REPORT OF THE COMMITTEE ON TRANSMISSIBLE DISEASES OF POULTRY AND OTHER AVIAN SPECIES

Chair: Julie Helm, SC
Vice Chair: Vacant

Bruce Akey, NY; John Atwell, NC; Lyndon Badcoe, WA; George Badley, AR; Deanna Baldwin, MD; Marilyn Balmer, MD; Richard Breitmeyer, CA; Deborah Brennan, GA; Paul Brennan, IN; Denise Brinson, GA; Nancy Chapman, MD; Bruce Charlton, CA; Steven Clark, NC; Stephen Crawford, NH; Sherrill Davison, PA; Thomas DeLiberto, CO; Brandon Doss, AR; Aly Fadly, MI; Naola Ferguson-Noel, GA; Tony Forshey, OH; Patricia Fox, NC; Tony Frazier, AL; Marion Garcia, WV; Samantha Gibbs, VA; Isabel Gimeno, NC; Eric Gingerich, IN; Eric Gonder, NC; Tanya Graham, SD; James Grimm, TX; Scott Gustin, AR; William Hartmann, MN; Rudolf Hein, DE; Michael Herrin, OK; Bill Hewat, AR; Linda Hickam, MO; Dee Hilliard, OK; Heather Hirst, DE; Donald Hoenig, ME; Guy Hohenhaus, MD; Floyd Horn, MD; Danny Hughes, AR; Dennis Hughes, NE; John Huntley, WA; Mark Jackwood, GA; Jarra Jagne, NY; Eric Jensen, AL; Annette Jones, CA; Donna Kelly, PA; Gary Kinder, WV; Bruce King, UT; Patrice Klein, MD; Spangler Klopp, DE; Michael Kopp, IN; Elizabeth Krushinskie, DE; Dale Lauer, MN; Randall Levings, IA; Anne Lichtenwalner, ME; Tsang Long Lin, IN; Mary Lis, CT; Edward Mallinson, MD; David Marshall, NC; Sarah Mason, NC; Todd McAloon, MN; Gay Miller, IL; Patti Miller, GA; Kristi Moore Dorsey, KS; Lee Myers, GA; Thomas Myers, MD; Kakambi Nagaraja, MN; Steve Olson, MN; Claudia Osorio, MD; Kristy Pabilonia, CO; Mary Pantin-Jackwood, GA; Boyd Parr, SC; James Pearson, IA; Angela Pelzel-McCluskey, CO; Jewell Plumley, WV; Willie Reed, IN; G. Donald Ritter, DE; Lisa Rodin, IN; Keith Roehr, CO; Charles S Roney, GA; A. Gregorio Rosales, AL; Michael Rybolt, DC; Mo Saif, OH; John Sanders, WV; Yuko Sato, IN; David Schmitt, IA; Andy Schwartz, TX; Jack Shere, NC; Marilyn Simunich, ID; Terry Slaten, AL; John Smith, GA; Philip Stayer, MS; Bruce Stewart-Brown, MD; Patricia Stonger, WI; Darrel Styles, MD; David Swayne, GA; Manoel Tamassia, NJ; Alberto Torres, AR; H. Wesley Towers, DE; Deoki Tripathy, IL; Susan Trock, GA; Arnaldo Vaquer, VA; Jesse Vollmer, ND; Shauna Voss, MN; Patricia Wakenell, IN; Don Waldrip, TN; Doug Waltman, GA; James Watson, MS; Steve Weber, CO; Richard Wilkes, VA; Ching Ching Wu, IN; Ernest Zirkle, NJ.

The Committee met on October 21, 2013 from 1:00 to 5:50 PM and October 22, 2013 from 1:00 to 3:15 PM at the Town and Country, San Diego, California. There were 43 Committee members and 41 guests in attendance, for a total of 84 participants. Chair Julie Helm presided. The Chair welcomed the Committee, summarized the 2012 meeting, and reported on the responses to the 2012 Resolution:

Resolution 28 – DHS SUPPORT FOR FOREIGN AND EMERGING ANIMAL DISEASE FUNDING: The USAHA urges that the US Department of Homeland Security support funding for avian influenza vaccine projects.

No response from DHS has been received by USAHA.

Dr. Maurice Pitesky, University of California, Davis, CA, presented the Spatial and temporal Epidemiology of very virulent Infectious Bursal Diseases Virus in California and is included in these proceedings.

Dr. David Suarez, USDA-ARS-SEPRL, Athens, GA, in lieu of Dr. David Swayne, Chair of the Avian Influenza and Newcastle Disease Subcommittee, gave the Subcommittee report. The report was approved by the Committee and is included in these proceedings.

Dr. David Suarez, USDA-ARS-SEPRL, Athens, GA, gave the Southeastern Poultry Research Laboratory Research (SEPRL) Update. The report is included in these proceedings.

Dr. Jane Rooney, USDA-APHIS-VS, Riverdale, MD, in lieu of Dr. Fidel Hegngi, USDA-APHIS-VS, presented the Live Bird Marketing Systems (LBMS) Update. The report is included in these proceedings.

Dr. Thomas Myers, USDA-APHIS-VS, in lieu of Dr. Denise Brinson, USDA-APHIS-VS, National Poultry Improvement Plan (NPIP), Conyers, GA, presented the annual status report for the NPIP and is included in these proceedings.

Dr. John Smith, Fieldale Farms, Baldwin, GA, in lieu of Dr. John Glisson, US Poultry & Egg Association, Tucker, GA, presented the U.S. Poultry & Egg Association Research Report and is included in these proceedings.

Dr. Jamie Slingluff, University of MN, St. Paul, MN, presented the risk assessment associated with live poultry movement in a control area during a HPAI outbreak and is included in these proceedings.

Dr. John Smith, Fieldale Farms, Baldwin, GA, in lieu of Dr. David Shapiro, Perdue Farms, Salisbury, MD, presented the annual industry report for the broiler industry and is included in these proceedings.

Dr. Eric N. Gingerich, Diamond V, Zionsville, IN, delivered the annual industry report for the table egg industry and included in these proceedings.

Dr. Steven Clark, Zoetis, West Jefferson, NC, gave the annual industry report for the turkey industry and is included in these proceedings.

Dr. Michelle Walsh, Augusta, ME, presented the annual report for backyard/small commercial flock report and is included in these proceedings.

The Monday session adjourned at approximately 5:50 PM. The meeting reconvened at 1:00 PM on Tuesday, October 22, 2012.

Dr. Sarah Tomlinson, USDA-APHIS-VS-NVSL, Fort Collins, CO, gave an overview of the National Animal Health Laboratory Network (NAHLN) concept paper and is included in these proceedings.

Dr. Mia Torchetti, USDA-APHIS-VS-NVSL, Ames, IA, delivered the annual status report for NVSL Avian Import Activities and Avian Influenza and Newcastle Disease Diagnostics and is included in these proceedings.

Ms. Brenda Morningstar, USDA-APHIS-VS-NVSL, Ames, IA, delivered the annual NVSL Diagnostic Bacteriology report and is included in these proceedings

Dr. Kristy Pabilonia, Colorado State University, Fort Collins, CO, presented salmonella in poultry at fair, shows and in feed stores and is included in these proceedings.

Dr. Doug Waltman, GA Poultry Laboratory Network, presented an overview of the USAHA Committee on Salmonella meeting. His report is included in these proceedings.

Dr. Michael David, Director of Sanitary International Standards, National Center for Import and Export, USDA-APHIS-VS, Riverdale, MD, was unable to attend the meeting due to the recent Federal Government shutdown, but had sent a report on the update on the World Organization for Animal Health (OIE) poultry activities and is included in these proceedings.

The Avian Diseases & Oncology Laboratory, Lansing, MI, update on current research activities at the laboratory was unable to be presented due to the recent Federal Government shutdown.

Committee Business

Committee Old Business: There was no old business.

Committee New Business: Dr. Dale Lauer, MN Board of Animal Health, Willmar, MN was nominated as the new Chair and Dr. Sarah Mason, NC Department of Agriculture & Consumer Services, Raleigh, NC was nominated as Vice Chair.

The Committee approved a Resolution entitled “Objection to Salmonella linked to human illnesses being declared adulterants” urging USDA to refrain from declaring any serotype of *Salmonella* an adulterant of raw poultry meat products, intact or ground, because this action is scientifically unwarranted and unlikely to result in measurable reductions in the national salmonellosis burden.

The meeting adjourned at 3:15 PM on October 22, 2013.

REPORT OF THE SUBCOMMITTEE ON AVIAN INFLUENZA AND NEWCASTLE DISEASE

David E. Swayne, Chair
USDA-ARS, Athens, GA

Newcastle Disease. Between July 2013 and June 2013, 75 countries had Newcastle disease in poultry or poultry and wild birds, either as suspect cases, infections without clinical disease, infections with clinical disease or limited infections of poultry. An additional five countries had Newcastle disease in wild birds only. Many developing countries are endemic. Few actual outbreaks were reported except in NDV-free countries that reported outbreaks.

High Pathogenicity Avian Influenza. Since 1959, there have been 33 HPAI epizootics. For 2012-2013, H5N1 HPAI was enzootic in six countries: 1) self-declared enzootic (Egypt and Indonesia), 2) continue to report occurrences of outbreaks over multiple years (Vietnam and Bangladesh), or 3) have published data in the literature of continuous reports of infection and molecular evidence of virus continual presence in country (China and east India).

For July 2012- September 2013, 17 countries have reported outbreaks of H5N1 domestic poultry: 12 with H5N1 (Bangladesh, Bhutan, Cambodia, China, Egypt, Hong Kong, India, Indonesia, North Korea, Myanmar, Nepal and Vietnam), two with H5N2 (South Africa and Chinese Taipei), one with H7N3 (Mexico), and two with H7N7 (Australia and Italy).

There were five epicenters of H5N1 HPAI: 1) Egypt; 2) Ganges Delta (India, Bhutan, Nepal and Bangladesh), 3) Mekong Delta (south Vietnam and Cambodia), 4) Indonesia, and 5) east to southeast Asia (China, Hong Kong, North Korea, northern to central Vietnam and Myanmar). For July 2012 – September 2013, six subclades of H5N1 HPAI virus have been reported in poultry and wild birds: 1) subclade 2.3.2.1, most frequently reported with wide geographic dispersion including northern and central Vietnam, India, Bangladesh, China, Hong Kong, India, Nepal, and Bhutan); 2) subclade 2.2.1 viruses in Egypt; 3) subclade 7.2 in northern China and Vietnam; 4) subclade 2.1.3.2 and 2.3.2.1 in Indonesia; and 5) subclade 1.1 in southern Vietnam and Cambodia. Human infections were reported with clades 2.3.4.2 (China), 2.2.1 (Egypt), 2.1.3.2 (Indonesia) and 1.1 (Vietnam and Cambodia).

Five HPAI outbreaks have involved subtypes other than H5N1. An outbreak of H5N2 HPAI began in 2011 in South Africa, affecting only ostriches, and continued until resolution in mid-2013. In total, 50 outbreaks have occurred, affecting 57,569 ostriches resulting in 16,402 cases with 4930 birds being destroyed and 47,677 handled via controlled slaughtered. The outbreak was resolved 3 July 2013.

An unrelated outbreak of H5N2 HPAI occurred in Chinese Taipei, being the second such outbreak in Chinese Taipei with first report on 27 February 2012 and resolved 7 August 2012. This involved native chickens on Penchu Islands with 200 deaths and 631 culled chickens. Chinese Taipei has ongoing outbreaks of North American lineage of H5N2 low pathogenicity avian influenza LPAI) virus with first report on 21 October 2008 and most recent 9 September 2013. The H5N2 HPAI virus was derived from the H5N2 LPAI.

The H7N3 HPAI epizootic in central Mexico has re-emerged. Initial cases were reported in Jalisco 21 June 2012 with last cases on 12 September 2012, and declaration of freedom 12 December 2012. The epizootic reemerged in Aguascalientes 3 January 2013, with 64 total outbreaks in the states of Jalisco, Aguascalientes, Guanajuato and Puebla. In the resurgence, layers, broiler breeders, backyard poultry and broiler farms were affected with 550,322 deaths, 6,230,022 culled and 284,015 slaughtered birds. The most recent case was 19 August 2013.

Two unrelated H7N7 HPAI epizootics have occurred in Italy and Australia. The Australian outbreak began 11 November 2012 in a free-range egg layer farm in New South Wales. The farm experienced 5000 deaths and the remaining 45,000 chickens were culled. The source of the virus was unknown, but farm had a pond with wild ducks. The Italian outbreak occurred in Emilia-Romagna province of Northern Italy, a geographic location of previous HPAI and LPAI outbreaks. The outbreak began on 15 August with the last cases on 4 September 2013. In total, six outbreaks occurred: four in commercial layers, one in turkey flock and one in a backyard free-range layer flock. Deaths numbered 5676 and 946,982 poultry were culled.

SPATIAL & TEMPORAL EPIDEMIOLOGY OF VVINFECTIOUS BURSAL DISEASE VIRUS IN CALIFORNIA

Maurice Pitesky, University of California, Davis, CA

During the winter of 2008, researchers at California Animal Health and Food Safety (CAHFS) identified a more virulent type of Infectious Bursal Disease (IBD) called very virulent IBD (vvIBD) not previously seen in North America in a commercial laying flock in northern California. Since then, several other commercial and backyard facilities mainly northern California have had flocks affected by the same strain and other unique (previously unseen) strains/subtypes of IBD.

