Report of the USAHA Committee on Poultry and Other Avian Species
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Vice Chair: Melissa Yates, MD

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The Committee met on Tuesday, October 29, 2019 at the Rhode Island Convention Center from 8:00 AM – 5:20 PM. There were 47 Committee members and 43 guests present for a total of 90 meeting attendees. Chair Yuko Sato presided, assisted by Melissa Yates, Vice Chair. Sato welcomed the Committee on Poultry and Other Avian Species (CPAS) members, summarized the 2018 meeting.

Resolutions:
No resolutions and recommendations were submitted at the 2018 meeting.

2019 Presentations and Reports

USDA-APHIS VS Update was presented by Dr. Alan Huddleston, United States Department of Agriculture, Animal and Plant Health Inspection Services, Veterinary Services (USDA APHIS-VS), Riverdale, MD. A summary of the report is included in these proceedings.

Virulent Newcastle Disease in California Response Updates was given by Dr. Annette Jones and Lisa Quiroz, California Department of Food and Agriculture, Sacramento, CA, and Clint Turnage, USDA APHIS Wildlife services, Sherwood, AR. A summary of the report is included in these proceedings.

Epidemiologic Analysis of LPAI Outbreak in MN was presented by Dr. Marie Culhane and Emily Waltz, University of Minnesota, St. Paul, MN. A summary of the report is included in these proceedings.

AVBP Current Diseases of Concern was given Dr. Scott Gustin, Tyson Foods, Springdale, AR. A summary of the report is included in these proceedings.

Table Egg Layer Industry Report was given by Dr. Eric Gingerich, Diamond V, Zionsville, IN. A summary of the report is included in these proceedings.

Turkey Industry Report was given by Ms. Lindy Froebel, National Turkey Federation, Washington, DC. A summary of the report is included in these proceedings.

Multistate Analysis of Backyard Poultry Mortality was given by Dr. Kristy Pabilonia, Fort Collins, CO. A summary of the report is included in these proceedings.

American Association of Avian Pathologist (AAAP) Meeting Report was given by Dr. Eric Jensen, Aviagen Inc., Huntsville, AL and Dr. Eric Gingerich, Diamond V, Zionsville, IN. A summary of the report is included in these proceedings.

CDC Update: Multistate Enteric Illness Outbreaks Linked to Poultry was given by Drs. Megin Nichols and Laura Gieraltowski, CDC, Atlanta, GA. A summary of the report is included in these proceedings.

US Poultry & Egg Association Report was given by Dr. Denise Heard, US Poultry & Egg Association, Tucker, GA. A summary of the report is included in these proceedings.

AI and NDV Disease Subcommittee Report was given by Dr. David Suarez, USDA-ARS-SEPRL, Athens, GA. A summary of the report is included in these proceedings.

NVSL Avian Influenza and Newcastle Disease Report was given by Dr. Mia Kim Torchetti, USDA-APHIS-VS-NVSL, Ames, Iowa. A summary of the report is included in these proceedings.

NVSL Bacteriology Diagnostics Report was given by Dr. Kristina Lantz, USDA-APHIS-VS-NVSL, Ames, Iowa. A summary of the report is included in these proceedings.

USA Interagency Surveillance for HPAI in Wild Birds was presented by Dr. Tom DeLiberto, United States Department of Agriculture, Animal and Plant Health Inspection Services, Wildlife Services, (USDA-APHIS-WS), Colorado Springs, CO. A summary of the report is included in these proceedings.

National Poultry Improvement Plan (NPIP) Update was presented by Dr. Elena Behnke, USDA-APHIS-VS-NPIP, Conyers, GA. A summary of the report is included in these proceedings.

National List of Reportable Animal Diseases (NLRAD) was given by Dr. Rebecca Jones, Fort Collins, CO. A summary of the report is included in these proceedings

Multistate Psittacosis Outbreak Among Poultry Plant Workers, 2018: Animal Health Perspectives was given by Dr. Tracey Dutcher, USDA-APHIS-VS, Riverdale, MD. A summary of the report is included in these proceedings

Animal Health (OIE) Update – Poultry was given by Dr. Michael David, USDA-APHIS-VS National Import Export Services, Riverdale, MD. A summary of the report is included in these proceedings.

Live Bird Market System Report was given by Dr. Fidelis Hegngi, USDA-APHIS-VS, Riverdale, MD. A summary of the report is included in these proceedings.

Center for Epidemiology and Animal Health (CEAH) Report was presented by Dr. Amy Delgado, USDA-APHIS-VS-CEAH, Colorado Springs, CO. A summary of the report is included in these proceedings.

Compartmentalization of Primary Breeders was given by Dr. Alberto Torres, Cobb-Vantress Inc, Siloam Springs, AR. A summary of the report is included in these proceedings.

Estimating the Time of Disease Introduction in vND in Layer Barns Using Experimental Data was presented by Dr. Marie Culhane and Emily Waltz, University of Minnesota, St. Paul, MN. A summary of the report is included in these proceedings.

Committee Business:

Sub-Committee Report: The Avian Influenza/Newcastle Disease Subcommittee Report as presented by Dr. David Suarez was approved by the CPAS Committee.

Old Committee Business: None

New Committee Business: None

Committee Recommendations: None

Committee Resolutions: There were two Resolutions that were brought before the Committee and passed.

There being no further business the Committee on Poultry and Other Avian Species (CPAS) adjourned at 5:20 PM.

01-USDA-APHIS-VS Update

Alan Huddleston, DVM, United States Department of Agriculture, Animal and Plant Health Inspection Services, Veterinary Services (USDA-APHIS-VS), Riverdale, MD

Dr. Huddleston provided a brief overview of the status of APHIS avian health accomplishments and challenges in FY 2019.

APHIS VS Avian Health Accomplishments and Challenges in FY 2019

Resources

In March 2019, the National Poultry Improvement Plan (NPIP) team welcomed back Dr. Elena Behnke. Dr. Behnke rejoined Federal service and specifically the NPIP after a period of years in the private sector. Elena joined the NPIP as the AI Compartmentalization Program specialist.

In July 2019, the Aquaculture, Swine, Equine and Poultry Health Center (ASEP) welcomed a Dr. Julie Gauthier as the new Assistant Director of Poultry Health. Julie oversees the day-to-day planning and response for avian health. She also oversees the National Poultry Improvement Plan team.

In September 2019, Dr. Elena Behnke assumed the role of Senior Coordinator, filling in behind Dr. Denise Heard and ensuring a seamless transition to keep this critical leadership role filled and functional.

In FY2020, APHIS will address the current challenging personnel gap in Conyers. We will focus efforts on filling the two vacant NPIP positions: the compartmentalization specialist and the NPIP laboratory coordinator position.

Response

Avian Influenza

In FY2019, APHIS and State partners successfully responded to 17 LPAI infected premises in 4 States. Premises types represented included commercial meat-type turkey premises, a commercial breeder flock, a backyard non-commercial flock, a backyard/non-commercial live bird market (LBMS) and a live bird market. Over 600,000 birds, including turkeys, chickens and ducks were affected in these detections.

Response activities included epidemiological investigations to identify all potentially affected flocks, controlled marketing where possible, depopulation and disposal when controlled marketing was not possible, cleaning and disinfection, continuity of business support and indemnity and compensation for depopulation, disposal and virus elimination.

There were no detections of highly pathogenic avian influenza (HPAI) in domestic poultry in FY2019.

Virulent Newcastle Disease (vND)

On May 17, 2018 the National Veterinary Services Laboratories (NVSL) confirmed virulent Newcastle disease (vND) in backyard exhibition poultry in Los Angeles County, California. The California Department of Food and Agriculture (CDFA) and the United States Department of Agriculture (USDA) initiated a unified command to respond to the incident. The response has been vigorous.

- As of March 2019, over 1.1 million birds had been depopulated and over 4.5 million eggs had been destroyed. USDA had spent approximately $17 million dollars on the response, including support of CDFA activities through cooperative agreements, and CDFA had contributed approximately $8 million of non-recoverable funds toward the response.

In March 2019, APHIS and CDFA initiated an enhanced campaign to eradicate virulent Newcastle disease (vND) from Southern California. VS secured CCC funding to support the effort and committed approximately $45M to the effort (in addition to approximately $17M spent from avian health funds).

In FY2019, VS identified and depopulated approximately 291 infected premises and 1,755 dangerous contact premises as part of the eradication effort. This included four large commercial operations.

Program Delivery

On July 5, 2019, Cobb-Vantress was officially recognized and awarded certification as a U.S. Avian Influenza Clean Compartment by the National Poultry Improvement Plan. A review of all application documents and corresponding audits conducted on pedigree and great-grandparent facilities from July 12, 2018 through July 1, 2019 allowed verification that each component had successfully met or exceeded standards as set forth in the NPIP Program Standards F: Compartmentalization for Protection Against Avian Influenza Disease in Poultry Primary Breeding Companies in the United States of America in order to establish a compartment.

The first AI Clean Compartment in the USA was acknowledged in 2017, which makes Cobb-Vantress the second company in the USA to earn certified U.S. AI Clean Compartment status. The new compartment will allow foreign trading partners a high degree of confidence in the health status of Cobb breeding stock such that the evaluation of risk in the event of an AI outbreak can be based on management practices and biosecurity programs that have met the rigorous standards necessary to participate in the program.

Policy

Flat Rates for Virus Elimination

In November 2018, APHIS published the per-cubic-yard flat rates for table egg laying bird barns and per-square-feet for table egg storage and processing facilities. The full document is available on the APHIS Web page. This set of flat rates complemented the per-square foot flat rate for floor-raised poultry, published March 2018.

- The per-square-foot flat rate for floor-raised poultry is $0.65.
- The per-cubic-yard flat rates for table egg laying bird barns is $2.90.
- The per-square-foot for table egg storage and processing facilities is $1.20.

Payment is made to the owner of the land and structures that housed the infected birds. The compensation is issued in two payments:

- 50 percent after the flock plan is completed; and
- 50 percent after environmental samples from the affected areas of the premises test negative.

In FY2019 APHIS accepted comments on the published flat rates. Our economists are currently evaluating the comments submitted for an FY2020 review and update of the flat rate documents.

LPAI Indemnity

APHIS has two primary objectives in forming an H5/H7 LPAI indemnity and compensation policy:

- Stop the spread of virus as quickly as possible to minimize the number of affected flocks and also to mitigate the chance of mutation of an LPAI virus into an HPAI virus; and
- Partner with States and producers in our response, reducing total costs for indemnity and compensation wherever possible.

In FY2019 APHIS competed a series of stakeholder engagements with States and the poultry sector to develop a sustainable policy for LPAI indemnity and compensations levels. As part of this engagement, APHIS held multiple discussions with stakeholders:

- USAHA 2018 in Kansas City, Missouri in October 2018;
- Stakeholder meeting at APHIS Headquarters in Riverdale, Maryland in April 2019.

Policy for LPAI indemnity and compensation.

- APHIS, with input from the owner and the State Animal Health Official, will first determine if controlled marketing or depopulation via slaughter is a recommended option for the affected flock.
- If the flock can be control marketed or depopulated via slaughter, APHIS will pay the following for indemnity and compensation:
    - Zero percent indemnity or compensation for depopulation; and
    - 100 percent of HPAI compensation/flat rates for disposal (materials), materials destroyed, and virus elimination in all occupied houses.
- If the flock cannot be control marketed or depopulated via slaughter, APHIS will pay the following for indemnity and compensation:
    - 100 percent indemnity and depopulation costs; and
    - 100 percent of HPAI compensation/flat rates for disposal (materials), materials destroyed, and virus elimination in all occupied houses.
- In both of these scenarios, the owner must present APHIS with evidence that the premises was following sufficient biosecurity measures to prevent the introduction of LPAI at the time the disease is suspected to have entered the flock.
- If there is evidence of significant biosecurity lapses documented by State and/or Federal personnel, if the owner declines control marketing or depopulation via slaughter as recommended by APHIS, or the owner does not meet the requirements for 100 percent indemnity as described in 9 CFR part 56, then the following guidance will be applied:
    - 25 percent indemnity;
    - 100 percent depopulation costs; and
    - 25 percent HPAI compensation/flat rates for disposal (materials), materials destroyed, and virus elimination in all occupied houses.

This policy will be incorporated into the revised VS Guidance Document 8603, *Procedures for Flock Plans, Compliance Agreements, and Indemnity Claims in Cases of H5/H7 Low Pathogenicity Avian Influenza Infection in Poultry*. We plan to publish the updated document in FY2020.

Analysis

FY2019, VS released the 2nd (12/2018) and then 3rd (7/2019) epidemiological analyses of the vND incident, available online for stakeholders.
In February 2019, VS released an epidemiological analysis of the LPAI event in Minnesota; other epidemiological analyses of LPAI events

Training and Outreach

In FY2019, the NPIP staff hosted three technical workshops for the NPIP on its three major disease prevention programs: one on avian influenza, one on mycoplasma and one on salmonella.

In March FY2019, the NPIP staff hosted an NPIP Avian Influenza Clean Compartment Auditor training. This provides VS and the NPIP with sufficient resources to carryout compartment audits in FY2020 and beyond, critical to the success of the NPIP AI Clean Compartment program.
In June 2019, APHIS Veterinary Services hosted the biannual NPIP Official State Agency (OSA)/General Conference Committee (GCC) meeting in Albuquerque, NM. The meeting was attended by over 90 percent of the OSAs, and provided a forum for information exchange, best practices, and requests for USDA action.

In FY2019, APHIS engaged in an extensive outreach campaign titled “Defend the Flock”, combining biosecurity messaging for commercial and backyard poultry producers. This campaign included stakeholder calls and announcements (November 2018), distribution of web and print materials, radio and print media interviews and monthly social media activities including Facebook and Twitter.

In FY2019, the APHIS Veterinary Service Poultry Health team participated in over 20 outreach activities spanning topics and audiences from trade and international animal health standards to laboratory training and domestic programs.

02-Virulent Newcastle Disease in California Response Updates

Annette Jones, DVM, California Department of Agriculture, Sacramento, CA
Lisa Quiroz, California Department of Agriculture, Sacramento, CA
Clint Turnage, USDA-APHIS-Wildlife Services (WS), Sherwood, AR

This panel, led by the California State Veterinarian, provided a response summary of the 2018/19 California virulent Newcastle disease (vND) Incident, including an overview of how Secure Food Supply (Secure Poultry Supply) Plans were implemented in the face of the outbreak, providing impacted producers with business continuity through validated biosecurity implementation, continuous disease surveillance testing, and permitted product movement. In addition, Clint Turnage, USDA Wildlife Services, provided a summary of how Wildlife Services personnel were integrated into the response and the critical role they performed in the eradication effort.

Clint Turnage discussed Wildlife Services’ role in the vND outbreak in southern California from a “boots on the ground” perspective. Turnage and his colleagues from across the country were deployed multiple times and played an integral part in the success of that endeavor.

03-Estimating Epidemiologic Parameters Using Diagnostic Testing Data from the 2018 LPAI H5N2 Outbreak in Minnesota

Emily Walz, DVM, College of Veterinary Medicine, University of Minnesota, St. Paul, MN
Marie Culhane, DVM, PhD, College of Veterinary Medicine, University of Minnesota, St. Paul, MN

Determining the time of LPAI virus introduction in a flock is an important part of outbreak investigations. By narrowing the time window of possible virus introduction, we can better identify the potential routes of virus introduction and enhance our understanding of the pattern of disease spread. In this analysis, diagnostic testing data was used to estimate the most likely date of virus introduction for all the barns that tested positive by rRT-PCR on the eight LPAI H5N2 virus infected turkey premises in Minnesota in 2018. The analysis was performed using a simulation-based method in which the likelihood of observing the diagnostic test results was estimated from a within-house disease transmission model for various candidate times of exposure.

