appropriation of congressional funding to implement the *National Plan for Assisting States, Federal Agencies, and Tribes in Managing Chronic Wasting Disease in Free-ranging and Captive Deer and Elk*. After brief discussion, the resolution was unanimously supported by Committee members and will be forwarded to the Resolutions Committee for further consideration.

Dr. Robert Meyer presented a proposed USAHA resolution that recognized the exemplary actions of all agencies engaged in Michigan’s effort to eradicate bovine tuberculosis from the state and encouraged them to continue to take all necessary and immediate actions to further reduce the prevalence of bovine tuberculosis in free-ranging cervids and livestock. The resolution was unanimously supported by Committee members and will be forwarded to the Resolutions Committee for further consideration.

Respectfully submitted,
John R. Fischer, D.V.M., Ph.D.
Vice Chair, Committee on Wildlife Diseases
22 October 200
BYLAWS OF THE
UNITED STATES ANIMAL HEALTH ASSOCIATION

ARTICLE I – NAME

The name of this Association shall be “The United States Animal Health Association.”

ARTICLE II – PURPOSE

The United States Animal Health Association is a forum for communication and coordination among State and Federal governments, universities, industry, and other concerned groups for consideration of issues of animal health and disease control, animal welfare, food safety and public health. It is a clearinghouse for new information and methods, which may be incorporated into laws, regulations, policy, and programs. It develops solutions of animal health-related issues based on science, new information and methods, public policy, risk/benefit analysis and the ability to develop a consensus for changing laws, regulations, policies, and programs.

ARTICLE III – MEMBERS

3.1. Classes of Members. The classes of members are: Official Agency Members; Allied Organization Members; Individual Members; Student Members; Elected Regional Delegate Members; International Members; Life Members; and, Honorary Members.

a. Official Agency Member. The animal health department or agency of each state, U. S. territory or commonwealth, and the District of Columbia; the animal health department of the United States of America; and such other governmental departments or agencies as the Board of Directors may, by a two-thirds majority vote, approve.

b. Allied Organization Member. Any non-profit organization that is national in scope and actively and directly concerned with and supportive of the interests and objectives of the Association as outlined in Article II-Purpose, may become a member upon approval of the Board of Directors by a two-thirds majority vote.

c. Individual Member. Any person engaged in work related to animal production, animal health, food safety, public health, veterinary medicine and animal research and who supports the interests and objectives of the Association as outlined in Article II-Purpose, may become a member upon approval of the Executive Committee Board of Directors by a majority vote.

d. Elected Regional Delegate Member. Such elected regional
delegates as provided for in Article VI-Board of Directors shall by virtue of such election automatically become members of the Association and shall serve from the close of the annual meeting following their election to the close of the following annual meeting and shall pay dues as the Board of Directors may determine.

e. **Student Member.** Any person enrolled in the study of animal production, animal health, food safety, public health, veterinary medicine, and animal health research who supports the interests and objectives of the Association as outlined in Article II-Purpose is eligible to become a member of the Association. Student members may take part in the open proceedings and meetings of the Association but shall not hold voting privileges as provided in 3.2.

f. **International Member.** The chief official agency member from any foreign federal animal health, food safety, public health and animal health research agency or department, and any foreign national animal industry organization or person who supports the interests and objectives of the Association as outlined in Article II-Purpose, or said person's designee, is eligible to become a member of the Association upon approval of the Board of Directors by a two-thirds majority. International members may take part in the open proceedings and meetings of the Association but shall not hold voting privileges as provided in 3.2. However, the Association recognizes that Australia, Canada, Mexico and New Zealand are voting members and shall continue to remain full voting members after the adoption of these bylaws. New International Members shall obtain voting rights only by amendment of the bylaws.

g. **Life Member.** Any individual member who has maintained membership in the Association for 35 years, or if such member is at the point of retirement, for 25 years, is eligible to be a life member. Past Presidents of the Association are deemed to be life members. Life members shall have all the privileges of regular membership and shall be exempted from payment of all dues. Past presidents, or individual members elected to life membership shall be exempt from the payment of one-half of annual meeting registration fees after the year 2001; provided that retired past presidents who receive no remuneration for expenses incurred while in attendance are fully exempt from the payment of annual meeting registration fees.

h. **Honorary Member.** Any person not otherwise a member of the Association who has contributed materially to the advancement of animal science, food safety, public health, veterinary medicine, animal research, or the purposes of the Association, may be nominated by the Executive Committee for Honorary Membership.
Honorary Membership shall be conferred by a majority vote of the Board of Directors. Honorary Members shall be exempt from the payment of all dues and shall not have voting privileges as provided in 3.2.