The vvIBD-working group, which includes researchers and veterinarians from a wide range of departments and universities including the California Department of Food and Agriculture (CDFA), UC Davis, UC Cooperative Extension, Ohio State University, USDA and the California Department of Fish and Game, has been studying the molecular biology, ecology, and epidemiology of these strains in order to better understand how to manage the disease. Since 2008, these combined efforts have led to: Gross pathology and PCR assays for endemic IBD and vvIBD of over 1,500 bird samples (representing over 200 backyard (BY) and commercial farms throughout California); the development and validation of a PCR assay for historical bursal samples in order to assess if the different versions of IBD (including vvIBD) were present prior to 2008; identification of 4 new subtypes of vvIBDV unique to CA; testing of the various types of the virus in pathogen free birds in order to assess the pathogenicity of the different types of IBD; testing for IBD in wildlife geographically associated with the affected farms; GIS mapping and spatial and temporal statistics of disease spread; advanced decision based modeling which takes data and stakeholder opinions into account; outreach efforts (4-H talks, scientific presentations, peer reviewed articles) with commercial, backyard, regulatory, and the scientific community; and selected paper publications, including Pitesky, ME. Cataline, K. Crossley, B. Poulos, M. Ramos, G. Willoughby, D. Woolcock, P. Cutler, G. Bland, M. Tran, J. Jackwood, D. Allen, L. Breitmeyer, R. Jones, A. Forsythe, K. Senties, G, & Charlton B. *Historical, Spatial, and Time-Space Epidemiology of very virulent Infectious Bursal Disease (vvIBD) in California: A Retrospective Study 2008-2011,* Avian Diseases 2013 (in press); Jackwood, D.J, B. M. Crossley, S. T. Stoute, S. Sommer-Wagner, P. R. Woolcock and B. R. Charlton. *Diversity of genome segment B from infectious bursal disease viruses in the United States.* Avian Dis. 56:165-172, 2012; and Jackwood, D. J., S. E. Sommer-Wagner, B. M. Crossley, S. T. Stoute, P. R. Woolcock and B. R. Charlton. *Identification and pathogenicity of a natural reassortant between a very virulent serotype 1 infectious bursal disease virus (IBDV) and a serotype 2 IBDV*. Virology 420:98-105, 2011.

Conclusions: Based on our surveillance and the molecular epidemiology of the virus we believe the virus was most likely introduced via legal trading of specialty birds between the European Union and one farm in the U.S. that specializes in procuring specialty breeds. That farm then sold infected birds to BY enthusiasts in California where the virus then spread further primarily within the BY specialty bird community. This route of spread is particularly worrisome because of the persistence of the virus in the environment coupled with the general lack of biosecurity that most BY facilities have. California is currently considering multiple approaches toward controlling the spread of vvIBDV. To our knowledge, California is currently the only state with a robust, on-going surveillance program for variant forms of IBD including vvIBD. Due to our current understanding of how BY birds are being 'web-traded' via websites such as Craig's List, we believe IBD surveillance for virulent strains in other states would improve the scientific understanding of this disease.

SOUTHEAST POULTRY RESEARCH LABORATORY (SEPRL) UPDATE ON EXOTIC AND EMERGING POULTRY DISEASES

David E. Swayne, Mary Pantin-Jackwood, David L. Suarez, Laszlo Zsak, Erica Spackman, Darrell Kapczynski, Patti Miller, Stephen Spatz, Qingzhing Yu, and Claudio Afonso; Southeast Poultry Research Laboratory, Athens, Georgia

Avian influenza

The recent outbreaks of H7N9 influenza in China has resulted in many human cases with a high fatality rate. Poultry have been suspected as the source of infection based on sequence analysis and virus isolations from live bird markets, but it's not clear which species of birds are most likely to be infected and shedding sufficient levels of virus to infect humans. Experimental studies with intranasal inoculation of chickens, Japanese quail, pigeons, pekin ducks, mallard ducks, muscovy ducks, and embden geese with A/Anhui/1/2013 virus resulted in infection but no clinical signs. Virus shedding in quail, chickens, and Muscovy ducks was much higher and prolonged than in the rest of the species. Quail effectively transmitted the virus to direct contacts but pigeons and pekin ducks did not. In all species, virus was detected at much higher titers from oropharyngeal swabs than cloacal swabs. The high levels of viral replication in the upper respiratory tract are characteristic of poultry-adapted influenza viruses.

Studies were also conducted looking at co-infection studies with avian influenza and other viral pathogens. Studies with infectious bursal disease demonstrated the expected decrease in the immune response to avian influenza vaccines after early infection with infectious bursal disease. An increase in severe clinical disease was also observed and is likely related to the decreased immune response.

Studies were also conducted looking at avian influenza vaccines with different challenge strains from Indonesia. Indonesia has clade 2.1 viruses, but the virus has considerably drifted since the introduction in 2003. This has resulted in some viruses that were not adequately protected by any of the existing commercially available vaccines. This supports the need to combine surveillance studies to understand what is circulating in a

country with targeted vaccine selection criteria to provide adequate protection for avian influenza through vaccination.

Pathogenesis studies were performed with swine influenza viruses in poultry. Many new variants of H3N2 viruses are circulating in swine in the U.S. and present a historical risk of spreading to turkeys. Studies showed the three variant viruses could infect adult turkeys and quail, but not young turkeys showing an age tropism.

Newcastle Disease Virus:

Research on Newcastle disease virus (NDV) continues with two different areas being highlighted. The first study examined whether virulent NDV, when infecting laying hens, would result in virus being present inside the egg or on the surface of the egg. Naïve and vaccinated birds were studied. The naïve birds did shed virus in and on the egg, and the vaccinated birds had much less virus detected with virus only detected on the egg shell. Studies were also done looking at the variability of NDV around the world and the impact on vaccination programs. It is still correct to believe that NDV is a single serotype, such that a vaccine with any NDV seed strain will be protective against any other NDV virus. However, the closer the match of vaccine to the challenge strain results in better protection as measured by virus shedding, which contributes to disease control and potentially eradication. One approach to make homologous vaccines involves substituting the HN and modified F genes from a virulent strain into a vaccine backbone using a reverse genetics approach. The vaccines strains in laboratory studies performed well in protecting chickens and reducing viral shed.

Enteric Diseases of Poultry:

We continued to analyze the large amount of data accumulated during a comparative analysis of the ribonucleic acid (RNA) virus communities present in selected chicken and turkey gastrointestinal tracts. Specifically, we compared the RNA virus metagenome of a healthy turkey flock and a turkey flock experiencing enteric disease signs. This comparison revealed the presence of a large number of small RNA virus sequences in the affected turkey flock that were not present in the healthy turkey flock. Specifically, a large amount of picornavirus sequence was discovered in turkey flocks experiencing enteric disease signs. Based upon the success of the turkey gut viral metagenome from a flock affected by enteric disease, a comparative metagenome comparing the ribonucleic acid (RNA) viral metagenomes from a healthy flock and a “sister flock” affected by enteric disease was further analyzed. This analysis revealed numerous picornaviruses that were determined to be homologous to the avian turdiviruses and the turkey and duck hepatitis viruses. Further, molecular diagnostic assays targeting the picornavirus capsid protein gene were designed and tested using archived and field enteric samples. We also developed a molecular diagnostic test targeting the novel enteric picobirnaviruses discovered in the turkey gut. This assay was fully validated in our laboratory and targets the novel turkey picobirnavirus ribonucleic acid (RNA)- dependent RNA polymerase (RdRp) gene.

Avian metapneumovirus (aMPV) and Newcastle disease virus (NDV) are threatening avian pathogens that cause sporadic but serious respiratory diseases in poultry worldwide. In our studies, reverse genetics technology was used to construct NDV LaSota vaccine strain-based recombinant viruses that express the glycoprotein (G) of aMPV, subtype A or B, as bivalent, next-generation vaccines. These recombinant viruses, rLS/aMPV-A G and rLS/aMPV-B G, showed slight attenuation in vivo, yet maintained similar growth dynamics, cytopathic effects, and virus titers in vitro when compared to the parental LaSota virus. Vaccination of turkeys with rLS/aMPV-A G or rLS/aMPV-B G conferred complete protection against velogenic NDV, CA02 challenge strains and partial protection against homologous pathogenic aMPV challenge. These results suggest that the LaSota recombinant virus and other low pathogenic NDV vaccines, including enterotropic strains may be safe and effective vaccine vectors against respiratory and enteric pathogen induced poultry viral diseases.

Avian Herpesviruses (Marek’s Disease and Infectious Laryngotracheitis):

To construct cell-free Marek’s disease vaccine candidates three herpesvirus of turkey (HVT) recombinants were generated in order to create an HVT helper virus. The first recombinant contained a single deletion in the packaging site. The second recombinant contained deletions in both packaging sites. The third recombinant containing double deletions in the packaging sites also contained a packaging site flanked by lox P sequences. The viability of this third recombinant was assessed on CEFs expressing the Cre recombinase and its complete genomic sequence was determined. Previously using a three step recombination scheme it was believed that this construct was successfully created; however, the complete nucleotide sequence of this recombinant indicated that the construct contained a deletion in a critical cis-acting site needed for packaging. In 2013 this construct was successfully repaired to be packaging competent.

The genomic ILTV program involved comparative analysis of virulent and vaccine strains of gallid herpesvirus type 1. In collaboration with the University of Georgia the nucleotide sequences of six vaccine strains [derivative of chicken embryo origin (CEO) and tissue culture origin (TCO)] was determined using hybrid next generation sequencing technology. The sequences of these strains have been instrumental in the identification of genes associated with virulence and will provide the blueprints for the generation of new vaccine containing deletion in these genes. Comparative sequence analysis between the vaccine strains and virulent strains indicated surprising conservation at the amino acid lengths of the majority of open reading frames. However,

numerous single nucleotide polymorphisms were identified and it is largely suspected that virulent isolates were the result of reversion of the vaccines to generate virulent progeny. Furthermore we have identified a gene within the TCO genome that contains a premature stop codon which results in a truncation protein for the ORF-C gene. By deleting this gene in a genome of a virulent virus, we could generate a potential vaccine strain that is safe and can protect poultry against virulent challenge.

2013 LIVE BIRD MARKETING SYSTEM (LBMS) NOTIFIABLE AVIAN INFLUENZA (NAI) PROGRAM WORKING GROUP REPORT

Fidelis N. Hegngi, National Center for Animal Health Programs
USDA-APHIS-VS, Riverdale, MD

In October 2004, the United States Department of Agriculture (USDA), Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) published Uniform Standards for NAI Prevention and Control in the LBMS to establish a more consistent approach by participating States in the control of NAI in the LBMS. In August 2012, VS published an updated edition of the Uniform Standards, which includes: adding of the definition of cleaning and disinfection and dealers. The definition of poultry was changed to reflect the OIE standard definition. Significant changes were made to the Bird Testing and Recordkeeping section. The use of rRT-PCR for testing domestic duck cloacal samples was added to the Official Testing of Specimens section.

State participation is voluntary. Participating States will enact regulations for compliance of their live bird markets (LBMs), producers, and distributors. All LBMs, producers, and distributors that supply the retail markets must be registered or licensed with the State and allow Federal and State inspectors access to their facilities, birds, and records. These facilities must also have written biosecurity protocols in place. APHIS coordinates and administers the program. APHIS provides field and laboratory personnel and resources to assist States with implementation and compliance with program requirements.

In February 2013, the annual LBM Working Group business meeting was held in Seattle, Washington, to address the LBMS NAI Prevention and Control program concerns. More than 55 participants representing 32 States attended the meeting including APHIS field, regional, and headquarters staff; State Department of Agriculture representatives; and LBMS industry stakeholders. Participants discussed the program's progress, shared ideas for continued program development, and agreed on further implementation of the program.

In addition, the working group discussed: (1) FY2013 Avian Health umbrella cooperative agreement work plans ; (2) VS guidance document on response, communications, and investigation of NAI in domestic poultry; (3) trans-border communication for foreign animal disease preparedness; (4) laboratory diagnostic support for foreign animal disease preparedness and response; (5) update on H7N3 HPAI outbreak in Mexico; (6) VS guidance document on procedures for flock plans, compliance agreements and indemnity claims in cases of H5/H7 LPAI in poultry; (7) methods for collection of specimens for AIV and NDV; (8) the National Veterinary Services laboratories (NVSL) 10-4 submission form and reporting of results. Special presentations were given on: risks of avian influenza and Newcastle disease from wild water birds in Washington State; human Salmonella infections associated with live bird markets; the National Animal Health Monitoring System (NAHMS) urban chicken study and plans for 2013 layer study. Further, the Agricultural Research Service and NVSL discussed avian influenza research and diagnostic updates. The working group also learned about the Poultry Handling and Transportation Quality Assurance (PHTQA) training program. This project is a collaborative effort between personnel from Pennsylvania State University, Diamond V and USDA-APHIS-VS. The program involves certification training for poultry transporters and catch crews. The training covers biosecurity, disease recognition, the American Veterinary Medical Association (AVMA) approved methods of euthanasia, transportation, safety, emergency response and media relations. Training materials are available in English and Spanish. The website address for this program is *www.poultryhandling.org*.

