North American Animal Health Laboratory Network Collaboration
February 16, 2007
Hosted by the Canadian Food Inspection Agency
National Centre for Foreign Animal Disease
Winnipeg, Manitoba, Canada
The United States Animal Health Association, the nation’s animal health forum for over a century, is a science-based, voluntary organization of official state and federal animal health agencies, national allied organizations, regional representatives and individual members founded in 1897 to protect animal and public health.

USAHA’s mission is to:

- Serve as a forum for communication and coordination among state and federal governments, universities, industry and other groups on issues of animal health and disease control, animal welfare, food safety and public health.
- Serve as a clearinghouse for new information and methods, which may be incorporated into laws, regulations, policy, and programs.
- Act to develop solutions to animal-health related issues based on science, new information and methods and the ability to develop a consensus for changing laws, regulations, policies, and programs.

The Association’s mission is implemented through deliberation of its science-based committees and the adoption of resolutions and recommendation aimed at solving problems. Committee size varies from 11to 135 members.

USAHA is administered and its policy determined by the Executive Committee and Board of Directors. The association maintains an office in Richmond, Virginia (www.usaha.org).

USAHA has met annually since its founding in 1897 and produces a printed proceeding of each meeting. The proceedings represent the most complete history of the nation’s animal health endeavors over the past century.

The 111th Annual Meeting of USAHA will be held October 17-24, 2007 at the John Ascuaga’s Nugget Hotel, Reno, Nevada.

### USAHA Membership

#### Official State Animal Health Agency (50)
- Alabama
- Alaska
- Arizona
- Arkansas
- California
- Colorado
- Connecticut
- Delaware
- Florida
- Georgia
- Hawaii
- Idaho
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maine
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Missouri
- Montana
- Nebraska
- Nevada
- New Hampshire
- New Jersey
- New Mexico
- New York
- North Carolina
- North Dakota
- Ohio
- Oklahoma
- Oregon
- Pennsylvania
- Rhode Island
- South Carolina
- South Dakota
- Tennessee
- Texas
- Utah
- Vermont
- Virginia
- Washington
- West Virginia
- Wisconsin
- Wyoming

#### National Allied Organizations (36)
- Alpaca Owners & Breeders Association
- American Association of Avian Pathologists
- American Association of Bovine Veterinarians
- American Association of Swine Veterinarians
- American Association of Veterinary Laboratory Diagnosticians
- American Association of Wildlife Veterinarians
- American Association of Zoo Veterinarians
- American Bantam Association
- American Farm Bureau Federation
- American Quarter Horse Association & American Horse Council
- American Sheep Industry Association
- American Veterinary Medical Association
- Association of American Veterinary Medical Colleges
- Battelle Memorial Institute
- Exotic Wildlife Association
- Holstein Friesian Association
- International Association of Fish & Wildlife Agencies
- International Lama Registry
- Livestock Exporters Association, U.S.A.
- Livestock Marketing Association
- National Aquaculture Association
- National Bison Association
- National Cattlemen’s Beef Association
- National Chicken Council
- National Dairy HERD Improvement Association
- National Institute for Animal Agriculture
- National Livestock Producers Association
- National Milk Producers Federation
- National Pork Board
- National Pork Producers Council
- National Renderers Association
- National Turkey Federation
- North American Deer Farmers Association
- North American Elk Breeders Association
- R-Calf United Stockgrowers of America
- U. S. Poultry and Egg Association

#### Elected District Delegate (8)
- Northeastern (2)
- Southern (2)
- North Central (2)
- Western (2)

#### Individual Member (1,122)
Agenda

Background - North American Animal Health Laboratory Network

Summary - Tri-National Meeting
USAHA October 17, 2006

Attendees - Contact Information

Biographies - Attendees and Presenters

Input from Those Unable to Attend

Mexico Laboratory Overview

Canada Laboratory Overview CAHSN 2007 Abstract

U.S.A. Overview - National Animal Health Laboratory Network

FMD Overview in North America by K. Conyngham

FMD’s 40th Anniversary by F. Mulhern

FMD Summaries:
Mexican American Commission 1947-97
Studies of FMD Vaccine 1946-54

Security and Prosperity Partnership of North America

Presentations:
Alfonso Clavijo and John Pasick

Fact Sheet - National Centre for Foreign Animal Disease
United States Animal Health Association
Annual Meeting Schedule

111th ANNUAL MEETING
October 17-24, 2007
JOHN ASCUAGA’S NUGGET HOTEL
Reno, Nevada

112th ANNUAL MEETING
October 23-29, 2008
SHERATON GREENSBORO HOTEL
Greensboro, North Carolina

113th ANNUAL MEETING
October 7-14, 2009
TOWN & COUNTRY HOTEL
San Diego, California

Acknowledgements:
Thank you to Karen Conyngham, Linda Ragland, Donald Allis, José Lopez, Michelle Roy and Montserrat Arroyo for their part in preparing for the meeting and their assistance with the notebook.

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## Agenda - February 16, 2007

United States Animal Health Association  
Committee on Diagnostic Laboratory and Veterinary Workforce Development  
Committee on International Standards  
North American Animal Health Laboratory Network Collaboration  
Mexico-Canada-USA Meeting Hosted by the Canadian Food Inspection Agency  
National Centre for Foreign Animal Disease  
Winnipeg, MB, Canada

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Participants</th>
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<tbody>
<tr>
<td>08:30-08:45</td>
<td>Welcome and Introductions</td>
<td>Paul Kitching/All participants</td>
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<tr>
<td>08:45-09:00</td>
<td>Purpose of the Meeting</td>
<td>Paul Kitching</td>
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<tr>
<td>09:00-09:15</td>
<td>SPP - Mexico’s Perspective</td>
<td>Montserrat Arroyo</td>
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<td>09:15-09:45</td>
<td>Mexico’s Animal Health Laboratory Network: Structure, Opportunities</td>
<td>Hugo Fragoso</td>
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<td>for Collaboration, Strengths, Concerns, Vision for the Future</td>
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<tr>
<td>09:45-10:15</td>
<td>The Animal Health Laboratory Network in the United States of America:</td>
<td>Beth Lautner</td>
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<td>An overview</td>
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<td>10:15-10:30</td>
<td>Coffee Break</td>
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<td>10:30-11:00</td>
<td>The Canadian Animal Health Surveillance Network (CAHSN)</td>
<td>Paul Kitching</td>
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<td>11:00-11:30</td>
<td>Pilot Plan for the Harmonization of Diagnostic Tests for FMD and</td>
<td>Alfonso Clavijo</td>
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<td>Other Vesicular Diseases in North American Laboratories</td>
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<td>11:30-11:45</td>
<td>Harmonization-Related Activities With Regard to Classical Swine</td>
<td>John Pasick</td>
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<td>Fever and Avian Influenza</td>
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<td>11:45-12:15</td>
<td>Lunch</td>
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<td>12:15-14:15</td>
<td>Open Discussion – Beginning Steps for Collaboration on a North</td>
<td>Paul Kitching-Facilitator</td>
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<td>American Animal Health Laboratory Network: Setting priorities,</td>
<td>All participants</td>
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<td>Initial Road Map, Funding Issues</td>
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<td>14:15-14:30</td>
<td>Coffee Break</td>
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<td>14:30-15:30</td>
<td>Tour of the Canadian Science Centre for Human and Animal Health</td>
<td>Kelly Keith</td>
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<td>15:30-17:00</td>
<td>Wrap-up / Next Steps / Action Items</td>
<td>Paul Kitching-Facilitator</td>
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<td>All participants</td>
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<td>17:00-17:30</td>
<td>Transportation to Fort Garry Hotel</td>
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<td>18:00-22:00</td>
<td>Dinner and Informal Discussion</td>
<td>Fort Garry Hotel</td>
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The concept of a North American Laboratory Network was then discussed. Dr. Brian Evans, Chief Veterinary Officer for Canada, discussed the status of diagnostic animal health programs in Canada and stated the need for interagency and cross-jurisdictional cooperation to provide a hemispheric response to global threats to animal health. Dr. Jose Angel del Valle, Chief Veterinary Officer for Mexico, discussed the status of animal health programs in Mexico and stated a strong desire to work with the U.S. and Canadian diagnostic laboratories to improve standardization and quality control. Dr. John Clifford, USDA-APHIS-VS Deputy Administrator, reported that USDA-APHIS is working with Canada and Mexico on a number of issues and expressed a commitment to continue the emergency response coordination. Co-chair Bob Frost stated a need to develop a North American Laboratory Network to improve harmonization and standardization among the diagnostic laboratories. The Committee expressed consensus to support the concept of a North American Laboratory Network and a commitment to increase collaboration among the diagnostic laboratories.

Collaboration between the animal health laboratory networks of the North American countries – Canada, México, the United States – is essential to the economic welfare of the continent and the health of their domestic, wild animal and human populations. This presentation describes the animal disease diagnostic laboratory system in the United States, reviews the structure of an animal health laboratory network in the United States and the reasons for its formation, and suggests a plan for future collaboration between the three countries on animal health laboratory networks.

There are a number of important reasons to support future collaboration of the laboratory systems in our three North American countries. The first and perhaps most important is that we live in a global environment, diseases know no boundaries. Transboundary diseases, as the World Organisation for Animal Health (OIE) calls foreign animal diseases, are not excluded as a result of political boundaries. The legal trade in animals and animal products has expanded tremendously and zero disease risk is not attainable nor supported by free trade agreements. In addition to the controlled risk of legal animal
disease movement, intentional or unintentional illegal movement of animals and animal products magnifies the risk of movement of animal diseases across borders and between countries.

Our world order has changed and the threat of intentional harm to free and developed countries through the use of animal disease agents is very real. The livestock industries are critically important to North America for a source of safe, reliable, reasonably priced meat food products as well as important non-food by-products. The economic importance is underscored when you consider the significance of livestock production in North America as related to world production for those livestock commodities. North American countries produce 35% of the world’s poultry meat, 25% of the world’s beef, one-sixth of the world’s milk and 10% of the world’s pork.

Today, wildlife and wildlife diseases are an integral component of North American disease prevention and control activities for domestic animals. Currently, United States and Canadian efforts to eliminate bovine tuberculosis and brucellosis have been challenged by these diseases in wildlife populations. In addition, zoonotic diseases, those transmissible between people and both domestic and wild animals are of increasing importance to public health. U.S. records show that 50 million people have acquired zoonotic diseases during the last five years.

Livestock markets of the North American countries are significantly integrated. The United States imports over a million live cattle from Mexico each year and in turn, livestock products and purebred seed stock are exported to Mexico. There is similar market integration between the U.S. and Canada. Unfortunately, there have been recent setbacks in market integration due to bovine spongiform encephalopathy (BSE). It is anticipated that this hurdle will be overcome and markets will continue to be further integrated, amplifying the need for improved surveillance for animal diseases and real time diagnostics for that surveillance.

Livestock markets of the North American countries are significantly integrated. The United States imports over a million live cattle from Mexico each year and in turn, livestock products and purebred seed stock are exported to Mexico. There is similar market integration between the U.S. and Canada. Unfortunately, there have been recent setbacks in market integration due to bovine spongiform encephalopathy (BSE). It is anticipated that this hurdle will be overcome and markets will continue to be further integrated, amplifying the need for improved surveillance for animal diseases and real time diagnostics for that surveillance.

The front-line defense that protects our domestic and wild animal populations as well as human health and economic welfare is the animal disease diagnostic laboratories and practicing veterinarians. The early identification at the animal disease diagnostic laboratory of transboundary (foreign) diseases and emerging and re-emerging diseases will enable us to mount a rapid response. Early containment and elimination are keys to restoring our livestock industries and the critically important export markets.

Collaboration of the North American countries on animal health diagnostic networks and connection of those systems will improve our ability to safeguard our important animal industries. Enhancement of real-time disease surveillance will shorten our time to respond. Enhanced and interconnected laboratory networks will also provide surge capacity during outbreaks of disease that overwhelm our individual resources. Collaboration will enhance the sharing of technology between the three countries and enable us to standardize our laboratory techniques and training. In short, collaboration will lead to a hemispheric protection net for our domestic and wild animal resources.

The foreign animal disease laboratories operated by the United States Department of Agriculture (USDA) in Ames, Iowa and Plum Island, New York are responsible for testing samples for foreign animal disease. However, almost all of the day-to-day animal disease diagnostic work is performed in an animal disease laboratories operated by either state governments or state universities. These laboratories, distributed throughout the country with nearly one in each state, may be the first to see a suspected foreign animal disease or a newly emerging disease. The concept of connection of these front-line laboratories into a network that can enhance our nation’s animal disease surveillance system and provide surge capacity in the event of a disease outbreak gave birth to the United States’ National Animal Health Laboratory Network (NAHLN).

The establishment of the NAHLN provided for the standardization of testing techniques, improved the infrastructure of network laboratories including the procurement of equipment, enhanced training and increased the sample capacity. The network was formed to enhance national surveillance for animal diseases and leverage the nation’s laboratory resources.
Twelve of the nation’s animal disease laboratories received initial funding to participate in the network focusing on a number of high-consequence foreign animal diseases. Since that time, a number of other laboratories have been incorporated into the system at various levels of participation. The diagnostic platform chosen to enhance surveillance in the network laboratories and conduct this testing in real-time was the polymerase chain reaction. Efforts have begun to connect the NAHLN to the food testing and human laboratory systems.

Canada recently has implemented a similar animal disease laboratory network that is connected to their human health laboratory system. Their animal disease surveillance system is similarly based in laboratories operated by a province or a university, with the federal foreign animal disease reference laboratory located in Winnipeg, Manitoba. Canada’s laboratory system is being connected to the NAHLN through the Winnipeg laboratory.

México has an extensive animal disease laboratory system supported by the federal foreign animal disease laboratory (CPA), national animal disease laboratory (CENASA), and the national parasite and toxic residue laboratory (CENAPA). These laboratories can and should be integrated with the U.S. and Canadian laboratory networks.

There are a number of areas where we can collaborate on our nation’s animal disease laboratory networks. They include;

- standardization of diagnostic tests;
- mutual recognition and application of international standards;
- development of technical capacity of our personnel through meetings of experts;
- exchange of experiences in laboratory network oversight;
- use of common protocols, reference materials and reagents; and
- improvement of knowledge on the epidemiology of transboundary diseases, including those that are zoonotic

Collaboration between and interconnection of the national animal health laboratory networks of México, Canada, and the United States are critical to enhancing our ability to safeguard the domestic animal and wildlife resources of North America, as well as to protect human health and the food supply. Laboratory integration will also contribute to our regional economic stability and growth through ensuring safe trade in animals and animal products. The Consejo Nacional de Sanidad Animal, the United States Animal Health Association and the Canadian laboratory support group must work together with our respective federal governments and stakeholders to accomplish this important effort.
A meeting between key laboratory representatives from the North American countries was held at the Minneapolis Hilton Hotel, in Directors row 4 Room, on Tuesday, October 17, 2006, from 7:00 – 9:00 P.M. Dr. Rick Willer, chair of the Committee on International Standards, welcomed 12 attendees to the meeting. They were from:

Commisión para la Prevención de la Aftosa (CPA) Laboratory in Mexico – Igor Romero, Montserrat Arroyo
Centro Nacional de Servicios de Constatación en Salud Animal (CENAPA) Laboratory in Mexico – Hugo Fragoso
United States Department of Agriculture, Animal and Plant Health Inspection Service, Veterinary Services - John Clifford (Deputy Administrator), Jere L. Dick, José R. Diez, Beth Lautner, Randall L. Levings, Barb Martin and Tom McKenna
Canadian Food Inspection Agency, National Centre for Foreign Animal Diseases - Paul Kitching
United States Animal Health Association (USAHA) – Bob Frost, Rick Willer

The topics proposed for discussion revolved around further collaboration on the establishment of a tri-national animal health diagnostic network. This topic had been discussed in the previous two Annual Meetings of the USAHA Committee on Diagnostic Laboratories and Veterinary Workforce Development. Topics covered during this meeting included participant perspectives on the merits of establishing a North American network, how the network would operate, identification of diseases of common interest, harmonization of tests, exchange of personnel, reagents and biological reference materials, training and future meetings.