3.2. Voting. Each member shall have one vote, unless otherwise provided in these By-Laws.
   a. By State and Federal Official Agency Members and Allied Organization Members. The director or chief executive officer of each Official Agency Member and Allied Organization Member shall appoint and certify in writing to the Executive Director of the Association a person to be its representative who shall represent, vote, and act for each of these classifications of member in all the affairs of the USAHA, until further notification.

3.3. Dues. The Board of Directors at any annual meeting shall have the power to determine the amount of dues.
   a. Non-payment of Dues. Subject to any policy the Board of Directors may establish for reinstatement, failure to pay dues within 90 days of notice of delinquency shall result in automatic termination of membership.
   b. Voluntary Withdrawal of Membership. A member may voluntarily terminate membership effective upon submission of notice of withdrawal to the Association but shall not be entitled to a refund of any dues paid.

3.4. Effective Date of Membership. Membership shall become effective upon submission of written application in the form required, satisfaction of eligibility requirements, election to membership by an appropriate vote of the Executive Committee, and payment of annual dues.

3.5. Suspension or Expulsion. For cause, and upon reasonable notice setting forth the specific reasons therefor, any member may be suspended or terminated. Sufficient cause for such suspension or termination of membership shall be violation of these bylaws or any lawful rule or practice duly adopted by this Association, or any other conduct prejudicial to its interests. Suspension or expulsion shall be by two-thirds vote of the entire membership of the Board of Directors.

ARTICLE IV – MEETINGS

4.l. Annual. There shall be an annual meeting between September 15 and November 15 for receiving annual reports and the transaction of other business.
a. **Notice Requirements.** Written notice setting forth the Agenda and location of the annual meeting shall be mailed or transmitted electronically to all members at least 60 days prior to the first day of such meeting.

b. **Annual Meeting Location.** The location of the annual meeting shall be selected by the Regional Districts on the following rotational basis: North Central, Northeast, Western, and Southern; and with the concurrence of the chief animal health official of the state in which the meeting is to be held. The location and site shall be finally selected in accordance with guidelines proposed by the Executive Director and approved by the Executive Committee. The Board of Directors shall be advised of the selected meeting location at least five years in advance of the meeting. In the event that any annual meeting location becomes unavailable and/or unacceptable the Executive Committee is authorized to select an alternate location.

c. **Closure.** The annual meeting shall be considered officially closed upon the completion of the Board of Directors’ meeting held on the last day of the annual meeting.

4.2. **Special.** Special meetings may be called by the President, in consultation with the Executive Committee, or by a majority of the Board of Directors. Notice of any special meeting shall be mailed, published in the Association newsletter and/or transmitted electronically to the membership with a statement of time and place and information as to the subject(s) to be considered at least 30 days prior to the date of the meeting. Emergency situations shall be dealt with by the Executive Director with the approval of the Executive Committee who shall provide as much notice to the Board of Directors as may be practical under the circumstances.

4.3. **Quorum.** A quorum of the Executive Committee shall consist of two-thirds of its membership. A quorum of the Board of Directors shall consist of 30 or more members, providing that a majority of those in attendance is comprised of Official Agency Members. A quorum of the general membership shall consist of 30 or more members.

**ARTICLE V – OFFICERS AND EMPLOYEES**

**Section 5.1.** **Elected Officers.** The elected officers of the Association shall be a President, President-Elect, First Vice-President, Second Vice-President, Third Vice-President, and Treasurer. They shall be voting members in good standing of the Association.

a. **President.** The President is the chief officer of the Association and shall preside at the annual meeting and all meetings of the
Executive Committee and perform such other duties as customarily belong to that office or which the Board of Directors or Executive Committee from time to time may assign. The president is an ex-officio member of all Committees and may designate an appropriately qualified member as his designee to attend any committee meetings of the Association in his place and stead.

b. **President-Elect.** The President-Elect shall act in place of the President in the event of his/her absence, death, or inability to act. When so acting the President-Elect shall have all the powers of and be subject to all restrictions upon the President. Specifically he/she shall be the chairman of all meetings of the Board of Directors. He/she shall perform such other duties as the President, Board of Directors or Executive Committee from time to time may assign. The President-Elect shall automatically become President upon election at the close of the annual meeting.

c. **First Vice-President.** The First Vice-President shall act in place of the President Elect in the event of his/her absence, death or inability to act; and shall perform such other duties as the President, Board of Directors or Executive Committee may assign.