Using this method, Kandiyohi 1 and Stearns 1 were estimated to have been the first premises infected with a most likely date of introduction of October 7th. Stearns 2 was estimated to have been infected only shortly afterwards, on October 8th. The most likely dates of virus introduction estimated for the subsequent premises was October 19th for Kandiyohi 2, October 26th for Stearns 3, and October 28th for both Stearns 4 and Kandiyohi 4. The last premises estimated to have been infected was Kandiyohi 3 on November 6th. The last barn estimated to have been infected was Kandiyohi 4/Barn 4, with a likely date of virus introduction of November 23rd. These estimates helped industry veterinarians target their review of visitor logs and other activity on the infected premises to identify possible pathways of introduction and to conduct tracebacks on likely exposures.

The disease transmission simulation model was used to predict the time at which there were no infectious birds in the barn based on diagnostic test results. As an example, predictions were made based on a test result of 10/10 seropositive serum samples and 1/1 rRT-PCR positive samples with the samples for both tests taken on the same day. This test result was observed in 5 barns during the outbreak, including Kandiyohi 3/Barn 8, Stearns 2/Barn 1, Stearns 3/Barn1, Stearns 3/Barn 2, and Stearns 4/Barn 4. For model validation, the predicted time range was compared to two different observed intervals in the diagnostic testing data, the time until negative rRT-PCR test results were obtained and the time until virus isolation was not successful. The model predictions were consistent with the observed rRT-PCR interval for all 5 barns. The model predictions were conservative with respect to negative virus isolation results, with the predicted time to stop shedding being later than the observed interval in 3 out of 5 barns.

The results of this analysis are subject to some uncertainty due in part to a lack of information from infection and transmission studies with the LPAI H5N2 strain. Proxy H5 and H7 LPAI strains were used instead in the transmission simulation model. Furthermore, the time between diagnostic tests was in some cases several days, which can also introduce uncertainty into the results. Nevertheless, the results of this analysis demonstrate the usefulness of diagnostic testing to better understand the behavior of LPAI in infected poultry flocks.

04-Association of Veterinarians in Broiler Production (AVBP) Current Diseases of Concern

Scott Gustin, DVM, Tyson Foods, Springdale, AR.
Prepared by: Steve McCarter, DVM

Broiler Production: Broiler production (lbs.) increased in 2018 (3.0%) and is projected to be higher again in 2019 (1.20%). Average broiler weights basically stayed the same from 2017 to 2018 and are unchanged so far in 2019. Average feed cost increased from 2017 to 2018 (4.8%) and is lower for the first half of 2019 (down 2.9%).

Mortality: Average total mortality for the first half of 2019 is at 5.27% in U.S. broilers through 47.16 days, an increase of over 0.2 % compared to 2018. Most broiler weight classes have experienced an increase in mortality. The one exception was the 5.20-6.0lbs bird class that was slightly lower at 0.21 percent. First week mortality is also higher in 2019 at 1.65%. The trend towards the removal of hatchery antibiotics, down over 73% since 2014[2], is likely contributing to this increase. Chick quality/early mortality ranked third in the 2018 AVBP survey as displayed later in this report.

Condemnations: Whole Bird Farm Condemnations + Parts Condemnations declined from 0.416 percent in 2018 to 0.385 percent in 2019. The movement of many processing plants to NPIS (New Poultry Inspection System) is the most likely explanation for the decline.

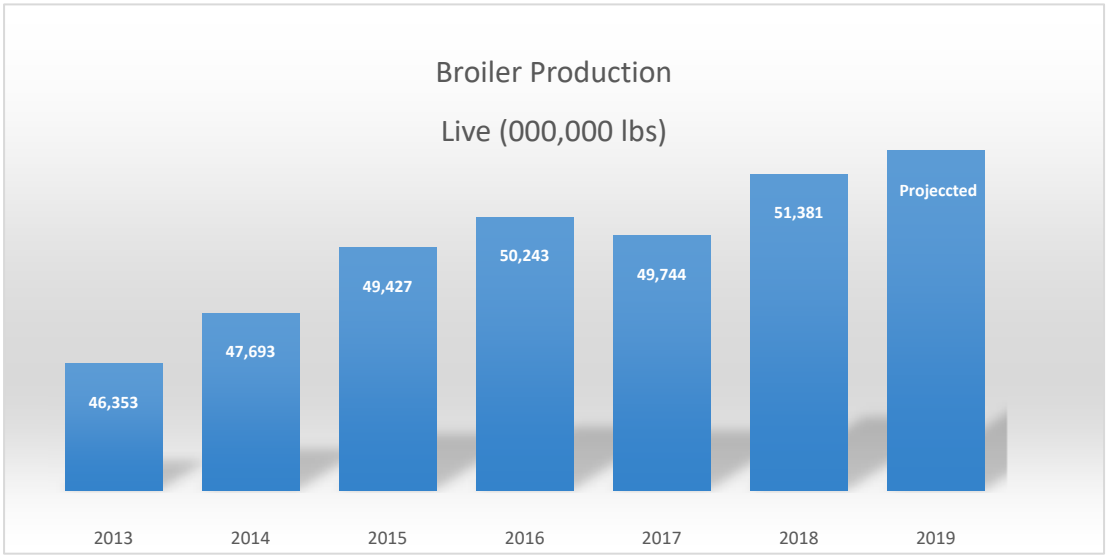
Key Broiler Disease Issues (*see below*): Among the major disease-related issues that broiler production veterinarians are concerned with, coccidiosis (specifically *E. maxima*) ranked first, and necrotic enteritis ranked second. These 2 diseases typically operate in tandem, and it's likely that restricted-use antibiotic programs (ranked first on SPECIFIC disease importance chart below) have only exacerbated their impact on the broiler industry. As of July 2019, over 50% of U.S. broilers were raised without a shared-class antibiotic or ionophore[1]. In addition, ionophore feed inclusion continues to decline each year since 2014[2]. "Chemical" coccidiostat and coccidiosis vaccine usage has doubled over the same period[2]. Marketing strategies and customer pressure are likely driving the move toward these methods of coccidiosis control. At the same time, the inclusion of a preventative antibiotic to control necrotic enteritis continues to decline. 77% of broiler feed does not contain any growth promoting antibiotic compounds.[2]

Infectious Bronchitis (Respiratory) ranked 8th on the survey. Many survey respondents highlighted bronchitis strain 1639 as an emerging issue.

Key Non-Disease Broiler Issues (*see below*): Every year since 2016, the survey indicated the highest ranked major non-disease issue among broiler veterinarians was restricted antibiotic-use programs. Ranking second in this year's survey is Poultry Welfare. Welfare displaces increased food safety regulations by USDA-FSIS that ranked 5th in this year's survey.

Of note, vaccine availability moved up the AVBP non-disease rankings considerably in 2018 and 2019. Several production and quality issues by major vaccine suppliers has disrupted supply. This has put a strain on the vaccine industry and caused concern for many broiler production companies.

[1]*Agristats report, 2019.*
[2]*2018 U.S. Broiler Health-Market Tracker, Rennier Associates, Inc.*



	2013	2014	2015	2016	2017	2018	2019 *(Jan-Jul)*
Average Age	46.81	47.27	47.82	47.13	47.04	47.16	47.12
Average Broiler Weight	6.01	6.12	6.24	6.22	6.27	6.27	6.24
Feed Ingredient Cost/Ton	342.55	287.69	249.90	235.69	228.90	239.37	232.88
First Week Mortality	1.15	1.28	1.39	1.41	1.41	1.55	1.65
Total Mortality	3.86	4.31	4.79	4.53	4.56	4.99	5.27
Mortality (3.6-4.4 lbs)	3.32	3.64	3.90	3.65	3.53	4.06	4.43
Mortality (4.4-5.2 lbs)	3.22	3.55	3.54	3.55	3.83	4.24	4.60
Mortality (5.2-6.0 lbs)	4.59	4.40	5.06	4.75	5.00	5.46	5.25
Mortality (6.0-6.8 lbs)	3.62	4.92	5.30	5.02	4.31	4.56	6.07
Mortality (6.8-7.5 lbs)	4.24	4.31	5.03	4.68	4.86	5.72	5.98
Mortality (7.5-8.5 lbs)	4.64	5.15	6.41	5.54	5.41	5.17	5.19
Mortality (>8.5 lbs)			5.41	5.43	5.52	5.95	6.04
WB Farm + Parts Condemns	0.501	0.541	0.569	0.525	0.491	0.416	0.385
Septox Condemns	0.133	0.152	0.166	0.140	0.128	0.130	0.127
Airsac Condemns	0.084	0.089	0.092	0.099	0.086	0.066	0.062
IP Condemns	0.027	0.028	0.025	0.020	0.018	0.012	0.015
Leukosis Condemns	0.004	0.001	0.001	0.001	0.001	0.001	0.001
Birds Placed (B)	8.049	8.147	8.326	8.459	8.309	8.629	8.797*
Birds Produced (B)	7.738	7.796	7.927	8.076	7.930	8.198	8.333*
Pounds Produced (B)	46.535	47.693	49.427	50.243	49.744	51.381	52.000*

* volume estimated for 12 months

2019 Disease and Non-Disease Rankings

As in previous years, the Association of Veterinarians in Broiler Production (AVBP) membership was polled concerning disease and non-disease issues. Major issues were ranked for both areas, and a further breakdown of specific disease and non-disease issues is included below.

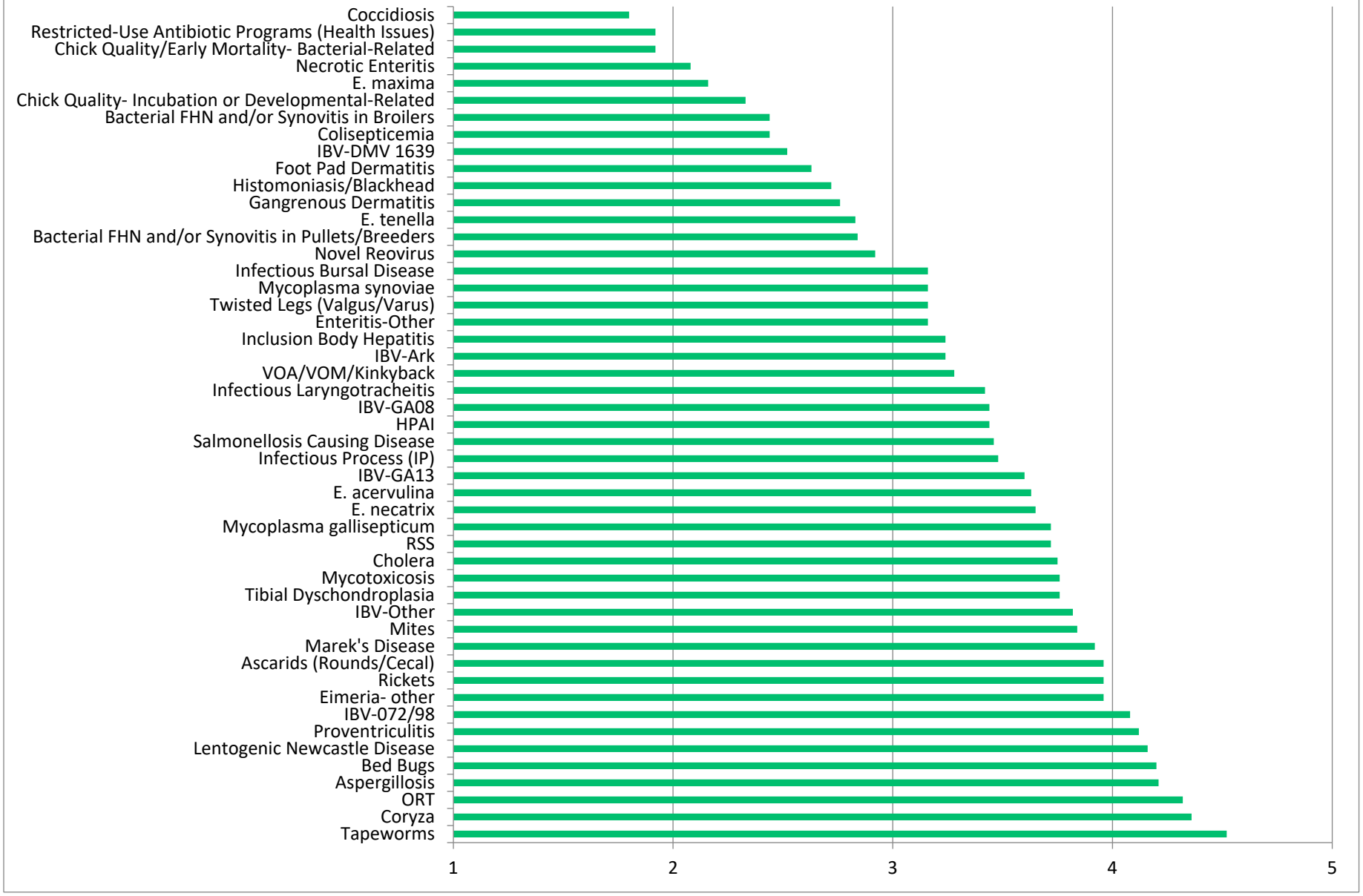
AVBP is comprised exclusively of veterinarians employed full-time by US broiler companies. The veterinarians responding to the 2018 survey represented approximately 76% of USA broiler production.

RANKING	2019 Major DISEASE Categories
1	Coccidiosis
2	Necrotic Enteritis
3	Chick Quality and Early Mortality
4	Infectious Bronchitis-Respiratory
5	Gangrenous Dermatitis
6	Novel Reovirus
7	General Polyserositis-E. coli
8	Bacterial Osteomyelitis of the Legs
9	Infectious Laryngotracheitis
10	Infectious Bursal Disease
11	Vertebral Osteomyelitis/Kinkyback
12	Infectious Bronchitis (Kidney form)

13	Avian Influenza
14	Histomoniasis
15	Mycoplasma
16	Cholera
17	Newcastle Disease

RANKING	2019 NON-DISEASE Categories
1	Food Safety Regulation Salmonella
2	Vaccine Shortage/Inadequate supply
3	Restricted Antibiotic Usage-Customer Related
4	Food Safety Regulations-Campylobacter
5	Meat Quality
6	Grain Prices
7	Biosecurity Risks
8	Poultry Welfare-Program Related
9	Vaccines-Slow Vaccine Licensing
10	Poultry Welfare-Activist Threats
11	Paw Quality
12	Restricted Antibiotic Usage-Media Related
13	Meat Quality-White Stripping
14	FDA-Drug Availability
15	HPAI/LPAI
16	Meat Quality Other

Rate the importance of the following **DISEASE** issues to you/your company?