During the roundtable discussion, a number of issues and action items were identified. They include:

- Each country needed to identify a point person for future planning (Canada-Kitching; Lautner-U.S.; Fragoso-Mexico);
- Canada is willing to put money into a three country agreement;
- An MOU signed by the Chief Veterinary Officers should be prepared;
- The activities could be accomplished under the umbrella of the U.S., Mexico and Canada “Security and Prosperity Partnership” agreement of the Prime Minister and the two Presidents;
- An initial step could be the harmonization of diagnostics;
- Funding will be needed to build/enhance infrastructure and expand cooperative activities;
- Sharing of expertise and training would be an important component;
- Diseases of possible collaboration could be listed. It was suggested that the countries could concentrate on 1 or 2 diseases initially;
- Adhering to international standards was an important consideration;
- It would be helpful to have an inventory of current activities because there is some collaborative work already in progress (i.e. Joan Arnoldi is working on a tri-national tuberculin comparison project);
- In the event of a Foreign Animal Disease (FAD) outbreak, the three nations individually do not have adequate lab capacity for a response or to recover from the outbreak (surveillance);
- Kitching thought there were some items that could be done quickly-exchange agents and exchange people to gain level of trust at the bench level as opposed to the distrust that is often seen at the political level;
- The priority for the three nations should be surveillance to preserve trade, early detection of an FAD, and follow-up testing to recover trade in the event of an FAD outbreak;
- The best techniques should be utilized from all three countries;
- The federal reference laboratories from each country should be the connecting points for the three countries’ lab networks;
- A follow-up meeting was suggested, possibly in early 2007 in Mexico or Canada with a suggested topic of early detection of TB and brucellosis;
- Prior to the early 2007 meeting, Kitching, Lautner and Fragoso would develop and share a draft reference document with proposed goals and objectives that would be signed by the three CVO’s;
- It was agreed that the U.S. would prepare the first draft of the reference document and Clifford asked Lautner for a turnaround of one month (November 17, 2006)
# Attendees

**United States Animal Health Association**

**North American Animal Health Laboratory Network Collaboration**

**Winnipeg, Canada - February 16, 2007**

<table>
<thead>
<tr>
<th>Attendee</th>
<th>Position and Contact Information</th>
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<tbody>
<tr>
<td>Judith Bossé</td>
<td>Vice-President, Science Branch, Canadian Food Inspection Agency, 59 Camelot Drive, Ottawa, ON K1A 0Y9, (613) 225-2342, <a href="mailto:bossej@inspection.gc.ca">bossej@inspection.gc.ca</a></td>
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<tr>
<td>José Angel del Valle Molina</td>
<td>Chief Veterinary Officer and Director General, Dirección General de Salud Animal, Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación, Mpo. Libre 377, Col. Santa Cruz Atoyac, Del. Benito Juárez, México, D.F. C.P. 03310, (555) 905-1000 Ext. 51007, <a href="mailto:dir.dgsa@senasica.sagarpa.gob.mx">dir.dgsa@senasica.sagarpa.gob.mx</a></td>
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<tr>
<td>Paul Kitching</td>
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<td>Hugo Fragoso Sánchez</td>
<td>Director Centro Nacional de Servicios de Constatación en Salud Animal, Carretera Cuernavaca-Cuautla, No. 8534 Col. Progreso Jiutepec, Morelos, C.P. 62550, (777) 319-0202, <a href="mailto:dir.cen@senasica.sagarpa.gob.mx">dir.cen@senasica.sagarpa.gob.mx</a>, <a href="mailto:cenapa@senasica.sagarpa.gob.mx">cenapa@senasica.sagarpa.gob.mx</a></td>
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<tr>
<td>Beth Lautner</td>
<td>Director, National Veterinary Services Laboratories, United States Department of Agriculture, 1800 Dayton Ave., Ames, IA 50010, (515) 663-7266, <a href="mailto:Elizabeth.A.Lautner@aphis.usda.gov">Elizabeth.A.Lautner@aphis.usda.gov</a></td>
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<tr>
<td>José Lopez</td>
<td>International Project Manager, National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, 1015 Arlington Street, Winnipeg, MB R3E 3M4, Canada, (204) 789-2023, <a href="mailto:JLopez@inspection.gc.ca">JLopez@inspection.gc.ca</a></td>
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<tr>
<td>Montserrat Arroyo Kuribreña</td>
<td>Jefe del Departamento de Operaciones de Campo Comisión México-Estados Unidos para la Prevención de la Fiebre Aftosa y Otras Enfermedades Exóticas de los Animales, Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación, Municipio Libre No. 377 Piso 6 Ala A, Col. Santa Cruz Atoyac, CP 03310, México D.F. (555) 905-1062, <a href="mailto:info04@senasica.sagarpa.gob.mx">info04@senasica.sagarpa.gob.mx</a></td>
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<td>Name</td>
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<tr>
<td>Alfonso Clavijo</td>
<td>Head of the Vesicular Disease Unit</td>
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<td>John Copps</td>
<td>Deputy Director</td>
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<td>John Pasick</td>
<td>Head of Classical Swine Fever &amp; Avian Disease Unit</td>
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<td>Pam Hullinger</td>
<td>Chief Veterinary Officer</td>
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<td>Samia Metwally</td>
<td>Head, Diagnostic Services</td>
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<tr>
<td>Neville P. Clarke</td>
<td>Director</td>
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<td>Patrick Fitch</td>
<td>President BNBI, LLC</td>
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<td>Rick Willer</td>
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JUDITH BOSSÉ
Vice-President, Science Branch

Dr. Bossé is the Vice-President of Science Branch, Canadian Food Inspection Agency (CFIA), Canada’s largest science-based regulatory agency. This Branch was created in May of 2003 to amalgamate scientific functions under one leadership. Its role is to ensure that science programs and advice are available to the Agency to maintain an effective and efficient regulatory regime. Its responsibilities include the national network of federal laboratories providing diagnostics, reference laboratory functions, research services in animal and plant health, food safety, risk assessment, biocontainment advice and other science-related advisory services.

Dr. Bossé received her veterinary degree from the St. Hyacinthe College of the University of Montreal in 1983, followed by a Master of Science degree from the University of Sherbrooke in 1986.

Her areas of expertise are the planning and delivery of broad-based science programs, targeted at food safety, animal and plant health, the management of laboratory systems, large-scale research and development projects involving government, industry and university partners, the training of scientific and regulatory personnel and international disease control.

Before spearheading the development of the Science Branch, Dr. Bossé held senior executive and science management positions at the CFIA and previously with Agriculture and Agri-Food Canada since joining the federal government in 1988. Prior to her career in research and government, Dr. Bossé was a private practitioner of veterinary medicine in Quebec.
Brian Evans  
Chief Veterinary Officer

Dr. Evans is the Chief Veterinary Officer for Canada. Raised in Oakville, Ontario; Moose Jaw, Saskatchewan and Halifax, Nova Scotia, Brian is an alumnus of the University of Guelph where he obtained a Bachelor of Science in Agriculture degree (B.Sc. Agr.) in 1974 from the Ontario Agricultural College, with a major in animal science and genetics, and his Doctor of Veterinary Medicine degree (D.V.M.) from the Ontario Veterinary College in 1978.

With the creation of the Canadian Food Inspection Agency (CFIA) in 1997, Dr. Evans was appointed as Executive Director of the Animal Products Directorate with the responsibility for the animal based food continuum from conception to consumption and as Canada’s fourteenth Chief Veterinary Officer since Confederation in 1867. In 2004, in recognition of the increasing complexity and challenge of the international threat environment for animal and emerging zoonotic diseases, the stand alone office of the Chief Veterinary Officer was created reporting to the President of the CFIA and to serve as the senior advisor to the Government on animal and veterinary public health issues.

Brian was appointed by the Minister of Agriculture and Agri-food and the Minister of Foreign Affairs and International Trade in 1999 to serve as Canada’s delegate to the World Organisation for Animal Health, (OIE). He held the position of Secretary General for the O.I.E. Regional Commission for the Americas from 2001 to 2003 and was elected to the eight-member Administrative Commission of the O.I.E. from 2003 to 2006. In May 2006 he was re-elected to the Administrative Commission for an additional three year term.

Dr. Evans public service career also included previous appointments as Director of the Animal Health and Production Division, the Chief of the Artificial Insemination and Embryo Transfer Program and Chief, Export Coordination with the federal Department of Agriculture and Agri-food. Prior to his entering public service, Dr. Evans was a private practitioner in a large veterinary clinic in Peterborough, Ontario focusing on reproductive herd health and preventive medicine. Dr. Evans holds a Doctor of Veterinary Medicine degree (1978) and a Bachelors of Science degree in Agriculture with a major in genetics from the University of Guelph (1974).

Nationally, Brian currently serves on the Advisory Councils of the Western College of Veterinary Medicine in Saskatoon, Saskatchewan, the Ontario Veterinary College in Guelph, Ontario and the Atlantic Veterinary College in Charlottetown, Prince Edward Island, Canada. He is also a member of the steering committee for the newly announced veterinary faculty being established at the University of Calgary in Alberta.

Dr. Evans is a strong proponent of collaboration and partnerships as fundamental to the integrity of food security and animal and veterinary public health programs at the national, hemispheric and international level. Dr. Evans has twice been the recipient of the prestigious Head of the Public Service Award by the Clerk of the Privy Council for Canada for outstanding leadership in public policy development in 2001 and 2003. In December 2002, he was named a recipient of the Queen’s Jubilee Medal for his service to Canada and his distinguished representation of the country at the international level.
José Angel del Valle Molina  
Chief Veterinary Officer

Dr. del Valle is the Chief Veterinary Officer and Director General of the Dirección General de Salud Animal (DGSA) of the Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA – Mexico’s Department of Agriculture).
John R. Clifford
Chief Veterinary Officer

Dr. Clifford is the Deputy Administrator for the Animal and Plant Health Inspection Service (APHIS), Veterinary Services’ (VS) program of the United States Department of Agriculture (USDA). In this position, he provides leadership for safeguarding the nation’s animal health.

Prior to being appointed as the Deputy Administrator in May 2004, Dr. Clifford served as the acting Deputy Administrator. He also served as the Associate Deputy Administrator for the USDA, APHIS, VS National Animal Health and Policy program where he led the agency effort to protect, sustain, and improve productivity, marketability, and health of the nation’s animals, animal products, and biologics.

Dr. Clifford, who served as the Assistant Deputy Administrator from 1997-2002, also has extensive field experience. Since joining APHIS in 1985, Dr. Clifford served as the Area Veterinarian-In-Charge in the states of Ohio, West Virginia, Michigan, and Indiana, as the National Health Monitoring System coordinator in Ohio, and as the brucellosis epidemiologist and veterinary medical officer in Kentucky.

Before beginning his work with APHIS, Dr. Clifford was a private veterinarian in a mixed animal practice. He received a Bachelor of Science in animal science and a Doctor of Veterinary Medicine degree from the University of Missouri.

A native of Kentucky, Dr. Clifford currently resides in Virginia with his wife, Sara.
Paul Kitching
Director, National Centre for Foreign Animal Disease

Dr. Kitching is the Director of the National Centre for Foreign Animal Disease (NCFAD), one of the laboratories within the Canadian Food Inspection Agency (CFIA). He qualified as a veterinarian in London, England and worked for 6 years in general practice. He completed an MSc in tropical veterinary science and worked on an overseas aid program in Paraguay for 2½ years before returning to the United Kingdom to work on his PhD. He specialized in the epidemiology and control of the major animal diseases that affect production and international trade, in particular the vesicular diseases and the pox diseases of animals and was head of the World Reference Laboratory for Foot and Mouth Disease prior to taking up his post in Canada in 2001. In June 2001, Dr. Kitching took over as Director of the National Centre for Foreign Animal Disease, Winnipeg, Canada, responsible for all foreign animal disease diagnosis and research in Canada. Working for CFIA, he is also technical advisor to the North American Foot and Mouth Disease Vaccine Bank. The NCFAD shares accommodations with the National Microbiology Laboratory, now part of the Public Health Agency, and contains containment level 3 and 4 facilities in which to work with foreign animal diseases as well as emerging zoonotic diseases. Much of the recent work has involved Bovine Spongiform Encephalopathy (BSE) - the NCFAD is the reference centre for Canada - and avian influenza, following the recent outbreak in British Columbia. However, there is also the responsibility to establish diagnostic capacity for any major outbreak of disease that could have significant economic impact on Canadian agriculture, such as foot-and-mouth disease and hog cholera. Increasingly there is the realization that many pathogens are shared by humans and animals, and it has been an objective of Dr Kitching to link the research and diagnostic programs of the NCFAD with those of the Public Health Agency laboratory.

Dr. Kitching is frequently an invited lecturer at international meetings in North America, Europe, Asia and Australia, and gave the Snowden Lecture and the technical presentation to the General Session of the OIE in 2002. Most recently he supervised the diagnostic response to the discovery of BSE in Canada, and following the outbreak of avian influenza in British Columbia in 2004. He has over 100 publications in refereed journals and over 100 other publications as book chapters in conference proceedings and in reference books.
IGOR FRANCISCO ROMERO SOSA
Director of the Mexico-U.S. Commission for the Prevention of Foot and Mouth Disease and Other Exotic Diseases of Animals

Dr. Romero is the Director of the Mexico-U.S. Commission for the Prevention of Foot and Mouth Disease and Other Exotic Diseases of Animals (Comisión México-Estados Unidos para la Prevención de la Fiebre Aftosa y otras Enfermedades Exóticas de los Animales).

Dr. Romero graduated from the National Autonomous University (UNAM) National Veterinary Medicine and Animal Science School in 1966, and completed several courses on artificial insemination, public administration, formulation and evaluation of projects, and studies in economy. He started his professional work at the National Bank of Ejidal Credit in the area of Technical Assistance for the Dairy Development programs. At the Ministry of Health, Dr. Romero was in charge of the Services of Sanitary Inspection in meat processing and slaughterhouses for the State of Mexico. At the Ministry of Agriculture, he acted as Head of the Department of Economic Studies and Programming and Cattle Organization, Director of Cattle Planning, Director of Cattle Commercialization, Director of Cattle Development, Advisory Technician, Coordinator of Technical Advisers, and Private secretary in the Undersecretary's office of Cattle Production. He also served as Chief of the General Direction of Cattle Development and as the Director of the National Center of Services of Animal Health Evaluation (CENAPA).

Dr. Romero was named as Mexico’s representative before the Food and Agriculture Organization (FAO) as consultant in policies for cattle development in Latin America and the Caribbean - in 1987 in Brazil, and in 1992 in Bolivia. He coordinated the consultation of experts for technology transfer for Latin America and the Caribbean in Mexico in 1994. He has participated as official representation at national and international events on cattle production and health. Among them: the official representation of the Mexican Delegation to the World Dairy Congress, Montreal, Canada 1992, the presidency of the cattle development XI Mexico-Canada Bi-national Ministerial Meeting (1995), and the Mexico-United States Animal Health Meetings. Also, through the International Regional Body for Animal and Plant Health (OIRSA), he has participated in activities of technical support and strategic development for animal health issues. He also has participated at several general and specific sessions summoned by the World Organisation for Animal Health (OIE), the North American Security and Prosperity Partnership (NASPP) and the Asia Pacifica Economic Cooperation (APEC).
Dr. Lautner was named the Director of United States Department of Agriculture (USDA) National Veterinary Services Laboratories (NVSL) in Ames, Iowa, on May 7, 2006. In that position, she is responsible for the operations and programs of NVSL which is the only Federal facility engaged in the diagnosis of both domestic and foreign animal diseases with locations in Ames, Iowa, and Plum Island, New York. NVSL serves as the national reference laboratory for the National Animal Health Laboratory Network and as an international reference laboratory for the World Organisation for Animal Health.

Previously, Dr. Lautner served as Center Director, Plum Island Animal Disease Center (PIADC) within the Science and Technology Directorate of the Department of Homeland Security (DHS). She was the first DHS Center Director and served in that capacity from January 2004 until March 2006. As Center Director, Dr. Lautner was responsible for administration and operations of the Center, a Biosafety Level 3 and 3 Agriculture facility with a budget of $50 million, and oversight of the DHS science program at the Center.

Prior to joining DHS, Dr. Lautner served as Vice President for Science and Technology at the National Pork Board where she oversaw the research and development programs on a variety of animal health and agricultural issues. In addition to these positions Dr. Lautner was a practicing veterinarian for more than 12 years. In 1986, she opened her own practice, Swine Health Services, in LeMars, IA, where she provided herd health programs and computerized records for area pork producers.

Dr. Lautner received a BS degree and a Doctor of Veterinary Medicine degree from Michigan State University. She also has a MS degree from the University of Minnesota. Lautner is a member of the American Veterinary Medical Association, the Iowa Veterinary Medical Association, and the American Association of Swine Veterinarians (AASV). In 1994, she received the Howard W. Dunne Memorial Award for outstanding service to AASV and the pork industry. Dr. Lautner also received the USDA, Animal and Plant Health Inspection Service Administrator’s Award in 1997 in recognition of her contributions to the advancement of animal health. In 2002, she received the Meritorious Service Award from the National Institute for Animal Agriculture. In 2005, she received a DHS Under Secretary Award in recognition of her accomplishments in Program Management at PIADC.
Dr. Fragoso is the Director of Centro Nacional de Servicios de Constatación en Salud Animal (CENAPA).

Dr. Fragoso graduated from the Veterinary Medicine and Animal Science Faculty of Mexico’s National Autonomous University (UNAM). He also obtained a Master’s Degree in Veterinary Sciences in the area of Preventive Medicine from UNAM and a PhD candidate for Biological Sciences in Veterinary Entomology from the Autonomous Metropolitan University – Xochimilco.