The annual Live Bird Marketing System Continuing Education (LBMS-CE) Training Course was held at the Western University of Health Sciences, College of Veterinary Medicine, Pomona, California, in August 2013. A total of 57 participant attended from15 States. The LBMS-CE Training Course is designed to provide veterinary medical officers (VMOs), animal health technicians (AHTs), and other regulatory personnel who are involved with the live bird marketing system program with the basic information and skills they need to successfully carry out their job responsibilities. The goals and objectives of the course are to provide participants with the ability to: (1) evaluate and define LBMS stakeholder activities and ensure compliance with applicable state laws, program standards, and licensing/registration requirements through consistent audit and evaluation of paper records within the LBMS; (2) identify and evaluate biosecurity and disease risks in auction markets, swap meets, small sales, fairs, shows, and flea market segments of the LBMS; (3) provide education and outreach information to bird marketers on appropriate mitigation techniques (e.g., cleaning, disinfection, best biosecurity principles and practices, and transport to retail market); (4) communicate knowledge regarding biosecurity issues and best

practices to various stakeholder groups via pre-prepared presentations; (5) define the different components of the LBMS; (6) understand the essential symptoms of poultry respiratory diseases; (7) learn the basic information and skills required for LBMS NAI surveillance activities; (8) identify where the U.S. LBMS NAI surveillance program fits within the context of a State's avian influenza response and containment plan; (9) identify the roles of VMOs and AHTs in supporting the implementation of activities and standards proposed by the LBMS Working Group subcommittees; (10) develop evaluation tools for risk assessment and risk communication, and determine what type of biosecurity certification system is appropriate for extending training to LBMS stakeholders; (11) define poultry-related issues involving social cultures within the various LBMS; and (12) perform proper techniques of bird restraint, swabbing, blood collection, necropsy, rapid field diagnostic tests (Zoetis Flu Detect and Abaxis VetScan Avian Influenza Rapid Test), and euthanasia techniques.

The training also included field trips to evaluate biosecurity and records auditing at several retail live bird markets in China town, Los Angeles, California. Participants also visited a spent hen and brown pullet supplier for the California live bird markets to conduct an emergency scenario exercise.

In fiscal year (FY) 2013, surveillance in the LBMS remains a high priority. Approximately 149,232 tests have been conducted for AI surveillance in the LBMS for the first three quarters. Tests included agar gel immunodiffusion, real-time reverse-transcriptase polymerase chain reaction (rRT-PCR), antigen capture immunoassay, and virus isolation. For virus isolation and rRT-PCR, each sample may represent five or eleven individual swabs pooled for a composite single sample/test.

Since the H5/H7 LPAI LBMS program was initiated in 2004, the number of LBMS positive premises has decreased steadily. FY2007 marked the successful eradication of the low pathogenicity H7N2 AI virus that had been circulating in the LBMS in the Northeast United States since 1994. The H7N2 virus has not been detected since April 2006. In FY 2013, there was one detection of H5N2 LPNAI virus in the LBMS. In addition, there were four detections of H5 viral RNA with no virus isolated. Detection was from multiple ducks and red fowl.

NATIONAL POULTRY IMPROVEMENT PLAN 2013 ANNUAL REPORT

Denise L. Brinson
USDA-APHIS-VS, Conyers, GA

Pullorum-Typhoid Status: There were no isolations of *Salmonella* pullorum in commercial poultry in FY 2011 or FY 2012. There were 2 isolations of *Salmonella* pullorum in backyard birds in FY 2011. There were no isolations of *Salmonella* pullorum in any type of poultry in FY 2013. There have been no isolations of Salmonella *gallinarum* since 1987 in any type poultry in the US.

Hatchery Participation in the National Poultry Improvement Plan Testing Year FY2013	
Egg and Meat-Type Chickens: Participating	**250**
Turkeys: Participating	**33**
Waterfowl, Exhibition Poultry and Game Birds: Participating	**788**

Egg-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2013	
U.S. Pullorum-Typhoid Clean Flocks	**262**
Birds in Flocks	**8,287,331**
Birds Tested	**42,889**

Meat-Type Chicken Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2013	
U.S. Pullorum-Typhoid Clean Flocks	**6,286**
Birds in Flocks	**100,100,705**
Birds Tested	**239,726**

Turkey Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2013	
U.S. Pullorum-Typhoid Clean Flocks:	**503**
Birds in Flocks	**4,754,650**
Birds Tested	**18,356**

Waterfowl, Exhibition Poultry, and Game Birds Breeding Flocks in the National Poultry Improvement Plan Participation and Testing Summary Testing Year FY2013	
U. S. Pullorum-Typhoid Clean Flocks	**6,001**
Birds in Flocks	**1,764,432**
Birds Tested	**147,980**

***Mycoplasma* gallisepticum*, Mycoplasma* synoviae, and *Mycoplasma* meleagridis positive breeding flocks - National Poultry Improvement Plan FY2013**				
	WEGBY	Egg-Type	Meat-Type	**Turkeys**
M. gallisepticum	38	0	5	7
M. synoviae	30	0	86	4
M. meleagridis	0	0	0	1

U.S. *Salmonella enteritidis* Clean Egg-Type Breeding Chickens No. of flocks and birds in flocks by State with *Salmonella* enteritidis isolates, 1990-2013			
Arkansas	**Environmental**	**Dead Germ**	**Birds**
Flocks	1		2
Birds in Flocks	6,000		15,000
Georgia			
Flocks	3	2	
Birds in Flocks	30,400	46000	
Illinois			
Flocks	3	2	1
Birds in Flocks	3,900	3700	1200
Indiana			
Flocks	15	2	1
Birds in Flocks	158,345	27,479	15,092
Kentucky			
Flocks	1		
Birds in Flocks	6,625		
Ohio			
Flocks	17		9

U.S. *Salmonella enteritidis* Clean Egg-Type Breeding Chickens No. of flocks and birds in flocks by State with *Salmonella* enteritidis isolates, 1990-2013			
Birds in Flocks	192,700		91,600
Oregon			
Flocks	2		
Birds in Flocks	19,516		
Pennsylvania			
Flocks	16		6
Birds in Flocks	166,385		78,450
Texas			
Flocks	1		
Birds in Flocks	10,000		

Salmonella enteritidis Phage Types for U.S. *Salmonella enteritidis* Clean Egg-Type Breeding Chickens		
Phage Type 13	**Environmental**	**Dead Germ**
Flocks	11	2
Birds in Flocks	152,000	3,700
Phage type 13A		
Flocks	5	2
Birds in Flocks	54,321	27,479
Phage type 2		
Flocks	2	
Birds in Flocks	28,900	
Phage type 23		
Flocks	21	
Birds in Flocks	16,000	
Phage type 28		
Flocks	2	2
Birds in Flocks	15,000	46,000
Phage type 34		
Flocks	2	
Birds in Flocks	12,500	
Phage type RNDC		

Flocks	1	
Birds in Flocks	7,000	
Phage type-Untypable		
Flocks	2	
Birds in Flocks	24,000	
Phage type 8		
Flocks	21	
Birds in Flocks	237,701	

Egg-type Chicken breeding flocks with isolates of *Salmonella enteritidis* by phage type and by year 1989-2013		
Year	**No. Flocks**	**Phage Type**
1989	1	13A
1990	11	13A, 13, 8, 28
1991	12	13A, 13, 8
1992	10	Untypable,13A,8,28,34
1993	5	Untypable, 8, 2
1994	3	13A, 8
1995	2	13A, 28
1996	5	Untypable, RNDC, 13A,8,2
1997	2	8
1998	2	8
1999	1	13
2000	4	13, 8
2001	1	13
2002	0	
2003	0	
2004	0	
2005	1	13
2006	1	34
2007	4	13, 8
2008	3	8
2009	0	
2010	3	8(2), 13
2011	0	
2012	0	
2013	0	

U.S. *Salmonella* enteritidis Clean Egg-Type Breeding Chickens No. of flocks and birds in the flocks with *Salmonella* enteritidis isolates, 1990-2013			
	Environmental	**Dead Germ**	**Bird**
Flocks	71	6	19
Birds in Flocks	706,871	77179	201,342

USPOULTRY RESEARCH PROGRAM CELEBRATES 50 YEARS OF ACHIEVEMENT

John R. Glisson
US Poultry & Egg Association, Tucker, GA

The current research program at USPOULTRY has a long and productive history. The program was started over 50 years ago by the Southeastern Poultry & Egg Association (SEPEA) in response to the need of the poultry industry for research directed toward solving the most important problems facing the industry. Over these five decades the program has advanced in size, scope, and organization to become an indispensable asset of the US poultry industry and has helped the industry overcome many of the hurdles which impaired its development and success.

During the early years of the development and organization of the United States poultry industry, one of the most limiting factors to success was the widespread incidence of disease in broiler, breeder, layer, and turkey flocks. As farms grew larger and production intensified, new diseases appeared for which control measures did not exist. The poultry industry desperately needed research to be conducted which could find solutions to some of these disease problems. In 1962, in response to this urgent need the SEPEA created a research program. The first two grants were awarded in 1963. Dr. Allen Edgar at Auburn University received $5,000 to study control measures for infectious bursal disease (Gumboro disease). Dr. Frank Craig, North Carolina State University, received $2,500 to also study infectious bursal disease. In 1964, a third grant of $5,000 was received by Dr. Sam Schmittle, University of Georgia, to study the control of Marek's disease. Although the program's beginning was

modest, the concept proved to be very successful. The interests and needs of the poultry industry fueled the continued expansion and development of the research program.

In the early years, researchers would simply submit research proposals to the Board of the Southeastern Poultry & Egg Association for consideration. The Board had a Grants Committee that would review all proposals and recommend to the Board which proposals to fund. In 1982 the Board created the Technical Advisory Committee (TAC) which was made up of technical experts from various companies in the poultry industry. This committee established a list of research topics which were considered to be the priority topics of interest for the research program. In addition, the committee established an annual deadline for submission of research proposals. The TAC reviewed all research proposals and recommended proposals for funding to the Board. The creation of the TAC and the implementation of research priorities and an annual funding timeline provided much of the structure we see in the program today.

As the program grew in the 1980's, the administrative activities required to operate the program also grew. In 1985, Dr. Morris Cover joined the staff of SEPEA as the first Director of Research Programs. During Dr. Cover's tenure the research priorities were expanded beyond the traditional topics of poultry production to include product quality, food safety and food technology. In 1993, Dr. Charles Beard joined SEPEA as the Vice President of Research and Technology and served the organization until 2010. During those years the research program expanded greatly in terms of the number of research projects funded, the scope of topics funded, and total dollars awarded. The program expanded to two proposal submission deadlines per year, one in the spring and one in the fall. The TAC was renamed the Research Advisory Committee (RAC). The submission of research proposals was greatly improved by the addition of a one-page pre-proposal which the researchers could submit to determine whether the RAC was interested in receiving a full research proposal on the topic. This allowed the submission of many diverse research ideas and allowed the RAC to easily determine which pre-proposals should be invited for full research proposals. In 2005, the research program became jointly funded by USPOULTRY and the USPOULTRY Foundation. The RAC was renamed the Foundation Research Advisory Committee (FRAC). When Dr. Beard retired, Dr. Henry Marks joined the organization (renamed the U.S. Poultry & Egg Association in 1997) as Research Coordinator and administered the program until 2011. In 2011, Dr. John Glisson joined USPOULTRY as the Director of Research Programs.

The good idea that the SEPEA Board had in 1962 to form a research program has grown to become a very big and important idea today. Since that first $5,000 grant in 1963 the USPOULTRY research program has funded over $25,000,000 in research grants. This investment in research and innovation by the USPOULTRY research program has been a vital component in the impressive growth and success of the U.S. poultry industry. Today the USPOULTRY research program funds research in 19 topic areas at research institutions all over the country. USPOULTRY and the USPOULTRY Foundation are committed to growing the research program and continuing to support the needs of the poultry industry through research.

RISK ASSESSMENT ASSOCIATED WITH LIVE POULTRY MOVEMENT IN A CONTROL AREA DURING A HIGHLY PATHOGENIC AVIAN INFLUENZA OUTBREAK - 2013 BROILER &TURKEY RISK ASSESSMENT WORK GROUP REPORT

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Todd Weaver, USDA APHIS VS CEAH, Fort Collins, CO

Risk managerial decisions involving live bird movements from premises located in a HPAI Control Area are highly consequential and have a considerable impact on business continuity. Past outbreak experiences indicate that live bird movements without adequate mitigation measures can contribute to spread of AI infections, while not moving live birds results in animal welfare issues and direct losses to producers as a result of depopulation. Assessing the risk of movement of live birds involves additional complexities as some of the simplifying assumptions and mitigation strategies used in other the poultry commodity assessments are not applicable. In the case of live bird movement risks assessments, the likelihood of a flock being infected as well as the likelihood of the infected flock being undetected by the time of movement have to assessed.

In the broiler and turkey sector working groups, we have made progress in discussion and evaluation of risk pathways, strategies and mitigation measures. One of the strategies being considered in these groups is to have a pre-movement isolation period ahead of the scheduled live bird movement date. In essence, this isolation period involves implementing enhanced biosecurity for some days prior to the movement date. The strategy is beneficial in minimizing the likelihood of the flock becoming exposed close to the scheduled movement date in which case the detection likelihood may be lower. Exposure and infection of the flock much before the scheduled movement day (e.g, more than 5 days) is likely detected by movement day and is unlikely to represent movement associated

risks. Some critical operational contacts such as feed delivery would continue to occur during the pre-movement isolation period with strict biosecurity.