d. **Second Vice-President.** The Second Vice-President shall act in place of the First Vice-President in the event of his/her absence, death or inability to act; and shall perform such duties as the President, Board of Directors or Executive Committee may assign.

e. **Third Vice-President.** The Third Vice-President shall take the place of the Second Vice-President in the event of his/her absence, death, or inability to act; and shall perform such duties as the President, Board of Directors or Executive Committee may assign.

f. **Treasurer.** The Treasurer shall be the chief financial officer of the Association, shall be chairman of the Audit Committee and perform those duties that are delegated to the office by the Board of Directors and the Executive Committee. The treasurer shall not be responsible for the day-to-day financial transactions of the Association, which will be assumed by the Executive Director.

g. **Election.**

1) The Committee on Nominations and Resolutions shall annually report its recommendations for the offices of President, President-Elect, First Vice-President, Second Vice-President, Third Vice-President, Treasurer and Regional Delegates to the Association membership at the first business session.

2) The District from which the President originated shall submit a nominee for the office of Third Vice President.

3) Should vacancy(ies) occur before the next annual meeting, the District(s) from which the officer(s) vacated shall submit a nominee for the office of Second Vice President (if two vacancies
occur a First Vice President will also need to be nominated).

4) Nominees for Regional Delegates from the Districts shall be selected by the individual districts and supplied in a timely fashion to the Committee on Nominations and Resolutions for inclusion in its report.

5) The Committee on Nominations report will be presented during the first business session. The committee report shall be posted on the registration bulletin board immediately following its presentation at the first business session. The report shall be read again during the second business session at a time certain specified in the program for “Report of Action of the Committee on Nominations and Resolutions.” If a paper is being presented at the specified time, the presentation will be completed and, immediately after, the report shall be read. If the program is ahead of schedule, a recess will be taken until the time specified in the program for the amendments to the slate presented by the Committee.

6) The report or amendments approved by a majority vote of the membership is forwarded to the Board of Directors. The acceptance of the report by a majority vote of the Board of Directors shall constitute election of the nominees to office.

h. Term. The officers shall serve for one year orand until their successors are elected and qualify.

5.2. Executive Director. The Executive Director shall be employed by and serve at the pleasure of the Executive Committee, manage the Association’s day-to-day affairs and perform such other duties as customarily belong to that office or as the Board of Directors or Executive Committee may assign. The Executive Committee shall prepare and negotiate a contract with the Executive Director for a period of not more than five (5) years which shall be subject to approval by a majority of the Board of Directors. If the Association does not have an Executive Director, the Board of Directors shall elect a Secretary.

ARTICLE VI – BOARD OF DIRECTORS

6.1. Board of Directors. The Board of Directors shall have authority over all matters of the Association within the limits of the bylaws.

6.2. Composition. The Board of Directors shall be composed of the following:
   a. The Official Agency members, or their designees.
b. One representative selected by each of the Allied Organization members.

c. Two delegates-at-large from each of the four regional districts.

d. Past presidents of the Association.

e. The International Member who is the chief animal health executive officer representing the principal federal animal health department of Canada, Mexico, Australia and New Zealand, or said person's designee.

6.3. Meetings. The Board of Directors shall have a regular meeting at the time and place of the annual meeting, and shall meet at such other times and places selected by the President or by request of a majority of the directors, in which latter event, the President shall promptly set the time and place of the meeting. Notice of all meetings of the Board of Directors shall be mailed, published in the Association newsletter or transmitted electronically at least thirty days in advance of such meetings. The President, on such reasonable notice as may be practicable under the circumstances, may call emergent meetings of the Board of Directors. At any meeting of the Board of Directors, the President Elect (Chairman of the Board of Directors), with a majority vote of the Board of Directors, may call for an Executive Session limiting attendance.

6.4. Duties. The Board of Directors shall: receive all committee reports and accept or reject all or part of them; review and approve or disapprove with comment the actions of the Executive Committee; and perform such other functions set forth in the By-Laws of the Association.

ARTICLE VII – EXECUTIVE COMMITTEE

7.1. Executive Committee. The Association shall have an Executive Committee composed of the elected officers and the immediate Past President of the Association. In addition the Executive Director shall serve as an ex officio, non-voting member of the Executive Committee and shall not be counted for the purpose of determining a quorum.

7.2. Duties. The Executive Committee shall manage the financial, administrative and internal affairs of the Association when the Board of Directors is not in session. To exercise the authority of the Board of Directors, the Executive Committee must act as a whole, and must forthwith submit its action for approval at the next meeting of the Board of Directors.

7.3. Meetings. The Executive Committee shall meet at least four times each fiscal year at such time and place and upon such notice as the President determines. The Executive Committee is authorized to take action
upon the concurring votes of a majority of its members a quorum being present.