Dr. Fragoso is past Director of the Autonomous Veterinary School at the Autonomous University of Guerrero. He has worked for the Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA), Mexico’s Department of Agriculture, since 1989 serving as Chief of the Helmintology Department, Subdirector of Parasitology, and now as the Director of the National Center for Animal Health Testing (CENAPA).

Dr. Fragoso has taught for several years at the university level in the subjects of Histology, Physiology, Immunology and Parasitology in Veterinary Medicine at the Universidad Autónoma de Guadalajara (UAG) and in the subject of Biology at the Universidad Autónoma de Morelos (UAEM). He was also taught protozoology for the Masters in Veterinary Pathology program at the UAEM and served as president of Veterinary Parasitology at UAEM. He is a member of the Consejo Nacional de Sanidad Animal (CONASA) Parasitology, Bee diseases and Diagnostic lab Committees, past secretary of the CONASA Parasitology Committee, and member of the Food and Agriculture Organization’s World Expert Group in Parasite Resistance, the Veterinary Epidemiology Association, the Mexican Veterinary Parasitology Association and the World Association for the Advance of Veterinary Parasitology. He also serves as the Coordinator of the U.S.-Mexico Binational Tick Committee.
José Lopez  
**International Project Manager, National Centre for Foreign Animal Disease**

Dr. Lopez holds a veterinary degree from the Faculty of Veterinary Medicine of Mexico’s National Autonomous University (UNAM), as well as MSc and PhD degrees, in veterinary microbiology, from the University of Guelph, Ontario Veterinary College. He has been Professor and Chairman of the Department of Bacteriology, Faculty of Veterinary Medicine, UNAM; Member of the UNAM Senate, Head of Bacteriology, Animal Pathology Laboratory, Agriculture Canada, Sackville, New Brunswick; Head, Microbial Food Safety Laboratory, Centre for Animal and Plant Health, CFIA, Charlottetown, Prince Edward Island; Adjunct Professor, Atlantic Veterinary College, Charlottetown, Prince Edward Island; Head of Bacteriology, and International Project Manager, National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg; and Chair of the Animal Care Committee, Canadian Science Centre for Human and Animal Health, Winnipeg. He currently is the International Project Manager for the National Centre for Foreign Animal Disease in Winnipeg. His research activities have included various aspects of the pathogenic mechanisms of bovine and avian septicemic *E. coli*, *Mycoplasma ovipneumoniae*, *Pasteurella haemolytica*, *Listeria monocytogenes*, *Salmonella enteritidis* and *Burkholderia mallei*, microbial food safety in the swine industry, and technology development in the diagnosis of contagious bovine pleuropneumonia, contagious caprine pleuropneumonia and equine glanders.

Alfonso Clavijo  
**Head of the Vesicular Disease Unit, National Centre for Foreign Animal Disease**

Dr. Clavijo has his DVM degree from Colombia. After moving to Canada, he did his PhD at the Ontario Veterinary College (University of Guelph) in Veterinary Virology. Then he worked for the Canadian Food Inspection Agency (CFIA) in Ottawa as Foreign Animal Disease Diagnostician. He worked there for two year before moving to Winnipeg to the new CFIA National Centre for Foreign Animal Disease Laboratory. In 2000 he accepted a position at the Pan American Foot-and-mouth Disease Centre in Brazil as Advisor in molecular Biology where he worked for nearly two years. Dr. Clavijo came back to Canada and is now the Head of the Vesicular Diseases Unit at the National Centre for Foreign Animal Disease Centre. Dr. Clavijo is adjunct faculty of the Ontario Veterinary College, University of Guelph and member of the technical committee of the North American Foot-and-mouth Disease Vaccine Bank.
Dr. Metwally is the Head of the Diagnostic Services Section of the United States Department of Agriculture (USDA) Foreign Animal Disease Diagnostic Laboratory (FADDL) at the Plum Island Animal Disease Center (PIADC) on Plum Island, New York. She received her DVM in 1983 from the College of Veterinary Medicine, Cairo University, Egypt. Following that, Dr. Metwally took a position as a research scientist at the Food and Animal Research Institute in Cairo where she was involved in the respiratory disease surveillance program in newly born calves. At the same time, she worked as a private practitioner with the poultry industry.

In 1986, Dr. Metwally moved to the U.S. and received a research appointment at the Ohio State University (OSU) Dental School where she participated in several studies on identifying cell types of the gustatory system of the hamster. In 1993, Dr. Metwally obtained her Ph.D from the OSU Veterinary School in the field of virology and immunology. Her dissertation focused on the role of maternal mucosal immunity in protection against rotavirus infection in turkeys. That research was recognized with the Pomery award for student achievement in avian disease research by the American Association of Avian pathologists in 1991. Dr. Metwally did post doctorate training at the Ohio Agriculture Research and Development Center in Wooster, Ohio where she participated in the production of monoclonal antibody to infectious bursal disease virus.

From 1993-2000, she joined the Cornell University duck research laboratory in Eastport, New York as a senior research associate. There her research focus was on duck virus enteritis virus latency and cells involved in virus replication and immunosuppression. She was involved with vaccine production and provided diagnostic services to the duck industry. From 2000-2002, Dr. Metwally was appointed as a veterinary medical officer at the diagnostic services section of FADDL, PIADC with main responsibility to provide diagnostic services on foreign animal disease (FAD).

From 2002 to present, Dr. Metwally has served as the head of the diagnostic services at FADDL, PIADC where she leads the diagnostic activities for FAD’s including FMD, CSF, VSV and other OIE listed diseases, serves as the subject matter expert on FAD’s for the government, and coordinates research on developing and improving diagnostic assays. Other responsibilities include teaching FAD Diagnostician courses and serving on the following USDA committees: Emergency Management Leadership Team, USAHA Committee on Animal Emergency Management, CSF surveillance plan, National veterinary stockpile, VSV working group, FMD surveillance plan, LIMS implementation for NVSL, and animal care and use committee at PIADC. She also lead the effort on obtaining ISO17025 accreditation for vesicular and swine fever diseases and participated in the risk assessment and evaluation for FAD freedom in the following countries: Chile, Brazil, Argentina, Poland, Hungary, Slovakia, Mexico, Cyprus and Namibia.

Dr. Metwally has authored over 40 publications including 3 book chapters, 30 abstracts and 10 research articles, and received 6 recognition awards during her service at FADDL.
MONTSERRAT ARROYO KURIBREÑA
Field Operations Department Chief for the Mexico-United States Commission for the Prevention of Foot and Mouth Disease and other Exotic Diseases of Animals

Dr. Arroyo is the Field Operations Chief for the Mexico-United States Commission for the Prevention of Foot and Mouth Disease and other Exotic Diseases of Animals.

Born in Mexico City in 1978, Dr. Arroyo graduated with honors from the Faculty of Veterinary Medicine and Animal Science, at the Mexico’s National Autonomous University (UNAM) in 2004. She did an internship in virology at the Texas A&M University in 2003. After graduation, she started working in the Export Department of the Animal Health Directorate of the Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA – Mexico’s Department of Agriculture). Later, she was appointed as the Coordinator for Foreign Animal Disease Projects at the Mexico-United States Commission for the Prevention of Foot and Mouth Disease and other Foreign Animal Diseases (CPA), and is currently the Field Operations Department Chief. She has participated in several international and national meetings regarding animal health issues, both endemic and foreign animal diseases.

John Pasick
Head of Classical Swine Fever & Avian Disease Unit, National Centre for Foreign Animal Disease

After obtaining his DVM from the Ontario Veterinary College in 1982, Dr. Pasick spent 2 years in mixed veterinary practice in Southern Ontario. He began graduate studies in the Department of Pathology at McMaster University where he obtained an MSc in 1987. He returned to veterinary practice for an additional 2 years before enrolling in a PhD program in the Department of Microbiology and Immunology at the University of Western Ontario where he was supported by a Multiple Sclerosis Society of Canada post-doctoral fellowship. After completing his PhD in 1993 he joined the Health of Animals Laboratory in Sackville, New Brunswick as a veterinary virologist/immunologist. He moved to the National Centre for Foreign Animal Disease in 1997 where he currently is Head of the Classical Swine Fever and Avian Diseases Unit.
Rick Willer  
Arizona State Veterinarian  
Past President – United States Animal Health Association

Dr. Willer, Arizona State Veterinarian, served as the President of the United States Animal Health Association (USAHA) in 2005. He currently serves as chair of the USAHA Committee on International Standards. In 1978, he received his BS in Veterinary Science followed in 1980 by his DVM degree, both from the Colorado State University, and entered an internship in large animal medicine at the University of California, Davis. Upon completion of the internship, he entered private practice in Arizona, specializing in large animal medicine. Dr. Willer served as the Assistant State Veterinarian and, in 1992, was appointed as State Veterinarian. Current international activities include working closely with the state of Sonora, Mexico, on animal disease programs, participating as a member and treasurer of the U.S./Mexico Binational Tuberculosis and Brucellosis Committee and as a frequent team member on tuberculosis program reviews of states in Mexico, and coordinating state veterinarian participation on United States Department of Agriculture international review teams for regionalization evaluations.

Bob Frost  
Past President – United States Animal Health Association

Mr. Frost, President of the United States Animal Health Association (USAHA) in 2003, is currently co-chair of the USAHA Committee on Diagnostic Laboratory and Veterinary Workforce Development. He received a BS in Wildlife Conservation at the University of California, Berkeley in 1964 and was appointed in 2006 to serve on the United States Department of Agriculture’s National Wildlife Services Advisory Committee (NWSAC). During his college years Bob fashioned an entrepreneurial lifestyle that continues today and his wildlife, agriculture and livestock endeavors brought him into the fold of USAHA in 1989. Bob’s energy during his leadership years in USAHA has been focused on recruiting individuals, government agencies and national allied organizations that will assist and provide leadership to the Association in dealing with animal health challenges. He has championed the modernization of the United States’ federal animal health laboratories, utilized USAHA’s partnerships to assist in establishing the National Animal Health Laboratory Network (NAHLN) and in 2004 initiated collaborative efforts between Canada, Mexico and the United States to form a North American Animal Health Laboratory Network.
Animal Health Laboratory System in Mexico – Executive Summary

The Animal Health Diagnostic Laboratory System in Mexico is comprised of two types of laboratories - the Official Federal laboratories that depend on the Secretariat of Agriculture (SAGARPA) through the Animal Health General Direction (DGSA), and the supporting authorized and/or approved laboratories which are distributed throughout the country and depend on support from cattlemen’s organizations, universities and individuals.

The Official Federal laboratories, located in the center of the country, are administered by the Federal government and they receive funding for operation from SAGARPA. The services offered by these laboratories are diverse and two of them receive payment for their services through their customers. The laboratory of the National Center of Diagnostic Services in Animal Health (CENASA) located in Tecamac, Estado de Mexico, is in charge of the diagnosis of national campaign diseases and testing and certification of biological products for their use in animals.

The laboratory of the National Center of Animal Health Quality Testing (CENAPA) is in charge of the diagnosis of the main parasitic diseases affecting animals with special attention to the National Tick Program. This laboratory tests dewormers and chemicals and pharmaceuticals for veterinary use as well as detects and quantifies toxic residues in animal tissues, honey and eggs.

The Biocontainment Level 3 Laboratory of the Comisión México-Estados Unidos para la Prevención de la Fiebre Aftosa y Otras Enfermedades Exóticas de los Animales (CPA) located in Mexico City carries out the diagnosis of samples for the foreign animal disease monitoring in Mexico.

In the last three years, as a result of the increasing demand of reliable quality diagnostic services, as well as the need to improve the diagnostic capability and modernize the facilities, approximately 200 million pesos have been invested in the remodelling and equipping of these three Federal laboratories. As a result, these laboratories have the most modern equipment that is equivalent to other world class laboratories and their personnel have been trained at laboratories in the United States, Canada, Europe, Australia and within Mexico for the development of tests for certain animal diseases.

Also, these Federal laboratories, are working to integrate quality management systems internationally recognized in order to be able to carry out inter-laboratory testing and technical assessment, and offer traceable results with demonstrated reliability.
In addition to the Federal laboratories, DGSA supports the approved/authorized laboratory system which carries out specific diagnostic activities for the animal diseases in the national sanitary campaigns, and performs toxic residue testing of biological, chemical, pharmaceutical and meat and other food products. The laboratories are located through the country, operate with their own financial resources and are supervised through inspection visits made annually by the DGSA. These laboratories also participate in training programs for the different diseases and inter-laboratory performance challenges.

The animal health laboratory network in Mexico has as its main goal the improvement of the testing capability for endemic diseases as well as for foreign animal disease (FAD) such as Classic Swine Fever, Aujeszky’s disease, Avian Influenza, Newcastle disease, Salmonella, Boophilus Ticks, Tuberculosis, Brucellosis, Foot and Mouth disease. This will result in an improved ability to provide surge capacity during outbreaks of FAD as well in enhancement of surveillance for these diseases.

The animal disease diagnostic laboratory system is coordinated by the DGSA and seeks to apply diagnostic protocols, and proven and standardized reagents, and to facilitate the exchange of personnel in order to enhance technical expertise. Being part of the North American animal health laboratory network in collaboration with the United States and Canada will improve the data exchange for emerging diseases that could disseminate in our countries, harmonize the tests being used, enable the sharing of diagnostic reagents and provide organization for inter-laboratory testing in order to improve the diagnostic system in all three countries.
The Canadian Animal Health Surveillance Network

The Canadian Animal Health Surveillance Network (CAHSN) program, led by Dr. Paul Kitching, Canadian Food Inspection Agency’s Director of the National Centre for Foreign Animal Disease, will establish over a three year period a network of federal, provincial and university animal health diagnostic laboratories to improve the capacity to detect in real time emerging animal disease threats, particularly those that could have zoonotic potential, and provide a rapid response to minimize the human health and economic consequences to the country. This network directly linked to the Canadian Public Health Laboratory Network (CPHLN) will combine surveillance data received from many sources across Canada and will simultaneously alert both the human and animal health authorities. Using the software developed for the CPHLN to link the public health laboratories across Canada into a surveillance network, the CAHSN laboratories will collaborate with the Canadian Network for Public Health Intelligence (CNPHI) to establish the rapid communication and identification of emerging animal disease problems.

The CAHSN will increase the surge capacity of federal and provincial laboratories to rapidly diagnose serious and infectious animal diseases, and with the provincial and university laboratories having the diagnostic capabilities for foreign animal disease enhances the response to an outbreak. It will establish interoperability between laboratories by using common protocols and reagents, and providing a framework within which technical and scientific staff may be easily exchanged to participate and to share expertise.

The CAHSN will bolster Canada’s domestic early warning surveillance capacity for detecting new and emerging diseases of animals that could affect animal health, the food supply or public health. It will bring together animal disease surveillance information from many disparate sources – veterinary practitioners, veterinary diagnostic laboratories and animal health agencies – so that baselines can be established and trends can be identified. By amalgamating information gathered from surveys, syndromic surveillance and rumour reports from the field, we can track the on-going animal health status of the country. The identification of aberrant trends will prompt further investigation and assessment of the situation. Since early detection is the key to early control of any disease outbreak, the CAHSN will be an important component of Canada’s defence against serious threats to animal health.

The key major outputs of the Canadian Animal Health Surveillance Network will be:

- A national early warning system for animal disease threats to the food supply, food safety or public health; and
- A federal-provincial laboratory network for the rapid diagnosis of serious infectious animal diseases
- An information-sharing network linking federal and provincial agencies and departments of animal and human health
NAHLN was established by USDA’s Homeland Security Office as part of a national strategy to coordinate and network the diagnostic testing capacities of the Federal veterinary diagnostic laboratory with the extensive infrastructure (facilities, professional expertise, and support) of State and university veterinary diagnostic laboratories. This network is enhancing the Nation’s early detection of, response to, and recovery from animal health emergencies, including bioterrorist events, newly emerging diseases, and foreign animal disease agents that threaten the Nation’s food supply and public health.

Laboratory Membership
In fiscal year 2002, 12 State and university veterinary diagnostic laboratories were selected by the Cooperative State Research Education and Extension Service and APHIS to enter into cooperative agreements funded by Homeland Security appropriations to formally initiate the network. APHIS has since established contracts with several State and university diagnostic laboratories to assist with testing and surveillance. These contracts incorporate 54 State/university laboratories, the Department of the Interior laboratory (DOI) in Madison, Wisconsin, the Food Safety and Inspection Services laboratory in Athens, Georgia, and the National Veterinary Services Laboratories (NVSL- Ames, IA and Plum Island, NY campuses) for a total of 58 labs in 45 States. The NAHLN member laboratories are trained and proficiency tested by USDA, APHIS, VS, NVSL on an annual or semi-annual basis. These laboratories are tested on standardized screening methods for the currently targeted diseases in the NAHLN (avian influenza (AI), exotic Newcastle disease (END), foot and mouth disease (FMD), classical swine fever (CSF), bovine spongiform encephalopathy (BSE), chronic wasting disease (CWD), and scrapie). NAHLN laboratories are currently participating in USDA surveillance efforts by performing screening assays and forwarding any suspect or positive samples to the appropriate section of the NVSL (the national reference laboratory), for confirmatory testing.