Rate the importance of each **NON-DISEASE** issues to you/your company

05-Table Egg Layer Industry Report

Summary:

Overall layer health is good due to a number of factors as follows:

- Continued good supply of high-quality biologics
- Readily available veterinary technical assistance from primary breeder, vaccine company, diagnostic laboratory, feed additive suppliers, and consulting veterinarians
- Flock supervision by professional, well-trained flock service technicians
- High quality nutrition provided by professional nutritionists
- Housing is of good quality in general supplying feed, lights, air quality, water, and space in the needed quantities and quality.
- 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

2019 AVEP Disease Survey:

A poll of the Association of Veterinarians in Egg Production (AVEP) was conducted within the last month. The members were asked to categorize a list of common diseases of caged and cage-free pullets (22 and 23 conditions listed respectively) and caged and cage-free layers (32 and 36 conditions listed respectively) as to their importance in their area of service on a scale of 1 to 5 with the following categories

- 1 = Little or no importance to flock health or profitability. Very little effort to control
- 2 = Some importance to flock health or profitability. Moderate effort to control on some farms.
- 3 = Moderate importance to flock health or profitability. Moderate effort needed to control on most farms.
- 4 = High importance to flock health or profitability. Significant effort to control on some farms.
- 5 = Very high importance to flock health or profitability. Significant effort to control on most farms.

30 of 41 (73%) targeted AVEP members answered the survey.

Starveouts and yolk infections of chicks during the first week continue to be of moderate to high importance indicating there is still work to be done in breeder hatch egg sanitation, hatchery, and brooding management.

	Caged Pullets	**Cagefree Pullets**
Starveouts	2.47	2.53
Yolk infections	2.40	2.27

The results showing the top 10 diseases and conditions for the different classes of egg layers with their average ranking are shown below:

Top 10 Diseases and Conditions				
Ranking	**Caged Pullets**	**CageFree Pullets**	**Caged Layers**	**CageFree Layers**
1	Infectious Bronchitis (IB) 3.70	Coccidiosis 3.60	E coli 3.63	Peckouts 4.07
2	Coccidiosis 3.40	Piling 3.37	IB 3.53	E coli 3.73
3	Infectious Bursal Disease (IBD) 2.90	IB 3.23	Calcium Depletion 3.17	Piling 3.63
4	Necrotic Enteritis (NE) 2.83	IBD 2.77	Tie: Coccidiosis 3.13	Tie Coccidiosis 3.27
5	Post SE Bacterin Hepatitis 2.70	Tie: NE 2.73	Tie: Mg 3.13	Tie: IB 3.27

6	vILT (Vaccinal Infectious Laryngotracheitis) 2.67	Tie: E coli 2.73	Infectious coryza (IC) 3.10	False Layer 3.13
7	*M gallisepticum (Mg)* 2.50	vILT 2.63	Focal Duodenal Necrosis (FDN) 3.07	FDN 3.00
8	*E. coli* 2.40	Tie: Mg 2.40	False Layer Syndrome 2.97	IC 2.97
9	Pox 2.27	Tie: Post SE bacterin hepatitis 2.40	Peckouts/Cannibalism 2.87	Tie: Roundworms 2.73
10	Marek's Disease 2.10	Roundworms 2.30	Necrotic enteritis 2.83	Tie: NE 2.73
11				Tie: ILT 2.73

Coccidiosis and necrotic enteritis continue to be high on the lists of all classes of layers due to the hardy nature of coccidial oocysts once they are established in a house. Vaccination of caged pullets is a challenge due to difficulty in cycling sporulated vaccinal oocysts. Cagefree pullets and layers outbreaks are usually due to breakdowns in litter management which override coccidiostat and gut health medication programs. The lack of routine antibiotic medication usage in early lay leads to an increase in necrotic enteritis should coccidiosis be a problem.

Infectious bronchitis (IB) and False Layer Syndrome (FLS) continue in the top ten for layers. Exposure to variant strain IB in very young pullets in the first 3 weeks is felt to result in FLS. This has been seen in locations in the northeast US, Ontario, Quebec, Southwest US, and Midwest in areas with high broiler populations infected with variant strain IB or multi-age pullet growing units that become infected. Vaccination at day old or just after placement with the Ma5 Mass or GA 08 vaccines have greatly prevented the problem.

Colibacillosis in layer flocks continues as highly important. The live E coli vaccine does a very good job of preventing the early lay onset problem but immunity is short-lived and does not provide a lot of protection for the late lay onset problems. Some producers are beginning to administer the live vaccine in mid-lay as a booster vaccination.

Piling of cagefree flocks continues to be a major problem involving environment management.

Peckout mortality of cagefree layers continues as well as an important issue. Lighting and behavioral management is often at the root of the problem. Some pressure is on to move to intact beaks for some cagefree programs which may be a real challenge in some operations.

Infectious coryza caused by *Avibacterium paragallinarum* spread through Pennsylvania flocks like wildfire between late December through May 2019 affecting over 12 million layers, pullets, and broilers. Also, an outbreak in Arizona in multiple complexes which previously were coryza-free, occurred in early January 2019. The ease of spread of this supposedly environmentally fragile organism is troubling. Recent studies at the University of Pennsylvania shows the causative bacteria can survive in 43F and 77F water for 24 hours and possibly longer.

Post SE Bacterin Hepatitis continues to be seen as an important cause of pullet mortality. Vaccine companies are continuing to work to determine why this syndrome exists. Preventing overheating of vaccine prior to use may be a key to prevention.

The high ranking of infectious bursal disease in pullets is the subclinical form resulting in poor growth rate, body weight uniformity, and response to vaccines not the acute mortality form.

The control of roundworms in egg layers got a boost as the product AquaSol (fenbendazole) was cleared for use in egg layers in production in 2018. Organic layers continue to be without a highly effective product to use for this condition.

Survey of Food Safety, Foreign Animal Diseases, and Other Issues of Concern:

The AVEP members were asked to rate their concerns on various topics according to the following scale:

- 1 = little importance, concern, or effort to prevent
- 2 = some importance, concern, or effort to prevent

- 3 = moderate importance, concern, or effort to prevent
- 4 = high importance, concern, or effort to prevent
- 5 = very high importance, concern, or effort to prevent

The results are summarized as follows:

Disease or Issue	**Ave. Rating**	**Category**
Avian influenza	4.00	High to Very High
Virulent Newcastle Disease	3.37	Moderate to High
Lack of approved, effective treatments/antibiotics	4.31	High to Very High
Salmonella enteritidis (SE)/FDA Egg Safety Rule compliance	3.28	Moderate to High
Group C or other non-SE serotypes resulting in egg recalls	3.67	Moderate to High
Welfare issues:		
• Possibility of banning beak trimming	3.50	Moderate to High
• Inability to use maceration for of male chicks after hatched	3.07	Moderate to High
• Continued misuse of MAK carts for on-farm euthanasia of spent fowl	3.57	Moderate to High
• Lack of guidance regarding emergency depopulation of layers	3.80	Moderate to High
• Cagefree management challenges	3.87	Moderate to High
Lack of effective vaccines	3.03	Moderate to High
Lack of effective diagnostics	2.10	Low to Moderate

Concerns and comments from AVEP members (a summary):

- ***Salmonella serotypes other than SE***:
    - The FDA SE plan inhibits surveillance of other serotypes and hence appropriate methods of controlling them
    - Clear guidance from FDA is lacking in this area
- ***Lack of approved treatments:***
    - The availability of useful, economic treatments is sorely lacking.
    - Treatments for organic layers are expensive and often lack effectiveness.
- ***Emergency depopulation procedures***:
    - We are not prepared for the next outbreak
    - Whole house gassing with CO2 information is lacking, at least it is for the majority of veterinary practitioners.
    - More research on the use of Ventilation Shutdown as a means of depopulation is needed.
    - Depopulation means for large caged or cagefree flocks is lacking
- ***Cagefree management issues***:
    - Most cagefree egg producers are still in the early stages of learning cagefree management.
    - Spotty Liver Disease is an emerging issue.
    - Keel deformities and keel fractures are issues that have not been addressed.
    - Products and information on internal parasite control is lacking

- ***Use of MAK (Modified Atmosphere Killing) carts for euthanasia of spent fowl***:
    - The use of MAK carts needs to be discontinued and humane alternatives used or use the MAK carts as they were designed to be used.
    - Whole house CO2 as an option for MAK carts needs to be evaluated.
    - The biosecurity risk of using MAK carts is a concern.
- ***Lack of appropriate vaccines***:
    - The possibility of the prohibition of using live Salmonella and other genetically modified vaccines for organic production is a huge concern for flock health and food safety.
    - The development of a mass applied fowl cholera or coryza vaccine would be quite useful in prevention and outbreak situations.
    - The vaccine companies are struggling to keep up with changes in providing effective infectious bronchitis vaccines due to changes in the virus in the field.
    - A vaccine for Spotty Liver Disease (*Campylobacter hepaticus*) would be useful in many areas where this disease is becoming enzootic.
- ***Prohibition of the use of maceration for male chick euthanasia***:
    - Until an acceptable, commercially viable, economic means of euthanizing male chicks is developed, maceration continues to give a humane means of male chick euthanasia in my opinion.
    - In-ovo sexing prior to 9 days of incubation is not likely on a commercial basis.
- ***Banning of beak trimming***:
    - At this point in the US, with the size and management ability of egg producers, banning of beak trimming would be a welfare disaster.
    - A lot of trials on a small scale will be needed to develop management techniques to counter a lack of beak trimming before it can be adopted on large scale.
    - Beak trimming is an effective and humane means of preventing feather pecking and cannibalism.
    - Banning of beak trimming would greatly increase losses to feather pecking and cannibalism.
- ***Avian influenza***:
    - Much more discussion is needed in how to detect low pathogenic avian influenza and how to control it if found.
    - The ability of infectious coryza to spread so easily in PA does not give one much confidence in our biosecurity programs to deal with high or low path AI.
- ***Other concerns***:
    - Shortage of qualified live production people
    - Colibacillosis prevention and control
    - Small intestine intussusception
    - Need to eradicate Mg from multi-age complexes
    - Fast spread of infectious coryza in the northeast and Midwest
    - Emergence of IBV strains like the DMV 1639 with no good means of prevention
    - Control of pullet or egg movement from diseased flocks to processing on other farms – premovement testing protocols needed
    - A different term for “starveouts” is needed.
    - The significance of finding “vent gleet” in mortality.
    - The need for a better reporting system for non-regulatory diseases such as Egg Drop Syndrome, infectious coryza, virulent IBD, variant IB viruses, etc. is desired.
    - Feather loss cause(s) and prevention information needed.
    - Cannibalism prevention information needed.

Emerging Diseases:

Emerging diseases, those that are serious but only seen in a small region or number of flocks, are being seen mostly in cagefree, outdoor access/pastured layers. They are as follows:

- Spotty Liver Disease (SLD) – Flocks with this condition experience a five to 20% drop in egg production over a three to four-week period and have 0.5 to 3% mortality. This is also a major problem in pastured flocks in Australia where the cause was determined to be due to *Campylobacter hepaticus*.

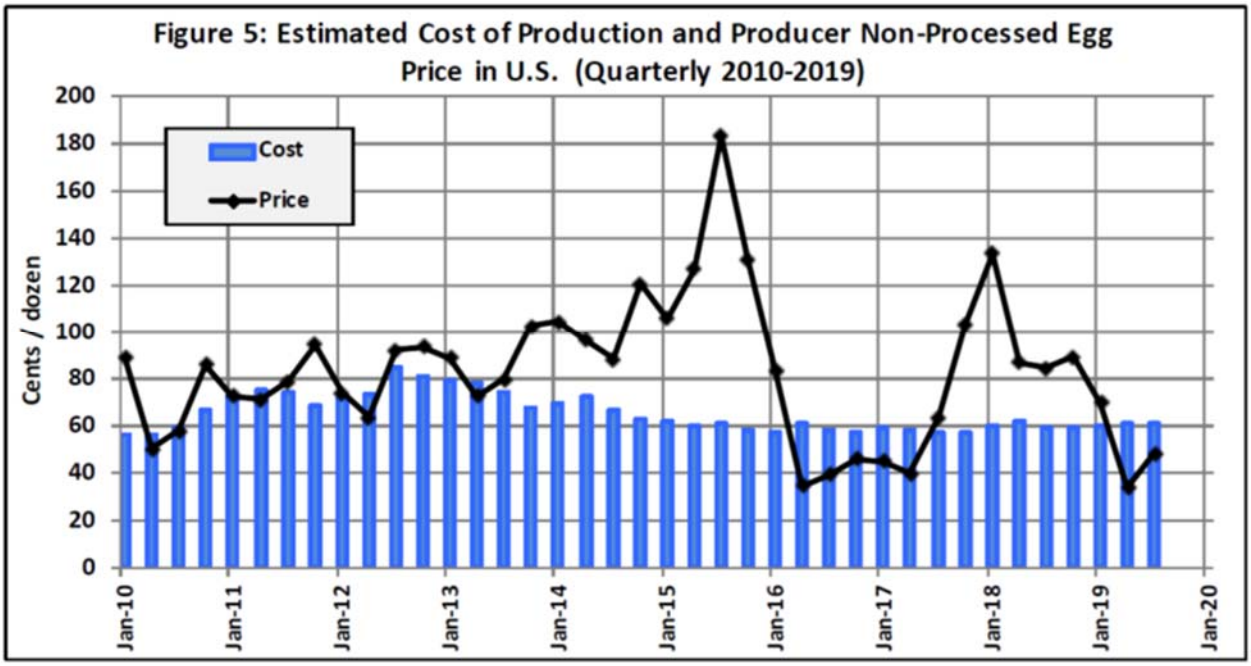
- Erysipelas – Several cases of high mortality have been seen in the last year in pastured layers with some flocks losing as much as 4% in a day. Attempts to treat the disease with live vaccine in organic flocks have met with success.
- Fowl Cholera – As with erysipelas, several cases of fowl cholera have been seen this past year in vaccinated and unvaccinated layer flocks. Vaccination with the live vaccine by wingweb has met with success in some organic flocks. Antibiotic therapy in conventional flocks has also been successful. Increasing the frequency of vaccination during grow and lay is being used preventatively.
- Feed Refusal Syndrome – This problem is less serious this year compared to past years partially due more feed mills screening incoming ingredients for mycotoxins.
- Bedbugs – Cagefree operations that are infested with bedbugs in the Northeast and Midwest US have been reported and concerns for house worker, bird movement, and other persons transfer of bedbugs to their dwellings is high. Some egg producers have been rejected by crews for consideration for moving their birds that have bedbugs.

Egg Industry Economic Conditions:

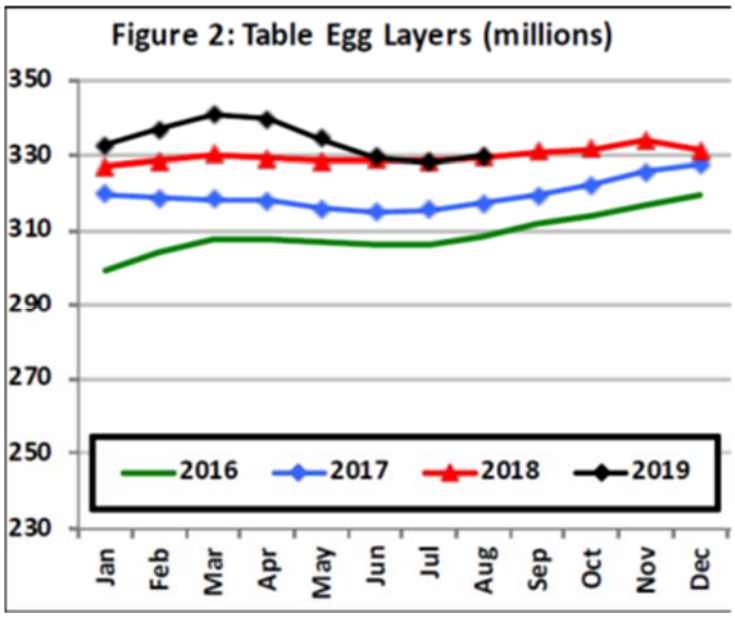
The egg industry had a losing year compared to the past two years.