There may still be a residual likelihood of the premises becoming infected after implementing heightened biosecurity due to components of local spread such as aerosols and flies. In the baseline scenario, our approach is to determine a distance beyond which such local spread components would represent a low risk for disease transmission. A combination of information sources including modeling, literature review and expert opinion are being utilized to evaluate the transmission likelihood for these pathways.

We have also evaluated various active surveillance options proposed by the working group members using quantitative simulation models. The primary surveillance protocol in both the broiler and turkey groups involved the testing of two pooled samples of swabs from dead birds via RRT-PCR (matrix gene) before movement of live poultry. Supplementary antigen capture testing by industry was also evaluated and the analysis thus far suggests some potential benefit under specific scenarios. However given the uncertainty regarding the test characteristics, further research on their performance for different HPAI strains and sample types is required.

In summary, objective science based risk assessments developed through an inclusive process with the participation of various stakeholders are critical to inform risk management decisions associated with live bird movements.

2013 Activities - Broiler Sector Working Group (Conference Calls every 2-3 weeks)

- Broiler Hatching Egg RA
  - Completed (June 2012)
- Broiler Day Old Chick RA Review Process
  - CEA H review complete (Sept 2013)
  - NCAHEM review pending (Oct 2013)
- Broilers to Slaughter RA Writing
  - RA writing process started (March 2013)
- Secure Broiler Supply
  - Initial draft started (Sept 2012)
- Secure Broiler Supply Website
  - Started Secure Broiler Supply website development (March 2013)

2013 Activities - Turkey Sector Working Group (Conference Calls every 2-3 weeks)

- Turkey Hatching Egg RA, Review Process
  - RA draft in review, CEAH (Oct 2013)
- Turkey Day Old Poult Risk RA, Review Process
  - Finalizing Draft (Sept 2013)
- Turkeys to Slaughter RA Writing
  - Discussions for framing RA, Scope, Risk Pathways and Information gathering (Fall 2013)

BROILER INDUSTRY ANNUAL REPORT

David Shapiro
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Broiler Production: Production thus far in 2013 is ahead of the same period in 2012 and is projected to be 2.1% higher for the year. Average broiler weight has increased slightly. Production costs, especially feed costs continue to put tremendous economic pressure on broiler production.

Mortality: First week mortality over the first half of 2013 is slightly higher than the same period in 2012. A relative shortage of hatching eggs may be contributing (increased usage of hatching eggs from very young and very old breeder flocks). Chick quality was also identified by broiler veterinarians as a current key issue. Total mortality during the first half of 2013 was more than 0.25% higher than the same period in 2012. This was reflected in most weight classes but was more pronounced in the heavier broiler classes.

Condemnations: Whole Body Farm Condemnations + Parts Condemnations increase from 0.470% in the first half of 2012 to 0.536% in the first half of 2013. All of the major condemnation categories strongly related to infectious disease (Septox, Airsac, IP, and Leukosis) increased. The greatest increase (both in percentage and absolute terms) was in the Airsac category, which strongly supports the concerns expressed by broiler veterinarians regarding new strains of Infectious Bronchitis.

Key Broiler Health Issues: Coccidiosis was listed more than any other disease as a major issue by broiler veterinarians. This reflects not only the actual frequency of diagnosis or treatment of coccidiosis but also a decrease in the efficacy of some coccidiostat programs as roxarsone usage stopped. It may also be the result of the challenges associated with chemical coccidiostat and coccidiosis vaccine programs. E. maxima was the

species most often mentioned by broiler veterinarians. Necrotic Enteritis also ranked high as a disease issue and would be often associated with inadequate control of E. maxima. Novel strains of reoviruses continue to cause tenosynovitis in many broiler operations. Use of autogenous vaccines in the parent stock is most common intervention. Infectious Bronchitis, primarily emerging strains such as the GA-08, seriously degraded broiler respiratory health. Affected birds often showed only modest clinical signs and lesions during growout but high airsac condemnations due to a partially 'silent' abdominal, E. coli complicated airsacculitis. Existing IB vaccines have been ineffective. Locally produced vaccines have showed some protection and USDA licensed vaccines are expected before year's end. Kinkyback or Vertebral Osteoarthritis continues to be a commonly mentioned problem. Treatment (antibiotics) and management interventions (layout) have been moderately effective. IP, Gangrenous Dermatitis, and Chick Quality/Cull Chicks were listed by 18% of responding broiler veterinarians as key issues. Other conditions listed as important by 12% or less of the responding veterinarians include: conditions related to E. coli, Mycoplasma synoviae, non-infectious leg problems, RSS, Marek's, DOAs, and Newcastle disease.

Key Non-Disease Broiler Issues: Loss of use of effective drugs was listed by the most broiler veterinarians as a key issue. This could include loss of a drug (e.g. roxarsone) or restriction of use of drugs due to market requirements or public opinion. It should be noted that the decreased usage of some drugs is more a result of marketing imperatives (e.g. "antibiotic-free", "organic"), pressure from consumer groups, or indirect regulatory actions; than rational veterinary decisions or credible threats to public health. Increased regulation is also a major issue. This can come from multiple sources. The USDA/FSIS has increased monitoring and oversight of Salmonella and other food pathogens in the plant and such food safety regulation is slowly being extended to farms. Testing results and notices of nonconformances which were previously confidential are now posted on the internet by the USDA. The FDA has dramatically increased inspection of farm and hatchery sites with regard to both the shell egg rule and hatchery antibiotic usage. More stringent environmental regulations at both the federal and state levels have made litter management and manure disposal more challenging, in some cases, restricting the frequency at which houses can be cleaned out (or new housing constructed). Poultry welfare is now a major aspect of any broiler veterinarian's job, occupying up to 20% of his/her time in some cases. Its importance can take the form of writing welfare programs, coordinating audits, balancing scientifically supportable welfare stances with what the public thinks chicken like, and formulating corrective actions for non-conformances. Food safety issues, such as Salmonella spp. and Campylobacter spp. continue to pose critical challenges, not only in the form of regulatory requirements but also as a serious matter in dealings with customers and the public. Export restrictions due to some country's MRLs (restricting use of some drugs) or AI-related trade bans (often excessively broad or lengthy were noted as business hampering situations. Wooden breast (hard muscle, plank breast), a non-infectious condition where the superficial breast muscle is unusually turgid was listed as a problem by multiple companies. Other non-disease topics listed as important problems include white striping, effective utilization of alternative feed ingredients, future status of the NPIP, grain prices, need for more efficient vaccine licensing, inaccurate condemnation dispositions, and economic pressures on contract growers. While some issues, both disease and non-disease, were only mentioned by a small number of respondents, given the large number of birds for which any broiler veterinarian is responsible, any topic mentioned by any broiler veterinarian is likely of significant importance industry-wide; just prioritized differently.

US TABLE EGG INDUSTRY UPDATE

Eric Gingerich
Diamond V, Zionsville, IN

Overall health of the national table egg layer flock continues to be very good. There are no major clinical disease problems occurring at this time. This is due to the several resources and practices available to the industry:

Continued availability of high quality vaccines

Flock supervision from professional, well-trained flock service technicians

Readily available veterinary technical assistance from primary breeder, vaccine company, diagnostic laboratory, feed additive suppliers, and consulting veterinarians

High quality nutrition provided by professional nutritionists

Housing of a majority of layers in environmentally controlled facilities in cages without exposure to litter

Use of sound biosecurity practices.

Continual surveillance for foreign animal diseases or potentially highly pathogenic agents such as Newcastle and avian influenza by our state and federal laboratory system

A poll of the Association of Veterinarians in Egg Production (AVEP) was conducted within the last month. The members were asked to rate a list of common diseases of caged and cage-free pullets (23 and 24 conditions listed respectively) and caged and cage-free layers (32 and 33 conditions listed respectively) as to their prevalence and their importance in their area of service on a scale of 0 to 3 with 0 = not seen, 1 = seen but not common, 2 = commonly seen, and 3 = seen in a majority of flocks. For the importance question, they were asked to give a value of each disease to a company in their area of service on a scale of 0 to 3 with 0 = not important issue for flock health or economics to 3 = very important issue for flock health and economics. Approximately 20 members answered the survey.

To follow are the results of prevalence and importance of chick issues:

	Caged Pullets		Cage-Free Pullets	
	Prevalence	**Importance**	**Prevalence**	**Importance**
Yolk Infections	1.32	1.26	1.47	1.50
Starveouts	1.14	1.05	1.21	1.19

Chick mortality problems are normally associated with small chicks, poor sanitation in the hatchery, or a lack of proper brooding management on the grow farm. As this problem continues high on the prevalence list, the emphasis on solving this issue is apparently not being addressed successfully.

The survey revealed the following top 5 diseases of concern occurring in US for growing pullets excluding chick yolk infections and starveouts:

Top 5 Caged Pullet Diseases		Top 5 Cage-Free Pullet Diseases	
Prevalence	**Importance**	**Prevalence**	**Importance**
1 – Coccidiosis (1.18)	1 – Coccidiosis (1.68)	1 – Coccidiosis (1.37)	1 – Coccidiosis (1.81)
Tie 2 – Necrotic enteritis (0.86)	2 – Marek's (1.63)	2 – E. coli (1.00)	Tie 2 – E. coli (1.38)
Tie 2 – E. coli (0.86)	Tie 3 – E. coli, Infectious bursal disease (IBD), Infectious laryngotracheitis (ILT), necrotic enteritis, and post SE bacterin hepatitis (1.37)	3 – Piling (0.94)	Tie 2 – Marek's (1.38)
4 – Marek's (0.82)		4 – Marek's (0.89)	4 – Post SE bacterin hepatitis (1.25)
5 – Post SE bacterin hepatitis (0.80)		5 – Mycoplasma synoviae (0.84)	5 – ILT (1.18)

The rearing of flocks on litter and exposure to feces complicates coccidiosis in cage-free situations. Coccidiosis is an increasing problem in caged pullets as well with vaccine usage as an intervention on the rise. Marek's Disease in caged pullets is due to early exposure to Marek's virus laden dust from the prior flock in the house or neighboring pullets in a multi-age unit. Marek's vaccine requires 5 to 7 days to provide full immunity. Marek's in cage-free flocks is also an issue due to the reduced ability to sanitize cage-free facilities between flocks compared to cage houses. SE bacterin induced hepatitis is a new item this year and apparently is being seen somewhat frequently. This syndrome can result in up to 7 percent mortality starting 2 weeks after the administration of SE bacterin. The cause of this problem continues to be unknown at this time.

Infectious bursal disease (IBD) is its subclinical form may lead to immunosuppression after the maternal antibody has subsided. The use of the recombinant HVT-vectored IBD vaccine has greatly aided those sites with problems.

To follow are the top 5 diseases for caged and cage-free layers from the survey:

Top 5 Caged Layer Diseases		Top 5 Cage-Free Layer Diseases	
Prevalence	**Importance**	**Prevalence**	**Importance**
1 – Ms (1.81)	1 – E. coli (1.89)	1 – Cannibalism (1.81)	1 – Cannibalism (2.00)
2 – E. coli (1.62)	Tie 2 – Calcium depletion (1.78)	2 – Ms (1.48)	2 – E. coli (1.89)
3 – Calcium depletion (1.57)	Tie 2 – Infectious bronchitis, IB (1.78)	3 – E. coli (1.43)	Tie 3 – Calcium depletion (1.61)
4 – M gallisepticum, Mg (1.48)	Tie 2 – Mg (1.78)	4 – Coccidiosis (1.24)	Tie 3 – Mg (1.61)

5 – Mites (1.33)	5 – Focal Duodenal Necrosis, FDN (1.56)	5 – Mites (1.14)	5 – FDN and IB (1.44)

Cannibalism continues to be seen especially in high light intensity situations in cage-free flocks. In these cases, the 10-day or younger rule for beak trimming result in longer beaks than desired compared to a beak trim at 4 to 8 weeks and results in an increase in incidence and severity of cannibalism. As this is a major problem for cage-free flocks, genetics companies are placing more emphasis on reducing this trait. The increasing use of large colony cages may also increase the level of cannibalism.

Colibacillosis is a problem mainly of young flocks with mortality rates of 0.5 to 4% per week starting shortly after housing can occur. It is felt that this condition is most often secondary to upper respiratory challenges with Mg, *Mycoplasma synoviae* (Ms), ammonia, infectious bronchitis (IB), etc. It also may be a primary problem if water lines are contaminated with *E. coli*. The overall incidence of early colibacillosis was about the same as last year, 1.52. A post-molt colibacillosis syndrome is also seen in some flocks due to declining immune system function, an ascending infection of the reproductive tract, upper respiratory infections, etc. The live E. coli vaccine, introduced in mid to late 2006, has been increasingly used successfully as both a preventative and as a treatment in the face of an outbreak in most areas.

Calcium depletion is normally associated with low intake of calcium, phosphorus, and/or vitamin D3 especially early in production with low feed intakes. This condition will be an ongoing issue with increasingly higher egg production rates through improvements in management and genetics.

Infectious bronchitis (IB) has a low prevalence in flocks but crept into the picture due to its importance where found. Variant strains of IB are usually the problem. Incorporating all of the available vaccine strains into the pullet program, making sure the pullet live and killed vaccines are administered properly, and/or utilizing a live booster program in lay are utilized in response to these problems.