Current Activities

- A “Train the Trainer” program has been developed and implemented for FMD, CSF, AI, and END rapid assays. This program has increased the number of State/university laboratories approved to conduct the CSF and FMD assays from 14 to 31. The program was recently implemented for AI and END and has been used to increase the number approved to conduct AI and END testing from 44 to 50 State/university laboratories and DOI. Not only has the program increased the number of laboratory personnel prepared to respond to a national animal health emergency, but it has also provided the United States with a cadre of trainers available to teach others when needed. Successful implementation of this program is a significant step for the network and its mission of ensuring sufficient diagnostic capability and capacity to address an animal health emergency.

- Enhanced AI surveillance efforts for USDA, APHIS, Veterinary Services (VS) and USDA, APHIS, Wildlife Services (WS) are being conducted in NAHLN approved State/university and DOI laboratories. These labs will determine if evidence of AI virus is present and whether it is an H5 or...
H7 subtype. Because of the potential for H5 or H7 subtypes to mutate into highly pathogenic strains, those samples are forwarded to USDA, NVSL for confirmatory testing. NVSL then conducts additional screening tests and confirmatory tests with research assistance from USDA’s Southeast Poultry Research Laboratory as needed to confirm genetic identification of isolated strains of the virus. The NVSL Diagnostic Virology Laboratory in Ames is the only internationally recognized AI reference laboratory in the United States.

- NAHLN and AI Supplemental funds are being used to increase the overall diagnostic testing capability of member laboratories by supporting the development and distribution of high throughput equipment. This technology allows semi-automated processing of diagnostic samples and test methods to enhance the daily testing output of each laboratory. Currently, work is being performed to validate NAHLN methods using this type of technology.

- A surveillance plan for CSF was developed and phase one was implemented in January 2006 in states with a high risk for introduction of CSF, including Puerto Rico. Twelve State/university NAHLN laboratories have been testing samples and 18 other State/university NAHLN laboratories have assisted with sample collection and processing. The number of laboratories participating in surveillance testing is currently being increased to 18 in 2007; an additional 14 laboratories will assist with sample collection and processing. Confirmatory testing is performed at the NVSL’s Foreign Animal Disease Diagnostic Laboratory at Plum Island, NY.

- USDA and DHS are working on a Diagnostic Roadmap to evaluate and prioritize gaps in available diagnostic technology for U.S. Agriculture and propose mechanisms to address and ultimately close them. A high-level strategic roadmap, applicable across a range of FAD threats was developed, in addition to roadmaps specific for several high-consequence FADs.

- Since June 2004, seven State/university NAHLN laboratories have participated in enhanced BSE surveillance testing. As of June 30, 2006, they have completed in excess of 797,000 tests. Confirmatory testing is performed at the NVSL’s Pathobiology Laboratory in Ames, IA. Surveillance for chronic wasting disease and scrapie is also occurring in 26 State/university NAHLN labs.

- International efforts:
  - USDA-APHIS is collaborating with the Canadian Food Inspection Agency (CFIA) laboratory at the Winnipeg National Centre for Foreign Animal Disease, (NCFAD) to produce, distribute, and use proficiency panels and reference materials in order to harmonize the diagnosis of major animal diseases between United States and Canada.
  - USDA-APHIS has developed international training programs for AI. Training includes epidemiology and diagnostics, and has been provided to laboratory personnel from 60 countries. Similar training programs have been developed and implemented in 7 countries for FMD and brucellosis.

- A critical aspect of the National Animal Health Laboratory Network (NAHLN) is the effort to standardize data, improve data quality, and maximize the efficiency of data transfer via the IT infrastructure and data repository. The NAHLN IT system is being integrated with numerous existing animal health and veterinary diagnostic data networks to allow seamless electronic transfer of information from the time diagnostic samples are collected in the field, to the addition of appropriate diagnostic test information from the NAHLN veterinary diagnostic laboratories, and finally to the daily reporting of relevant information from each submission to the NAHLN repository database. The IT system is used to enhance surveillance programs and recognize emerging issues and is designed to provide automated alerts on defined animal health events to authorized personnel who support disease prevention and response. The system allows NAHLN labs to securely transmit and store data using nationally recognized health information standards that improve data quality and data re-use in systems such as the Department of Homeland Security’s National Biosurveillance Integration System (NBIS). The NAHLN IT system has been piloted in five laboratories and is
NAHLN Methods Technical Working Group was established in July 2006 and consists of personnel from NAHLN laboratories, the National Veterinary Services Laboratories, DOI, and FSIS. The working group will provide input on various aspects of methods validation and approval of methods including the following:

- Review of available methods and associated gaps
- Identification of potential new technologies
- Validation criteria
- Dossier review
- Assay approval process
- Equivalency of modified methods or for adaptation to new platforms
- Continual performance assessment of assays
- Development of performance characteristic summary documents for NAHLN assays
- Issues associated with transfer of existing and new technologies to laboratories

NAHLN is a participating member of the Integrated Consortium of Laboratory Networks (ICLN) which is a multi-department and multi-agency effort led by DHS. The ICLN includes representation of public, animal, and plant health response networks (LRN, ELRN, FERN, NPDN, and NAHLN). This group is working towards identifying gaps in surveillance and diagnostic efforts of national importance and mechanisms for collaboration and sharing of information and resources between networks.
NAHLN Laboratory Designations

There are many levels of laboratory participation within the National Animal Health Laboratory Network (NAHLN). The term “core laboratories” was used to designate the original 12 laboratories that participated in the NAHLN. As participation in the network has expanded since 2002, a system to define laboratory designations was needed to reduce confusion among stakeholders. The laboratory designation system was created to reflect different levels of infrastructure support for emergency response preparation as well as funding for surveillance testing. Each level of laboratory participation is vital to the function and capacity of the NAHLN for early disease detection, surveillance, and surge-and-recovery testing in response to disease outbreaks. Additional infrastructure support is necessary to expand the number of participating laboratories. The goal is comprehensive coverage of the U.S. livestock industry. Four designations are used to describe participation in the NAHLN: Core Member Laboratories and Member Laboratories (receive infrastructure support), Contract Member Laboratories, and Adjunct Member Laboratories. The first three categories all participate in active surveillance (fee-for-testing) programs. Laboratories in all four categories have successfully completed the NAHLN approval checklist and quality-assurance requirements, and each laboratory has personnel trained and proficiency-tested to conduct the approved NAHLN diagnostic assays.

- **A Core Member Laboratory** receives significant infrastructure support and also conducts fee-for-service testing for the United States Department of Agriculture (USDA). This group of laboratories currently includes the original 12 laboratories. Their funding level enables them to be fully committed to the NAHLN mission and able to respond to domestic or foreign animal disease emergencies on a 24/7 basis.

- **A Member Laboratory** receives limited annual infrastructure support from USDA for specific purposes such as establishing IT connections or developing capacity for data-reporting. These laboratories also conduct fee-for-service testing. 16 laboratories currently in this group could move to the Core Member category as USDA funds become available to provide the significant annual infrastructure support needed to reach the Core Member category.

- **A Contract Member Laboratory** performs ONLY fee-for-service testing for control of specific animal diseases. These laboratories can move into either the Member or Core Member category as USDA funding levels enable infrastructure support.

- **An Adjunct Member Laboratory** is considered a member of the NAHLN because of its implementation of NAHLN protocols, but its primary mission is not domestic animal disease diagnostic work within the United States.

![NAHLN Laboratory Designations](image_url)
Foot-and-mouth disease (FMD) is a contagious and virulent disease of cloven-hoofed livestock. It is feared by livestock owners and governments alike for its potentially devastating effect on animals, individual livelihoods and regional economies.

The U.S. experienced nine FMD outbreaks prior to 1946: 1870, 1880, 1884, 1902, 1908, 1914, twice in 1924 and once in 1929. The worst of these was the 1914 outbreak where 22 states and the District of Columbia were affected (Keeping Livestock Healthy, Yearbook of Agriculture 1942, p. 271). This outbreak also severely affected the Union Stockyards of Chicago. The others were of short duration and limited to small geographic areas.

Map reprinted from A Study of the Potential Economic Impact of Foot-and-Mouth Disease in the United States by McCauley, et.al. TB 1597; Univ. of Minnesota; p. 74
The Mexican Saga

Mexico suffered one short outbreak of FMD in 1925 in the area of Tabasco which was eradicated. In October 1946 Mexico allowed importation of some Zebu bulls from Brazil. Despite these animals being quarantined, FMD type A soon struck Mexico in the eastern coastal state of Veracruz, the area where the imported bulls had unloaded. It took authorities one month to determine that the disease was indeed FMD; initially it was thought to be vesicular stomatitis. Mexico called for U.S. veterinarians to confirm the FMD diagnosis which was done and the border between the two countries was officially closed to Mexican livestock on Dec. 26, 1946. Within one month, 4 Mexican states and the Federal District were infected as the disease spread westward.

It took four months to establish an agreement between the U.S. and Mexico to deal with the outbreak by establishing a National Joint Commission. By this time the disease had spread further to include 16 states. It was agreed that the U.S. would provide indemnification funds for destroyed cattle and Mexico would pay for all other livestock; Mexico also supplied laborers and soldiers. The U.S. provided most of the technicians and equipment. Veterinarians of the two countries worked together as teams and the Joint Commission was co-directed by Oscar Flores, Sub-secretary of Husbandry for Mexico and initially for the U.S. by Dr. Maurice Shahan of the Bureau of Animal Industry (BAI -within USDA). The U.S. leadership changed several times; General Harry H. Johnson took over from 1948 - May 1951 when he was replaced by Dr. Leroy Noyes for the duration. Between 1946 and 1954, over 1,500 U.S veterinarians and scientists helped Mexico eliminate foot-and-mouth disease. (1984 Yearbook of Agriculture, p.185)

The initial plan was to pursue an aggressive inspection/slaughter/disinfection/quarantine routine (“stamping out”) as had been used successfully in previous U.S. outbreaks. However the extremes of Mexican topography (jungle to mountainous areas), lack of roads and the language barrier were significant obstacles to timely execution of the plan. Parts of central Mexico had not even been mapped. Many of the Indians did not speak Spanish or English and few U.S. personnel spoke anything other than English. This slowed progress considerably as at least one community leader from each village had to be convinced to allow inspection of animals and then slaughter if needed. The type A strain found in Mexico was not generally fatal to the livestock and residents believed that their animals would recover if left alone. The campesinos were personally attached to their livestock, treating them as members of the family and the people were hugely dependent on their small numbers of cattle for milk as one of the few sources of protein for their children. Oxen were relied upon as work and transportation animals and were vital to the survival of the family. Although the Commission replaced many destroyed oxen with mules, the campesinos were not accustomed to working with mules whose temperament, pace and care requirements differed from those of their familiar oxen. Mules also had a difficult time adapting to the lowland climate. The campesinos argued with Commission inspectors over indemnity payments and sometimes hid most of their animals, turning over just a few for slaughter. Resistance to the program grew, especially in the mountainous areas where any other forms of agriculture were extremely difficult, so the dependency on livestock was crucial for the people. Physical violence first occurred on Sept. 1, 1947 with the killing of several Mexican army men and one Mexican veterinarian.
A Change in Tactics

With more violence being carried out, the Commission pulled back from the mountainous areas and drafted a revised eradication plan, using vaccination instead of slaughter in the infected zone. This required setting up laboratories in Mexico that could manufacture the proper vaccine. Until local vaccine labs were in production, 1,644,619 doses of vaccine were purchased from Argentina, Switzerland, the Netherlands and Denmark. Foreign vaccines were of limited help and in some cases caused small outbreaks, but bought time for the Mexican labs to perfect a vaccine for the specific type A strain being fought. Once the Mexican labs were running, they produced 54,958,619 doses for the vaccination phase of the program (which ended July 31, 1950). The largest number of animals vaccinated in one month was January 1950 with 5,052,811 doses administered. [USLSA Proc. 54th Annual Meeting 1950; p. 45]

This middle phase of the campaign was overseen by Gen. Harry Johnson who continued portions of the initial eradication plan, working from the outer “buffer zone” area that had limited outbreaks (stamping out continued there), inward toward the most heavily infected areas. He divided central Mexico into 8 districts and apportioned staff and materiel to each area based on need. The outer edges of the buffer zone were fenced with barbed wire and were patrolled. The closest that FMD came to the U.S. was 330 miles south of Brownsville, TX.

The entire disease eradication process involved educating the campesinos about all aspects of the disease, encouraging them to report new cases and to allow their animals to be inspected and vaccinated on a regular basis. The goal of the vaccination drive was to keep all livestock in central Mexico clear of FMD for a period of 12 months, which was the longest time the virus was known to survive outside the body of an animal. Vaccination was followed by a strict 30-day inspection routine of all animals, checking for any signs of the disease. Local vigilante
committees were set up among the campesinos within the districts to monitor for outbreaks and alert inspectors immediately if needed. Susceptible livestock were vaccinated and monitored every 4 months (the length of the vaccine induced immunity) for one year. By 1951, with only two more cases reported, the situation was looking favorable for a possible lifting of the embargo on Mexican beef sometime in late 1952.

**Convincing Congress**

While the fight against FMD was being waged on the ground in Mexico, another battle was fought in Washington, DC to gain more funding for FMD eradication efforts and to establish a U.S. animal disease research laboratory. Many Congressional hearings were held on the FMD issue over the sessions of 1947-1952. From the outset, representatives from most livestock associations, several state legislatures and many private citizens lobbied both houses of Congress for continued Commission funding to prevent the disease from entering the U.S. In Feb. 1947, the American National Livestock Assoc. passed several resolutions that were forwarded to Congress. One called for the patrol of the U.S.-Mexican border “as though it were a prison camp”. [American Cattle Producer, v.28, #9, Feb. 1947 p. 7] A letter from Tom Lasater, Lasater Ranch, Falfurrias, TX to Rep. George Gillie dated January 30, 1948 said in part: “In closing let me state that intensive research seems to be our only means of salvation and that the rapidity with which this research is instituted may greatly lessen the tremendous financial loss which is facing our entire economy and may obviate the loss of certain irreplaceable blood lines among our livestock which blood lines have taken generations of human effort to develop.” [Hearings of the House of Representatives, Eradication of Foot-and-Mouth Disease Subcommittee of the Committee on Agriculture; Feb. 3, 1948; pp.119-120]

When it became obvious that the slaughter campaign was not going to succeed alone, Congress was asked to allow foreign animal disease research to be conducted within the U.S. A new law had to be passed allowing U.S. scientists to work with the FMD virus inside the country. By 1948, public law 496 was passed authorizing the Secretary of Agriculture “...to establish research laboratories, including the acquisition of necessary land, buildings, or facilities and also the making of research contracts under the Bankhead-Jones Act of 1935...for research and study, in the United States or elsewhere, of foot-and-mouth disease and other animal diseases which in the opinion of the Secretary constitute a threat to the livestock industry of the U.S....” [Public Law 496, U.S. Code April 24, 1948; pp.198-99]. However the laboratory could not work with live virus on the mainland, but it could be brought to a coastal island, surrounded by waters suitable for deep-water navigation and not connected to the mainland via a tunnel. This stipulation was a result of a concerted effort on behalf of livestock associations to keep the virus itself out of the U.S. proper. While all of those groups said that research was essential and very overdue, none wanted to risk the accidental escape of live virus from a research facility. Many people still vividly remembered the outbreaks of 1924 and 1929 when the economy of the state of California for example, was greatly impacted by embargoes on all agricultural products, not just animals and meats (fruits, nuts and other produce from California were also banned by some states).

Many appropriations bills were passed to continue funding the work of the Joint Commission in Mexico but while Public Law 496 was passed, no appropriation was made to actually fund the establishment of a U.S. research laboratory. Nevertheless, the USDA continued work on design plans for a facility and looked for an appropriate site. As possible locations would be named, local residents would object, saying the facility would pose a public health threat despite all
assurances of the USDA to the contrary. An article in Science News Letter voiced indignation over the failure on the part of Congress to move faster on establishing a laboratory. The article stated: “Congress, beset by the faint-hearted, refused money to set up a laboratory off the Rhode Island coast for the study of aftosa (FMD) after previously authorizing the project.” [October 7, 1950 p. 229] The article noted that the U.S. government had spent $119 million to date on the fight against FMD in Mexico whereas only a $500,000 appropriation was passed to select a lab site, secure options on the land and prepare design plans. It was estimated that a lab could cost $25 million. According to a short item in the journal Veterinary Medicine: “There is at present no effort being made by the USDA to revive the issue of establishing a laboratory for investigations on foot-and-mouth disease. Congress has, in effect, three times failed to appropriate money for the project.” [v.47, #1, January 1952, p. 5]

And then, Canada

The announcement of the discovery of FMD type A on a dairy outside Regina, Saskatchewan on February 25, 1952 was a shock to Canadian and U.S. livestock producers and animal health officials. Canada had only suffered 3 previous outbreaks (1870, 1875 and 1884), all from imported cattle and sheep and those cases had been quickly stamped out.