Graphs From the Egg Industry Center, September 2019

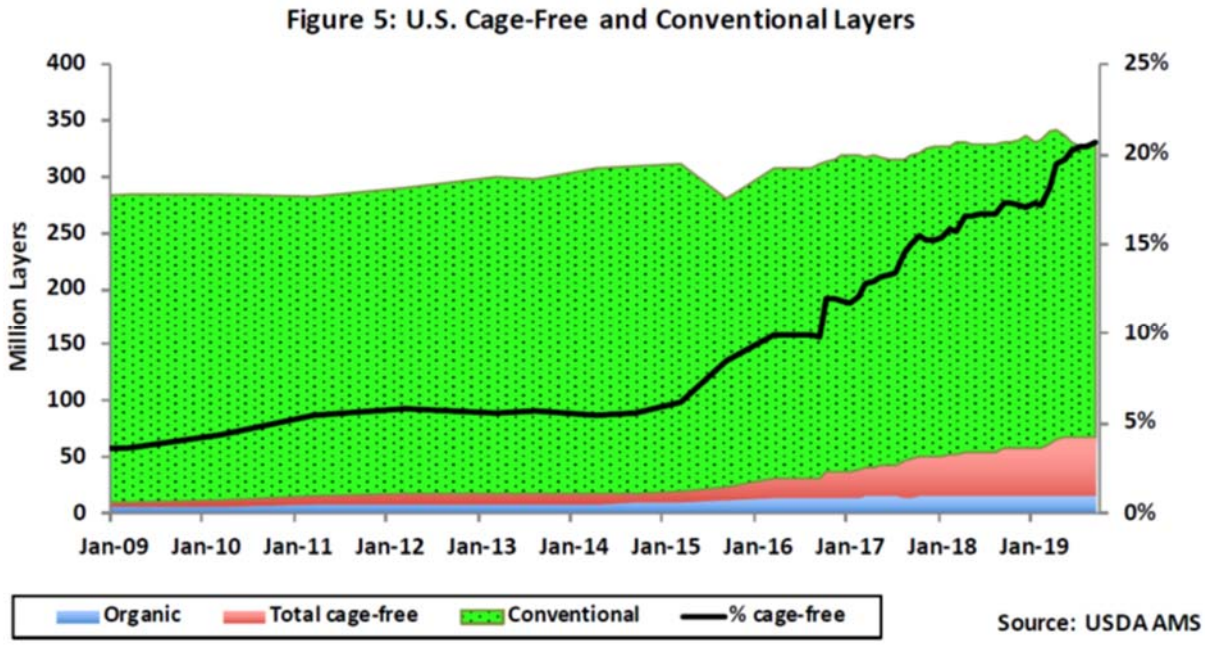
With a farm cost of approximately 60 cents per dozen, 2019 has not been profitable for egg producers this year. The reason is too many egg layers in production mostly due to adding cagefree production without taking caged housing out of production.



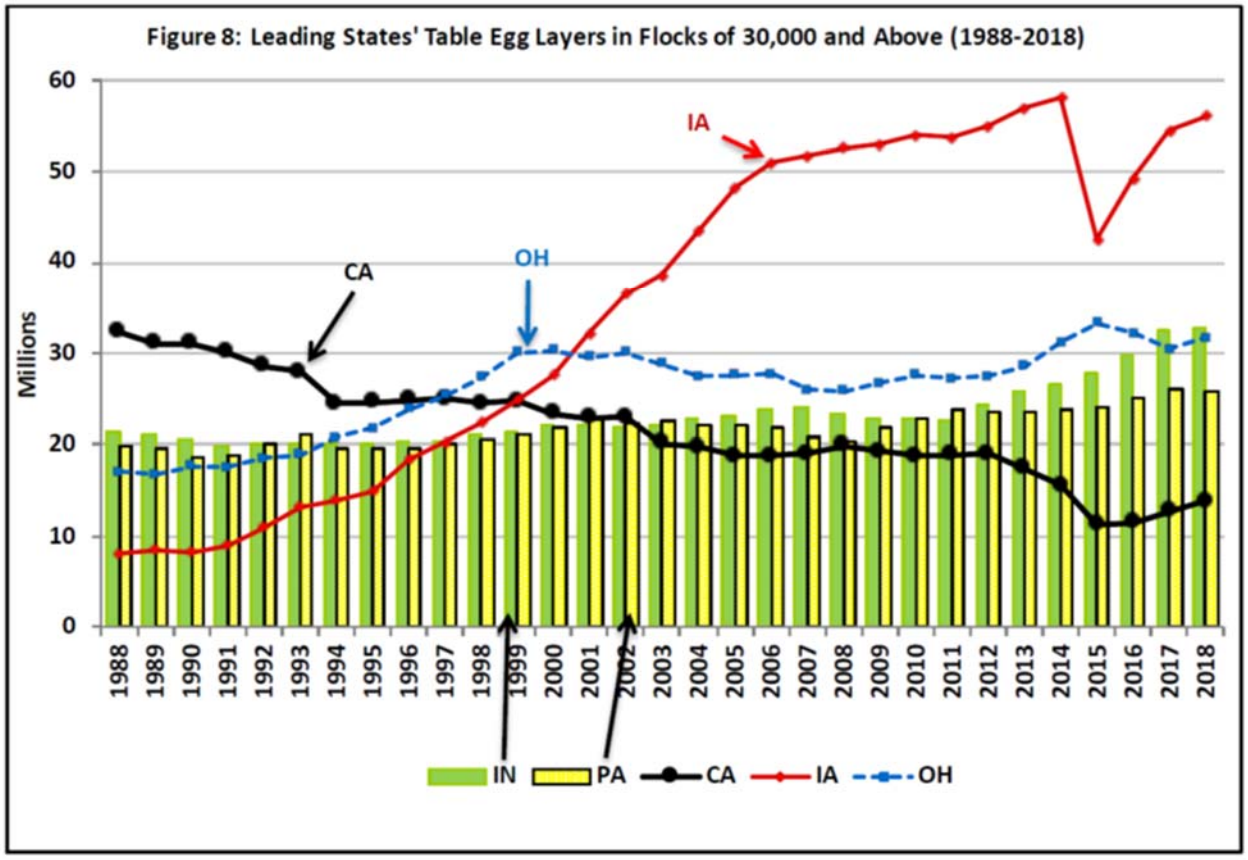
The total egg layer numbers increased over the number from last year during the same months.



As can be seen from this graph, the number of caged layers continued to increase in addition to the cagefree sector.



As of August 2019, #1 Iowa (55.5 million layers) continues to hold the top spot of states in egg production by far over #2 Ohio (34.8 million), #3 Indiana (32.5 million), #4 Pennsylvania (25.7 million), and #6 California (12.5 million). Texas (#5) numbers are not reported by USDA starting this year. Source: USDA NASS Chickens and Eggs.



06-Turkey Industry Report
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In preparation for this report to the USAHA Committee on Poultry & Other Avian Species, the subcommittee chairman, Dr. Clark, surveyed turkey industry professionals and veterinarians representing (n=24) the US turkey production regarding the health status of turkeys produced in August 2018 through August 2019. 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 2019 are issues with lack of efficacious drugs, colibacillosis, clostridial dermatitis, ORT, Salmonella, leg problems, Bordetella, and coccidiosis. The top-10 list for 2019 was near identical to 2018 with notable exception coccidiosis dropped in rank but salmonella and leg problems increased. Blackhead ranking dropped to #18 from #11 the prior year, and the number of reported cases decreased by 24%. Cases of Turkey Reovirus increased 108% and ranked #9.

The "**lack of approved efficacious drugs**" continues to be the top health 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** (has ranked #2 since 2016), or **fowl cholera** (ranked #14 from #12). In July 2011 the sale of roxarsone was suspended; September 30, 2013, the FDA marketing authorization NADA was withdrawn. The sponsor of Penicillin-100 Type A medicated article (in feed administration) withdrew the approval (NADA) June 30, 2015. Nitarsone (see **blackhead**) approval was withdrawn December 31, 2015. Issues 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), also referred to as **Cellulitis**, remains a major disease issue across all geographic regions; as the survey average changed slightly to a score of 3.7 (from 3.6 in prior year) and jumped to a #3 rank (from #5 in 2018, #4 in 2017, #3 in 2016 and #2, 2008-2015). 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 clinical 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, wet litter, feed outages and do not compost litter within 200 feet of poultry barn. Vaccinating at-risk flocks with autogenous bacterins and toxoids is not a viable option for the industry.

ORT (*Ornithobacterium rhinotracheale*) ranked #4 in 2019 and 2016 (#3, 2017, 2018; #7, 2015), is a highly contagious respiratory disease in poultry caused by a gram-negative pleomorphic rod-shaped bacterium. It has been isolated from chickens, ducks, partridges, and guinea fowl. It was originally recognized in Europe and South Africa. ORT was first confirmed in the U.S. from turkeys in 1993. Horizontal transmission (such as, bird-to-bird, contaminated people and equipment) by direct and in-direct contact is the primary route of spread. However, vertical transmission is suspected (Hafez, 2000). In the fall of 1995 it was a major cause of respiratory disease in midwestern states and since has become endemic across most of the USA. Management systems, such as brood-and-move have increased the exposure of ORT-naive birds to ORT in the finisher barns, resulting in respiratory disease and mortality in some operations. Biosecurity procedures must be taken. Proper water sanitation can minimize the severity and spread. Vaccination is limited and results are varied (toxoids, bacterins). Bacterins are used in breeders. No commercial vaccine is approved. Limited application of controlled exposure efforts on individual flocks have shown value. ORT in turkeys is an identified critical research need.

The turkey industry continues to work to reduce **Salmonella** (#5) colonization in birds. In 2019 the NTF has continued efforts to assist industry members with this task. A Salmonella Technology Summit was held July 2019 for the industry to evaluate and discuss emerging technologies for Salmonella monitoring and mitigation. A best practice guide for each sector of the industry was developed by NTF subcommittees to outline potentially important methods to reduce Salmonella. In addition, NTF has evaluated potential governmental policy changes to help advance Salmonella vaccine technologies.

Leg problems are ranked #6 in 2019 (#9, 6, 6, 10 in 2018 – 2015, respectively) 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. The year 2017 - 2019 was particularly noted increased incidence of valgus and varus leg deformities across much of the US industry due to undetermined etiology; the issue contributed to increased mortality in affected flocks. Issues were less prevalent in 2018. Bacterial Chondronecrosis with Osteomyelitis (BCO)-associated lameness, as described by Dr. Wideman, has been diagnosed in some cases. Leg problems can represent substantial production losses and welfare issues of turkeys.

Bordetella avium continues as a significant respiratory disease challenge in several geographic regions; bordetellosis ranked #7 and fluctuates between #5 and #8 the prior year 5-years. Bordetellosis, otherwise known as Turkey Coryza, is a highly infectious, acute upper respiratory tract disease of turkeys characterized by high morbidity and usually low mortality. Bordetella avium (BA) is a small, Gram-negative, nonfermentative, motile, strictly aerobic bacillus. Other birds and older turkeys can be carriers, but may not show clinical signs. Commercial vaccines are available but are not routinely used. Water sanitation and biosecurity are emphasized to control Bordetella.

Coccidiosis decreased to #8 in 2019 (#4, #6, #13 in 2018 – 2016, respectively) most likely reflects the industry increasing raised without antibiotics (RWA) and no antibiotics ever (NAE) market. RWA and NAE programs do not permit the use of ionophore anticoccidials and some programs prohibit FDA approved chemical anticoccidials, so anticoccidial programs consist of alternative phytogenics or vaccination. An effective coccidiosis control program in turkeys involves the use of anticoccidial medications and/or phytonutrients (eubiotics) and/or live vaccines and the subsequent development of immunity. Table 6 summarizes the US turkey production coccidia control products (n=262.2 million head, survey total) and ionophores represent the majority, 62% (44%, 2018; 55%, 2017) of heads for an average use of 7.3 (7.7 and 7.5, 2018 - 2017) months during the 12-month survey period. Chemical anticoccidials account for 29% (30% and 33%, 2018 - 2017) head and 5.5 (4.6 and 4.5, 2018 - 2017) months. Coccidia vaccination was limited to 10% (10% and 7%, 2018 - 2017) head; the low incidence might be in part due to the limited availability of the only USDA approved commercial turkey coccidiosis live vaccine. Also, several colleagues are utilizing autogenous coccidiosis vaccination. Nutritional dietary supplementation with phytonutrients (eubiotics) is becoming more popular, reported at 27% (28% and 14%, 2018 - 2017) head, either via in-feed application or drinking water administration. Programs may utilize phytonutrients in addition to the current anticoccidial program, to potentiate the possible benefits, or as the sole supplement for coccidia control. Some phytonutrients have purported activity against coccidia. Eubiotics consist of ‘alternative’ products including: organic acids, yeast, phytonutrients from plant extracts (saponin, yucca, etc.) and essential oils (oregano, carvacrol, thymol, cinnamaldehyde, capsicum oleoresin, turmeric oleoresin). Essential oils may be natural extracts or synthetic nature-identical compounds.

Turkey Reovirus Digital Flexor Tendon Rupture (TR-DFTR), also called **Turkey Arthritis Reovirus** (TARV), 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 continues 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 #9 in 2019 and #17 in 2018 (Table 1) with 486 "confirmed" cases or flocks (Table 2). Affected breeder companies have implemented an autogenous reovirus vaccination program to induce the maximum production of antibodies and resulting transfer of maternal antibodies. Historic results originally showed 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 once appeared to be controlling this disease. Increased recognition of TR-DFTR in 2016 - 2017 suggest that the reovirus has again mutated. TR-DFTR is an identified critical research need.

The UMN working definition is: **Turkey Arthritis Reovirus (TARV)** is a progressive condition that appears as early as 10-12 weeks of age in male, and sometimes female, commercial turkeys. Younger birds are occasionally affected. The disease does not appear to be transmitted from chickens. Signs are most severe when the birds reach 15-16 weeks of age. Clinical signs are characterized by reluctance to move, recumbency and limping on one or both legs. There is often unilateral or bilateral swelling of the hock (intertarsal) joint. Morbidity can be as high as 40% and mortality is usually a result of culling or aortic rupture. Lesions observed in acutely affected birds at necropsy are unilateral or bilateral enlargement (subcutaneous edema) of the hock joints, which contain increased volume of clear yellow to serosanguinous synovial fluid. Similar fluid can expand the sheath of the gastrocnemius and digital flexor tendons. In chronic cases there is bruising of the skin of the hock, with prominent periarticular fibrosis, edema and occasional large flecks of fibrin within the subcutis and tendon sheaths. In a small percentage of cases one can observe partial or complete rupture of the proximal gastrocnemius tendon or a digital flexor tendon with hemorrhage at the level of the rupture. Histological sections of gastrocnemius tendon and sheath reveal lymphocytic infiltrates in the sub-synovium in acute cases, progressing to prominent sub-synovial and peritendon fibrosis in chronic cases. Secondary bacterial infections (e.g., *Staphylococcus*) occasionally occur and are accompanied by heterophilic inflammation. Definitive diagnosis requires (1) observation of typical gross lesions, (2) ruling out other causes of lameness in turkeys (e.g., osteomyelitis, primary bacterial arthritis, muscle rupture, footpad dermatitis, *Mycoplasma synovitis*) and (3) isolation of reovirus from the gastrocnemius and/or digital flexor tendon in embryonated eggs or cell culture.