7.4. Emergency Meetings. Should the President determine that an emergency situation exists, the President may convene a telephone or other type of electronic conference meeting of the Executive Committee, which may then act provided a quorum participates.

ARTICLE VIII – ORGANIZATIONAL DISTRICTS

8.1. Districts. The Association shall be organized into five districts composed of the Northeast Regional District, the North Central Regional District, the Southern Regional District, the Western Regional District and the District-At-Large.


b. The North Central Regional District consists of Association members of the states of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin.

c. The Southern Regional District consists of Association members of the states of Alabama, Arkansas, Georgia, Florida, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; and the Virgin Islands and Puerto Rico.

d. The Western Regional District consists of Association members of the states of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming.

e. The District-At-Large shall be composed of the Allied Organization Members and the Elected Regional Delegate Members.

8.2. Each District, on a rotating basis, shall submit to the Nominations and Resolutions Committee a nominee for the vacancy in the office of the Third Vice-President. The order of rotation shall be as follows: Northeast, Western, North Central, Southern, and District-At-Large. In the event that an elected officer is unable to complete his/her term, the District that originally nominated that officer may nominate another person to fill his/her unexpired term.

ARTICLE IX – STANDING AND SPECIAL COMMITTEES

9.1. General. The President shall annually appoint from the members of
the Association such standing or special committees or subcommittees and their chairpersons as may be required by the bylaws or as he/she may find necessary. Each committee shall meet at least once per year at the time of the annual meetings of the Association, and at such other times as the President of the Association and committee Chairman deem necessary to accomplish the work of the Committee. Only members of the Association permitted by these by-laws are permitted to vote on the work of the committee.

9.2. Program Committee. A program committee shall be appointed by the President and shall consist of the chairpersons of all committees and the elected officers of the Association to develop the programs for the annual and any special meetings of the Association with the goal of furthering the purposes of the Association. The Program Committee shall be chaired by the President-Elect and co-chaired by the First Vice-President.

9.3. Committee on Nominations and Resolutions. The Committee on Nominations and Resolutions shall be comprised of the living past presidents of the Association, the Presidents of the Northeast, North Central, Southern and Western Regional Districts, and the President of the District-At-Large.

a. Chairman. The immediate past President of the Association shall chair this committee.

b. Nomination of Elected Officers. This Committee shall receive, consider and recommend to the Association’s membership at the annual meeting nominations for the elected officers specified in 5.1 and delegates from each district as specified in 6.2.c. The recommendation of elected officers and delegates from each district shall be submitted no later than the third day of September next preceding the annual meeting at which the election will be held.

c. Resolutions. This Committee shall review all resolutions of the standing and special committees for ambiguities and redundancy but shall not alter their intent. After this review, this committee shall present the resolutions to the general membership for approval, which shall require a majority vote.

9.4.9.4. Audit Committee. The Audit Committee shall receive the annual audit report, and confirm that all financial affairs of the Association are in order and make such recommendations to the Board of Directors as may be necessary to ensure the proper management of the finances of the Association.

9.5. Special Committees. The President with the advice of the Executive
Committee shall appoint the chairman and members of such other committees as are necessary to accomplish the purposes of the Association.

ARTICLE X – MISCELLANEOUS

10.1. Amendments.

a. In General. These bylaws may be amended by: (1) Specific proposed amendment(s) being presented in writing to the Board of Directors for preliminary approval; (2) If preliminarily approved by majority vote of the Board of Directors, the proposed amendment(s) shall then be presented to the membership, by printing in the next annual proceedings; (3) The proposed amendment(s) shall then be presented to the membership at the next annual meeting for approval by the affirmative vote of two-thirds of the members of the Association present at a meeting at which a quorum is present. In the event the amendment(s) proposed are not approved by the Board of Directors as set forth in (1), then the proposed amendment(s) may be presented by a petition signed by at least thirty members which shall result in their proceeding through steps (2) and (3) as if the Board of Directors had initially approved the proposed amendment(s).

b. Notice. Written notice of an intention to amend the bylaws containing the text of any amendment must be sent to all members. Prior to presentation to the annual meeting for final approval, the amendment(s) shall be printed in the report of the annual proceedings of the immediately preceding annual meeting.

10.2. Fiscal Year. The Executive Committee shall from time to time establish the Association’s fiscal year.

10.3. Parliamentary Procedure. Robert’s Rules of Order Newly Revised shall govern the proceedings of the Association, the Board of Directors and all committees in all cases not otherwise provided for in applicable federal or state statute or rule, the articles of incorporation or bylaws of the Association or its policies or procedures.