Official diagnosis of FMD was not made immediately since first field diagnostics were inconclusive. One of the initial farmers affected called in his neighbors for their opinion about the condition seen in his cattle; consequently those men carried the disease back to their own farms – this was in late November 1951. 26 premises were found to be infected by Feb. 25, 1952; a further 32 were placed under quarantine, 6 were considered contact premises. It was the middle of winter in Saskatchewan and the process of digging burial trenches was made very difficult by 5 ½ feet of frozen earth. Within 17 days, animals on the infected premises were slaughtered out by the Royal Canadian Mounted Police and crews began checking each animal in the surrounding district. After 5 weeks another infected farm was found and a trace-back indicated a packing plant in Regina had also been infected. All exports of hides, frozen pork and casings from that plant were quickly located in the U.S. by the BAI and destroyed. The Bureau of Animal Industry also tripled the number of inspectors along the Canadian border with Montana and N. Dakota.

A second round of infection came about in spring as an infected quarter of beef was thawed and cooked by the farmer but bones were tossed out for the dogs, which carried the bones to the stables and hogs ate them. The infected hogs quickly spread the disease to the other livestock on the property.

In total, 42 premises were involved in the Canadian outbreak. The exact cause of the outbreak has never been determined, but a suspected German worker who had been on an FMD infected farm in Germany just prior to emigrating to Canada was cleared by the government after a careful search and testing of his belongings. Canada never needed any financial assistance from the U.S. to eradicate FMD, but the U.S. – Canadian border was promptly closed to ruminants, swine and fresh meat. The Canadians lifted their internal embargo on August 19, 1952; the U.S. border embargo was lifted on March 1, 1953. Canada has not had any further outbreaks of FMD.
The Final Straw

The Canadian outbreak, at one point within 60 miles of the U.S. border, was used by the farm press and U.S. producer associations to finally pressure Congress into action on a foreign animal disease laboratory.

The journal Veterinary Medicine (April 1952, p. 158) stated: “…efforts to establish research facilities available in or adjacent to the United States mainland have been blocked for political reasons.” Science News Letter (May 3, 1952; p. 281) wrote: “Discovery of 22 virus-infected cattle so near the U.S. emphasizes the constant danger to which this country is exposed from the plague, yet no research work is being done here to fight the disease.”

Perhaps the most influential and strongly worded articles appeared in the Farm Journal, April 1952. The editors called on subscribers – estimated at 2,850,000* to lobby Congress and demand a research facility. [*figure from Farm Journal masthead, May 1952] A background article on the Canadian situation by Claude Gifford stated: “…Regina, Saskatchewan, could just as easily have been Tyler, Texas; Medford, Oregon; or Columbus, Ohio. It could have been your own town.” (C. Gifford: “I Saw the Cattle Shot”; Farm Jnl., April 1952; p. 177)

The main article, entitled “Let’s Get That Foot-and-Mouth Lab!” summarized the Mexican and Canadian outbreaks very effectively: “We’ve got the Threat; We’ve got the Law (we’ve had it since 1948); We’ve got the Plan (it was ready four years ago)….Then why haven’t we got the laboratory?”

And:

“Farm Journal asks you to write your Senators and Congressmen – right now – urging immediate action. Get your farm organizations to adopt a resolution and send that, too. Do it this week! Let’s get a foot-and-mouth laboratory NOW.” (Farm Jnl.; April 1952; pp. 32, 33, 180)
The May 1952 issue of Farm Journal stated: “Your letters are pouring into Washington, D.C. and stirring things up. Some Congressmen haven’t appreciated the danger until now.” (Farm Jnl.; May 1952 p. 31)

This call to arms resulted in Congressional action within months of the Canadian outbreak. Two House bills and one Senate appropriations bill were introduced to fund a research laboratory. On June 30, 1952, Public Law 431 was passed, authorizing $10 million to the BAI for “…the establishment of a laboratory and related facilities for investigation of foot-and-mouth and other animal diseases…at a location to be selected by the Secretary of Agriculture after full hearings of which reasonable public notice shall be given to those who may reside within twenty-five miles from the island selected.” Further legislative intent indicated the island needed to be under federal control that eliminated one site from consideration and left Plum Island as the proposed site, recommended by Agriculture Sec. Brannan on July 29, 1952. A total of four public hearings were conducted, finding only 1% of the population living within 25 miles of Plum Island opposed to a lab at that site. Since some structures were already in place on the island, researchers were working in Building 257 by 1954 – eight years after the Mexican outbreak began.

1951 saw the establishment of the Pan-American Foot-and-Mouth Disease Center (PANAFTOSA) in Brazil that was later transferred to the Pan-American Health Organization. Significant work has been done by the Center, encouraging each South American country to collaborate on reporting and analysis of vesicular diseases. However continued governmental support and vigilance by South American countries are vital to the success of the center’s work. Eduardo Correa de Melo, PANAFTOSA's director, stated that "every country is at risk of the introduction of foot-and-mouth disease as long as it is endemic in other countries where programs have not had the expected results. No country—no matter how isolated—can afford to let down its guard." [From the PAHO web site: http://www.paho.org/English/DD/PIN/Number18_article4.htm Accessed 1/14/07]

In Summary

It has now been 52 years since the end of the last outbreak of FMD in North America. Mexico suffered one further outbreak in April 1954, in Veracruz, so Mexico was not officially declared free of FMD until January 5, 1955. It has remained free of FMD since that time. However the concerns of R.E. Duckworth, Assistant Director of the California Department of Agriculture in 1952, still resonate. In his report to California State Senator George J. Hatfield dated August 7, 1952, Duckworth states:

“Those of us who have gone through an outbreak or two are pretty well prepared to move into action when the disease makes its appearance. But what is likely to happen if the disease does not appear until older experienced men are gone or out of service and younger inexperienced men are at the helm?”

And:

“How much faster, cheaper and safer would those outbreaks be put down if we were well enough prepared to avoid, even in a limited measure, the usual mistakes in diagnosis and decision when
the disease is first encountered.” [ Special Report of the Joint Legislative Committee on Agriculture and Livestock Problems on: Part 2: Foot-and-Mouth Disease in Canada; 1952; p. 41]

The U.S. Livestock Sanitary Association, Foot-and-Mouth Disease Committee meeting in 1952 commented on the establishment of Plum Island as a research laboratory site with: “Your Committee regards this project as one of the most progressive developments of our time.” [Proc. 56th Annual Meeting of the USLSA, 1952; p. 173]

Suggested Resources:

Canadian Food Inspection Agency has an informational page with further links on FMD:
http://www.inspection.gc.ca/english/anima/heasan/disemala/fmdfie/inf_e.shtml

Krystynak, R.H.E. et al; “The Potential Economic Impact of an Outbreak of Foot-and-Mouth Disease in Canada”; Canadian Veterinary Jnl., v.28, #8, August 1987; pp. 523-27


Panaftosa web site search feature has links to its database and informational documents on FMD:

The Rand Corporation (www.rand.org) has written several reports on agro- and bio-terrorism which include discussions of FMD:
(Last accessed 1/14/07)
Others are accessible via the Rand publications search page:
http://www.rand.org/publications/pubs_search.html

USDA/APHIS “Foot-and-Mouth Disease: A Threat to US Livestock” c. 2001. 2-page brochure with color photos of FMD symptoms:
(Last accessed 1/21/2007)

The U.S. Government Accountability Office (GAO) documents are searchable on the GAO web site: http://www.gao.gov/
Several reports have been issued on FMD including:
“FMD: to protect US livestock, USDA must remain vigilant and resolve outstanding issues”; Report to the Hon. Tom Daschle, U.S. Senate
GAO 02-808, July 2002
(Last accessed 1/14/07)

Acknowledgement:
Thank you to Dr. Jan Huber, now retired from USDA, for reviewing this article.
If the obstacles ahead seem insurmountable, we need to recall the experience of the past, or we may have to re-live it, as a scholar told us years ago.

Forty seven years ago, in 1947, when this organization was called the United States Livestock Sanitary Association [USLSA], it sent a committee of four state veterinarians to Mexico when Foot and Mouth Disease was introduced into that country and quickly spread to 16 states. The members of that committee were Will J. Miller of Kansas, who was then president of USLSA and who served as chairman of the committee; H. F. Wilkins of Montana; Ivan G. Howe of New York, and C.E. Kord of Tennessee. Imagine the concern of the livestock industry in the U.S. at that time - no reliable vaccine was available anywhere in the world. The only solution was the slaughter of all infected and exposed herds. Quotes from the report submitted to USDA and the appropriations committees of the U.S. Congress seem appropriate tonight when USAHA is commemorating the successful eradication of Foot and Mouth Disease in Mexico, which occurred 40 years ago this December.

When the committee arrived in Mexico City the members saw a build-up of equipment similar to the Gulf War or Haiti in miniature. The report states:

“We were informed that over 1,400 pieces of automotive and heavy equipment are engaged in the campaign, with additional items arriving daily for field assignment. A random sampling of the major equipment items received from the U.S. and now in active field use, included 180 jeeps, 100 light trucks, 71 bulldozers, 59 scrapers, 10 power shovels, 35 heavy trucks, 122 trailers, 268 power sprays and 25 paymaster cars.” Later, LCVP boats used to land our military on beaches in World War II were sent to move heavy equipment to the tropical areas where transportation was mainly by boat. The committee toured the entire infected area by automobile, jeep, airplane and boat. They traveled throughout the 16 infected states of the 28 in Mexico and along the U.S.- Mexican border. They described the travel "over unusually high, rugged mountain sections in which nothing but foot paths or burro paths or burro trails could be seen; large, open, intensely cultivated valleys and apparently almost impenetrable tropical areas along the coasts where rivers slowly and tortuously course their way through jungle to the sea. In these coastal areas most travel and movement of supplies is by boat or on foot. Rugged mountains, up to at least 10,000 feet high, are inhabited and cultivated in spots to the very top. It must be remembered that such areas contain a large number of susceptible animals which can only be satisfactorily located and brought out by native inhabitants when needed to be sacrificed or inspected."

“In other words, the infected area is almost as open as when discovered by the Spaniards and certainly much more densely populated. Every plot of tillable ground in this southern section of Mexico is cultivated and much of it by hand as the steep mountain sides rise at an angle up to approximately 45 degrees, where neither oxen nor mules can be used. In the open valleys, oxen, mules and tractors are employed. Most of the people live in communal villages from which the cattle sheep and goats move out to graze during the day and are brought in at night, when distribution is made to the numerous owners. While grazing, the herds from adjoining villages
are frequently mixed, so the herders may visit, or if the herds are not mixed, the herders do congregate; hence when infection is present in one of the village herds, it is soon found in the surrounding ones."

"The people, most of whom in these poorer, rural areas are Indian, move about by foot or on burro and can be seen at all times of the day and night going to market and elsewhere or returning home. At the present time, infection is not known to exist in these hostile areas, but without much better control of the human and livestock factors, it is reasonable to presume that all territory within the north and south lines will become infected, except perhaps for some marginal or isolated area."

"The topography of the country involved varies from high, steep, rugged mountains, barren, rocky, arid regions to fertile valleys intensively tilled and heavily populated, and to wet, tropical, malaria-infected, mosquito-infested jungles and everglades. In the swampy coastal area transportation is, of necessity, by boat and on foot."

"Although the spread of the disease has been slow, it has been relentless. Energetic eradication work has kept this spread to a minimum, but it has not been able to stop it without the same energetic handling of the quarantine operations.

The committee observed:
1. The continued effort has contributed to the better understanding of the quarantine restrictions on the part of some of the military officers and soldier personnel.
2. Commission people are being placed with the military personnel at the most important places.
3. The new line approaches the natural dividing line between the communities toward the north of Mexico and those which depend upon Mexico City, and the other areas of central Mexico.
4. The character of the terrain in many places is such that it acts as a natural barrier to the spread of the disease.
5. These quarantine lines are approaching the areas where the local inhabitants are cognizant of the unbearable cost and loss associated with attempting to live with Foot and Mouth Disease and are, therefore, naturally actively desirous that the disease be kept from their territory. This has been evidence in some cases through the local decision of the people to employ guards to augment the quarantine force of the Army. This point is probably the most important."

"It is obvious that the success of the campaign will depend a great deal upon the unselfish and wholehearted cooperation of the people, as well as that of the Mexican government and the Mexican and American forces assigned to the task of eradicating this most devastating animal plague."

The committee also listed some of the obstacles, including:
1. Continued disagreements over appraisals. Each such disagreement stops slaughter operations, with an attendant waste of man hours, until a solution can be found.
2. The lack of transport for Mexican Army troops. Work cannot go on without the presence of these troops to keep order and the lack of transport has often delayed the work until the troops arrived.
3. Resistance of the people to the work of the Commission, in many ways necessitating delays in the work until the resistance can be dissolved through the use of educational aids, persuasion or military force.
"The present extent of the disease is such that the control and eradication effort will have to be continued for some considerable time and the results will most assuredly cause a tremendous impact upon the economy of central Mexico. A realization of this is probably responsible for some of the opposition to the campaign, particularly on the part of political leaders in some of the infected areas. The government is making every effort to counteract this effect through the formation of educational committees throughout the infected areas and the establishment of an over-all committee for rehabilitation of the areas that have been deprived of their livestock. These efforts have had considerable effect, but the impact of the disease and the program of eradication are so tremendous that it cannot be said whether the efforts of the government are sufficient to accomplish the desired ends."

"One outstanding feature that we observed was the high morale of the Commission forces. Taking into consideration the many difficulties and discouraging aspects that have presented themselves, this high morale very forcibly demonstrates the sincerity of purpose and ability of the campaign personnel. To attempt eradication of Foot and Mouth Disease from such a large infected area and in a foreign country requires courage, foresight and hope - a hope that every interested individual and department will give that cooperation and immediate favorable response so indispensable to immediate control and ultimate eradication.” The underlines were not in the original report. I have added them for emphasis.

"Action, speedy and positive, is the essence of success and it is not readily obtained in a country not geared to that way of doing and to a people who do not fear or realize the far-reaching effects of the disease or fully understand the cost of delays, even of hours. The effort to hold the north and south lines - to operate from without inwardly - to attempt eradication from within, concurrently in the hope of saving thousands of animals – is commendable. This, however, has not been attainable with all of the deterring factors enumerated, including adverse and conflicting propaganda and sabotage.”

"In view of the almost impossible terrain and the many obstacles that present themselves, your committee considers that the problem of eradication of Foot and Mouth Disease in Mexico is one of the most difficult ever presented to the veterinary profession.”

The final recommendations of the committee were:

1. “The establishment and maintenance of a research laboratory on an isolated island or other acceptable safe area for the intensive study of Foot and Mouth Disease.” As a result we have had the benefits of the Plum Island Research Laboratory, built in the 1950's.

2. “Further research to determine methods for the immediate and proper disposal of carcasses by chemicals or means other than burial.”

3. “The building of an adequate fence along the U.S.-Mexico international boundary line or adjacent to, as previously suggested by others.”

The disease was having a devastating effect on the economy, due to controls on movement of livestock, and the closing of the U.S. border, and to livestock production and marketing in northern Mexico, not to mention the political unrest due to eradication procedures. In spite of these conditions, the joint program continued, but the method of eradication changed from killing all infected and exposed animals to vaccinating 17 million animals between the north and south quarantine lines.
The theory was to keep the entire population immune during a 12-month period (the longest time the virus was known to live outside of an infected animal's body). The next step was to establish an inspection system that would find and eliminate any of those vaccinated animals that showed evidence of the disease.

So we established what I call the "first Peace Corps." The infected area was divided into sectors, the size being determined by the time it took a U.S. inspector and his Mexican counterpart, traveling together, to inspect all susceptible animals every 30 days. Vigilante committees were set up to contact the inspectors if any animals got sick between their monthly visits. The inspectors were allowed out of their sectors one weekend a month for rehabilitation purposes.

I say they were the original Peace Corps because in most cases they were the only persons who could read or write in their sector. They spent money for lodging, food, horse and mule hire within their sector. If any animals came down with the disease and had to be killed, the owner was paid on the spot. Needless to say they became great friends with the inhabitants of their sector.

Initially we ran into trouble with vaccines imported from South America, due to outbreaks associated with their use. Importation of vaccines from Europe turned out to be too much of a hassle for the amount that was needed. So the Mexican and U.S. researchers on the Commission built a production laboratory and turned out a very effective vaccine against the strain we were combating. As with the few effective vaccines available at the time, the length of immunity was only 4 months, so the entire population had to be revaccinated at 4-month intervals.

The inspectors lined up the animals for the vaccination brigades in the villages within their sectors. Here again, local people were hired to help with the work involved. Those inspectors found approximately 12,000 infected animals among the 17 million that were vaccinated.