An external parasite, the Northern Fowl Mite, has risen to prominence in cage layers in past years' surveys. The difficulty in treating this condition, in cages and in cage-free flocks, has likely led to this increase. Spray treatment of caged layers is difficult due to the configuration of equipment. Elemental sulfur in dust baths is being used very successfully in cage-free flocks. Feeding of elemental sulfur will aid in reducing numbers of mites on birds as well. Decontamination of pullet moving trucks and equipment may also be lacking especially if the equipment was used previously for mite-infested spent fowl movement.

Focal duodenal necrosis (FDN), felt to be due to *Clostridium colinum,* is an under-diagnosed problem. It is felt to be a widespread subclinical disease with lesions in the duodenum, and results in losses of egg weight gain and/or egg production depending on the severity of the infection. The use either of the antibiotics chlortetracycline or bacitracin is used successfully for treatment and/or prevention. Fermentation metabolite, probiotic, prebiotic, and botanical products are being evaluated for their usefulness in prevention of FDN.

Mycoplasma synoviae (Ms) is a very prevalent disease in multi-age complexes but has little significance in most cases due to its low pathogenicity.

Mycoplasma gallisepticum (Mg) continues as an issue in multi-aged facilities and is successfully controlled in most cases through vaccination. Each complex must customize its vaccination program to control the strain on the farm. Ts-11 and 6/85 live vaccines are used for controlling mild strains of Mg while F-strain live vaccine is being used to control more pathogenic strains or where the Ts-11 or 6/85 vaccines are no longer effective. The live pox-vectored recombinant Mg vaccine is being used in a variety of situations and appears to be useful in low challenge situations. Vaccine failures with all vaccines are somewhat common and the unit must resort to medication programs using tylosin or tetracycline antibiotics. Most all operators are now applying the F-strain vaccine by eyedrop rather than spray in an effort to increase its efficacy.

Diseases under control and of low incidence are as follows: Marek's, vaccinal infectious laryngotracheitis (vILT), fowl coryza, and urolithiasis/gout. These diseases tend to be localized to a region or a farm. The pox-vectored recombinant ILT vaccine has been determined to not be a replacement for chick embryo origin (CEO) vaccines in high challenge areas. The HVT-vectored ILT vaccine continues to show good results in high challenge regions and should reduce the amount of CEO vaccine used in layer flocks that may spread to broilers. Fowl coryza is a regional disease (Maine, California, Florida, and south Texas) and is controlled well by the use of commercial bacterin. Gout is almost exclusively due to feeding of excess calcium to birds not yet sexually mature or feeding inadequate phosphorus to birds at any stage of life.

Diseases that are very rarely a problem for table egg layers are pox, Newcastle, infectious bursal disease, chick anemia virus, erysipelas, and fowl cholera. The area where the very virulent IBD outbreaks (vvIBD) seen in northern California in Dec08 and May09 have not shown a recurrence of the disease in layers but apparently may still be present in broiler flocks.

The AVEP survey also asked about other issues and diseases of concern on a scale of 0 to 3 with 0 = no concern, 1 = some concern, 2 = moderately concerned, and 3 = very high concern. The opinions of the 20 respondents is as follows:

Issue (20 respondents)	Average 2012	2013
Avian Influenza (AI)	1.55	2.00
Lack of Effective Treatments	2.15	2.43
SE and FDA Egg Safety Rule	2.55	2.29
S. heidelberg and Egg Safety Rule	2.45	1.90
Welfare in General	2.33	2.15
Beak Trimming	1.70	1.50
Disposal of male chicks	1.40	1.25
On-Farm Euthanasia	1.95	1.80
Molting of Layers	1.60	1.35
Banning of Cages	2.60	2.35
Adoption of Enriched Cages	N/A	2.11
Supply of Useful Vaccines	1.20	1.05

Concern for SE and its consequences continues due to the ongoing possibility of human outbreaks as occurred with the egg recall of 2010 involving two Iowa operations in August 2010. The Egg Safety Rule was implemented on July 9, 2010 for flocks over 50,000 layers. Flocks of between 3,000 and 50,000 joined the program on July 9, 2012. The inspections for these smaller units began in late 2012 and early 2013.

The FDA Egg Safety Program entails obtaining chicks from NPIP SE Clean breeders, rodent and fly monitoring and control programs, biosecurity, cleaning and disinfection of premises, training of persons involved, testing of manure samples at 14-16 weeks, 40 to 45 weeks, and 6 weeks after molt. If any of the manure tests are positive for SE, egg testing must take place. The producer funds all testing and compliance efforts. Laboratories have managed to gear up to handle the increased testing load this requires. Producers with a manure positive swab test are holding eggs from the market until after the test results of eggs are obtained. The use of DNA based tests are now being used that minimize the time of testing from the formerly required 10 days for culture to as low as 27 hours with the new tests. There is no provision in the program for compensating a producer who has an egg-positive flock and does not have a pasteurization or hard-cooking plant that will take their eggs. Producers are greatly ramping up measures to reduce risk of SE infection by increased use of vaccines, intestinal health feed additives, rodent and fly control measures, and biosecurity practices as was intended by the plan.

The possible addition of *Salmonella heidelberg* (SH) to the FDA Egg Safety Plan has the industry questioning why and how this will be initiated. SH in humans has not recently been attributed to eggs and the prevalence of SH in humans has dropped since the late 1990's to 2011 from 1 per 100,000 population to 0.35 per 100,000 in CDC figures from FoodNet. Also, there is no breeder program as there is for SE and it may take five to 10 years before one can be fully assured of a clean product once a breeder program is started. Also, no specific SH vaccines are available as they are for SE. It is estimated that a much higher contamination rate of flocks with SH is present compared to SE. The SE flock prevalence has been found to be reduced to as low as 2 % at present with the pressure of state and federal programs.

Poultry welfare concerns continue to be of high to very high concern due to continued activities by activist groups. A surprising event occurred in 2011 as the United Egg Producers (UEP) and the Humane Society of the United States (HSUS) agreed to work together to establish federal legislation to require an eventual switch from conventional cage systems to enriched cage systems by 2029. This should lead to the use of enriched cages in CA where the issue of which type of system would be approved according to the Prop 2 ballot initiative was undecided. This possibility of an agreement also negated the ballot initiatives that were planned by HSUS in WA and OR. This agreement was attached to the 2012 Farm Bill as an amendment to the Egg Products Inspection Act. The 2012 Farm Bill did not pass. An attempt was made to add the bill to the 2013 Farm Bill but without success. Attempts will be made to pass it on its own or add it to the Farm Bill in 2014.

The lack of effective treatments for diseases such as colibacillosis, necrotic enteritis, ascarids, *Capillaria spp*., fowl cholera, etc. is a very high concern and a welfare issue for the diseases that can cause much suffering due to illness. The list of antibiotics that can be used in egg layers is quite short – bacitracin, tylosin, and chlortetracycline. The lack of an anti-parasitic product for used in controlling ascarids during lay, or other nematodes, is especially troublesome as these conditions are becoming increasingly common in cage-free production. Amprolium continues to be available to prevent and treat coccidiosis. Hygromycin is also now approved for use in egg layers in production for roundworms, *Capillaria spp*., and cecal worms. Also, there is an

increase in usage of non-antibiotic, preventative feed and water additives containing probiotics, prebiotics, and fermentation metabolites.

AI rose to moderate concern this year compared to last due to the threat of highly pathogenic (HP) AI, H7N3, in Mexico. The situation in Mexico is being controlled by vaccination without culling of flocks that may be infected with the virus so the threat of virus coming from positive flocks there.

AI active and passive surveillance programs are continue across the US in response to the threat of HPAI H5N1 from Asia or HPAI H7N3 from Mexico. As there is great concern in the layer industry in regard to the amount of time before egg movement can take place once quarantine is placed on a premise in a control zone, the industry and USDA have developed the Secure Egg Supply (SES) Plan that would allow movement of product within 48 hours after quarantine. This is done by assuring that a farm 1) has good biosecurity practices by being pre-approved, and 2) is negative for AI by a) testing five dead birds per house by AI real time PCR, and b) reporting daily mortality and egg production to the authorities. Discussion and research as to the best ways of bird euthanasia and disposal from large cage layer houses and complexes continues. The threat of H5 or H7 low pathogenic AI (LPAI) for layer flocks on the East coast is much reduced due to the efforts by NY and NJ Departments of Agriculture and USDA to reduce the positivity of the live bird markets from 60% positive markets in 2004 to near 0 since. No significant AI isolations have been made in layer flocks in the US in the last year. A majority of egg operations are complying with the National Poultry Improvement Plan (NPIP) low pathogenic AI (LPAI) program for commercial layers.

Vaccine use continues to be the mainstay of disease prevention in the egg layer industry second to biosecurity. The supply of useful vaccines continues to be quite adequate and appears to be keeping up with the layer industry needs. It will be interesting to see if this good supply of vaccines continues with the consolidations now occurring in the poultry vaccine business.

This is the second year that the AVEP members have been asked for their ideas as to research needs for the layer industry. A summary of the responses of the 15 members is as follows:

Research Need Area	Number of Respondents
1 – FDN	9
2 – Salmonella control	6
3 – Increased availability of therapeutics	4
4 – Mg vaccination and dynamics in a complex	3
5 – Welfare – stress, housing, food safety effects	3
6 – Coccidiosis in layers and coccidiosis vaccination of cage pullets	2
7 – Soft bones	2
8 – Low Atmospheric Pressure (LAPS) Euthanasia	1
- Longevity of vaccine effectiveness	1
- Intestinal health and immunity modulation	1
- Immunomodulators	1
- Attaining pullet target weights	1
- Intestinal Dilatation Syndrome	1
- Disease risk of outdoor access	1
- Composting of spent fowl	1
- Pooling of drag swabs for Salmonella detection	1
- Infectious bronchitis	1
- Infectious laryngotracheitis and vaccinal immunity	1
- Peripheral neuropathy	1
- New Marek’s vaccines	1

The egg industry has experienced higher profits this year compared to last year. Exports of eggs to Mexico due their losses of birds due to AI have buoyed the egg price this year leading to a projected profit of over $1.30 per bird compared to a breakeven situation in 2012. Feed price decreases in late 2013 will aid in increasing profits. Exports as a percent of total production averaged 3.8% in 2012 and is averaging 4.5% so far in 2013.

Iowa (51.9 million) continues to be the lead state in egg production followed by Ohio (28.2 million), Indiana (25.7 million), Pennsylvania (23.8 million), and California (18.9 million) according to the National Agricultural Statistics Service for August 2013.

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In preparation for this report to the USAHA Committee on the Transmissible Diseases of Poultry & Other Avian Species, the subcommittee chairman, Dr. Clark, surveyed turkey industry professionals and veterinarians representing a majority (n=26) of the US turkey production regarding the health status of turkeys produced in August 2012 through August 2013. The turkey industry reports several disease challenges for this 12 months varying by geographic regions within a state and across the United States. This report will list, Table 1, the challenges by disease and issues. Of particular interest in 2013 are lack of efficacious drugs and issues with clostridial dermatitis, turkey coronavirus, blackhead and colibacillosis.

The "lack of approved efficacious drugs" continues to be the top disease issue (Table 1). The withdrawal of the NADA (New Animal Drug Application) for enrofloxacin in 2005 for use in poultry leaves the industry with no adequate therapeutic response to colibacillosis (ranked #3, unchanged from prior year), or fowl cholera (ranked #17 from #20). In July 2011 the sale of roxarsone was suspended; September 30, 2013, it was announced that the FDA marketing authorization (New Animal Drug Applications) would be withdrawn. The controversy over the use of antibiotics in animal agriculture remains a major concern for the turkey industry and for all of animal agriculture.

Clostridial Dermatitis (CD), previously referred to as Cellulitis, remains a major disease issue across all geographic regions; as the survey average decreased slightly to a score of 3.6 (from 3.8 in prior year) and ranked #2 (no change), from 3.9 (#2), 4.0 (#2), 3.8 (#2) and 3.3 (#3) in 2011, 2010, 2009 and 2008, respectively. Analysis indicates range of concern; 62% of respondents score CD a 4 or 5 (severe), 27% score it a 2 or 1 (mild), 76% and 20% respectively for the prior year. CD is most commonly seen in, but not limited to, commercial male turkeys nearing market age. Clostridium septicum, C. perfringens type A, or C. sordelli is isolated from fluid or affected tissue samples of affected or dead birds. Affected turkeys present with two or more of the following signs: subcutaneous emphysema (crepitus); serous or serosanguineous subcutaneous fluid; vesicles on the skin, especially on the breast/inguinal area; moist, dark, wrinkled skin, especially breast/inguinal area; cellular necrosis (microscopic); organ involvement (spleen/liver); vesicles on the skin, and/or moist, dark, wrinkled skin, on the tail area. The affected flock will have mortality greater than or equal to 0.5 dead per 1,000-birds, fitting the individual bird definition, for two consecutive 24-hour periods. Opinions vary as to risk factors and potential causes of the problem. Some of the key areas to control of CD include: early recognition; removal of mortality 2-3 times per day; medicating affected flocks with appropriate antimicrobials; promptly managing all water spills and wet litter. There has been limited success with vaccinating at-risk flocks with autogenous bacterins and toxoids.