Blackhead, also known as Histomoniasis, changed to position #18 (#11, 8, 9, 13 in 2018 -2015, respectively). There were 96 reported cases of blackhead (Table 2) a decrease from 127 the prior year. Histomoniasis occurs regionally and seasonally in turkeys, and can result in significant mortality. 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. Nitarsone FDA approval was withdrawn December 31, 2015, leaving the industry with no drugs approved with indications against histomoniasis. Nitarsone was approved for the prevention of histomoniasis (blackhead disease) in turkeys and chickens, and was the only approved animal drug for this indication. Table 2a list some additional blackhead responses, including a survey as to management interventions in controlling or preventing blackhead disease. Of those 13 respondents reporting blackhead cases in 2019, enhanced biosecurity 85%) and insect control (85%) were the two most popular. Nine respondents (69%) will till or top dress the litter, once a flock is diagnosed; install migration (partition) fences; administer eubiotics in feed and/or drinking water. Other popular interventions include acidify or apply lime to the litter, once a flock is diagnosed (54%) and insure excellent intestinal health (62%). The variety of responses support that prevention and control of blackhead requires a multifactorial approach. Thirteen respondents equal to 54% of survey reported one or more cases of blackhead (63%, 2018; 74%, 2017). Of the 96 reported cases at least 10% (n=10) were destroyed to alleviate animal suffering and due to excess morbidity and mortality. Two recent peer reviewed publications of industry, include Clark and Kimminau[1] summary of current blackhead situation in the field and also Regmi[2] details FDA considerations for antihistomonal drug approvals. Early diagnosis and start of interventions is considered part of

[1] Clark, S. and E. Kimminau. Critical Review: Future Control of Blackhead Disease (Histomoniasis) in Poultry. Avian Diseases 61(3): 281-288. Sept 2017.
[2] Regmi, P.R., Shaw, A.L., Hungerford, L.L., Messenheimer, J.R., Zhou, T., Pillai, P., Omer, A., and Gilbert, J.M. Regulatory considerations for the approval of drugs against Histomoniasis (Blackhead Disease) in turkeys, chickens, and game birds in the United States. Avian Diseases. 60:725-730. 2016.

controlling *Histomonas meleagridis* in field conditions; for this reason, a sound monitoring system using diagnostic tools, such as, PCR and serology is needed, in particular on problem farms.

Poult enteritis of unknown etiologies has changed in importance, to position #12 (#8, 10, 14 from 2018 – 2016). **Turkey Coronavirus** (TCV), as a defined cause of enteritis, was ranked #29 (#30, 30, 31 from 2018 – 2016), with 95 reported cases, from 185 the previous year (Table 2).

Protozoal Enteritis, attributed to flagellated protozoa, *Cochlosoma*, *Tetratrichomonas* and *Hexamita*, ranked #16, changed from #13; protozoal enteritis remained relatively unchanged over past years until 2016 and associated with the loss of nitarsone. 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 turkey 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 2018 (n=23), 53% of brooding was single age, compared to 35% in 2010. 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. **Tunnel ventilation** of finisher (grow-out) barns is becoming more popular method to minimize heat stress; in 2018, 32% of the industry finisher production is tunnel ventilated, compared to 12% in 2010. (*The Survey was not updated in 2019*).

Late mortality ranked #10 health issue and changed from #14 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.

Heat stress ranked #20 in 2019 compared to #18 prior year. Tunnel ventilated barns allow growers to manage heat stress better than in years past. Poult Enteritis Mortality Syndrome (**PEMS**) ranked #32 versus #30 previously. Avian Metapneumovirus (**AmPV**) ranked #34.

Mycoplasma synoviae (**MS**, infectious synovitis) infections, ranked #24 (#29, 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 25 cases of MS reported (Table 2). 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 30 cases of MG reported (Table 2).

The health of turkeys continues to be a leading concern for industry members. The **Turkey Health Task Force**, established in 2017, along with NTF staff, has continued working to find innovative solutions for the top disease challenges of the turkey industry. The Task Force aims to accelerate the research, development and approval of turkey health products. The Task Force began by creating dialogues with animal health companies to understand barriers to entry for developing products for prevention and treatment for turkey-specific diseases. Priorities of the Turkey Health Task Force have been set around disease challenges that have most impact to the turkey industry.

Blackhead, as previously discussed in this report, results in significant mortality and is a top disease of concern in the turkey industry. The pursuit to find an efficacious preventative for blackhead remains an important objective. FDA provided the Task Force with a **Minor Use in Major Species (MUMS) designation** for control in the incidence of mortality in turkeys at high risk of developing blackhead associated with *Histomonas meleagradis* in flocks of turkeys where blackhead has been diagnosed. This designation can be given by the FDA if a condition can be shown to affect no more

than 14 million turkeys, a treatment and/or preventive drug (with use limits on label to show it will not be used beyond those birds most at risk) could be eligible for MUMS status. In addition, the MUMS designation means the financial burden of product research burdens are lessoned and gives the supplier seven years of marketing without generic competition. To NTF's knowledge, this the first time a MUMS designation has been provided to an entire disease prior to the identification of a product. The Task Force continues to be cautiously optimistic on utilizing the MUMS regulations to speed approval of treatment of conditions such as blackhead and hopes the MUMS designation will incentivize companies to develop new molecules.

Turkey Arthritis Reovirus (TARV) and other leg-related problems continue to be an industry-wide concern. Under the direction of the Turkey Health Task Force, a subcommittee for was established this year to promote coordination of research efforts to mitigate TARV. The collaborative group is composed of members in live production, veterinarians, researchers, and members of the allied industry. To date, the following primary objectives have driven the group's efforts:

- Establish a common of nomenclature to use when naming isolates
- Develop a case definition for TARV
- Perform an economic impact analysis to assess the cost of TARV to the industry

Members of the Turkey Health Task Force and NTF staff continue to work with CVB to refine Agency policy that would speed the approval of **autogenous vaccines**. NTF has secured support throughout the other animal ag associations for this as well. In addition to enhanced approvals, NTF is working to extend approval length from the two-year approval cycle in current policy. USDA has verbally supported this issue, and NTF will continue to push for the needed policy change to be implemented.

The turkey industry has a limited number of available **anticoccidials** and one commercial vaccine, which creates a great challenge for designing coccidia management rotation program. Options for rotation of anticoccidials are even more limited in antibiotic free production due to the restrictions of ionophores. At the beginning of this year, only two chemical coccidiostats are approved for use in turkeys. In February the Turkey Health Task Force, in coordination with NTF staff and animal health companies worked with CVM to gain re-approval for clopidol to address current challenges of coccidiosis. Options for control remain limited and focus in this area will be a continues focus for the Task Force.

Virulent Newcastle Disease (vND) reemerged in 2018 and continues to be a disease affecting the western portion of the country. Virulent Newcastle Disease, formerly known as Exotic Newcastle Disease, is a contagious and fatal viral disease that affects the respiratory, nervous, and digestive systems of migratory birds and commercial poultry. To date, USDA-APHIS has confirmed at least 451 cases of vND this year. Most cases have occurred in backyard poultry in several California counties including, San Bernardino County, Riverside County, Los Angeles County, Ventura County, Alameda County, Utah County, Utah, and Coconino County, Arizona. However, vND has been confirmed in commercial laying facilities as well. Scientific evidence shows that vND is not a food safety concern, as no human cases of Newcastle disease have ever resulted from the consumption of any poultry products. The turkey industry remains alert to the threat of vND and continues to employ biosecurity practices to reduce risk of exposure. NTF and the other poultry groups have lobbied Congress to obtain appropriations funding to help control diseases and have maintained communication with USDA to control this outbreak.

A new report[3] released August 5, 2019, by the U.S. Poultry & Egg Association (USPOULTRY) shows dramatic reductions of turkey and broiler chicken antimicrobial use over a five-year time frame. *The USPOULTRY reports "use" in contrast to the FDA reporting "sales" data.* The results showed a reduction in antimicrobial use by both turkey and broiler chicken operations. The report reflects data from 2013 – 2017 in turkeys and broilers from hatchery to the day of harvest. Key changes among turkeys over the five-year period include:

- Turkeys receiving antimicrobials in the hatchery decreased from 96% to 41%.
- Hatchery gentamicin use decreased approximately 42%.
- Medically important in-feed antimicrobial use in turkeys decreased: tetracycline 67%.
- Medically important water-soluble antimicrobial use decreased substantially. For example, penicillin 42%, tetracycline 28%, lincomycin 46%, neomycin 49%, erythromycin 65%.

NTF has noted that even though it is promising to see the documentation showing a decrease in antibiotic use, the health of turkeys remains a chief concern for industry members. Increased consumer pressure for antibiotic free production and the inflated conversations surrounding antimicrobial resistance has created challenges for the turkey

[3] Antimicrobial Use in Poultry: Antimicrobial Stewardship within U.S. Poultry Production, 2013 – 2017 Report. U.S. Poultry & Egg Association, Tucker, GA. Accessed 12AUG19 http://www.uspoultry.org/poultry-antimicrobial-use-report/docs/USPOULTRY_Antimicrobial-Report.pdf

industry. Therefore, turkey professionals have turned to creative product innovation, increased research efforts and a multitude of other avenues to protect U.S. turkeys while simultaneously taking consumer wants and preferences under careful consideration.

Use of approved, efficacious drugs in a judicious manner is necessary to support animal welfare by preventing animal diseases and treating animals that become sick. Therefore, the turkey industry recognizes the need for research related to innovative prevention and treatment options for turkey producers. Several initiatives are working to reduce antimicrobial resistance, especially for antimicrobials of importance to human health.

In September 2018, CVM unveiled its **five-year action plan to support antimicrobial stewardship in veterinary settings**. The plan is part of a broader agency-wide strategy for combating antimicrobial resistance in both veterinary and human health care settings. It is being initiated in phases over the five fiscal years. Recently, the results from Veterinary Feed Directive (VFD) audits spanning 2016 to 2018. Of the 456 VFD inspections, 91% were classified as no action needed (NAI) or were inspections without significant deficiencies, and less than 0.5% of inspections were classified as needing official actions. In addition, NTF anticipates FDA will release updated antibiotic sales data report at the end of the calendar year and anticipates the announcement of a public meeting to update Appendix A of Guidance for Industry #152, *Evaluating the Safety of Antimicrobial New Animal Drugs with Regard to Their Microbiological Effects on Bacteria of Human Health Concern.* NTF's Turkey Health and Welfare committee holds quarterly calls with CVM to discuss the effects of changes in policy on the turkey industry.

This September 2019, CVM released draft **Guidance for Industry GFI #263** entitled *Recommendations for Sponsors of Medically Important Antimicrobial Drugs Approved for Use in Animals to Voluntarily Bring Under Veterinary Oversight All Products That Continue To Be Available Over-the-Counter* outlining a process for voluntarily bringing remaining approved animal drugs containing antimicrobials of human medical importance under the oversight of licensed veterinarians by changing the approved marketing status from over-the-counter (OTC) to prescription (Rx). This largely covers injectables and targets the beef and dairy industries.

Gene-edited animals continue to be of significant interest and are thought to be a potentially important technology to improve animal health. The administration still has not made a determination of whether gene-edited animals will be regulated by FDA or USDA. FDA issued a draft guidance in 2018 that proposes to regulate animal gene-editing as a new animal drug. The regulation of gene-edited animals as a new animal drug would be a lengthy and expensive process that would likely discourage development in the technology. Although there is some question as to what would happen if the product worked in a manner similar to a biologic, as defined in the Virus Serum Toxin Act, NTF believes USDA should also be involved in regulating gene-edited animals. The Virus Serum Toxin Act gives USDA authority over biologics, but it is unclear if and how USDA will ultimately be involved. NTF continues to work with a barnyard coalition to press for the USDA to have the maximum regulatory authority possible under existing statutes, and NTF will continue to work with others in the barnyard to promote USDA as the leader on animal gene-editing as well as urge the White House and Congress to support that position.

On the congressional front, NTF, along with most other major animal-related commodity organizations as a part of the Animal Agriculture Coalition (AAC), pioneered the **Animal Pest, Disease and Disaster Prevention and Response Program (APAD)** in mid-2016 that was fully funded in the 2018 Farm Bill that passed at the end of last year. The program was established to transform animal disease prevention and response and ensure preparedness for responses during a food animal disease crisis. Further, the APAD program will significantly limit the threats of foreign diseases on American livestock and poultry producers. APHIS has begun moving forward with implementation of the program. Two arms of the program relate directly to turkey production—the strengthening of **the National Animal Health Laboratory Network (NAHLN)** and establishing **the National Animal Disease Preparedness and Response Program (NADPRP)**. NADPRP allows APHIS to enter into cooperative or interagency agreements with States, universities, livestock and poultry producer organizations, and other eligible entities to fund targeted projects aimed at biosecurity and prevention, detection and surveillance, preparedness and response, and outreach and education. NADPRP funding will support multiple training and exercise projects that will help us enhance our existing disease emergency preparedness and response efforts. APHIS is seeking NADPRP proposals from potential collaborators for projects that will:

- Develop and deliver emergency management training for animal agriculture sector responders,
- Develop and conduct exercises for animal agriculture sector responders, or
- Support animal agriculture sector responder attendance at training and exercises.

APHIS will make available up to $10 million in funds to be divided between the NADPRP and the NAHLN. Specifically, projects selected will included disease prevention and emergency response training and exercise projects and targeted

projects to enhance NAHLN diagnostic capability. NTF is working with executives from state associations on application efforts to secure funding for turkey-specific programs.

In 2018, **turkey production** decreased from 7,949,651.00 to 7,598,289.00 pounds (live weight). Overall, domestic **per capita consumption** for turkey products decreased from 16.4 in 2017 to 16.2 in 2018. Live production in 2018 decreased to 244,750,000 head with an average live weight of 31.12 lbs. In 2017, 245,500,000 head were produced with an average live weight of 30.92 lbs. (Reference: NTF Sourcebook, pending publication October 2019).

07-Multistate Analysis of Backyard Poultry Mortality

Kristy Pabilonia, DVM, PhD, Colorado State University, Fort Collins, CO

Understanding common causes of mortality affecting backyard poultry flocks provides essential information to veterinarians, animal health officials, backyard poultry owners and commercial poultry producers. The goal of this study was to collect necropsy reports from veterinary diagnostic laboratories from multiple states and evaluate commonality of diseases resulting in mortality within backyard flocks. Eight states participated in this study: California, Colorado, Georgia, Hawaii, Iowa, Pennsylvania, South Carolina and Texas, representing different regions of the United States. Each laboratory or laboratory system was asked to provide necropsy reports for a three year period. A total of 2,509 reports were submitted over a 3 year period (2015-17), involving the necropsy of 2,687 birds. The vast majority of birds necropsied were chickens (96%).

More than one contributing cause of mortality was reported in 69% of the birds necropsied. Neoplasia or lymphoproliferative disease was the most common primary diagnosis and was determined to be a cause of death in 42% of the birds necropsied. Of these cases, 63% were diagnosed as Marek's disease or leukosis/sarcoma. All infectious diseases potentially contributing to mortality were included as a cause of mortality. Bacterial, viral and parasitic organisms were detected in 42%, 7% and 28% of birds necropsied, respectively, with two or more organisms detected in 69% of those birds. A number of zoonotic bacteria were detected, including paratyphoid salmonellae, *Listeria monocytogenes*, *Mycobacterium avium* and *Campylobacter* spp. Toxins including lead and other heavy metals were detected in 1.5% of birds. The results of this study highlight the need for education of backyard flock owners on prevention of disease and biosecurity practices, as well as public health education for consumers of backyard poultry meat and egg products.