Many of us learned to speak out of both sides of our mouth at the various meetings with the local population. When the program was slaughter of infected and exposed animals, we belittled the use of vaccine. When the program was changed, we became advocates of vaccine use.

Within a seven-year period, 2550 veterinarians and support personnel were recruited or transferred to Mexico. At the height of the program in 1949, 8000 American and Mexican personnel were working in it. Nearly a million infected and exposed cattle, sheep, goats and hogs were killed and 17 million were vaccinated every four months for a year. Some personnel became sick and died of diseases - malaria, malaria, typhoid fever and dysentery. Six Mexican veterinarians were killed and one U.S. inspector was stoned to death riding into a village to inspect livestock. A U.S. information specialist was killed with a shotgun. There were three main causes of deaths - civil mutiny which took 20 lives, highway accidents which took 19 and plane crashes which killed 14. Seven persons were shot from ambush; two were killed when thrown from their horse, one was run over by a train and one was accidentally shot.

In 1954, the disease was declared eradicated by the governments of the U.S. and Mexico. The insurmountable objective had been achieved.

In retrospect, the report of the USLSA committee was extremely pessimistic; however, I want to emphasize the committee's recognition of the dedication and positive attitude of the U.S. and Mexican personnel conducting the program and the high morale observed by the committee members.
I sincerely believe this experience gave both the state and federal governments and the industries involved in the U.S. a "can do" attitude that played a major role in these programs:

- Eradication of Vesicular Exanthema of swine;
- Changing the brucellosis goal from control to eradication;
- Hog Cholera eradication;
- Sheep Scabies eradication;
- Contagious Equine Metritis;
- Virulent Velogenic Newcastle Disease of poultry;
- Venezuelan Equine Encephalomyelitis;
- African Swine Fever in the Dominican Republic and Haiti;
- Screwworm eradication in the U.S.

Equally with our Mexican neighbors, the program established the competence and dedication of researchers. It strengthened the recognition and importance of the veterinary profession in both countries. It created effective, workable relationship between the governments and the livestock industries of both countries. It was a major factor in developing a successful joint U.S.- Mexican screwworm eradication program.

What was learned:

1. Don't avoid what may appear to be insurmountable challenges; where there is a will, a way will be found;
2. Be absolutely sure that you have the support of the industry involved, or chaos may result;
3. Effective communication is essential, both within and outside the governments and industries involved;
4. No job is too big; don't let logistics overwhelm your outlook; and
5. Now, when we are facing the challenges of eradicating piroplasmosis, food safety, free trade, environment and animal welfare, remember the real message of the 1947 USLSA committee report-Keep a positive attitude and high morale and, based on past accomplishments, you will ultimately get the job done.
Fifty years (1947-1997) have passed since the Mexico-United States Commission for the Prevention of Foot-and-Mouth Disease and other Exotic Animal Diseases (CPA) was created.

This institution, known then as the Mexican-American Commission for the Eradication of Foot-and-Mouth Disease (CMAPEFA), was responsible for eradicating this disease in Mexico in 1954; without this occurrence our livestock industry would not have progressed to its present levels.

Early in 1948 both sections of the CMAPEFA decided to incorporate vaccination into the eradication program. Vaccines were ordered from two European laboratories and one in South America. The first vaccines for the emergency plan were prepared from European strains of type A virus or a combination of European strains of types O and A virus. They were later produced from type A strains isolated in Mexico in order to obtain better results.

Later in that same year, it was decided to produce the vaccine in Mexico, and the Vaccine Production Division was created within the Commission. For this purpose, personnel from Mexico and the United States were trained in the European and South American laboratories, and eight months later a limited amount of vaccine produced in Mexico was available for use in the field.

After the conclusion of the vaccination program, the Commission changed its activities and name to that of the Mexican-American Commission for the Prevention of Foot-and-Mouth disease (CMAPFA). Since 1951 the Commission has been conducting surveillance activities and responding immediately to reports of FMD-suspicious cases. In 1988, under an agreement between the two countries, these activities were broadened to include other diseases exotic to Mexico, under the name of Mexico-United States Commission for the Prevention of Foot-and-Mouth Disease and Other Exotic Animal Diseases (CPA). In the interest of simplifying and shortening the name for USDA, APHIS, IS, the Commission is referred to as “CPA” in Spanish and as “EADC” in English.

At present [1997] the Commission performs the following activities:

- Epizootiological surveillance
- Response to reports of suspicious cases
- Early specialized diagnosis
- Training on emergency plans and programs
Tab 12 – FMD Summeries

- Promotion of reporting through public information programs
- Preparation and updating of emergency plans on the control and eradication of exotic diseases
- Regionalization of areas free of enzootic diseases
- Execution of emergency programs through the National Animal Health Emergency Mechanism (DINESA)

Although it is true that in the beginning there was some reluctance about reporting exotic diseases, at present thanks to intensive public information work on the part of the Commission, livestock producers, private and government veterinarians, educational institutions and the livestock industry have created an awareness of the problem caused by exotic diseases, with a gradual increase in reporting of suspicious cases.

The Commission’s laboratory has constantly endeavored to use the most up-to-date diagnostic techniques, developing new techniques and improving those already existing. In 1977 the Commission expanded FMD surveillance and upgraded the laboratory to BSL-3. The technical staff has been trained in new diagnostic methods at the international reference centers and has established permanent contacts with the major world laboratories.

The laboratory’s evolution has allowed it to respond to diagnostic needs and to carry out successfully control and eradication operations conducted by DINESA, whose operations are coordinated by the CPA.

In addition to those duties, the CPA also provides training on the importance, prevention, control and eradication of exotic diseases for inspectors in ports, airports and border crossings; inspectors at checkpoints for the control of animal movements and central distribution points; government and private veterinarians and those responsible for zoos; senior students of veterinary medicine and animal husbandry.

Jointly with the United States and Canada, Mexico maintains a foot-and-mouth disease vaccine bank that is located at the Plum Island Animal Disease Center.

For current information on the Comisión México-Estados Unidos para la Prevención de la Fiebre Aftosa y Otras Enfermedades Exóticas de los Animales (CPA) and its activities, see:

http://www.aphis.usda.gov/is/mexico/aiis.htm [Spanish]

http://www.aphis.usda.gov/is/mexico/eadc.htm [English]

http://senasicaw.senasica.sagarpa.gob.mx/portal/html/salud_animal/diagnostico_y_constatacion/Laboratorio_de_Alta_Seguridad_de_CPA.html [Spanish]

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This tri-national cooperation, as exemplified by the CPA, is crucial to protecting the health of animals and the agricultural economies of Canada, Mexico and the United States.
IV. DISCUSSION

Although there have been many developments and events since these reported experiences in Mexico, and much of the later accrued information detracts to some extent from the significance of some of the data presented here, publication has nevertheless been deemed worthwhile, from both scientific and historical standpoints.

The joint Mexico-U.S. campaign against FMD was at the time of its conclusion in 1954, an outstanding example of successful eradication of an animal disease through international cooperation. Since that time, many countries have made great progress in control of the disease, but complete eradication has been achieved by comparatively few. In the last twenty years, however, Canada (24, 25) and Great Britain (26) have eradicated the disease without the aid of preventive vaccination. Argentina also embarked on a reportedly successful program of eradication of the disease from its part of the Island of Tierra del Fuego in 1967 (27). The eventual eradication of FMD in Mexico, after a prolonged and varied campaign, with the comparatively limited knowledge available at the time, may serve to encourage all FMD-beleaguered countries, even the most seriously involved.

In most countries where FMD is enzootic or widespread, considerable reliance is placed upon vaccination for control of the disease. Countries that are free of the disease continue to rely chiefly on restrictive measures intended to exclude the virus, together with continuous surveillance of their animal populations. Such procedures unquestionably have been effective in Australia, New Zealand, North and Central America, the Caribbean area, and some few other countries outside the western hemisphere.

In the western hemisphere, sporadic, enzootic, or epizootic appearance of VS are cause for great concern because of the close resemblance of the disease to FMD. According to present knowledge, VS is not amenable to the techniques for control and eradication that are applicable for FMD, and the mere existence of VS poses a special threat to FMD-free countries. There is a constant danger of inaccurate diagnosis, by which FMD easily might be overlooked until it becomes widespread and extremely difficult to manage. Therefore, special efforts should be made in these circumstances to identify as promptly as possible any disease which resembles FMD even remotely.

As noted (III. Results, G. Virus Identifications) there was a high incidence of VS in Mexico in
the early 1950's, followed by a period of much lower incidence. In 1958, there was only 1 diagnosis; in years successive to 1961, the incidence based on laboratory diagnoses averaged about 30 per year, ranging from as few as 3 diagnoses in 1961 to as many as 89 in 1966. The relatively high incidence in 1965 (74 cases) and in 1966 (89 cases) corresponds with a comparably high incidence in the U.S. in the same years.

Especially in countries where VS is enzootic, it is difficult to maintain continuous comprehensive surveillance of incidence of the infection. This problem continues in Mexico and the U.S., despite official insistence that specific identification of vesicular diseases is a critical need. Those countries which have never experienced an outbreak of FMD, for example in Central America and in the Caribbean, have encountered even greater difficulties in this respect, as have some of the countries in South America that are still afflicted by FMD. The situation is further complicated by the fact that diagnoses based exclusively on the presence of VS antibodies in an animal population may not accurately reflect current disease status.

The fact that VS of one type or another occurs in Central, North, and South America is important to the entire western hemisphere and also to the rest of the world. Without an accurate diagnosis, FMD may be disguised by ignorance, or new types or variants of the viruses of FMD or VS may not be disclosed promptly. The fact that VS generally is a milder disease than FMD contributes to complacency, even though FMD also may at times be a comparatively mild disease. The Pan American Foot-and-Mouth Disease Center rightly continuously emphasizes the critical importance of prompt and accurate diagnoses in all instances of suspected vesicular disease.

It is highly improbable that substantial quantities of FMD vaccine, as it was produced in Mexico with bovine-propagated virus, will ever again be used. Today, little if any FMD vaccine is produced with virus from inoculated animals as the constituent antigen, except for the so-called modified live-virus products. The delicate balances between immunogenicity and pathogenicity of such viruses, as well as viral mutations which occur unpredictably in the field during epizootics, frequently have complicated their practical use. Consequently, such products have been found to have limited utility, except in special circumstances.

Most of the FMD vaccines currently in use are compounded with virus propagated in explanted bovine tongue epithelium, in general accordance with methods developed by Frenkel (28). Increasingly, however, virus propagated in cultures of cells from various tissues is being used. These techniques are being studied widely, as are virus inactivants other than formaldehyde, and adjuvants other than aluminum hydroxide (29, 30, 31). The special advantages of tissue-cultured virus involve economic and humane considerations, general availability and adaptability, more readily controllable production of quantities of virus, and suitability for concentration and purification of antigenic components.

Much remains to be accomplished for implicit improvements of vaccines for general use in countries where FMD is enzootic or epizootic. Meanwhile, products of the ValleeSchmidt-Waldmann type, containing Frenkel-propagated virus, continue in common use throughout the world. Experience in the Netherlands clearly affirms the effectiveness and utility of such a product if it is appropriately controlled and regularly applied in a coordinated official program of repeated general vaccination (22, 23). In the studies in Holland, virus-neutralizing antibodies persisted in cattle for as long as four years after two or more annual vaccinations. Moreover, depending on the virus type, 56 to 100 percent of the repeatedly vaccinated cattle that were challenged under controlled conditions resisted generalization of the disease 9 to 49 months after the last vaccination.
It is probable that the repeated vaccinations accomplished in Mexico resulted in generally persistent antibody titers and high resistance to generalized FMD in cattle, just as has been shown in Holland. On the other hand, antibodies and resistance must have been acquired by much of the animal population in central Mexico as a result of natural epizootic circumstances, even before vaccination became general. The significance and possible interaction of these two influences cannot be assessed at this time. It seems obvious, however, that vaccination cannot be credited as the major factor in eventual eradication of the disease, at least not in or of itself.

Quite obviously, continuing slaughter of infected and exposed animals was a decisive limiting factor. The character of the type A virus involved in the epizootic, as well as the explosive nature of the outbreak resulted in fast-moving, widespread waves of clinically evident infection, while very probably many animals contracted occult or inapparent infection. Perhaps because the number of susceptible animals had thus been substantially reduced, the intensity of the epizootic was already subsiding markedly by the time when substantial quantities of vaccine became available, and through a combination of these circumstances only sporadic bursts of infection were occurring when vaccination became general.

The coincidence of reduced need for destruction of animals and initiation of vaccination led to better public understanding and cooperation, and the infection was held within the confines of the quarantine lines which were strategically located in relation to prevailing commercial practices, travel patterns, and geographic features in the Republic. The general involvement of only a single type of virus was a known major factor in the eventual success of the eradication program. Finally, of course, the prevalent movement of animals and animal products in the quarantined zone was toward the more heavily populated area around Mexico City, and in the course of such commerce hundreds of thousands of animals were slaughtered there for food during the course of the program.

Virus carriers, are now known to be common among convalescent and exposed vaccinated animals (32). While transmission from carriers to susceptible contact animals has not yet been accomplished in the laboratory, there is strong circumstantial evidence that this occurs in the field.

At the time of the 1925 outbreak of FMD in Texas, U.S.A., it was thought that stevedores or crew members of vessels involved in shipments from South America may have introduced the virus through their practice of washing in a stock-watering tank near the port where the ships docked. Later background review, however, has strongly suggested that the outbreak more probably originated from a shipment, some months before, of Zebu cattle into Texas from South America by way of Mexico, which was ostensibly free of FMD at that time.

While a consignment of 127 South American bulls came into Mexico October 15, 1945, without apparent untoward results, it is generally conceded that FMD was probably introduced into Mexico in 1946, through a second shipment of bulls from South America that had been under surveillance, without evidences of the disease, for more than six months. Again, in 1953, FMD recurred in Mexico almost 22 months after the last previously observed cases in the country. These experiences conform with the general impression that some yet undetermined factors influence the potentiality of carrier animals to disseminate the virus to susceptible contacts.

Substantial savings in the over-all cost of producing and testing vaccines in Mexico were effected through partial salvage from 155,386 cattle. Salvage included deboned beef, hides, and processed fertilizer derived from bones, viscera and other by-products. It should be pointed out...
Substantial confirmatory evidence of man's resistance to the virus of FMD was obtained in Mexico. In the course of producing virus for vaccine, from 100 to 200 persons were literally drenched with the virus five days a week, week after week, over a period of about two years. About half as many persons were regularly engaged in examining affected animals in various stages of the disease, in the course of tests of potency of vaccine. Not a single case of suspected infection with FMD virus occurred in any of these heavily exposed people. While there have been few authenticated cases of clinically evident infection in man, people are generally acknowledged to be potentially dangerous purveyors of the virus through personal contamination.

In comparing percentages of animals protected by subcutaneous and interdermal vaccination, no essential difference was found. Subcutaneous vaccination, however, might be preferred generally on account of its relative simplicity.

From the study of duration of immunity, it was evident that doses of vaccine larger than those used by the Commission extended the protection period. However, the smaller doses afforded some protection for a short period. The use of smaller than routine doses might be considered appropriate in some circumstances if supplies of vaccine were limited but broad coverage was desired. The larger doses could be expected to extend the period of resistance, and they might be preferred in some circumstances.

The availability of cattle susceptible to FMD, from a part of Mexico that was never involved in the epizootic, was an important basic advantage to the Commission. On the other hand, the importance of class, condition, and quality of the cattle, was emphasized repeatedly. If it had been practical, a longer period for conditioning of animals in FMDfree Mexico would have been desirable. Thereby, some of the losses encountered in the course of vaccine production and testing might have been avoided. The hazards of intercurrent anthrax surely could have been reduced by vaccination during an extended conditioning period. Other infectious diseases also might have been substantially reduced.

Although the campaign in Mexico was eventually successful after arduous efforts, it should be pointed out that comparable programs today might be considerably accelerated, rationalized, and simplified by modern-day techniques which were not developed or not widely applied 20 years ago. These include the use of suckling mice, tissue cultures, improved virus-neutralization and protection tests, precipitin reactions, hemagglutination, fluorescent antibody techniques, virus infection-associated antigen and other assays of virus-antibody reactions, and improvements in virus characterization. Continuing research on FMD may be expected to result in still further improvements and innovations.

V. SUMMARY

Foot-and-mouth disease (FMD) was officially diagnosed in Mexico in December, 1946. The prevalent causative virus was identified early in 1947 as Type A FMD virus.

Organization of the Mexico-U.S. Commission for Eradication of Foot-and-Mouth Disease was formalized April 2, 1947. The Commission was reconstituted in September, 1952, under the designation: Mexico-U.S. Commission for Prevention of Foot-and-Mouth Disease. However, the
new agreement was not formally effective until the last required signature was affixed in November 1952.