Poult enteritis of unknown etiologies has decreased in importance, to position #9 from #7, with a score of 2.8 (from 2.9). Turkey Coronavirus (TCV), as a defined cause of enteritis, was ranked #27 (Table 1), increasing from #29, with a record 420 reported cases (Table 2); we began reporting in 2008 with 10 cases (2009, 3; 2010, 91; 2011, 70; 2012, 221). We conducted an Enteric Health supplemental survey in April 2012; the survey was not conducted this year.

Protozoal Enteritis, attributed to flagellated protozoa, Cochlosoma, Tetratrichomonas and Hexamita, ranked #22 (score 1.8). Several types of protozoa are associated with enteric disease of turkeys. Protozoal enteritis can present with general signs, including dehydration, loss of appetite (off-feed), loose droppings (diarrhea) and watery intestinal contents. Flagellated protozoa include Cochlosoma, Tetratrichomonas and Hexamita. Eimeria and Cryptosporidia are non-flagellated protozoa. Cochlosoma and Hexamita are associated with enteritis, primarily in young turkeys, especially in the summer months. There are field reports of co-infections with Cochlosoma and Tetratrichomonas, or Cochlosoma and Hexamita, or flagellated protozoa and Eimeria.

Single age brooding has been implemented during the last several years to assist in managing diseases on turkeys farms, especially enteric diseases. Historically, production systems included 2 - 3 different ages on a single farm site reared in separate barns, from day-old to market age. The trend is to isolated, specialized brooding facilities. All production is separate hen and tom rearing. The brooding phase for commercial turkeys is rearing about 0 – 5 weeks of age, then the flock is moved to specialty finisher or grow-out barns. Single age brooding may be termed all-in/all-out or single-age or brooder hub. Single age brooding systems can operate in two ways. One option rears the turkeys to slaughter age at the same farm site, without other ages on the farm. Another system of single age brooding involves farm sites dedicated to brooding, then at 5 weeks of age birds are moved to a separate site for finishing; some systems may move birds 0.25 miles up to 20 miles away. In 2013, 49% of brooding was single age, compared to 39% in 2008. Single age brooding is more common in the Southeastern US than the Midwest states. Conversion to single age brooding started in late 1990 following the emergence of PEMS in North Carolina; advantages became obvious and it has expanded to other areas of the US.

Late mortality ranked fifth (#5) health issue and no change from the prior year. Late Mortality may be defined as mortality, in excess of 1.5% per week, in toms (males) 17-weeks and older; mortality is not diagnosed to a

specific disease or cause. Excess cumulative mortality of 5 – 10% in toms prior to slaughter has been reported. Late mortality may be associated with physiologic or biomechanical deficiencies following early rapid growth in heavy toms achieving genetic potential; aggressive behavior noted in mature toms; cannibalism; leg problems and/or hypertension.

Leg problems (#4, prior year was #6) are ranked among the top concerns of the turkey industry. Leg problems are a common complaint, such as, spiral fractures of the tibia or femur. Leg Problems may be defined as lameness, particularly in toms, several weeks prior to slaughter. Leg problems are attributed to various conditions (refer to Table 1), including, pododermatitis, fractured femurs, fractured tibia, osteomyelitis (OM), tibial dyschondroplasia (TDC), spondylolisthesis, "Shaky Leg", etc.

Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR) was recognized as a newly emerging disease in 2011. A unique reovirus has been isolated and identified as the cause of tenosynovitis and digital flexor tendon rupture in commercial turkeys. Clinical signs in young flocks are reportedly mild to nonexistent, but can develop into lameness and/or abnormal gait in older flocks, starting at about 12 weeks of age. Affected flocks may also report an increased incidence of aortic ruptures and poor flock performance (weight gain, uniformity). Research is on-going into pathogenesis, virus characterization, diagnostics and epidemiology. Research indicates that the turkey arthritis reovirus is distinct from the recently identified novel reovirus causing arthritis in chickens, and most similar to the turkey enteric reovirus. TR-DFTR was added to the survey in 2011 and ranked #11 (Table 1) with 106 "confirmed" cases or flocks (Table 2). In 2013 TR-DFTR ranked #26 with 39 cases (2012, 131). A breeder company has implemented an autogenous reovirus vaccination program to induce the maximum production of antibodies and resulting transfer of maternal antibodies. Results show a significant reduction in associated clinical signs in those poults placed from vaccinated flocks. A commercial turkey lighting program of 4-8 hours of continuous dark in a 24-hour period has also been recommended. The combined efforts of breeder vaccination, commercial farm biosecurity and flock management appear to be controlling this disease.

Blackhead, also known as Histomoniasis, decreased to position #16 (#14 prior year). It is one disease with no efficacious drug approved for use in turkeys. There were 52 reported cases of blackhead (Table 2) a decrease from 80 the prior year, and a record 108 in 2010. Losses to blackhead have been severe and sporadic cases are occurring in North America. The disease can be devastating in the individual flocks affected. Nitarsone is the only product approved by the FDA for the prevention of histomoniasis, Dimetridazole was extremely efficacious and previously approved for use in turkeys for the prevention and treatment of blackhead; it was banned in 1987. The lack of any legal treatment for histomoniasis is of concern, especially in the case of valuable turkey breeder candidate flocks. Losses to blackhead have been severe in several areas of Europe, and sporadic cases are occurring in North America. It seems unconscionable that we are unable to prevent the suffering and death in flocks affected by histomoniasis when effective treatments exist.

Heat stress ranked #12 following another hot summer, compared to #4 the prior year. Poult Enteritis Mortality Syndrome (PEMS) ranked #31 versus #30 previously, *Ornithobacterium rhinotracheale* (ORT) ranked #13 versus #17 previously, and Avian Metapneumovirus (AmPV) ranked #35 versus #34.

Mycoplasma synoviae (MS, infectious synovitis) infections, ranked #24 (#25, prior year), are one cause of synovitis. It may be present in flocks 10-12 weeks of age with typically low mortality and low morbidity. There were 75 cases of MS reported (Table 2) representing an increase from 49 the prior year. The primary breeders have remained free of *M. gallisepticum* (MG), *M. meleagridis* (MM) and MS. Sporadic, but increasingly frequent infections with Mycoplasma, both MG and MS, often in association with backyard poultry and broiler breeder flocks is an ongoing concern, having the greatest impact when a breeder flock is infected and has to be destroyed. There were 45 cases of MG reported (Table 2).

Over the past 10 years the US animal agriculture industry has been continually challenged with numerous attempts to ban the use of antibiotics in livestock and poultry. The current attempt at the federal level is with the [113th Congress] Preservation of Antibiotics for Medical Treatment Act of 2013, introduced into both the House and Senate [H.R.1150; S.1256], otherwise known as PAMTA 2013. The Senate version is titled S. 1256 Preventing Antibiotics Resistance Act (PARA) and is "to amend the Federal Food, Drug, and Cosmetic Act to preserve the effectiveness of medically important antimicrobials used in the treatment of human and animal diseases." The legislation would disallow use of medically important antimicrobials for nontherapeutic uses. The turkey industry opposes PAMTA, a bill that would devastate the ability to protect animal health by unnecessarily and inappropriately removing several classes of important antibiotics from the market. The turkey industry welcomes honest discussion of science-based, pragmatic options allowing producers to farm in the best interests of their animals and customers while providing consumers' assurance our use of these vital, safe and effective production tools is professional, judicious and does not jeopardize these products' effectiveness in human medicine.

The industry's primary focus in 2012 - 2013 continues to be the protection of the drugs approved for use in turkeys, especially in light of increased scrutiny from special interests regarding antibiotic resistance. The first related guidance was introduced in 2003, Final Guidance #152, "Evaluating the Safety of Antimicrobial New

Animal Drugs with Regard to their Microbiological Effects on Bacteria of Human Health Concern". In 2012, the Food and Drug Administration Center for Veterinary Medicine published the draft text of its proposed rule for the Veterinary Feed Directive, the Final Guidance #209, "The Judicious Use of Medically Important Antimicrobial Drugs in Food-Producing Animals", and the Draft Guidance #213, "New Animal Drugs and New Animal Drug Combination Products Administered in or on Medicated Feed or Drinking Water of Food Producing Animals: Recommendations for Drug Sponsors for Voluntarily Aligning Product Use Conditions with GFI #209". CVM's Guidance #209 addresses FDA's current thinking regarding the judicious use of medically important antibiotics from human medicine in food producing animals, and Draft Guidance #213 provides recommendations for drug companies to voluntarily eliminate or transition to "production" (growth promotion and feed efficiency) claims to "therapeutic" claims, in order to conform to Guidance #209 (Table 5). Although voluntary, FDA will be working closely with companies to encourage them to make these changes. FDA is still expected to publish the VFD and Final Guidance #213 in 2013. These programs are still being developed, and the industry continues to play an active role in helping to shape how they ultimately look, both through comments and participation in FDA and APHIS' public meetings. In 2013, individual reports were published from groups such as the Environmental Working Group (EWG), Center for Science in the Public Interest (CSPI), and Consumer Reports (CR) focusing on antibiotic resistant bacteria in foods. Regardless of the accuracy or influence of any of these reports, the fact remains that there exist many groups committed to eliminating antimicrobial use in food animal production, which could have substantial impacts on the health and well-being of turkey flocks.

A major, growing concern of the turkey industry over the past several years has been the impact of feed prices on feed availability, and on potential animal health impacts of feed alternatives. The Renewable Fuels Standard (RFS) has distorted feed costs for turkey producers, as well as the rest of the livestock and poultry industries. Today, livestock and poultry feed accounted for ~4.4 billion bushels (40.8% of domestic production), while ethanol consumed ~4.6 billion bushels of corn (42.7%). The result has been corn stocks at near-record lows and corn prices at near-record highs, leading turkey producers to search for alternative feed sources, and reduce production overall. The distillers' grains that are byproducts of ethanol production do not have a major impact on feed availability, as only about 10% of a turkeys' feed ration can be comprised of DDGs. The turkey health impacts of such altered-diets are currently a subject of concern and research for turkey producers. Further, with growing attention on antibiotic usage, the Center for Food Safety (CFS) and the Institute for Agriculture and Trade Policy (IATP) submitted a petition to the FDA in April of 2013 encouraging a ban on the use of antibiotics in ethanol production when DDGs are sold as animal feed for food producing animals. This debate further complicates the feed availability and antimicrobial resistance issues.

The industry continued work on developing the Federal and State Transport (FAST) Plan for Movement of Commercial Turkeys in a High Pathogenicity Avian Influenza (HPAI) Control Area, and Turkey Risk Assessment. The goal of this work is to facilitate business continuity and economic survival of participating non-infected turkey operations in a Control Area after an outbreak of HPAI, and to help assure the continuous availability of safe turkey meat to consumers. Recent outbreaks of Low Pathogenicity AI (LPAI) in two states have underscored the need for such programs in responding to a potential AI outbreak. Regarding disease surveillance, the industry has continued to voice strong support for the maintenance of the National Poultry Improvement Plan (NPIP) in the face of increased government spending cuts. NPIP is a vital state-federal-private partnership for the turkey industry, as well as the broiler and egg industries, and APHIS has continued to show strong support for the program, having recently hired a new program coordinator, indicating that it would hire an additional staff person, and maintaining their officers in Conyers, Georgia, instead of moving it to the Washington, D.C. area.

In early 2012 the Food Safety and Inspection Service (FSIS) issued its proposed rule for the New Poultry Inspection System (NPIS), which would modernize the inspection of turkeys and other poultry in the United States. Under this new inspection system, FSIS inspectors would be allowed more flexibility to patrol the processing plant and provide scientific oversight to ensure the plant is meeting the required food safety performance standards. Federal inspectors would be stationed at the end of the production line to verify every poultry carcass meets the federal regulations, and plant employees would have an expanded role in inspecting carcasses for quality standards on the inspection line. The finalization of this rule, and establishing a practical implementation process is still a major priority.

In 2012, turkey production increased to 7,546.695 from 7,273.60 million pounds (live weight) in 2011. Overall domestic per capita consumption for turkey products decreased to 16.00 lbs in 2012 from 16.10 lbs in 2011. The preliminary number for 2013 is 16.40 lbs turkey consumption per capita, which is the highest level since 2010. Production in 2012 increased to 253.500 million head with an average live weight of 29.83 lbs. In 2011, 248.500 million head were produced with an average live weight of 29.43 lbs. (Reference: National Turkey Federation Sourcebook, September 2013).

Table 1. Turkey health survey (August 2012 - 2013) of professionals in US turkey production ranking current disease issues (1= no issue to 5 = severe problem).