10.4. Confidential Information. Confidential information of the Association shall be maintained in confidence and not used for any other than Association purposes nor disclosed to others, except as permitted by law, these bylaws or written consent of the Association, by Association members, directors, officers, employees and agents.
10.5. **Liability of Officers and Directors.** The officers and directors of the Association shall not be personally liable for the debts or actions of the Association.

10.6. **Annual Audit.** The Association shall cause an independent certified public accountant, selected by the Executive Committee, to make an annual examination of its financial accounts and shall submit the report of examination to Audit Committee.

10.7. **Compensation/Reimbursement.** No member of the Board of Directors, committee member or elected officer of the Association shall receive any compensation for his or her services as such. The Association shall develop policies providing for reimbursement of expenses reasonably incurred in attending meetings and performing special assignments of the Association by the elected officers.

10.8. **Dissolution.** In the event of dissolution, the Association shall distribute its assets as required by the laws and statutes of the State of Delaware; and distribute its remaining net assets in a manner permitted an entity to maintain its status as exempt from taxation under Section 501 (c) (6) of the Internal Revenue Code of 1986, as amended, or any successor provision.
USAHA ADMINISTRATIVE POLICIES
(As adopted by the Executive Committee, October 1993)

ESTABLISHMENT AND OPERATION OF STANDING COMMITTEES

1. All members of standing committees must be paid up members of USAHA.
2. The Chairman and all members of USAHA Committees shall be appointed by the President. It is expected that member appointments will be made in consultation with Committee Chairman.
3. Efforts should be made to keep committee size between 15 and 50 members, and to maintain a geographical balance, as well as an appropriate balance of State, Federal, industry and technical members.
4. Committee Chairmen shall be appointed for a term of not more than five years, and may not be reappointed Chairman for at least one year.
5. All recommendations and resolutions shall be approved by a majority of the committee members present before the adjournment of a committee meeting.
6. All USAHA members present at committee meetings may enter into discussions. Only committee members may introduce resolutions or vote on items of business.
7. Committees shall submit reports only to the Executive Committee and Resolutions only to the Committee on Nominations and Resolutions. Committee resolutions and reports have no standing until approved by the Executive Committee.
8. Committee Chairmen may appoint subcommittees as necessary. Subcommittee members must be members of the parent committee. Subcommittees shall report only to the parent committee.
<table>
<thead>
<tr>
<th>Date</th>
<th>Place of Meeting</th>
<th>President</th>
<th>Secretary</th>
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<tbody>
<tr>
<td>Sept. 27-28, 1897†</td>
<td>Fort Worth, TX</td>
<td>Mr. C. P. Johnston, Springfield, IL</td>
<td>Mr. D. O. Lively, Fort Worth, TX</td>
</tr>
<tr>
<td>Oct. 11-12, 1898</td>
<td>Omaha, NE</td>
<td>Mr. C. P. Johnston, Springfield, IL</td>
<td>Mr. Taylor Riddle, KS</td>
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<td>Oct. 8-9, 1900</td>
<td>Chicago, IL</td>
<td>Mr. C. P. Johnston, Springfield, IL</td>
<td>Dr. E. T. Eisenman, Louisville, KY</td>
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<tr>
<td>Oct. 7-8, 1900</td>
<td>Buffalo, NY</td>
<td>Mr. W. H. Dunn, TN</td>
<td>Dr. E. T. Eisenman, Louisville, KY</td>
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<td>Sept. 26-27, 1900</td>
<td>Cincinnati, OH</td>
<td>Mr. C. P. Johnston, Springfield, IL</td>
<td>Dr. E. T. Eisenman, Louisville, KY</td>
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<td>Aug. 23-24, 1904</td>
<td>St. Louis, MO</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
<td>Dr. Charles G. Lamb, CO</td>
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<td>Aug. 15-16, 1905</td>
<td>Guthrie, OK</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
<td>Dr. Charles G. Lamb, CO</td>
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<td>Aug. 15-16, 1906</td>
<td>Springfield, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
<td>Dr. Charles G. Lamb, CO</td>
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<td>Aug. 15-16, 1907</td>