Through systematized inspections, quarantines, slaughter of more than one million infected and exposed animals, disinfection, and the application of more than 60,000,000 doses of type A vaccine in cattle, goats, sheep and swine, FMD was eradicated from Mexico. The campaign against the disease began in early 1947 and ended in late 1954. During this period, vaccine was used from early 1948 to August, 1950, while the other procedures continued as necessary to the end of the program.

A total of 383 lots of type A vaccine, each consisting of 9,000 to 200,000 doses (2 ml intradermal), were produced and tested. In controlled tests, only one lot of the vaccine protected as few as 63 per cent of the vaccinated test cattle against generalization. Only 8.9 per cent of the vaccines protected less than 80 per cent of the vaccinated animals, and 40 per cent of the vaccines protected 95 per cent or more. In these tests the over-all average protection from all the vaccines produced in Mexico was 89.3 per cent.

The materials and methods used in producing and testing the vaccine are described. Essentially equal protection of cattle against generalization of the virus resulted from either intradermal or subcutaneous vaccination.

Although 2 ml doses of vaccine were effective in test cattle in preventing generalization, the resistance of treated animals decreased substantially within 3-4 months after vaccination. Larger doses were effective for a slightly longer time. Doses smaller than 2 ml afforded some protection against generalization for short periods of time.

Cattle in poor condition and underweight at the time of vaccination were protected to a lesser extent when exposed 2 weeks after vaccination than animals in comparatively good condition. At later times of exposure, however, when the condition of all cattle was comparable, protection was essentially equal.

FMD virus of the type and strain used in Mexico, stored for as long as 12 months, was shown to be still antigenically effective when compounded into vaccine.

Vaccines stored for periods of time up to 20 months gradually decreased in potency, but they would still have been acceptable for use in case of need in emergencies, which never arose.

Although swine were less protected in a controlled test than cattle, swine were continuously vaccinated in the field with 1 ml doses, as were goats and sheep.

There were more deaths after exposure in experimental control cattle than in vaccinated cattle, and the localized and generalized lesions in controls were generally more extensive and severe than in the vaccinates. Thus, even partially protected vaccinates could be expected to lessen the over-all impact of the disease in serious epizootic situations where vaccine is used for control.

Type A FMD virus persisted in Mexico until the last known outbreak was eliminated in April, 1954. Type O virus was identified in an outbreak on 1 premises in October, 1949. Although this virus was exceptionally virulent, it never spread from these premises where the affected and exposed animals were promptly slaughtered and buried. The exact source of the type O virus was never determined.
Complications due to vesicular stomatitis (VS) are discussed. Although sheep were found to be artificially susceptible to some Mexican strains of the virus, natural infections in sheep were not discovered.

The rationale for use of FMD vaccine and for discontinuance of vaccination in Mexico are discussed.

REFERENCES

The Security and Prosperity Partnership of North America (SPP) was launched in March of 2005 as a trilateral effort to increase security and enhance prosperity among the United States, Canada and Mexico through greater cooperation and information sharing.

This trilateral initiative is premised on our security and our economic prosperity being mutually reinforcing. The SPP recognizes that our three great nations are bound by a shared belief in freedom, economic opportunity, and strong democratic institutions.

The SPP provides the framework to ensure that North America is the safest and best place to live and do business. It includes ambitious security and prosperity programs to keep our borders closed to terrorism yet open to trade.

The SPP builds upon, but is separate from, our long-standing trade and economic relationships. It energizes other aspects of our cooperative relations, such as the protection of our environment, our food supply, and our public health.

Looking forward, President Bush, Prime Minister Harper and President Fox have identified emergency management; influenza pandemics, including avian influenza; energy security; and safe and secure gateways (border security and facilitation) as key priorities for the SPP. The Leaders also announced the creation of North American Competitiveness Council to fully incorporate the private sector into the SPP process.

*Joint Statement by President Bush, President Fox, and Prime Minister Martin*

We, the elected leaders of Canada, Mexico, and the United States, gather in Texas to announce the establishment of the Security and Prosperity Partnership of North America.

Over the past decade, our three nations have taken important steps to expand economic opportunity for our people and to create the most vibrant and dynamic trade relationship in the world. Since September 11, 2001, we have also taken significant new steps to address the threat of terrorism and to enhance the security of our people.

But more needs to be done. In a rapidly changing world, we must develop new avenues of cooperation that will make our open societies safer and more secure, our businesses more competitive, and our economies more resilient.
Our Partnership will accomplish these objectives through a trilateral effort to increase the security, prosperity, and quality of life of our citizens. This work will be based on the principle that our security and prosperity are mutually dependent and complementary, and will reflect our shared belief in freedom, economic opportunity, and strong democratic values and institutions. Also, it will help consolidate our action into a North American framework to confront security and economic challenges, and promote the full potential of our people, addressing disparities and increasing opportunities for all.

Our Partnership is committed to reach the highest results to advance the security and well-being of our people. The Partnership is trilateral in concept; while allowing any two countries to move forward on an issue, it will create a path for the third to join later.

Advancing our Common Security

We will establish a common approach to security to protect North America from external threats, prevent and respond to threats within North America, and further streamline the secure and efficient movement of legitimate, low-risk traffic across our shared borders. As part of our efforts, we will:

- Implement common border security and bioprotection strategies;
- Enhance critical infrastructure protection, and implement a common approach to emergency response;
- Implement improvements in aviation and maritime security, combat transnational threats, and enhance intelligence partnerships; and
- Implement a border facilitation strategy to build capacity and improve the legitimate flow of people and cargo at our shared borders.

Advancing our Common Prosperity

We will work to enhance North American competitiveness and improve the quality of life of our people. Among other things, we will:

- Improve productivity through regulatory cooperation to generate growth, while maintaining high standards for health and safety;
- Promote sectoral collaboration in energy, transportation, financial services, technology, and other areas to facilitate business; and invest in our people;
- Reduce the costs of trade through the efficient movement of goods and people; and
- Enhance the stewardship of our environment, create a safer and more reliable food supply while facilitating agricultural trade, and protect our people from disease.

Next Steps

We will establish Ministerial-led working groups that will consult with stakeholders in our respective countries. These working groups will respond to the priorities of our people and our businesses, and will set specific, measurable, and achievable goals. They will identify concrete steps that our governments can take to meet these goals, and set implementation dates that will permit a rolling harvest of accomplishments.

Within 90 days, Ministers will report back to us with their initial report. Following this, the groups will report on a semi-annual basis. Because the Partnership will be an ongoing process of
cooperation, new items will be added to the work agenda by mutual agreement as circumstances warrant.

Through this Partnership, we will ensure that North America remains the most economically dynamic region of the world and a secure home for our people in this and future generations.

PROSPERITY AGENDA

Promoting Growth, Competitiveness and Quality of Life

To enhance the competitive position of North American industries in the global marketplace and provide greater economic opportunity for all of our societies, while maintaining high standards of health and safety for our people, the United States, Mexico, and Canada will work together, and in consultation with stakeholders, to:

Improve Productivity

- **Regulatory Cooperation to Generate Growth**
  - Lower costs for North American businesses, producers, and consumers and maximize trade in goods and services across our borders by striving to ensure compatibility of regulations and standards and eliminating redundant testing and certification requirements.
  - Strengthen regulatory cooperation, including at the onset of the regulatory process, to minimize barriers.

- **Sectoral Collaboration to Facilitate Business**
  - Explore new approaches to enhance the competitiveness of North American industries by promoting greater cooperation in sectors such as autos, steel, and other sectors identified through consultations.
  - Strengthen North America's energy markets by working together, according to our respective legal frameworks, to increase reliable energy supplies for the region's needs and development, by facilitating investment in energy infrastructure, technology improvements, production and reliable delivery of energy; by enhancing cooperation to identify and utilize best practices, and to streamline and update regulations; and by promoting energy efficiency, conservation, and technologies such as clean coal, carbon capture and storage, hydrogen and renewable energy.
  - Improve the safety and efficiency of North America's transportation system by expanding market access, facilitating multimodal corridors, reducing congestion, and alleviating bottlenecks at the border that inhibit growth and threaten our quality of life (e.g., expand air services agreements, increase airspace capacity, initiate an Aviation Safety Agreement process, pursue smart border information technology initiatives, ensure compatibility of regulations and standards in areas such as statistics, motor carrier and rail safety, and working with responsible jurisdictions, develop mechanisms for enhanced road infrastructure planning, including an inventory of border transportation infrastructure in major corridors and public-private financing instruments for border projects).
  - Work towards the freer flow of capital and the efficient provision of financial services throughout North America (e.g., facilitate cross-border electronic access to stock exchanges without compromising investor protection, further collaboration on training programs for bank, insurance and securities regulators)
and supervisors, seek ways to improve convenience and cost of insurance coverage for carriers engaged in cross border commerce).

- Stylus and accelerate cross-border technology trade by preventing unnecessary barriers from being erected (e.g., agree on mutual recognition of technical requirements for telecommunications equipment, tests and certification; adopt a framework of common principles for e-commerce).

- Investing in Our People
  - Work through the Partnership for Prosperity and the Canada-Mexico Partnership to strengthen our cooperation in the development of human capital in North America, including by expanding partnerships in higher education, science, and technology.

Reduce the Costs of Trade
  - Efficient Movement of Goods
    - Lower the transaction costs of trade in goods by liberalizing the requirements for obtaining duty-free treatment under NAFTA, including through the reduction of "rules of origin" costs on goods traded between our countries. Each country should have in place procedures to allow speedy implementation of rules of origin modifications.
    - Increase competitiveness by exploring additional supply chain options, such as by rationalizing minor differences in external tariffs, consistent with multilateral negotiation strategies.
  - Efficient Movement of People
    - Identify measures to facilitate further the movement of business persons within North America and discuss ways to reduce taxes and other charges residents face when returning from other North American countries.

Enhance the Quality of Life
  - Joint Stewardship of our Environment
    - Expand cooperative work to improve air quality, including reducing sulphur in fuels, mercury emissions, and marine emissions.
    - Enhance water quality by working bilaterally, trilaterally and through existing regional bodies such as the International Boundary and Water Commission and the International Joint Commission.
    - Combat the spread of invasive species in both coastal and fresh waters.
    - Enhance partnerships and incentives to conserve habitat for migratory species, thereby protecting biodiversity.
    - Develop complementary strategies for oceans stewardship by emphasizing an ecosystem approach, coordinating and integrating existing marine managed areas, and improving fisheries management.
  - Creating a Safer and More Reliable Food Supply while Facilitating Agricultural Trade
    - Pursue common approaches to enhanced food safety and accelerate the identification, management and recovery from foodborne and animal and plant disease hazards, which will also facilitate trade.
    - Enhance laboratory coordination and information-sharing by conducting targeted bilateral and/or trilateral activities to establish a mechanism to exchange information on laboratory methods and to build confidence regarding each other's testing procedures and results.
Increase cooperation in the development of regulatory policy related to the agricultural biotechnology sectors in Canada, Mexico and the United States, through the work of the North American Biotechnology Initiative (NABI).

- Protect Our People from Disease
  - Enhance public health cross-border coordination in infectious diseases surveillance, prevention and control (e.g., pandemic influenza).
  - Improve the health of our indigenous people through targeted bilateral and/or trilateral activities, including in health promotion, health education, disease prevention, and research.
  - Building upon cooperative efforts under the International Conference on Harmonization of Technical Requirements for Registration of Pharmaceuticals for Human Use, work towards the identification and adoption of best practices relating to the registration of medicinal products.

**Fact Sheet: Security and Prosperity Partnership of North America**

"In a rapidly changing world, we must develop new avenues of cooperation that will make our open societies safer and more secure, our businesses more competitive, and our economies more resilient." Joint Statement by President Bush, Prime Minister Martin, and President Fox, March 23, 2005

Through the SPP, the United States, Canada, and Mexico seek to:

- Establish a cooperative approach to advance our common security and prosperity.
- Develop a common security strategy to further secure North America, focusing on:
  - Securing North America from external threats;
  - Preventing and responding to threats within North America; and
  - Streamlining the secure and efficient movement of legitimate and low-risk traffic across our shared borders.
- Promote economic growth, competitiveness, and quality of life. Through cooperation and information sharing, the SPP will work toward:
  - Improving productivity;
  - Reducing the costs of trade; and
  - Enhancing the joint stewardship of our environment, facilitating agricultural trade while creating a safer and more reliable food supply, and protecting our people from disease.
- The SPP is based on the principle that our prosperity is dependent on our security, and recognizes that our three great nations are bound by a shared belief in freedom, economic opportunity, and strong democratic institutions.
- At the meeting, President Bush, Prime Minister Martin, and President Fox released Security and Prosperity Agendas to further protect and secure North America from 21st Century threats and to increase economic opportunities for the people of North America while maintaining high standards of health and safety.
- Following the meeting, and based on the content of the Security and Prosperity Agendas, each nation will establish ministerial-level Security and Prosperity Partnership working groups. The working groups will:
  - Consult with stakeholders (in the business sector, state and local governments, and non-governmental organizations) in their respective countries;
  - Set specific, measurable, and achievable goals and implementation dates;
  - Identify concrete steps the governments can take to achieve these goals;
Areas of Focus and Responsibility

The following U.S. working groups will be established:

- **Security working groups** chaired by Secretary Chertoff and the Department of Homeland Security will address:
  - External Threats to North America
  - Streamlined and Secured Shared Borders
  - Prevention/Response within North America

- **Prosperity working groups** chaired by Secretary Gutierrez and the Department of Commerce will address:
  - Manufactured Goods
  - Energy Food and Agriculture
  - Business Facilitation
  - E-Commerce and Information and Communications Technologies (ICT)
  - Transportation
  - Environment
  - Financial Services
  - Rules of Origin

- Secretary Rice and the Department of State will work with the Departments of Homeland Security and Commerce to integrate the work of the Security and Prosperity working groups, and ensure that it advances U.S. foreign policy goals and enhances our strong relations with Canada and Mexico.

Relationship to Other Initiatives

- The SPP will complement, rather than replace, existing bilateral and trilateral fora and working groups that are performing well. It establishes leader-level priorities for ongoing and new trilateral and bilateral initiatives, giving existing efforts additional momentum, and creating new programs and initiatives where necessary and appropriate.

- The SPP will enhance and strengthen our ongoing security efforts, such as the Smart Border Accord, the Border Partnership Action Plan, and the Free and Secure Trade (FAST) Initiative.

- The SPP builds upon, but is separate from, our long-standing trade and economic relationships, and it energizes other aspects of our cooperative relations, such as the protection of our environment, our food supply, and our public health. The issues of immigration and trade disputes will be dealt with outside the SPP thru existing treaties and congressional action.

SPP Prosperity Working Groups

Following the March 23, 2005, launch of the SPP, each nation established Security and Prosperity working groups to fulfill the vision of the North American Heads of State. The working groups will consult with stakeholders; set specific, measurable, and achievable goals and implementation dates; and identify concrete steps the governments can take to achieve these goals. An initial report is due to Heads of Government on June 23 with semi-annual progress reports thereafter.
Food & Agriculture Working Group…will work towards creating a safer and more reliable food supply while facilitating agricultural trade by pursuing common approaches to enhanced food safety; enhanced laboratory coordination and information sharing; and increasing cooperation in the development of regulatory policy related to the agricultural biotechnology sectors in Canada, Mexico and the United States, through the work of the North American Biotechnology Initiative (NABI).

Security and Prosperity Partnership of North America (SPP):

Myth vs. Fact

Myth: The SPP was an agreement signed by Presidents Bush and his Mexican and Canadian counterparts in Waco, TX, on March 23, 2005.

Fact: The SPP is a dialogue to increase security and enhance prosperity among the three countries. The SPP is not an agreement nor is it a treaty. In fact, no agreement was ever signed.

Myth: The SPP is a movement to merge the United States, Mexico, and Canada into a North American Union and establish a common currency.

Fact: The cooperative efforts under the SPP, which can be found in detail at www.spp.gov, seek to make the United States, Canada and Mexico open to legitimate trade and closed to terrorism and crime. It does not change our courts or legislative processes and respects the sovereignty of the United States, Mexico, and Canada. The SPP in no way, shape or form considers the creation of a European Union-like structure or a common currency. The SPP does not attempt to modify our sovereignty or currency or change the American system of government designed by our Founding Fathers.

Myth: The SPP is being undertaken without the knowledge of the U.S. Congress.

Fact: U.S. agencies involved with SPP regularly update and consult with members of Congress on our efforts and plans.

Myth: The SPP infringes on the sovereignty of the United States.

Fact: The SPP respects and leaves the unique cultural and legal framework of each of the three countries intact. Nothing in the SPP undermines the U.S. Constitution. In no way does the SPP infringe upon the sovereignty of the United States.

Myth: The SPP is illegal and violates the Constitution.

Fact: The SPP is legal and in no way violates the Constitution or affects the legal authorities of the participating executive agencies. Indeed, the SPP is an opportunity for the governments of the United States, Canada, and Mexico to discuss common goals and identify ways to enhance each nation’s security and prosperity. If an action is identified, U.S. federal agencies can only operate within U.S. law to address these issues. The Departments of Commerce and Homeland Security coordinate the efforts of the agencies responsible for the various initiatives under the prosperity and security pillars of the SPP. If an agency were to decide a regulatory change is desirable through the cooperative efforts of SPP, that agency is required to conform to all existing U.S. laws and administrative procedures, including an opportunity to comment.