Issue	Score Average (1-5)	Score Mode (1-5)
Lack of approved, efficacious drugs	4.6	5
Clostridial Dermatitis (Cellulitis)	3.6	5
Colibacillosis	3.4	4
Leg Problems	3.2	3
Late Mortality	3.0	3
Salmonella	2.8	2
Poult Enteritis of unknown etiologies	2.8	3
Bordetella avium	2.5	3
Breast Blisters and Breast Buttons	2.5	2
Osteomyelitis (OM)	2.5	2
Cannibalism	2.5	2
Heat stress	2.4	2
Ornithobacterium rhinotracheale (ORT)	2.3	3
Coccidiosis	2.3	2
Tibial Dyschondroplasia (TDC, Osteochondrosis)	2.3	2
Blackhead (Histomoniasis)	2.2	1
Cholera	2.2	1
Fractures	2.1	2
Bleeders (aortic, hepatic ruptures)	2.0	2
Newcastle Disease Virus (NDV)	1.9	1
Round Worms (Ascaridia dissimilis)	1.9	1
Protozoal Enteritis (Flagellated)	1.8	1
Shaky Leg Syndrome	1.8	2
Mycoplasma synoviae (MS)	1.7	1
Mycoplasma gallisepticum (MG)	1.7	1
TR-DFTR (Turkey Reovirus Digital Flexor Tendon Rupture)	1.7	1
Turkey Coronavirus	1.7	1
Avian Influenza	1.5	1
Mycoplasma iowae (MI)	1.4	1
Necrotic enteritis	1.4	1
PEMS (Poult Enteritis Mortality Syndrome)	1.4	1
H3N2 (H1N1) Swine Influenza	1.3	1
Erysipelas	1.2	1
Mycoplasma meleagridis (MM)	1.1	1
Avian Metapneumovirus	1.1	1
Spondylolisthesis (Kinky-Back)	1.0	1

Table 2. Turkey health survey (August 2012 - 2013) of professionals in US turkey production. * One respondent noted that their operation processed over 300 flocks with varying degrees of severity, but not included in the reporting of confirmed cases; Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR).

Cases (##) of	2013	2012	2011	2010	2009	2008	2007
Blackhead (Histomoniasis)	52	80	89	108	67	63	68
Mycoplasma gallisepticum (MG)	45	n/a	n/a	n/a	n/a	n/a	n/a
Mycoplasma synoviae (MS)	*75*	49	39	56	38	47	52
Turkey Coronavirus (TCV)	420	221	70	91	3	10	n/a
Turkey Reovirus Digital Flexor Tendon Rupture	39	131	106	n/a	n/a	n/a	n/a

Table 3. Turkey research priorities (August 2012 - 2013) of industry professionals in turkey production (1= low to 5 = high).

Issue	Score Average (1-5)	Score Mode (1-5)
Disease	4.0	4
Food Safety	3.9	5
Welfare	3.5	4
Poultry Management	3.2	3
Nutrition	2.8	3
Environmental	2.5	2
Processing	2.4	3
Waste Disposal	2.4	3

Table 4. Percentage (%) of brooding (commercial; farm) production is all-in/all-out (single-age; brooder hub); average of respondents (n=24).

Year	Percentage (%)
2013	48.6
2008	39.0

Table 5. Nineteen (19) in-feed FDA approved medications for turkeys listed by label indication categories: subtherapeutic (improved weight gain, feed conversion) versus therapeutic (disease prevention, control, treatment). * Not currently marketed. ** Deemed “Medically Important” per FDA Guidance #209 and #152. (Roxarsone approval was withdrawn September 30, 2013).

Subtherapeutic	Therapeutic (Prevention, Control, Treatment)
Bacitracin Zinc	Amprolium
Bacitracin Methylene Disalicylate	Bacitracin Methylene Disalicylate
Bambermycin	Chlortetracycline **
Chlortetracycline **	Clopidol
Neomycin + Oxytetracycline **	Diclazuril
Oxytetracycline **	Fenbendazole
Penicillin **	Halofuginone *
Ractopamine	Lasalocid
Virginiamycin **	Monensin
	Neomycin + Oxytetracycline **
	Nitarsone
	Sulfadimethoxine + Ormetoprim **
	Oxytetracycline **
	Zoalene (DOT) *

BACKYARD & SMALL COMMERCIAL FLOCKS DISEASE REPORT

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Backyard poultry production continues to increase in many parts of the nation and with it the emergence of diseases that are infrequently seen in commercial poultry production because of the use of vaccines. In the 2013 backyard poultry survey, ten laboratories in nine states responded with the different types of diseases diagnosed

from August 2012 to August 2013. Laboratories were from California, Pennsylvania, Arkansas, West Virginia, New York, New Jersey, Maine, Maryland and South Carolina. State submissions are seen in table 1 below. A total of 1,066 submissions were diagnosed. California, Pennsylvania, West Virginia and Maine had the highest submissions.

Table 1.

State	Total Submissions
California	447
Arkansas	55
West Virginia	108
Pennsylvania	175
South Carolina	33
New York	46
New Jersey	24
Maine	105
Maryland	73

Chickens were the most numerous species submitted to the labs (80%) followed by turkeys (7.3%) and game birds (5.3%) as seen in table 2 below. Pigeon submissions were also notable (3.6%).

In the disease categories, the most diagnosed were the bacterial diseases. Colibacillosis and *Mycoplasma gallisepticum* infections were the most diagnosed bacterial infections Parasitic diseases accounted for over 25% of all the lab-confirmed diseases with coccidiosis and nematodiasis being the most numerous. Viral neoplastic diseases followed closely after the parasitic diseases at 23.8% of the total. Almost 70% of all the viral neoplastic diseases were diagnosed as Marek's disease again reflecting the absence of vaccination programs in backyard and small flock production. Fatty Liver Hemorrhagic syndrome (FLHS) was the most frequently diagnosed metabolic condition. Aspergillosis and Candidiasis had significant numbers in the fungal category. In the "other" category, cannibalism, salpingitis, pecking and lead toxicosis were among the conditions listed.

Disease Categories	Poultry Species Affected						Total
	Chicken	Turkey	Duck	Game bird	Pigeon	Other	
Viral (non-neoplastic)	59	6	0	9	6	3	83
Viral (neoplastic)	251	1	0	2	0	0	254
Bacterial	238	28	6	10	6	9	297
Parasitic	177	40	0	34	17	5	273
Metabolic	57	3	0	1	2	1	64
Fungal	29	0	3	2	7	0	41
Nutritional	19	1	0	0	1	2	23
Other	22	1	4	2	0	2	31
Total	**852**	**80**	**13**	**60**	**39**	**22**	**1,066**

Bacterial, parasitic and neoplastic diseases (mostly due to Marek's) are significant problems in backyard poultry. Hatcheries that supply most of the birds going into the backyard system do not routinely vaccinate day-old chicks for Marek's. At the moment, there are no comprehensive policies either at the state or federal level to monitor the nation's backyard flocks. Our survey just covered ten labs but it is clear from the results that the disease situation in small flocks is at a high level. More education directed at owners is necessary to control and manage diseases in this population.

OVERVIEW OF THE NATIONAL ANIMAL HEALTH LABORATORY NETWORK (NAHLN) CONCEPT PAPER

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The National Animal Health Laboratory Network is a partnership between the United States Department of Agriculture, State, university and federal diagnostic laboratories across the U.S. Currently, there are 60 NAHLN laboratories that work together to ensure there is adequate diagnostic capacity and capability for early detection of, rapid response to, and recovery from animal health emergencies. NAHLN operates on six key founding principles including: supporting lab quality management systems; ensuring competency of laboratory personnel;

using standardized protocols, reference materials and equipment; maintaining secure reporting systems; confirming facilities use appropriate biosafety/biosecurity and emphasizing laboratory preparedness. NAHLN laboratories are AAVLD or ISO 17025 accredited or reviewed regularly by the NAHLN program. Along with their state animal health official, NAHLN laboratories submit a checklist for diseases they wish to be approved to test for which is reviewed by relevant VS programs. If accepted, lab personnel are provided standardized SOPs and trained and proficiency tested by NVSL reference labs. The NAHLN program works to establish sample targets, test result reporting criteria and funding mechanisms with the labs. In order to ensure the network can maintain adequate capacity and capabilities, a concept paper was developed by the NAHLN Coordinating Council to propose a revised structure for the NAHLN. The concept paper was published for public comment in the Federal Register in April 2013; forty-two comments were received that will be incorporated into efforts to codify the NAHLN, develop program standards and update the NAHLN strategic plan. A number of comments were related to questions regarding the proposed structure and implications regarding the National Poultry Improvement Plan (NPIP). The proposed structure will not affect NPIP testing; it will not be a requirement for NPIP laboratories to become NAHLN laboratories. However, NPIP laboratories will have the opportunity to request to become NAHLN laboratories- fitting into one of the five categories, including private laboratories, as described in the concept paper. The details regarding the number of laboratories in each category, the specific criteria on how that will be determined and the funding at each level are yet to be determined. Stakeholder input is welcome as those decisions are made.

AVIAN IMPORT ACTIVITIES AND NVSL AVIAN INFLUENZA AND NEWCASTLE DISEASE REPORT FY 2013

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Live Bird Marketing System (LBMS), Backyard Birds and Exhibition Birds

As part of the ongoing LBMS surveillance for presence of avian influenza virus (AIV) and avian paramyxovirus type-1(APMV-1), the National Veterinary Services Laboratories (NVSL) tested 642 specimens in 266 submissions from 16 states (AL,CT, FL, MA, MD, ME, MO, NH, NJ, NY, OH, OK, OR, PA, RI, SD) by virus isolation in embryonated chicken eggs and, when appropriate, by real-time RT-PCR (rRT-PCR). The surveillance is a collaborative effort between individual States and the United States Department of Agriculture (USDA). Presumptive positive specimens from rRT-PCR testing at State laboratories and specimens requiring virus isolation (environmental and non-duck cloacal swabs) were submitted to the NVSL for testing. All remaining LBMS surveillance specimens were tested at the State level.

In fiscal year (FY) 2013, AIV or APMV was isolated from 14% (37/266) of submissions and 16% (102/623) of specimens tested. AIV subtype H1N1 (VA n=2), H1N2 (SD, PA n=2), H1N8 (PA n=3), H4N6 (PA n=1), H4N9 (PA n=1), H5N2 (PA n=1), H6N2 (AL n=1), H6N8 (NJ n=2), H11N9 (PA, OK n=4) and H12N5 (MA n=1) were found in the LBMS and backyard this year (Table 1). An H5N2 LPAI virus was isolated from Muscovy ducks in a LBM in PA. The finding was epidemiologically connected to a Philadelphia LBM which tested positive for H5 viral RNA. Also, an H1N8/LoNDV mixed infection virus was isolated from the duck specimens, and the H1N8 virus was isolated from environmental samples from PA. In an unrelated event, H5 viral RNA was detected in Muscovy ducks in a retail LBM in Kings County, NY; no virus was isolated. For APMV; 56 viruses were isolated, 53 APMV-1 from 9 states (CA, FL, MA, MD, MI, NY, OK, PA, RI), with APMV-4 and APMV-6 from PA and APMV-6 from NY. Pathogenicity of representative APMV-1 isolates obtained from birds was determined by the intracerebral pathogenicity index (ICPI, n=11) test and/or by analysis of the deduced amino acid profile at the fusion protein cleavage site (n=24). All were characterized as low virulent (lentogenic pathotype) strains; the remaining 3 were characterized as APMV-4 (1) and APMV-6 (2) viruses.

Low Pathogenicity Avian Influenza (LPAI) in Commercial Poultry

Surveillance for AIV in commercial poultry is conducted under provisions of the National H5 and H7 Low Pathogenicity Avian Influenza Control Program implemented in September, 2006. Although most of the testing is performed locally, the NVSL provides reagents for the agar gel immunodiffusion (AGID) test and controls for the rRT-PCR test in addition to confirmation and identification testing of positive specimens. For commercial poultry during FY 13 a single event of H7 AI (PCR and sera) was reported. Antibody to H7N7 AI and H7 viral RNA was detected in a broiler breeder flock in Scott Co, AR. Specimens were collected from 44 wk old broilers as the result of a drop in egg production. No AI was detected as the result of further surveillance, and the index flock was depopulated. In addition, LPAI isolated from turkeys in OH H3 (1) and WV H1N1 (7) (Table 1).

The NVSL received 393 submissions (2789 sera) for AI antibody confirmation and subtyping in FY13 from 36 states and one international submission. Antibodies to influenza H1 and/or H3, with N1 and/or N2 antibodies in 262 submissions were detected in samples from 14 states (AR, FL, IA, MA, MI, MN, NC, OH, OK, PA, SC, SD,

VA, WI). The majority of these detections were in turkeys (93.5% of submissions) where vaccination is common; the remaining detections were from chickens and one submission from pheasants. Antibodies to H4 (MN), H6 (OH), H9 (AR, MN, OK), and H11 (MN, OH) were also detected in turkeys. In separate events, H7 antibody was detected in broilers from AR (see above), backyard poultry from MA, and LBM chickens from PA. For PA, a follow-up investigation was conducted, and swabs tested negative for AI viral RNA. H5 antibody was detected from upland game pheasants in WI. No virus or viral RNA was detected from subsequent specimen collection.

AI Diagnostic Reagents Supplied by the NVSL

During FY 2013, a total of 11,375 units of AGID reagents (antigen and enhancement serum) were shipped to 61 state, university, and private laboratories in 34 states. The quantity is sufficient for approximately 1,365,000 AGID tests. An additional 862 units (103,440 tests) were shipped to 14 foreign laboratories in 12 countries. One hundred twenty-three laboratories were invited to participate in an AI Proficiency Test; 90 panels were shipped (including Canada (2), Mexico (1), and Chile (1)). A total of 67 laboratories from 36 states plus Puerto Rico passed with a score of 90% or better. Positive amplification (PAC) as well as positive extraction (PEC) control for the AI matrix (M), H5 and H7 rRT-PCR assays were distributed to National Animal Health Laboratories for AI rRT-PCR testing and support of NPIP and LBM surveillance. A total of 82 vials of PAC were shipped in FY13 to 18 states, and 366 vials of PEC were shipped to 35 states. Additionally, 24 vials of PAC (M, H5 & H7) and 8 vials of PEC were shipped to 4 countries.

rRT-PCR Proficiency Test Panels

The NAHLN laboratories conducting surveillance testing for AI and/or ND are required to have one or more diagnosticians pass an annual proficiency test (PT) to perform official rRT-PCR testing. In FY 2013, AI (matrix/H5/H7) PTs were distributed to 249 diagnosticians in 56 laboratories and to 244 diagnosticians in 54 laboratories for APMV-1 (Newcastle disease) rRT-PCR. A total of 236 diagnosticians have been approved to conduct rRT-PCR testing for AI and 229 for APMV-1 in 55 labs. In addition to NAHLN laboratories AI and ND rRT-PCR proficiency panels were distributed to Canada and Mexico as part of the North American Animal Health Laboratory Network (NAAHLN) harmonization.