This study is published in the Journal of Veterinary Diagnostic Investigation. 2019; 31(3):318-326. doi: 10.1177/1040638719848718

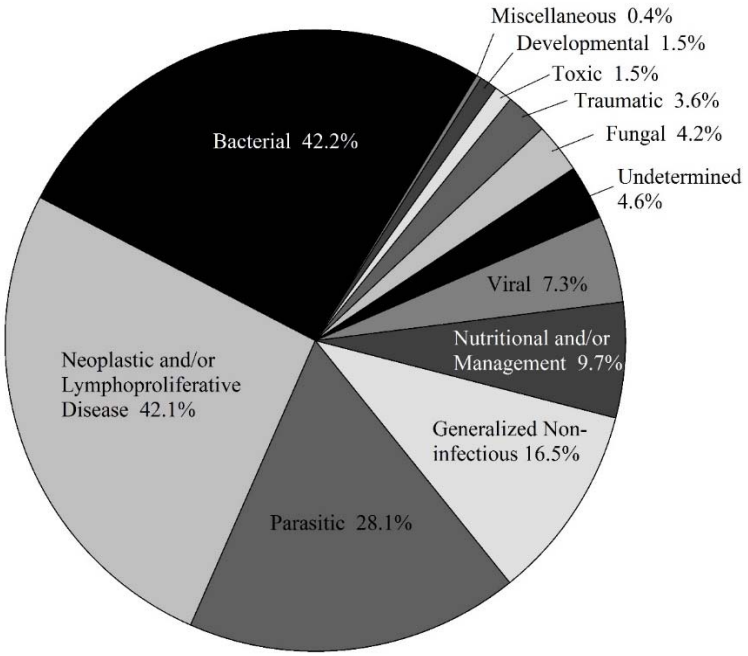

Figure 1 – All causes of mortality in backyard poultry submitted to 12 veterinary diagnostic laboratories in 8 states, 2015-17. Percentages exceed 100% because of concurrent disease in multiple categories (69.1% of birds necropsied).

08-American Association of Avian Pathologists (AAAP) Meeting Report

Eric Jensen, DVM, Aviagen, Inc, Huntsville, AL
Eric Gingerich, DVM, Diamond V, Zionsville, IN

AAAP's net assets are $1,065,922, an increase of $30,300. Overall for FY2019 total revenue was up $27,599 due to strong membership growth and investment growth. Annual meeting sponsorship increased with 80 sponsors contributing $170,650; an increase of 10% over the previous year.

Last year AAAP sponsored the 2nd International Necrotic Enteritis Symposium. The conference had 260 attendees from 23 countries and 22 sponsors. A net profit of $38,185 is anticipated.

Sales of educational materials remained strong thanks in great part to the publication of "Gross Pathology of Avian Diseases" authored by Tahseen Abdul-Aziz and John Barnes. The 14th edition of "Diseases of Poultry" is expected to be available in January 2020.

The Avian Diseases journal continues to provide substantial royalties. This year the AAAP eliminated page charges for members and reduced page charges for nonmembers. The reduction in cost to publish an article is intended to encourage more manuscript submissions for the journal. AAAP plans to increase advertising revenue to offset the decrease in page charges.

AAAP membership increased by 32 and now includes 926 members. It is important that we continue to have all of our US members who are veterinarians also be members of the AVMA so that we can continue to be represented on the House of Delegates and important AVMA committees.

AAAP Board of Directors held a strategic planning session that resulted in creating goals to a. Recruit and retain members, 2. Expand scientific information base, 3. Improve member experience, 4. Foster relationships with external organizations and groups that influence issues important to AAAP members, 5. Support AAAP management team, and 6. Strengthen AAAP's financial stability.

The annual meeting was held in Washington DC with 500 attendees from 20 countries. This year's symposium was "Investigating Disease and Assessing Productivity Using Epidemiological Tools" and was well received. There are plans to include more presentations on epidemiology at future meetings.

Two significant proposals were raised at the AAAP annual business meeting. The first was a proposal to revise the association's bylaws. There had been no major revisions since 1957 so numerous changes were made for improvement. Significant changes included 1. Membership changed to only two categories, voting members and associate members. Voting members are veterinarians, and if US based then must be an AVMA member. All other members are associate members, 2. All use of districts has been eliminated for membership categories as well as for electing Directors (in effect all Directors will be at Large), 3. An associate member (voting) and student member (non-voting) were added to the Board of Directors, 4. All Directors will serve 4 year terms (previously District terms were not specified but served 4 years and Directors at Large served 2 years), 5. Nominations for Directors may be from both the Nominating Committee and the membership, 6. The Nominations Committee has been increased from 3 to 5 members with the Past-President serving as chairperson, and 7. A procedures manual has been added. The second proposal was to hold the annual meeting independently from the AVMA in 2021 and was tabled for one year.

The AAAP Foundation supports scholarships, preceptorships and awards. Funding for the Foundation has increased significantly in recent years with endowment for scholarships and awards at $1,000,000 and corporate annual giving has increased to $69,100 this year. Twenty-one scholarships totaling $69,000 and 17 preceptorships totally $20,000 were distributed this year. The first Avian Bioscience Travel Scholarship for non-DVM research students was awarded and two new scholarship funds have been created; AAAP Women's Network and the Foundation Yan Ghazikhanian scholarships.

For the coming year efforts will continue to recruit new membership and improve revenue from our educational products. Proposals to be addressed will be having our meeting independent from the AVMA and changing the name of our organization to better represent the activities of the membership.

The **AAAP Research Priorities Committee** conducted a survey of the broiler, turkey, and egg layer production veterinarians as well as the Association of Primary Breeder Veterinarians to find the top research priorities for health/diseases, vaccines and pharmaceuticals, diagnostic tools, food safety, poultry welfare, and management/environmental concerns.

Dr. Natalie Armour, AAAP Research Priorities Committee chair prepared a presentation given at the annual meeting of AAAP. Her report will be given at the USAHA annual meeting in Providence RI by Eric Gingerich DVM.

The top research priorities for broilers, turkeys, and egg layers are listed as follows:

Broilers:

1. Salmonella – Intervention strategies at all phases of production or processing
2. Salmonella – Methods to quantify the impact of control interventions
3. Infectious bronchitis – Improved live vaccines
4. Campylobacter – Live production interventions
5. Histomoniasis – Improved preventative and treatment options
6. Reovirus – Improved live and killed vaccines
7. Campylobacter – Improved processing interventions
8. Necrotic enteritis and gangrenous dermatitis – Develop non-antibiotic strategies for control
9. Necrotic enteritis and gangrenous dermatitis – Develop effective vaccines
10. Gut Health – Develop non-antibiotic strategies for preventing gut health issues
11. Autogenous vaccines – Improved selection process of isolates

Turkeys:

1. Salmonella – Intervention strategies to reduce at all stages of production and processing
2. Salmonella – Methods to quantify the impact of control methods
3. Reovirus – Develop diagnostic tools for better surveillance and identifying variants
4. Salmonella – Develop preharvest interventions
5. Reovirus – Epizootiology and emergence of variant strains
6. Reovirus – Develop a rapid test to identify day-old poults that are infected
7. Reovirus – Develop new effective live and killed vaccines
8. Reovirus – Develop alternative vaccine technologies for protection against emerging variants.
9. Histomoniasis – Develop better preventative and treatment options.
10. Ornithobacterium rhinotracheale (ORT) – Determine the pathogenesis and risk factors leading to ORT related disease.

Egg Layers:

1. Infectious bronchitis – Strategies to prevent False Layer Syndrome
2. Infectious bronchitis – Strategies to prevent the Delmarva strain 1639
3. Infectious coryza – Development of an effective and safe live, mass-applied live vaccine
4. Infectious bronchitis – Effect of DMV 1639 virus on egg production
5. Treatments – Develop treatments for various diseases with no egg withdrawal
6. Post bacterin hepatopathy – Determine the causative factors
7. Colibacillosis – Develop non-antibiotic preventative and treatment options
8. In-ovo sexing – Develop and apply commercially
9. Infectious bronchitis – Develop safe and effective vaccines against variant strains

Dr. Armour is planning to publish the survey results in their entirety in the near future.

09-CDC Update: Multistate Enteric Illness Outbreak Linked to Poultry

Megin Nichols, PhD, Centers for Disease Controls (CDC), Atlanta, GA
Laura Gieraltowski, PhD, CDC, Atlanta, GA

Illness outbreaks linked to backyard poultry

CDC and public health officials in several states are investigating multiple multistate outbreaks of Salmonella infections with serotypes Agona, Alachua, Altona, Anatum, Braenderup, Enteritidis, Infantis, Manhattan, Montevideo, Muenchen, Newport, and Oranienburg linked to contact with backyard poultry.

As of August 23, 2019, a total of 1003 people infected with the outbreak strains of Salmonella have been reported from 49 states. Illnesses started on dates from January 1, 2019, to August 9, 2019. Ill people range in age from less than 1 year to 99 years, with a median age of 32 years. Of 850 ill people with age information available, 192 (23%) are children younger than 5 years. Fifty-seven percent are female. Of 605 people with information available, 175 (29%) have been hospitalized. Two deaths have been reported.

Whole genome sequence (WGS) analysis of 149 bacterial isolates from ill people predicted antibiotic resistance or decreased susceptibility to one or more of the following drugs: amoxicillin-clavulanic acid, ampicillin, azithromycin, cefoxitin, ceftriaxone, chloramphenicol, ciprofloxacin, fosfomycin, gentamicin, kanamycin, nalidixic acid, streptomycin, sulfisoxazole, tetracycline, and trimethoprim-sulfamethoxazole. Testing of eight isolates by CDC's National Antimicrobial Resistance Monitoring System (NARMS) laboratory using standard antibiotic susceptibility testing confirmed these results. If antibiotics are needed, this resistance profile may affect the choice of antibiotic. WGS analysis of an additional 512 isolates from ill people did not show evidence of antibiotic resistance. Testing of 30 of these isolates by CDC's NARMS laboratory using standard antibiotic susceptibility testing confirmed these results.

Six of the outbreak strains making people sick have been identified in samples collected from backyard poultry environments at people's homes in California, Minnesota and Ohio, and from poultry environments at retail stores in Michigan and Oregon.

In interviews, ill people answered questions about animal contact in the week before they became ill. Of 511 people interviewed, 343 (67%) reported contact with backyard poultry before becoming ill. Ill people reported buying poultry from various sources, including agricultural stores, websites, and hatcheries.

Backyard poultry from multiple hatcheries are the likely source of these outbreaks. Regardless of where poultry are purchased, they can carry Salmonella germs that can make people sick. Backyard poultry owners should always follow steps to stay healthy around their poultry.

Salmonella outbreak linked to raw chicken products

During fall of 2018, CDC, USDA-FSIS, and state partners investigated a cluster of 51 *Salmonella Blockley* infections with the same DNA fingerprint from 10 states. Bacteria isolated from chicken samples that originated from several different processors in the Northeast were closely related by whole genome sequencing (WGS) to clinical isolates. Overall, 90% (26/29) of interviewed patients reported any chicken exposure but chicken brand information was limited, and a single brand was not identified. A sub-cluster at a catered event in NYC was identified and a case-control study implicated chicken consumption as the likely outbreak source. These epidemiologic findings in conjunction with the chicken isolate information suggests this was likely an outbreak linked to raw chicken products but the ultimate source was not determined. Food isolate data indicate that multiple chicken producers could have contributed to this outbreak.

In 2019, a total of 94 people infected with the same outbreak strain of Salmonella were reported from 5 states in the Northeast (Connecticut, Massachusetts, New Jersey, New York, Pennsylvania, and Vermont). Illnesses started on dates from March 8, 2019, to September 17, 2019. Ill people range in age from less than 1 year to 77 years, with a median age of 31 years. Forty-three percent are female. Eighteen percent of ill people have been hospitalized. No deaths were reported. Officials in NYC identified a sub-cluster of illnesses associated with rotisserie chicken and chicken salad consumption at a single grocery location.

The outbreak strain of *Salmonella Blockley* was isolated from a leftover chicken product from a patient's home. The bacteria from clinical isolates are closely related by WGS to Salmonella identified d chicken isolates collected from slaughter and processing establishments by USDA-FSIS. This strain may originate upstream of USDA-FSIS regulated slaughter and processing facilities because it has been identified in ill people who ate a variety of chicken products and brands in 2018 and 2019; two sub-clusters of illnesses linked to chicken and USDA-FSIS testing results from a number of slaughter facilities. Further investigation and intervention may be needed to help prevent new illnesses and similar outbreaks in the future.

10-US Poultry & Egg Association Report
Denise Heard, US Poultry & Egg Association, Tucker, GA

Dr. Heard gave a brief update of the US Poultry & Egg Association as the new director of research.

11-Avian Influenza (AI) and Newcastle Disease Virus (NDV) Subcommittee Report
David Suarez, DVM, PhD, USDA-ARS-SEPRL, Athens, GA

Newcastle disease virus

Viruses of genus Avian orthoavulavirus 1 (AOAV-1) (formerly designated as Avian avulavirus 1 (AAvV-1)), commonly known as Avian paramyxoviruses 1 (APMV-1) or Newcastle disease viruses (NDV), cause infections in a wide range of domestic and wild birds worldwide. Avian paramyxoviruses are found widely in both poultry and in wild birds, and as a single stranded negative sense RNA virus, it has considerable sequence variation. The virulent forms of the virus are reportable to the World Organisation for Animal Health (OIE) and therefore outbreaks of the virulent form of the virus affects trade. In order to characterize avian paramyxoviruses, different classification schemes have been proposed. Many of these early schemes had flaws that were exposed as more NDV sequences have become available for study. In an effort to provide a robust classification scheme, an international consortium of laboratories doing NDV diagnostics or research was developed to establish a classification scheme that was robust enough to allow for the continued evolution of the virus. Because of the availability of large numbers of sequences and the importance of the fusion gene as a virulence factor, it was determined to use the full coding sequence of this gene for classification. Analysis of available sequences showed APMV-1 viruses separate into two major classes, I and II. The class I viruses are primarily found in wild birds, and has only limited genomic variation. The class II viruses, which includes almost all of the virulent viruses, has considerable genetic variation. The consortium used a criteria of 10% sequence differences for groups of viruses to identify it as a unique genotype, and within a genotype a difference of greater than 5% would classify a sub-genotype. Using this classification scheme, a total of 20 unique genotype were identified with some genotypes have multiple sub-genotypes. As the consortium contains most of the active laboratories working on NDV, this scheme has been rapidly adopted by the research community (Dimitrov el, 2019).

The virulent Newcastle disease virus (vNDV) outbreak in California that started in 2018 appears to be contained as of August 2019. This outbreak was largely centered in backyard flocks in southern California. Earlier phylogenetic analysis has shown that the virus was most related to viral sequences from Central America and was in the same genotype as the California 2002-03 outbreak virus. Although related to these viruses, in-depth sequence analysis supports that the differences between these viruses was too great for them to be the direct source of the virus. Unfortunately, little vNDV sequence is available from Mexico or Central America in the last 15 years. However, a new virus from Guatemala from 2018 was sequenced and this virus is now the closest virus to the original introduction into California. However, because this virus is 0.8% different from the California virus, it also does not appear to be the direct progenitor.