Myth: The SPP will cost U.S. taxpayers money.

Fact: The SPP is being implemented with existing budget resources. Over the long-term, it will save U.S. taxpayers money by cutting through costly red tape and reducing redundant
paperwork. This initiative will benefit the taxpayers through economic gain and increased security, thereby enhancing the competitiveness and quality of life in our countries.

**Myth:** The working groups and SPP documents are a secret and not available to the public.

**Fact:** The SPP’s initiatives and milestones with timelines can be found by clicking the Report to Leaders link at [www.spp.gov](http://www.spp.gov). The Web site contains a section to enable interested persons to provide input directly to the various working groups.

**Myth:** The SPP seeks to lower U.S. standards through a regulatory cooperation framework.

**Fact:** The framework will support and enhance cooperation and encourage the compatibility of regulations among the three partners while maintaining high standards of health and safety. Enhanced cooperation in this area will provide consumers with more affordable, safer, and more diversified and innovative products. Any regulatory changes will require agencies to conform to all U.S. administrative procedures, including an opportunity to comment.

**Myth:** The SPP is meant to deal with immigration reform and trade disputes.

**Fact:** Immigration reform is a legislative matter currently being debated in Congress and is not being dealt with in the SPP. Likewise, trade disputes between the United States, Canada, and Mexico are resolved in the NAFTA and WTO mechanisms and not the SPP.

**Myth:** The SPP will result in the loss of American jobs.

**Fact:** The SPP seeks to create jobs by reducing transaction costs and unnecessary burdens for U.S. companies, which will bolster the competitiveness of our firms globally. These efforts will help U.S. manufacturers, spur job creation, and benefit consumers.

**Myth:** The SPP will harm our quality of life.

**Fact:** The SPP improves the safety and well-being of Americans. It builds on efforts to protect our environment, improves our ability to combat infectious diseases, such as avian influenza, and ensures our food supply is safe through the exchange of information and cooperation — improving the quality of life for U.S. citizens. Americans enjoy world class living standards because we are engaged with the world.

**Myth:** The SPP creates a NAFTA-plus legal status between the three countries.

**Fact:** The SPP does not seek to rewrite or renegotiate NAFTA. It creates no NAFTA-plus legal status.
Alfonso Clavijo

Pilot plan for the harmonization of diagnostic tests for Foot-and-Mouth Disease and other vesicular diseases in North American laboratories.

Veterinary laboratories for foreign animal diseases (FAD) are a vital component of the national infrastructure which provides animal health services. These laboratories lead the efforts to improve diagnostic methods, technology of biological manufacturing and programmes for the control of infectious animal diseases, with special reference to diseases of international importance. However, one of the most important roles of these laboratories is to provide diagnostic services for the rapid detection of foreign animal disease agents.

Although the United States, Mexico and Canada national FAD laboratories have similar mandate and responsibilities, they use different diagnostic tests and reagents which are obtained from a wide variety of sources. Standardization and harmonization of diagnostic tests has now a new significance and the need to obtain equivalent results in these three countries is of great importance. For this reason we have initiated a pilot plan for the harmonization of diagnostic tests for Foot-and-Mouth Disease and other vesicular diseases. With this plan we expect to share information regarding diagnostic tests currently used and to analyse their performance, relative to other laboratories, using proficiency panels. Results of this project will facilitate the transfer and optimization of diagnostic tests as well as the exchange of fully characterized diagnostic reagents between our laboratories. Research needs will be also identified and they will be addressed as a collaborative effort.

The importance of harmonization of diagnostic tests used for FAD is emphasized in the context of the Security and Prosperity Partnership and the North American free trade agreement.

John Pasick

CSF and AI Presentation

Presentation:

A brief overview will be given describing the harmonization of real-time RT-PCR assays for avian influenza and avian paramyxovirus serotype-1 that has been informally carried out between Canada and the United States. An EU led inter-laboratory comparison test for classical swine fever in which Canada and the USA both participate will also be described.
CFIA’s National Centre for Foreign Animal Disease (NCFAD) is located in the Canadian Science Centre for Human and Animal Health (CSCHAH), in close proximity to Winnipeg’s Health Science Centres and the University of Manitoba’s Faculties of Medical and Biomedical Sciences. The NCFAD’s team of scientists, veterinarians, technicians and laboratory administration and support staff contribute to the delivery of CFIA’s Animal Health Programs by providing an advisory service and state-of-the-art scientific expertise and technologies for the detection of Foreign Animal Disease (FAD).

FADs are a threat to Canada when they affect human health or the health of livestock, and when there is an appreciable cost associated with disease control or eradication. The economic impact of FAD incursion in Canada may be severe, with immediate loss of export markets, high production losses, and major socio-economic impacts. The early recognition and accurate diagnosis of any FAD is essential for its prompt control and eradication.

NCFAD staff are experts in tests to detect FAD agents, and they perform many of these tests on a routine basis to meet requirements for import, export, and domestic disease control - including surveillance, the provision of confirmatory testing of suspect material, and reference laboratory services. NCFAD scientists also undertake research to develop better testing technologies for FADs, and to study FADs such as Transmissible Spongiform Encephalopathies (TSEs) which may affect human health. NCFAD staff also serve on international committees; maintain international linkages and collaborations with FAD experts in other countries; and provide training to veterinarians, graduate students, and technologists.

The NCFAD has been designated as an OIE Reference Laboratory for Classical Swine Fever and has tentative Reference Laboratory designation for both Bovine Spongiform Encephalopathy and Avian Influenza, pending ratification at the next General Session of the OIE. These diseases have particularly serious socioeconomic consequences and are of major importance in international trade of animals and animal products. Reference Laboratory designation is based on recognition of expertise in Laboratory diagnostics, test method development, establishment of international standards and disease research. NCFAD experts also participate on a number of OIE ad Hoc Groups and Specialist Commissions. Recognition and participation in OIE activities places the NCFAD and the CFIA amongst the best of the world’s experts.
CSF/AVIAN

The Classical Swine Fever and Avian Disease Unit (CSF/Avian Unit) provides testing services, technology development and research (TDR), training and scientific consultation services to the Animal Health Program of the CFIA. Diseases of primary concern are: classical swine fever, African swine fever, Newcastle disease, and notifiable avian influenza. This unit has expertise in the detection, isolation, identification, and characterization of viruses using conventional and molecular techniques. The CSF/Avian unit is also involved in discovery research on viral pathogens, host responses, and transmission and pathogenic mechanisms. In addition to pending OIE Reference Laboratory status, this unit is also the National Reference Laboratory for Avian Influenza and as such is responsible for coordination of a network of provincial/university diagnostic laboratories across Canada.

VESICULAR

The Vesicular Disease Unit provides testing services, technology development and research (TDR), training and scientific consultation services for vesicular diseases such as foot-and-mouth-disease (FMD), swine vesicular disease (SVD) and vesicular stomatitis (VS). Production of standardized reagents is a critical function of this unit and specialized teams are formed as needed to carry out the production and quality control of biological reagents.

ZOO Notics

The BSL 4 section provides expertise in the area of special pathogens, especially the BSL4 agents of veterinary importance. The laboratory maintains a state of readiness for emergencies or outbreak situations through research, technical development, training and scientific consultation. The unit has the capability to work with large animals under the BSL4 containment. If possible, support work not involving infectious agents is performed in BSL3 and BSL2 containment laboratories. The staff members receive extensive training prior to and during the work in BSL4.

REAGENT DEVELOPMENT UNIT

The mandate for the reagent development unit is to provide three core services to NCFAD. These services involve the production and characterization of: 1) monoclonal antibodies 2) recombinant proteins and 3) mammalian, avian and insect cells. Each of the services is provided by research and technical staff who specialize in up-to-date technologies relating to the efficient productions of quality reagents.

BACTERIOLOGY

The Bacteriology Unit (BU) supports the foreign animal disease diagnostic services by carrying out tests for bacteria, mycoplasma and fungi on FAD submissions; NCFAD laboratory environment and cell lines from the Cell Culture Unit. The BU is also responsible for the isolation and identification of Salmonella organisms as part of the avian import program. The technology development efforts currently focus on diagnostic methodologies for three important diseases; contagious bovine pleuropneumonia (CBPP), contagious caprine pleuropneumonia (CCPP) and equine glanders, as well as on potential agents of bio-terrorism.
PATHOLOGY

The Diagnostic Pathology unit of NCFAD/CFIA is the National Reference Laboratory for Bovine Spongiform Encephalopathy (BSE). BSE is a fatal neurological disease of adult cattle. The BSE agent is believed to be the common source of transmissible spongiform encephalopathies in several species of bovidae and felidae. There is evidence of a causal link between the BSE agent and a new variant form of the human transmissible spongiform encephalopathy, Creutzfeldt-Jakob disease. BSE is an OIE List B disease with public health and socio-economic importance, and significance in international trade. The Diagnostic Pathology unit plays the key role in the National BSE-surveillance program to minimize the risk of BSE becoming established in Canada.

ANIMAL CARE

The Animal Care Team consists of certified Animal Health Technologists and Veterinarians who provide for the care and welfare of animals housed at CFIA/NCFAD Winnipeg. All animal-based projects for research, teaching, and testing require both a completed Animal Use Document (AUD) and a Safety and Environmental Services form. The AUD must be reviewed and approved by the local Animal Care Committee (ACC), which is comprised of scientists, veterinarians, and members of the general public; the committee adheres to the national standards set by the Canadian Council on Animal Care.

FOREIGN ANIMAL DISEASE COURSE

The Foreign Animal Disease Recognition Course is designed to educate federal, provincial, institutional and private industry veterinarians in the early recognition, control and eventual eradication of foreign animal disease incursions into Canada. The "global economy" presents increased risk of an FAD introduction into Canada via the legal or illegal importation of livestock or livestock related products. It is only through a highly trained and proficient veterinary infrastructure that Canada can prevent an incursion of a foreign livestock disease into the national herd.

The current Foreign Animal Disease Recognition Course is an intense 8-day training program consisting of lectures, live animal demonstrations, and post-mortem studies designed to give participating veterinarians the most complete and comprehensive appreciation of the more prominent foreign animal diseases that present the greatest potential threat to the Canadian livestock industry.

The course format has established a strategic three-way training partnership between NCFAD, the established Veterinary Institutions and Provincial Veterinary Laboratory staff. Livestock industry specialists (veterinarians) have also been invited to participate in the course. All course participants receive a certificate from NCFAD upon the successful completion of all aspects of the course.

The pilot studies, as well as the FAD Course, represents a unique situation whereby numerous research/educational/training materials (tissue sections, slides, animal videos) can be collected in addition to the demonstration of actual clinical disease entities. The pilot study is designed to evaluate specific virus inoculation schedules, harvest antigens, harvest tissue, prior to the actual course. NCFAD is in a unique position whereby it is the only facility of its kind in Canada capable of containing and demonstrating actual foreign animal diseases in a teaching/demonstration format.

The production and harvesting of teaching materials to be used at the Veterinary Colleges and Provincial Pathology Laboratories are now considered part of the FAD Course curriculum.
Course lecturers include internationally recognized experts in specific foreign animal diseases. The FAD Course participants benefit from viewing the clinical aspects of a specific disease, attending lectures on numerous disease entities, and the opportunity to interact with many experts on specific disease entities.

The active participation of both Veterinary School faculty members and Provincial Veterinary Diagnostic Pathologists during the duration of the course has given CFIA/NCFAD an opportunity to build new links to educational and provincial institutions across the country.

In order to facilitate the growing number of requests by the veterinary community for greater access to the FAD Course, an interactive electronic link through the Canadian Advanced Network for Research, Industry and Education (CANARIE) is being considered as a possible solution. The CA’net4 connection (http://www.canarie.ca) can provide an electronic link between the various federal and provincial veterinary laboratories, the veterinary colleges as a potential electronic learning format.
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<td>OIE FMD and other epizootics Commission</td>
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<td>Peter Cairns, DVM</td>
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<td>3.</td>
<td>John Copps, BScAg, DVM, DVMc</td>
<td>Veterinarian, Head Animal Care Unit</td>
<td>Veterinary Medicine and Pathology</td>
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<td>Alfonso Clavijo, DVM, PhD</td>
<td>Virologist, Head Vesicular Diseases Unit</td>
<td>Veterinary Virology</td>
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<td>5.</td>
<td>Stefanie Czub, DVM, PhD</td>
<td>Pathologist, Head Pathology Unit, Head BSE Nat. Reference Lab</td>
<td>Neuropathology/Pathology, Pathogenesis</td>
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<td>Carissa Embry-Hyatt, BSc, DVM, MVSc</td>
<td>Veterinary Pathologist</td>
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<td>7.</td>
<td>Kevin Hills, BSc</td>
<td>Diagnostic Biologist, CSF/Avian Unit</td>
<td>Virology, Serology, Molecular Biology</td>
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</table>
8. **Name:** Kathleen Hooper-McGrevy, BSc, MSc, PhD  
   **Specialization:** Research Scientist, Section Head Serology  
   **Associations:** Serology, Immunology, Assay Development and Validation  
   American Association of Veterinary Laboratory Diagnosticians  
   American Association of Veterinary Immunologists

9. **Name:** Tom Hunt, BSc  
   **Specialization:** Diagnostic Biologist, Immunology/Serology Unit  
   **Associations:** Serology

10. **Name:** Christiaan Kranendonk, BSc(Agr.), DVM  
    **Specialization:** Diagnostic and Training Coordinator  
    **Associations:** Diagnostic sample submission and test result dissemination  
    Training, NCFAD staff and external associates  
    Canadian Veterinary Medical Association,  
    Manitoba Veterinary Medical Association,  
    Ontario Veterinary Medical Association

11. **Name:** José López, DVM, MSc, PhD  
    **Specialization:** Research Scientist, Head Bacteriology Unit  
    **Associations:** Veterinary Bacteriology and Foreign Animal Disease Mycoplasmas  
    Manitoba representative for the Visible Minorities Advisory Committee  
    American Society for Microbiology  
    Editorial Board: Veterinaria Mex.  
    Head Organizing Committee, OIE 14th Conference of the Regional Commission for the Americas  
    Chair, Canadian Science Centre for Human and Animal Health, Animal Care Committee

12. **Name:** Lizhong Luo, BSc, PhD equivalent  
    **Specialization:** Research Scientist, Leader of Recombinant Protein Development Group  
    **Associations:** Molecular virology and biology, Molecular cloning and recombinant protein expression/purification, Viral gene structure and function, molecular diagnostics and vaccine development

13. **Name:** Lisa Manning, RT, BSc  
    **Specialization:** Biologist, Pathology Unit  
    **Associations:** Histology, Immunohistochemistry, In-Situ Hybridization  
    Canadian Society for Medical Laboratory Technologists  
    Manitoba Society of Medical Laboratory Technologists  
    National Society for Histotechnology

14. **Name:** Mariko Moniwa, BSc, MSc  
    **Specialization:** Biologist, Vesicular Disease Unit  
    **Associations:** Molecular Biology, Serology, Protein Biochemistry

15. **Name:** John Pasick, DVM, MSc, PhD  
    **Specialization:** Head, CSF/Avian Unit  
    **Associations:** Molecular Virology, Encephalitides, African Swine Fever, Avian Influenza,  
    Classical Swine Fever  
    Scientific Collaborator on OIE/FAO Avian Influenza Network
16. **Name:** Marta Sabara, BSc, MSc, PhD  
   Research Scientist, Head Reagent Development Unit  
   **Specialization:** Diagnostic and molecular virology, antigen identification and purification, viral pathogenesis and vaccine development  
   **Associations:** American Society for Microbiology  
                   Canadian Society for Microbiology  
                   American Society for Virology

17. **Name:** Hana Weingartl, RNDr (Czech), MSc, PhD  
   Research Scientist, Head Special Pathogens Unit  
   **Specialization:** Molecular virology, viral receptors, avian and zoonotic diseases  
   **Associations:** Canadian Society for Microbiology  
                   American Society for Virology  
                   American Society for Microbiology

18. **Name:** Ming Yang, PhD  
    Immunologist/Vesicular Disease Unit  
    **Specialization:** Immunology
Foot and Mouth Disease Campaign – 1947 to 1954

Memorial Plaque

This plaque recognizes eight Mexican citizens that gave the ultimate sacrifice during Mexico’s FMD war.

Photo courtesy of Dr. Rick Willer taken at the laboratory of the Comisión México-Estados Unidos para la Prevención de la Fiebra Aftosa y Otras Enfermedades Exóticas de los Animales (CPA) – November 2007.
Canadian Food Inspection Agency

National Centre for Foreign Animal Disease

Winnipeg, Manitoba, Canada

North American Animal Health Laboratory Network
February 16, 2007