<td>Richmond, VA</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
<td>Dr. Charles G. Lamb, CO</td>
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<tr>
<td>Aug. 16-17, 1908</td>
<td>Washington, DC</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
<td>Dr. Charles G. Lamb, CO</td>
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<td>Aug. 17-18, 1909</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
<td>Dr. Charles G. Lamb, CO</td>
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<td>Aug. 18-19, 1910</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
<td>Dr. Charles G. Lamb, CO</td>
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<td>Aug. 19-20, 1911</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
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<td>Aug. 20-21, 1912</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
<td>Dr. Charles G. Lamb, CO</td>
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<td>Aug. 21-22, 1913</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
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<td>Aug. 22-23, 1914</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
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<td>Aug. 23-24, 1915</td>
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<td>Mr. W. E. Bolton, Woodward, OK</td>
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<td>Aug. 24-25, 1916</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
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<td>Aug. 25-26, 1917</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
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<td>Aug. 26-27, 1918</td>
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<td>Aug. 27-28, 1919</td>
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<td>Mr. W. E. Bolton, Woodward, OK</td>
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<td>Aug. 28-29, 1920</td>
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<td>Aug. 29-30, 1921</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
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<td>Aug. 30-31, 1922</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
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<td>Aug. 31-Sept. 1, 1923</td>
<td>Chicago, IL</td>
<td>Mr. W. E. Bolton, Woodward, OK</td>
<td>Dr. Charles G. Lamb, CO</td>
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<td>Place of Meeting</td>
<td>President</td>
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<td>28. Dec. 3-5, 1924</td>
<td>Chicago, IL</td>
<td>* Dr. J. G. Femeyhough, Richmond, VA</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>29. Dec. 2-4, 1925</td>
<td>Chicago, IL</td>
<td>* Dr. J. H. McNeil, Trenton, NJ</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>30. Dec. 1-3, 1926</td>
<td>Chicago, IL</td>
<td>* Dr. John R. Mohler, Washington, DC</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<tr>
<td>31. Nov. 30-Dec. 2, 1927</td>
<td>Chicago, IL</td>
<td>* Dr. L. Van Es, Lincoln, NE</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<tr>
<td>32. Dec. 5-7, 1928</td>
<td>Chicago, IL</td>
<td>* Dr. C. A. Cary, Auburn, AL</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>33. Dec. 4-6, 1929</td>
<td>Chicago, IL</td>
<td>* Dr. Chas. O. Lamb, Denver, CO</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>34. Dec. 3-5, 1930</td>
<td>Chicago, IL</td>
<td>* Dr. A. E. Wright, Washington, DC</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>35. Dec. 2-4, 1931</td>
<td>Chicago, IL</td>
<td>* Dr. J. W. Connaway, Columbia, MD</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>36. Nov. 30-Dec. 2, 1932</td>
<td>Chicago, IL</td>
<td>* Dr. Peter Malcolm, Des Moines, IA</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>37. Dec. 6-8, 1933</td>
<td>Chicago, IL</td>
<td>* E. T. Faulder, Albany, NY</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>38. Dec. 5-7, 1934</td>
<td>Chicago, IL</td>
<td>* Dr. T. E. Robinson, Providence, RI</td>
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<td>39. Dec. 4-6, 1935</td>
<td>Chicago, IL</td>
<td>* Dr. Edward Records, Reno, NV</td>
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<td>40. Dec. 2-4, 1936</td>
<td>Chicago, IL</td>
<td>* Dr. Walter Wisnicky, Madison, WI</td>
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<td>41. Dec. 1-3, 1937</td>
<td>Chicago, IL</td>
<td>* Dr. R. W. Smith, Concord, NH</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>42. Nov. 30-Dec. 2, 1938</td>
<td>Chicago, IL</td>