International Avian Influenza virus

Both low pathogenic and highly pathogenic avian influenza viruses continue to circulate widely around the world of many different lineages. The H9N2 low pathogenic subtype remains widely distributed in Asia, the Middle East, and parts of Europe and Africa. The H9N2 virus actually has at least four unique poultry adapted lineages. The G1 lineage, first identified in China, is probably the most widespread lineage being found in Asia, the Middle East, and is spreading in Africa. The H9N2 subtype, although low pathogenic, can cause high morbidity and when combined with other poultry pathogens can result in low to moderate mortality. Vaccination is commonly used to control the disease, but because of antigenic variation well matched vaccines are not available in most countries. Of additional concern is the potential for zoonotic infection. There have been at least 24 cases of humans infected with H9N2, although mostly causing respiratory disease with no mortality. Serologic data suggests that infection of humans with H9N2, particularly those with poultry exposure, may be much higher. Additionally, these viruses have several molecular markers suggestive of human adaptation (Pusch et al 2018). This virus remains of concern to both poultry and public health officials.

In Mexico, both a low pathogenic H5N2 virus and a highly pathogenic H7N3 virus are endemic. The H5N2 virus has circulated in Mexico since 1994, and despite the widespread use of vaccines it remains endemic in the country, and it also has spread to several neighboring countries. The virus appears to be highly adapted to chickens and experimentally transmits efficiently. The H7N3 virus has been circulating in Mexico since 2012 and vaccination has also been used for control. The original vaccine was a related but not identical low pathogenic wild bird H7 virus, and initially provided good protection. However, field reports suggest the vaccine has lost its efficacy. Alternative vaccines have been made include

viral-vectored vaccines and reverse genetics made viruses used as killed vaccines. Current vaccination programs may reduce clinical disease, but recent reports of outbreaks by Mexico show the virus is still widespread.

The H7N9 virus that was first detected in China in 2013 is also still being reported. The H7N9 virus was originally a low pathogenic virus, but it mutated to a high pathogenicity virus in 2016. The virus is zoonotic and has caused over 1500 confirmed human cases with over a 30% case fatality rate. Vaccination was implemented in 2017 because of a spike in human cases and the virus being highly pathogenic. The Chinese government provides a bivalent H5-H7 vaccine free of charge to poultry producers, and the vaccine program appears to have greatly reduced the incidence of both human and poultry infections. The virus appears to have remained endemic in the country.

The goose/Guangdong lineage of highly pathogenic H5 avian influenza continues to be a global threat. The virus continues to reassort and currently H5N1, H5N6, and H5N8 are commonly reported and H5N5 and H5N2 are occasionally reported. All the reassortant viruses should be considered to have unique attributes. Fortunately, zoonotic infections of these viruses have decreased to only sporadic human infections with H5N6 being reported most commonly in the last year. The H5N8 lineage of viruses has not been reported as zoonotic, but can potentially become zoonotic. Europe, which had numerous outbreaks in 2018 related to wild bird infection and introduction into poultry, have had only sporadic detections in 2019. However new outbreaks, likely related to wild birds, has resulted in outbreaks in several African countries including South Africa and Namibia in 2019. The goose/Guangdong lineage of virus continues to evolve and the infection and maintenance of the virus in wild birds makes it an ongoing threat to the United States.

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Pusch, E.A. and D.L. Suarez. 2018. The Multifaceted Zoonotic Risk of H9N2 Avian Influenza. Vet. Sci. 2018, 5, 82; doi:10.3390/vetsci5040082

12-National Veterinary Services Laboratory (NVSL) AI and NDV Report
Mia Torchetti, DVM, PhD, USDA-APHIS-VS-NVSL, Ames, IA

Dr. Torchetti gave an update on AI and NDV findings from NVSL.

13-NVSL Bacteriology Diagnostics Report
Kristina Lantz, PhD, USDA-APHIS-VS-NVSL, Ames, IA

***Salmonella* serotyping**

The Bacterial Identification section within the Diagnostic Bacteriology and Pathobiology Laboratory of the National Veterinary Services Laboratories (NVSL) routinely performs serotyping of *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 the NVSL from January 1 through December 31, 2018, originating from poultry.

Salmonella isolates are identified as clinical (clinical signs of salmonellosis from primary or secondary infection) or non-clinical (flock monitoring programs, environmental sources, feed). Serotyping data from isolates submitted for research purposes are not included in the summary.

Salmonella serotyping at the NVSL is an ISO 17025 accredited test. Salmonellae are typed via classical serotyping using polyvalent and single factor antisera to determine the O and H antigens and/or via molecular typing using the xMAP *Salmonella* serotyping assay. Approximately 60% of the sera used at the NVSL are produced in-house as previously described (Ewing, 1986). The remaining antisera are purchased from commercial vendors. All sera are subject to extensive quality control testing prior to use. *Salmonella* antigenic formulae are determined as previously described (Ewing, 1986) and interpreted via the White-Kauffmann-Le Minor scheme (Grimont, 2007). The subspecies designation precedes the antigenic formula for those serotypes other than subspecies I.

From January 1 to December 31, 2018, 13,037 isolates were received for *Salmonella* serotyping. Of those, 4,742 isolates were from chicken sources and 874 isolates were from turkey sources. The most commonly isolated serotypes from chicken and turkey are listed in Tables 1 and 2 respectively.

The NVSL provided a *Salmonella* Group D proficiency test to 98 individuals from 85 different laboratories. The purpose of the PT was to assess the ability of laboratories to detect or isolate *Salmonella* Group D and/or *Salmonella* Enteritidis from simulated environmental samples. The test consisted of 10 lyophilized cultures containing various combinations of *Salmonella* and common contaminants typically found in environmental swabs. The 2018 test included

Salmonella serotypes Enteritidis, Heidelberg, Javiana, and Oranienburg. Contaminant bacteria included *Citrobacter sedlakii* or *rodentium, Citrobacter freundii, Enterobacter cloacae, Klebsiellae pneumoniae* and *Pseudomonas aeruginosa*. Laboratories were instructed to test the samples according to the procedures used in their laboratories. The NVSL randomly retained approximately 10% of the test kits for QA purposes. All were tested blindly with no discrepancies. The results of the proficiency test are shown in Table 3.

***Salmonella* Enteritidis**

From January 1 to December 31, 2018, 4,742 *Salmonella* isolates were received from chickens and their environment for identification of serotype. This was an 8% increase in chicken submissions from 2017. *Salmonella* Enteritidis was isolated in 9% of these isolates and remains in the top five serotypes observed in both clinical and non-clinical submissions. A summary of the number of *S.* Enteritidis isolates identified from chicken during the previous five years is shown in Table 4.

***Salmonella* Pullorum and Gallinarum**

The NVSL received 551 samples for *Salmonella* Pullorum and Gallinarum serological testing in 2018. No isolates of *Salmonella* Pullorum or Gallinarum were identified or confirmed at the laboratory in 2018. The NVSL provided 4,005 mL of *S*. Pullorum tube antigen, a 41% increase from 2017; 2,323 mL of *S*. Pullorum stained microtiter antigen, a 63% increase from 2017; and 416 mL of control antisera, unchanged, to testing laboratories between January 1 and December 31, 2018.

Pasteurella

The NVSL received 167 isolates for *Pasteurella multocida* Gel-Diffusion Precipitin testing. Fifty-one isolates were identified as type 3 in 2018 compared to 14 isolates in 2017, a 73% increase. A summary of the results is provided in Table 5. Additionally, 169 isolates were received for *P. multocida* DNA fingerprinting. The NVSL supplied 39 mL of *P. multocida* typing sera to testing laboratories.

Mycoplasma

The NVSL received 191 samples for avian *Mycoplasma* hemagglutination inhibition testing in 2018. In addition, 738 mL of *Mycoplasma* control antisera and 315 mL of *Mycoplasma* hemagglutination antigen were supplied to testing laboratories. Information on *Mycoplasma* reagents provided is shown in Tables 6 and 7.

Table 1: Most common serotypes in 2018: Chicken

Clinical		**Non-Clinical**	
Serotype	**No. Isolates**	**Serotype**	**No. Isolates**
Enteritidis	109	Kentucky	881
Typhimurium	58	Senftenberg	444
Kentucky	33	Montevideo	428
Infantis	29	Mbandaka	347
Braenderup	14	Enteritidis	309
All others	74	All others	2,061
Total	**317**	**Total**	**4,425**

Table 2: Most common serotypes in 2018: Turkeys

Clinical		**Non-Clinical**	
Serotype	**No. Isolates**	**Serotype**	**No. Isolates**
Albany	41	Senftenberg	100

Reading	39	London	96
Senftenberg	33	Bredeney	74
Uganda	31	Schwarzengrund	43
Anatum	28	Agona	29
All others	168	All others	192
Total	**340**	**Total**	**534**

Table 3: Summary of the NVSL Salmonella Group D proficiency test

	2014	**2015**	**2016**	**2017**	**2018**
Participants	80	94	98	101	98
Mean Score	98%	98%	97%	95%	98%
Below Passing	0	1	0	1	3

Table 4: Number of Salmonella Enteritidis isolates in chicken per calendar year at the NVSL

	2014	**2015**	**2016**	**2017**	**2018**
No. chicken isolates	4,688	4,593	3,539	4,397	4,742
No. chicken SE isolates	377	513	342	358	418
SE percent of all isolates	8.4%	11%	9.7%	8%	9%

Table 5: Somatic types of Pasteurella multocida observed at the NVSL per calendar year

	2014	**2015**	**2016**	**2017**	**2018**
Type 1	10	18	34	37	35
Type 3	18	4	8	14	51
Type 3,4	36	28	22	14	0
All other	62	99	122	118	81
TOTAL	**126**	**149**	**186**	**183**	**167**

Table 6: *Mycoplasma* antisera (mL) provided by NVSL per calendar year

Antisera	**2014**	**2015**	**2016**	**2017**	**2018**
M. gallisepticum	246	290	192	376	236
M. meleagridis	34	68	42	58	48
M. synoviae	212	260	172	362	192
Negative	156	250	322	340	262
Total	648	868	728	1,136	738

Table 7: Mycoplasma antigen (mL) provided by NVSL per calendar year

Antigen	2014	2015	2016	2017	2018
M. gallisepticum	170	70	275	290	145
M. meleagridis	85	45	80	90	45
M. synoviae	230	205	215	235	125
Total	485	320	570	615	315

Ewing, WH. 1986. Edward and Ewing's Identification of Enterobacteriaceae. 4th edition. Elsevier Science Publishing Co., Inc., New York, U.S.

Grimont, PAD, Weill, FX. 2007. Antigenic Formulae of the *Salmonella* Serovars. 9th edition. WHO Collaborating Centre for Reference and Research on *Salmonella*. Paris, France.

14-USA Interagency Surveillance for HPAI in Wild Birds
Tom DeLiberto, USDA-APHIS-WS

Update on the U.S. Interagency Surveillance for Highly Pathogenic Avian Influenza in Wild Birds Update

A unique A(H5Nx) clade 2.3.4.4 highly pathogenic avian influenza virus (HPAIV) was detected in North America in late 2014. Motivated by both the alarming spread of new H5 reassortant viruses in Asia and Europe as well as by the detection of HPAIV in both domestic poultry in Canada, and in wild and captive birds in Washington State, initial HPAIV surveillance was conducted among wild birds in the Pacific Flyway of the United States. This effort was later expanded to include the Central and Mississippi Flyways. Positive HPAI H5 findings from wild waterfowl samples suggested that while some of these species exhibited no detectable morbidity or mortality, clinical disease was documented for other wild bird species similarly infected. Also, losses in U.S. domestic poultry were unprecedented. In July 2015, state and federal agencies initiated a national surveillance effort to provide information to guide management actions to address some of the issues associated with HPAIVs in birds. This includes risks to commercial poultry, backyard poultry, game bird farms, wild birds, wild bird rehabilitation facilities, falconry birds, and captive bird collections in zoos/aviaries. Specific objectives of the plan were to: 1) determine the distribution of influenza viruses of interest in the U.S.; 2) detect spread of influenzas of interest to new areas of concern; and 3) provide a flexible surveillance framework that can be modified to monitor wild waterfowl populations for avian influenza, detect reassortant avian influenza viruses, and estimate apparent prevalence of important influenzas once detected in an area of concern. During 2015 and 2016, surveillance data indicated that A(H5Nx) clade 2.3.4.4 HPAIV was circulating in wild birds at about a 1% prevalence each year. No HPAI detections have been detected in wild birds since December 2016. An update on the current year's wild bird HPAIV surveillance program and associated research on avian influenza will be provided.

15-National Poultry Improvement Plan (NPIP) Update
Elena Behnke, DVM, USDA-APHIS-VS-NPIP, Conyers, GA

The National Poultry Improvement Plan is a Federal-State-Industry cooperative program. There are 50 Official State Agencies, one US Territory Official Agency and 99 Authorized Laboratories. Official NPIP disease monitoring classifications include: U.S. Pullorum Typhoid Clean, U.S. Mycoplasma Gallisepticum Clean & Monitored, U.S. Mycoplasma Synoviae Clean & Monitored, U.S. Mycoplasma Meleagridis Clean, U.S. Salmonella Enteritidis Clean and Monitored, U.S. Sanitation Monitored, U.S. Salmonella Monitored, U.S. Avian Influenza Clean, U.S. Avian Influenza Clean Compartment, U.S. H5/H7 Avian Influenza Clean, and U.S. H5/H7 Avian Influenza Clean Compartment for poultry breeding flocks, and U.S. H5/H7 Avian Influenza Monitored for commercial (production) poultry flocks.

Pullorum-Typhoid Status: There were no isolations of *Salmonella* pullorum in commercial poultry in FY2015, FY2016, FY2017, FY2018 or FY2019. There were no isolations of *Salmonella* pullorum in backyard birds in FY2015, FY2016, FY2017, FY2018 or FY2019. There have been no isolations of Salmonella *gallinarum* since 1987 in any type of poultry in the US. U.S. Pullorum-Typhoid Clean participating hatcheries include: 268 egg and meat-type chicken hatcheries, 66 turkey hatcheries, and 779 waterfowl, exhibition poultry and game bird hatcheries.

NPIP U.S. Pullorum-Typhoid Clean Participating Breeding Flocks and Number of Birds are listed below:

Egg-Type Chickens
230 Flocks with 6,004,447 birds
Meat-Type Chickens
6,385 Flocks with 114,368,511 birds
Turkeys
381 Flocks with 3,674,096 birds
Waterfowl, Exhibition Poultry, and Game Birds
7,170 Flocks with 2,554,380 birds
Meat-Type Waterfowl
130 Flocks with 350,564 birds

Avian Influenza Status:

From July 1, 2018-June 30, 2019, there were 3 isolations of confirmed Low Pathogenicity Avian Influenza in commercial poultry in the US:

- CA – commercial turkey flock confirmed 9/8/18 – H7N3
- MN – commercial turkey flock confirmed 10/20/18 – H5N2
- CA – commercial duck flock confirmed 4/22/19 – H5N2

Table 1: 2019 NPIP U.S. Avian Influenza Clean and U.S. H5/H7 Clean Participating Breeding Flocks; and U.S. H5/H7 Avian Influenza Monitored Participating Commercial Flocks:

Subpart	Flocks	Birds	Tests
Egg-Type Chicken Breeders	334	2,410,251	25,308
Table-Egg Layers-Commercial	5,888	470,012,204	128,465
Meat-Type Chicken Breeders	13,881	447,511,162	670,940
Meat-Type Chickens-Commercial	100,284	6,937,853,390	1,652,623
Turkey Breeders	1,018	8,620,452	43,114
Turkeys-Commercial	11,489	151,869,038	136,832
Waterfowl, Upland Game birds, Exhibition Poultry	5,066	2,350,306	108,245
Upland Game birds, Waterfowl, Raised for Release Upland Game birds, Raised for Release Waterfowl-Commercial	3,303	36,970,420	41,050
Total	**141,263**	**8,057,597,223**	**2,806,577**

Table 2: 2019 MG, MS, and MM positive breeding flocks:

***Mycoplasma* gallisepticum, *Mycoplasma* synoviae, and *Mycoplasma* meleagridis positive breeding flocks - National Poultry Improvement Plan FY2019**				
	WEGBY	Egg-Type	Meat-Type	Turkeys
M. gallisepticum	16	2	9	0
M. synoviae	20	0	68	10
M. meleagridis	0	0	0	0

Authorized Laboratories Activities: The National Veterinary Services Laboratory issues a group D Salmonella check test and an Avian Influenza check test for the Agar Gel Immunodiffusion test for Authorized Labs of the NPIP. Laboratory

training provided to the authorized labs included a Salmonella Isolation and Identification Workshop, a Mycoplasma Diagnostic Workshop, and an Avian Influenza Diagnostic Workshop during FY2019.