AIV Surveillance in Wild Waterfowl

Since the curtailment of the National Wild Bird Surveillance Program in March of 2011, NVSL has supported the surveillance of AI in wild waterfowl by subtyping (determination of hemagglutinin and neuraminidase subtype) all viruses and pathotyping (amino acid sequencing and/or chicken inoculation) H5 and H7 viruses submitted by university and independent researchers as well as the United States Geological Survey (USGS). Virus isolation (VI) and rRT-PCR testing is conducted on mortality event specimens. In FY2013, 343 wild bird specimens were received for confirmation, subtyping and characterization and, from mortality events, VI and rRT-PCR. No HPAI H5N1 was detected; however, LPAI H5N1 virus was detected in specimens submitted from 2 states (OH and IL). Predominant H5 and H7 subtypes were H5N2, H7N7, and H7N3. All H5 and H7 AIVs were characterized as LPAI viruses of North American lineage. All wildbird subtypes are listed in Table 2 by state and subtype.

Isolations of Virulent Newcastle Disease Virus (vNDV) and PPMV-1

In FY2013, no vNDV was isolated from domestic poultry. Pigeon paramyxovirus type-1 (PPMV-1) was isolated from racing and other pigeons in 8 states (CA, FL, MD, MI, MN, NJ, PA, WI). Virulent NDV was isolated from wild cormorant specimens from FL and OR (4 submissions). In addition vNDV was isolated from poultry in Honduras. All vND and isolates were characterized by the intracerebral pathogenicity index (ICPI) and/or amino acid sequence analysis of the fusion protein cleavage site; PPMV-1 isolates were identified by the HI test with monoclonal antibodies specific for PPMV-1 and sequence analysis of fusion protein cleavage site.

Isolations of Low Virulent Newcastle Disease Virus (LoNDV)

During FY2013, LoNDV was isolated and/or characterized from 119 APMV-1 viruses or specimens received for characterization or isolation at the NVSL. The specimens and viruses were received from LBM and NPIP surveillance and diagnostic submissions. The specimens originated from poultry and environmental samples in 14 states (CA, DE, FL, IA, IN, MA, MD, MN, NC, NY, OK, PA, RI, WI). All of the isolates were characterized as LoNDV by the ICPI and/or by deduced amino acid motif at the fusion protein cleavage site.

NDV Diagnostic Reagents Supplied by the NVSL

During FY2013, a total of 224 vials of LaSota APMV-1inactivated antigen (2.0 ml per vial) was shipped to 5 domestic and 7 foreign state, university, and private laboratories. One hundred four vials of APMV-1 antiserum (2.0 ml per vial) for the hemagglutination-inhibition test were shipped to 8 domestic and 10 foreign labs respectively. Positive amplification (PAC) as well as positive extraction (PEC) controls for the APMV-1 rRT-PCR

assay were distributed to National Animal Health Network Laboratories for support of APMV-1 rRT-PCR testing. A total of 36 vials (18 states) of PAC, and 167 vials (27 states) of PEC were shipped. An additional 12 vials of PAC (4 countries) and 7 vials of PEC (3 countries) were shipped internationally.

Table 1. FY2013 IAV isolates from LBM, backyard, and commercial submissions by state and H-type.

Purpose	Subtype	# isolates	Source	State
LBM/ backyard	H1N1	2	Turkey	VA
	H1N2	1	Turkey	SD
		1	Duck	PA
	H1N8	1	Muscovy duck	PA
		1	Duck	PA
		1	environment	PA
	H4N6	1	environment	PA
	H4N9	1	Duck	PA
	H5N2	1	Muscovy duck	PA
	H6N2	1	Chicken	AL
	H6N8	2	Pheasant	NJ
	H11N9	1	Duck	OK
		1	Duck	PA
		2	Muscovy duck	PA
	H12N5	1	guinea hen	MA
Other Commercial	H1N1	7	Turkey	WV
	H3	1	Turkey	OH

Table 2. FY2013 wild bird IAV isolates by state and H-type.

State (# isolates)	**H-type** (n=233)
AK (2)	H3
AR (7)	H1, H7, H10, H11, H14
CO (1)	H3, H6
IA (1)	H10
IL (19)	H1, H2, H3, H4, H5, H6, H7, H10, H11
LA (30)	H7, H10
MD (57)	H2, H3, H8
MI (1)	H10
MN (4)	H3, H5, H7
MO (9)	H3, H4, H5, H10, H11
MS (16)	H1, H4, H5, H7, H10, H11, H14
NE (1)	H6
OH (61)	H1, H2, H3, H4, H5, H6, H7, H10, H11, H12
TX (4)	H4, H5, H7, H11
WI (18)	H1, H3, H4, H5, H6, H11
WY (1)	H6

POULTRY *SALMONELLA*, *MYCOPLASMA*, AND *PASTEURELLA* DIAGNOSTICS AT NVSL

B.R. Morningstar-Shaw, Diagnostic Bacteriology Laboratory, National Veterinary Services Laboratories, USDA
(proceedings summarized from presentation by the Chair)

Salmonella serotyping

The Diagnostic Bacteriology Laboratory within the National Veterinary Services Laboratories (NVSL) routinely serotypes *Salmonella* isolates submitted by private, state, and federal laboratories as well as veterinarians, researchers and other animal health officials. This report summarizes *Salmonella* serotyping submissions to NVSL from January 1 through December 31, 2012 originating from poultry. The *Salmonella* isolates are identified as clinical (clinical signs of salmonellosis from primary or secondary infection) or non-clinical (herd and flock monitoring programs, environmental sources, food). Serotyping data from isolates submitted for research purposes are not included in the summary. From January 1 to December 31, 2012, there were a total of 10,357 clinical and non-clinical submissions, of these 4,577 isolates were from chicken or turkey sources submitted to NVSL for *Salmonella* serotyping. The most common isolates from chickens and turkeys are listed in Tables 1 and 2 respectively.

Table 1: Most common serotypes in 2012: Chicken

Rank	Clinical	Non-Clinical
1	Enteritidis	Heidelberg (up from 5th)
2	Kentucky	Kentucky
3	Typhimurium	Enteritidis (down from 1st)
4	Rough O: g,m:-	Senftenberg (down from 3rd)
5	Muenchen	Mbandaka (down from 4th)

Table 2: Most common serotypes in 2012: Turkeys

Rank	Clinical	Non-Clinical
1	Senftenberg	Senftenberg (up from 4th)
2	Albany	Muenster (up from 5th)
3	Typhimurium (up)	Hadar (down from 1st)
4	Saintpaul (up)	Kentucky (up)
5	Montevideo	London (up)

***Salmonella* Molecular Typing**

The xMAP Salmonella assay developed by CDC has been implemented at the NVSL. Currently some samples are being tested by xMAP with the goal of initial testing of all isolates via the xMAP assay and complete typing as needed with antisera.

Obervations with the molecular typing is that it is faster and less cumbersome than conventional serotyping (high throughput), it eliminates some sera QC issues and subjective interpretation, genotype versus phenotype is not affected by expression, and the method is less labor intensive, needs expensive equipment, and the reagent cost varies.

***Salmonella* Pullorum and Gallinarum**

The NVSL provided 725 ml of *S*. Pullorum tube antigen, 2,375 ml of *S*. Pullorum stained microtiter antigen, and 346 ml of control antisera to testing laboratories.

Pasteurella

NVSL received 152 isolates for somatic typing, 108 isolates for DNA fingerprinting and supplied 48 reference isolates and 10 vials of antisera.

Mycoplasma

NVSL performed 660 hemagglutination inhibition tests, and supplied 555 ml of hemagglutination antigen and 712 ml of control antiserum to laboratories.

SALMONELLA IN AGRICULTURAL EXHIBITIONS AND FEED STORES IN COLORADO

Kristy Pabilonia
Colorado State University, Fort Collins, CO

The Centers for Disease Control reported eight *Salmonella* outbreaks linked to contact with live backyard poultry in 2012. With the number of backyard flocks increasing the United States, evaluating the epidemiology of *Salmonella* in these flocks is important to understanding measures that can be utilized to prevent transmission of the bacteria between flocks and prevent zoonotic transmission to humans. Colorado State University and collaborators recently conducted two studies in an effort to further understanding of this issue.

The aim of the first study was to measure the frequency of isolation of *Salmonella* from the environment of poultry exhibits at agricultural fairs. The results of this study are published in *Zoonoses and Public Health* [KL Pabilonia, KJ Cadmus, et al. Environmental *Salmonella* in agricultural fair poultry exhibits in Colorado. *Zoonoses and Public Health* (epub ahead of print 2013)]. Poultry cage litter, feed and environmental samples (floors and tables) were collected from 11 agricultural fairs. *Salmonella* was detected in 91% of fairs and 50.9% of all samples collected. Eleven *Salmonella* serotypes were detected, including Enteritidis, Infantis, Kentucky and Braenderup. Results demonstrate that environmental surfaces of agricultural fairs can be contaminated with *Salmonella* and could potentially serve as a route of transmission to bird owners and the general public.

The aim of second study was to assess the prevalence of *Salmonella* in baby poultry enclosures at feed stores. Cage litter and drag swab samples were collected from 30 feed stores. *Salmonella* was detected in 63% of the stores and 13 serotypes were identified. Feed stores sourced baby poultry from 10 different hatcheries in 7 states. Results of this study are currently being submitted for publication.

REPORT FROM THE USAHA COMMITTEE ON SALMONELLA

Doug Waltman, Chair
GA Poultry Laboratory Network, Oakwood, GA

The USAHA Committee on Salmonella met on October 22, 2013 and heard presentations from the below speakers. Details of the program can be found on the Committee's full report.

Drs. Tara Anderson and Stacey Bosch of CDC who discussed the ongoing outbreaks of Salmonellosis in humans attributed to live baby poultry, with special emphasis to the recent outbreak associated with Typhimurium.

Dr. Kristy Pabilonia shared her research work looking at Salmonella in backyard poultry specifically at fairs and shows and also feed stores.

Brenda Morningstar-Shaw presented the annual Salmonella update from NVSL.

Dr. Eileen Thacker with USDA/ARS shared an update on NARMS. Apparently the NARMS program is in a state of flux. They are looking at testing ceca in processing plants as a predictor of the salmonella on farm.

Dr. Dayna Harhay of USDA/ARS shared a very interesting look at the Salmonella issues related to beef. Apparently Salmonella can contaminate meat from external contamination, but also from internal contamination from infected lymph nodes. She showed that typically the serotypes found on the animal are not what are found in the beef.

Dr. Annette O'Connor of ISU shared the Salmonella control programs of various countries as compared to the United States. The bottom line is that on farm intervention does not work or if it does work it is not cost effective.

The Committee also discussed and passed the Resolution concerning the presence of Salmonella of any serotype whether it is antibiotic resistant or not being declared an adulterant.

THE WORLD ORGANIZATION FOR ANIMAL HEALTH (OIE) UPDATES – POULTRY

Michael J. David, International Animal Health Standards, National Center for Import and Export, USDA-APHIS-VS, Riverdale, MD

Every year, the World Organization for Animal Health (OIE) updates existing terrestrial animal code chapters or drafts new ones. At its May 2013 General Session, the World Assembly of Delegates adopted new text to several existing chapters. Pertinent to the poultry industry are the following new or updated Code chapters:

Biosecurity Procedures in Poultry Production. In 2011, a new chapter addressing basic biosecurity and hygiene procedures during poultry production was adopted. For 2013 the chapter received some minor revisions to improve its clarity and understanding.

Animal Welfare. A new chapter called Animal Welfare and Broiler Chicken Production was presented and adopted during the 2013 General Session. The chapter presents recommendations for the housing and rearing of broilers. It excludes poultry reared in 'backyard' environments. The recommended measures follow basic good

management practices. The US commercial poultry industry should have no difficulty meeting these recommendations.

Responsible and Prudent Use of Antimicrobial Agents in Veterinary Medicine. The chapter introduces some general recommendations on the use of antimicrobial agents. For the most part, the United States should be able to comply with the recommendations.

Infection with Avian Influenza Viruses. Although the substance and specific reporting obligations of the chapter have not changed, the United States had concerns with the proposed changes to the terminology of 'avian influenza' – doing away with the term "notifiable" and replacing it with simply 'avian influenza' or 'highly pathogenic AI' depending on the context of the recommendation. The President of the Commission made it clear that notification obligations did not change – the avian influenzas that are notifiable are the low pathogenicity H5 and H7 subtypes in *poultry* (as defined by the OIE) and all highly pathogenic strains. Brazil, another significant exporting country of poultry commodities, also expressed the same concerns. The updated chapter, however, was adopted.