<td>* Dr. D. E. Westmoreland, Frankfort, KY</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>43. Dec. 6-8, 1939</td>
<td>Chicago, IL</td>
<td>* Dr. J. L. Axby, Indianapolis, IN</td>
<td>* Dr. O. E. Dyson, Kansas City, MO</td>
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<td>44. Dec. 4-6, 1940</td>
<td>Chicago, IL</td>
<td>* Dr. H. D. Port, Cheyenne, WY</td>
<td>Dr. Mark Welsh, College Park, MD</td>
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<td>45. Dec. 3-5, 1941</td>
<td>Chicago, IL</td>
<td>* Dr. E. A. Crossman, Boston, MA</td>
<td>Dr. Mark Welsh, College Park, MD</td>
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<td>46. Dec. 2-4, 1942</td>
<td>Chicago, IL</td>
<td>* Dr. I. S. McAdory, Auburn, AL</td>
<td>Dr. Mark Welsh, College Park, MD</td>
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<td>47. Dec. 1-3, 1943</td>
<td>Chicago, IL</td>
<td>* Dr. W. H. Hendricks, Salt Lake City, UT</td>
<td>* R. A. Hendershott, Trenton, NJ</td>
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<td>48. Dec. 6-8, 1944</td>
<td>Chicago, IL</td>
<td>* Dr. J. M. Sutton, Atlanta, GA</td>
<td>* R. A. Hendershott, Trenton, NJ</td>
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<td>49. Dec. 5-7, 1945</td>
<td>Chicago, IL</td>
<td>Dr. C. U. Duckwork, Sacramento, CA</td>
<td>* R. A. Hendershott, Trenton, NJ</td>
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<td>50. Dec. 4-6, 1946</td>
<td>Chicago, IL</td>
<td>* Dr. William Moore, Raleigh, NC</td>
<td>* R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>51. Dec. 3-5, 1947</td>
<td>Chicago, IL</td>
<td>* Dr. Will J. Miller, Topeka, KS</td>
<td>* R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>53. Oct. 12-14, 1949</td>
<td>Columbus, OH</td>
<td>* Dr. T. O. Brandenburg, Bismarck, ND</td>
<td>* R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary</td>
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<tr>
<td>Nov. 14-16, 1951</td>
<td>Kansas City, KS</td>
<td>* Mr. F. E. Mollin, Denver, CO</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 29-31, 1952</td>
<td>Louisville, KY</td>
<td>* Dr. Ralph L. West, St. Paul, MN</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Sept. 23-25, 1953</td>
<td>Atlantic City, NJ</td>
<td>* Dr. T. Childs, Ottawa, Canada</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Nov. 10-12, 1954</td>
<td>Omaha, NE</td>
<td>* Dr. T. C. Green, Charleston, WV</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Nov. 16-18, 1955</td>
<td>New Orleans, LA</td>
<td>Dr. H. E. Wilkins, Helena, MT</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Nov. 28-30, 1956</td>
<td>Chicago, IL</td>
<td>* Dr. A. L. Brueckner, Baltimore, MD</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Nov. 13-15, 1957</td>
<td>St. Louis, MO</td>
<td>Dr. G. H. Good, Cheyenne, WY</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Nov. 4-6, 1958</td>
<td>Miami Beach, FL</td>
<td>* Dr. John G. Milligan, Montgomery, AL</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Nov. 15-18, 1959</td>
<td>San Francisco, CA</td>
<td>* Mr. F. G. Buzzell, Augusta, ME</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 17-21, 1960</td>
<td>Charleston, WV</td>
<td>* Dr. J. R. Hay, Chicago, IL</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 30-Nov. 3, 1961</td>
<td>Minneapolis, MN</td>
<td>Dr. A. P. Schneider, Boise, ID</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 30-Nov. 2, 1962</td>
<td>Washington, DC</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 15-18, 1963</td>
<td>Albuquerque, NM</td>
<td>* Dr. T. J. Grennan, Jr. Providence, RI</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 25-29, 1965</td>
<td>Lansing, MI</td>
<td>* Dr. J. W. Safford, Helena, MT</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 10-14, 1966</td>
<td>Buffalo, NY</td>
<td>Dr. C. L. Campbell, Tallahassee, FL</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 16-20, 1967</td>
<td>Phoenix, AZ</td>
<td>* Dr. Grant S. Kaley, Albany, NY</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 6-11, 1968</td>
<td>New Orleans, LA</td>
<td>Dr. John F. Quinn, Lansing, MI</td>
<td>* Dr. R. A. Hendershott, Trenton, NJ</td>
</tr>
<tr>
<td>Oct. 12-19, 1969</td>
<td>Milwaukee, WI</td>
<td>* Dr. John L. O'Hara, Reno, NV</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Oct. 18-23, 1970</td>
<td>Philadelphia, PA</td>
<td>* Dr. Frank B. Wheeler, Baton Rouge, LA</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Oct. 24-29, 1971</td>
<td>Oklahoma City, OK</td>
<td>* Dr. M. D. Mitchell, Pierre, SD</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Nov. 5-10, 1972</td>