16-National List of Reportable Animal Diseases (NLRAD)
Rebecca Jones, DVM, USDA-APHIS-VS-Strategy and Policy (SP), Center for Epidemiology and Animal Health (CEAH), Fort Collins, CO.

The National List of Reportable Animal Diseases (NLRAD) is a proposed regulation that will create an obligation to report detections of animal disease to the Animal and Plant Health Inspection Service (APHIS) and to State Animal Health Officials. The joint effort of many stakeholders, including the United States Animal Health Association (USAHA), the American Association of Veterinary Laboratory Diagnosticians (AAVLD), and the National Assembly of State Animal Health Officials (NASAHO) resulted in the creation of the NLRAD.

The purpose of the NLRAD is to have consistent animal disease reporting across the United States and to help animal health officials protect the U.S. agriculture infrastructure. The NLRAD also supports domestic and international commerce; helps meet international reporting obligations to the World Organization for Animal Health (OIE) and trading partners; supports the creation of export certifications; contributes to the knowledge of zoonotic and endemic animal diseases; and aids in the response to an emerging disease or issue in the United States. Finally, the NLRAD helps inform reports made to the World Health Organization's International Health Regulations and Public Health Emergencies of International Concern.

The national animal disease list is based on the OIE list of reportable diseases and is intended to complement and supplement State reportable disease lists. The NLRAD builds on the current National Animal Health Reporting System (NAHRS) that facilitates voluntary disease occurrence reporting by State animal health officials to APHIS.

The NLRAD includes two categories: 1) Notifiable Diseases and Conditions and 2) Monitored Diseases. The term 'disease' includes disease agents and pathogens.

Notifiable diseases and conditions (notifiable diseases) consist of *emergency incidents, emerging disease incidents, and regulated disease incidents*. Any animal health professional who suspects or diagnoses a notifiable disease will be required to report it immediately to the State Animal Health Official and to APHIS. Proposed notifiable avian diseases include:

- Duck viral hepatitis (poultry only)
- Low pathogenic avian influenza (H5 or H7 subtypes) (poultry only)
- Highly pathogenic avian influenza
- Newcastle disease (exotic, virulent) (poultry only)
- *Salmonella enterica – Gallinarum & Pullorum*
- Turkey rhinotracheitis (poultry only)

Monitored diseases generally are those that are endemic in the United States and are required to be reported in 6-month and annual reports to the OIE. APHIS also uses data gathered to monitor changes in disease occurrence over time. States and laboratories will be required to report occurrence information (yes/no) on monitored diseases monthly; laboratories will report to State Animal Health Officials and States will report to APHIS. Proposed monitored avian diseases include:

- Avian chlamydiosis (psittacosis and ornithosis, *Chlamydia psittaci)*
- Avian infectious bronchitis
- Avian infectious laryngotracheitis
- Avian mycoplasmosis (*Mycoplasma gallisepticum & synoviae)*
- Infectious bursal disease (Gumboro disease)

Stakeholder collaboration and feedback has been important in the development of the NLRAD and APHIS would like to continue with this engagement into the future. Additional information about the stakeholder engagement process will be made available on the APHIS website when the proposed rule is published for public comment in the Federal Register. APHIS encourages and welcomes all stakeholders to review and comment on the proposed rule when it is published.

17-Multistate Psittacosis Outbreak Among Poultry Plant Workers, 2018: Animal Health Perspectives
Tracey Dutcher, DVM, MS, DACVPM, USDA-APHIS-VS, Riverdale, MD

From August – October 2018, 13 confirmed and multiple probable and suspect cases of psittacosis (ornithosis) were reported among workers at two FSIS-inspected poultry slaughter plants in Virginia and Georgia. A single corporation owns both plants, which slaughter spent broiler breeder hens supplied by 23 companies sourced from multiple grower farms east of the Mississippi River. This outbreak was unique in several ways. Psittacosis outbreaks among poultry slaughter plant workers in the United States are rare – or rarely reported – and previously associated with turkeys, rather than chickens. Additionally, illness among confirmed and suspected case-patients was unusually severe; 28 individuals required hospitalization, three in intensive care units, and 26 of the case-patients had radiographically diagnosed lobar pneumonia. No deaths were reported.

This presentation highlights the roles and responsibilities of the different State and Federal agencies involved in the outbreak, and how they provided an integrated, multi-sectoral One Health response. While no single farm was conclusively identified as the source, survey results suggest that increased awareness of avian chlamydiosis combined with practical surveillance could mitigate or prevent future outbreaks of this rare but serious disease in humans. Key prevention areas include improving biosecurity and implementing targeted surveillance. Flocks experiencing an increase in mortality 1.75 times above expected during the last 4 weeks before processing should consider testing for *C. psittaci* following necropsy and diagnostic testing for common bacterial pathogens and other routine causes of increased mortality.

18-Animal Health (OIE) Updates

Michael David, DVM, USDA-APHIS-VS National Import Export Services, Riverdale, MD

Every year the World Organization for Animal Health (OIE) updates existing terrestrial animal health code chapters or develops new ones. Additional chapters are in the process of being drafted or revised. Chapters of interest to the poultry industry and which will likely be presented for comment this fall are:

Code chapter on avian influenza. In an effort to clarify the chapter and help reduce unjustified import health measures Member countries place on the international trade of live poultry and poultry products, the OIE is revising this chapter. The revisions will include proposing a new definition for poultry, further clarifying the risk differences between low pathogenic and highly pathogenic AI viruses, proposing that low pathogenic strains not be immediately reported, and clarifying the risk associated with the trade of certain poultry products.

New Code chapter on laying hen production and welfare. The OIE has circulated a draft chapter for Member country comment on two separate occasions. The second iteration included text that is potentially exclusive of the most common layer hen housing system used currently throughout the world (conventional cage systems), causing significant concern among major egg laying producing countries. The OIE is revising this language which should address those concerns.

Code chapter on zoning and compartmentalization. A new concept – the concept of establishing “temporary protection zones” – will be proposed for inclusion in this chapter. The aim of this concept is to help minimize the impact a foreign animal disease introduction has on the status of the rest of the country and, there, also on international trade from that country.

19-Live Bird Market System (LBMS) Report

Fidelis Hegngi, DVM, MS, USDA-APHIS-VS-S&P, Riverdale, MD

Since 1986, States have been monitoring live bird markets (LBMs) in the Northeastern United States for the presence of avian influenza (AI) viruses that may pose a threat to the commercial poultry industry. On October 20, 2004, the U.S. Department of Agriculture’s Animal and Plant Health Inspection Service (USDA-APHIS) published uniform program standards to prevent and control H5 and H7 LPAI subtypes in the U.S. LBMS. The standards cover (1) licensing, (2) AI testing, (3) recordkeeping, (4) sanitation, (5) biosecurity, (6) surveillance, (7) inspection, (8) trace backs, (9) premises registration, (10) trace outs when positives occur, and (11) response to positive facilities. The standards apply to LBMs, auctions, and small sales, as well as to producers and distributors who supply the markets. The LBMS Uniform standards have been revised in 2008, 2012 and 2016. The standards are currently being implemented.

States are responsible for enforcing LBMS LPAI program standards. All LBMs, producers, and distributors that supply the markets must be registered or licensed with the State and must allow Federal and State inspectors access to their facilities, birds, and records. These facilities must also have written biosecurity protocols in place. USDA-APHIS coordinates and administers the program. USDA-APHIS provides personnel and resources to assist States with implementation and compliance with program requirements.

The LBM Working Group held its annual business meeting in February 2019 in San Diego, California. More than 71 participants representing 23 States attended the meeting including APHIS field, district, and headquarters staff; State Department of Agriculture representatives; and LBMS industry stakeholders. Participants discussed the program's progress, shared ideas for continued program implementation, and agreed on further advancement of the program.

The working group also discussed:

(1) Fiscal Year (FY) 2019 Avian Health line item budget update.
(2) An update on Initial State Response and Containment Plan (ISRCP) indemnity and compensation procedures.
(3) California AI Incidents – H7N3 LPAI Overview, Challenges and Lessons Learned.
(4) Minnesota AI Incidents– H5N2 LPAI Overview, Challenges and Lessons Learned.
(5) California Virulent Newcastle Disease: Overview and Lessons Learned; Farm Specific Secure Food Supply Plans; Biosecurity Accomplishments; Overview of LBM vND and Lessons Learned; Education and Outreach Efforts.
(6) Health Monitoring for People Exposed to Avian Influenza.
(7) An update on National Veterinary Services Laboratory Surveillance Testing: Current Nationwide Findings and Status of Current AI and Newcastle Disease (ND) Diagnostics.
(8) AI Dashboard: Cooperative agreement future data processing and reporting.
(9) An update on mass depopulation and euthanasia technologies.
(10) An update on mass disposal methods and cleaning and disinfection.
(11) National Veterinary Stockpile (NVS) update and accomplishments.
(12 New York LBM HPAI Response Exercise and Lessons Learned
(13) An update on the National Poultry Improvement Program (NPIP) and the announcement of the 2020 NPIP Biennial and General Conference Committee (GCC) meeting in Providence , RI.
(14) NPIP authorized laboratories system and compartmentalization update.
(15) USDA Southeast Poultry Research Laboratory (SEPRL) Update on vND and Avian Influenza.
(16) Update on vND Response Policies and Procedures.
(17) Vaccine immune evasion by AIV: Pandora's Box opened with today's technologies.
(18) Discussion on Outreach and Education Projects: Defend the Flock (DTF) – Combined campaign; Background/Goals/Outreach materials; Webinar/Launch/Partnering; Calendar Replacements Social media vND response
(19) 2018 LBMS Continuing Education Training Course, College of Vet Med, University of Minnesota.
(20) Zoonotic Disease Survey of Backyard Poultry and Swine Owners in Lancaster and York Counties, Pennsylvania.
(21) Role of Wild Waterfowl in the Ecology of Avian Influenza
(22) Potential North American Bridge hosts for avian influenza viruses.

In November 2018, USDA launched the new Defend the Flock campaign that combines outreach to both commercial and backyard poultry flocks. The new campaign emphasizes the importance of shared responsibility between anyone who owns or works with poultry. Since the launch, the campaign hosted two webinars to share information with all poultry owners and workers. We also launched a twice-yearly e-newsletter in July, 2019. USDA is partnering with states, industry and other groups to share information and resources through social media and on the web. The campaign offers a series of checklists in English, Spanish, Chinese, Vietnamese and Tagalog, with new materials coming in FY2020. A webinar aimed at helping the commercial audience prepare for NPIP audits will take place in November 2019 featuring USDA, state and industry speakers. Defend the Flock materials and information are available at www.aphis.usda.gov/animalhealth/defendtheflock.

LBMS surveillance remained a high USDA priority in FY 2019. There were two detections of H7N3 LPAI in the U.S. LBMS.

20-CEAH Report

Amy Delgado, MS, DVM, PhD, USDA-APHIS-VS-CEAH, Colorado Springs, CO

USDA APHIS Veterinary Services' Center for Epidemiology and Animal Health (CEAH) has provided extensive epidemiologic support for poultry-related issues in the past year. This work has ranged from epidemiologic study design and review to the integration and public sharing of outbreak investigations and epidemiologic analyses. CEAH provided support to the National Turkey Federation in response to their request for a study design to estimate the national seroprevalence of infectious bursal disease virus (IBDv) in U.S. turkeys going to slaughter. The last study examining IDBv in U.S. turkeys was conducted 35 years ago. This new study, conducted by NTF in collaboration with Ohio State

University will provide updated estimates of IBDv seroprevalence among turkeys being processed within the top U.S. poultry plants.

Fiscal year 2019 saw numerous outbreaks affecting U.S. poultry. CEAH assisted with analysis and integration of epidemiologic investigations for low pathogenic avian influenza and virulent Newcastle disease. Full information on these investigations is available online through the USDA APHIS avian health website at: https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/animal-disease-information/avian. The epidemiologic investigations and analyses conducted as part of the virulent Newcastle Disease outbreak have improved our understanding of disease transmission in affected poultry populations and led to more targeted surveillance and response efforts. CEAH continues to work with State and Federal partners, academia, and the poultry industry to improve our ability to detect and respond to disease incursions.

21-Compartmentalization of Primary Breeders

Alberto Torres, DVM, MSc, PhD, Cobb-Vantress Inc., Siloam Springs, AR

Dr. Torres presented an update on the status of compartmentalization of primary breeders.

22-Estimating the Time of Disease Introduction in vND in Layer Barns Using Experimental Data

Emily Walz, DVM, College of Veterinary Medicine, University of Minnesota, St. Paul, MN
Marie Culhane, DVM, PhD, College of Veterinary Medicine, University of Minnesota, St. Paul, MN

Active surveillance is a critical component of managing animal disease emergencies such as an outbreak of vND. The time to detect vND based on active surveillance can be influenced by the within-flock transmission dynamics and depends on factors such as virus strain, vaccination, and flock management.
Within-flock disease transmission simulation models can provide beneficial information on several areas of animal health emergency management, including poultry product movement, surveillance design, and disposal options.
In this project, we developed a stochastic simulation model for vND transmission within a layer flock to predict the time to detection under various active surveillance protocol options and input parameter scenarios. The transmission model predicted the number of birds in various disease states (latently infected, infectious, immune, and dead) at various times post flock exposure. Statistical distributions for input disease state durations were estimated with a maximum likelihood method using data from experiments performed at the Southeast Poultry Research Laboratory (SEPRL). We used three scenarios for the adequate contact rate parameter that determines the rate of virus spread in the poultry house given the uncertainty regarding its value under field conditions. The adequate contact rate for the fast- spread scenario was estimated using data from contact experiments performed at SEPRL. The adequate contact rates for the slow and very slow spread scenarios were based on reproduction number estimates from the literature. Other model parameters included the proportion of birds immune to vND virus infection following vaccination and the proportion of infected birds that die, both of which were estimated from the SEPRL experimental data.

Preliminary results show considerable uncertainty regarding vND transmission dynamics in vaccinated flocks. The rate of transmission varies depending on vaccine efficacy and immunity under field conditions, which may be influenced by vaccination schedule, flock management, age, and co-morbidities. The time to detect vND in a vaccinated flock may be extended, especially in scenarios with slow spread due to factors such as high immunity levels, less virulent virus, and decreased adequate contact rates. To provide more certainty to the models, additional data regarding flock production, flock mortality, and diagnostic surveillance results are needed.

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