<td>Miami Beach, FL</td>
<td>Dr. J. C. Shook Mechanicsburg, PA</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Oct. 14-19, 1973</td>
<td>St. Louis, MO</td>
<td>* Dr. W. C. Tobin, Denver, CO</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Oct. 13-18, 1974</td>
<td>Roanoke, VA</td>
<td>* Mr. O. H. Timm, Dixon, CA</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Nov. 2-7, 1975</td>
<td>Portland, OR</td>
<td>* Dr. J. E. Andrews, GA</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Nov. 7-12, 1976</td>
<td>Miami Beach, FL</td>
<td>* Dr. H. E. Goldstein, Columbus, OH</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Oct. 16-21, 1977</td>
<td>Minneapolis, MN</td>
<td>* Dr. A. E. Janawicz, Montpelier, VT</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>Date</td>
<td>Place of Meeting</td>
<td>President</td>
<td>Secretary</td>
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<tr>
<td>82. Oct. 21-Nov. 3, 1978**</td>
<td>Buffalo, NY</td>
<td>**Dr. L. E. Bartell, Sacramento, CA</td>
<td>* Dr. W. L. Bendix, Richmond, VA</td>
</tr>
<tr>
<td>83. Oct. 28-Nov. 2, 1979</td>
<td>San Diego, CA</td>
<td>Dr. T. F. Zweigart, Raleigh, NC</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>84. Nov. 2-7, 1980</td>
<td>Louisville, KY</td>
<td>Mr. B. W. Hawkins, Ontario, OR</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>85. Oct. 11-16, 1981</td>
<td>St. Louis, MO</td>
<td>* Dr. L. W. Hinchman, Indianapolis, IN</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>86. Nov. 7-12, 1982</td>
<td>Nashville, TN</td>
<td>Dr. G. B. Rea, Salem, Or</td>
<td>Dr. J. C. Shook, Hyattsville, MD</td>
</tr>
<tr>
<td>88. Oct. 21-26, 1984</td>
<td>Ft. Worth, TX</td>
<td>* Mr. J. O. Pearce, Jr. Okeechobee, FL</td>
<td>Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>89. Oct. 27-Nov. 1, 1985</td>
<td>Milwaukee, WI</td>
<td>* Dr. David U. Walker, Montpelier, VT</td>
<td>Dr. J. C. Shook, Annapolis, MD</td>
</tr>
<tr>
<td>90. Oct. 19-14, 1986</td>
<td></td>
<td>* Dr. N. W. Kruse, Lincoln, NE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>91. Oct. 25-30, 1987</td>
<td>Salt Lake City, UT</td>
<td>Dr. J. F. Hudelson, Denver, CO</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>92. Oct. 16-21, 1988</td>
<td>Little Rock, AR</td>
<td>Dr. J. A. Cobb, Atlanta, GA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>93. Oct. 28-Nov. 3, 1989</td>
<td>Las Vegas, NV</td>
<td>Dr. P. E. Bradshaw, Griggsville, IL</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>94. Oct. 6-12, 1990</td>
<td>Denver, CO</td>
<td>Dr. M. A. Van Buskirk, Harrisburg, PA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>95. Oct. 26-Nov. 1, 1991</td>
<td>San Diego, CA</td>
<td>* Dr. P. L. Smith, Sacramento, CA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>96. Oct. 31-Nov. 6, 1992</td>
<td>Louisville, KY</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>97. Oct. 23-29, 1993</td>
<td>Las Vegas, NV</td>
<td>Dr. T. J. Hagerty, St. Paul, MN</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>98. Oct. 29-Nov. 4, 1994</td>
<td>Grand Rapids, MI</td>
<td>Mr. J. B. Finley, Jr., Encinal, TX</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>99. Oct. 28-Nov. 3, 1995</td>
<td>Reno, NV</td>
<td>Dr. H. Wesley Towers, Dover, DE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
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<tr>
<td>100. Oct. 12-18, 1996</td>
<td>Little Rock, AR</td>
<td>Dr. M. R. Marshall, Salt Lake City, UT</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>101. Oct. 17-24, 1997</td>
<td>Louisville, KY</td>
<td>Dr. Larry L. Williams, Lincoln, NE</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>102. Oct. 3-9, 1998</td>
<td>Minneapolis, MN</td>
<td>Dr. Jones W. Bryan, Columbia, SC</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>103. Oct. 7-14, 1999</td>
<td>San Diego, CA</td>
<td>Dr. Richard H. McCapes, Davis, CA</td>
<td>Dr. J. C. Shook, Mechanicsburg, PA</td>
</tr>
<tr>
<td>104. October 19-26, 2000</td>
<td>Birmingham, AL</td>
<td>Dr. Ernest W. Zirkle, Trenton, NJ</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>105. Nov. 1-8, 2001</td>
<td>Hershey, PA</td>
<td>Dr. Bob R. Hillman, Boise, ID</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
<tr>
<td>106. Oct. 17-24, 2002</td>
<td>St. Louis, MO</td>
<td>Dr. Maxwell Lea, Jr., Baton Rouge, LA</td>
<td>Dr. J. Lee Alley, Montgomery, AL</td>
</tr>
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</table>

+ This was the last meeting of the Interstate Association of Livestock Sanitary Boards