2020 Turkey Industry Annual Report - Current Health and Industry Issues Facing the US Turkey Industry

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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=26) the US turkey production regarding the health status of turkeys produced in August 2019 through August 2020. 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 2020 are issues with lack of efficacious drugs, colibacillosis, clostridial dermatitis, ORT, Salmonella, leg problems, Bordetella, and coccidiosis. The top-10 list for 2020 was near identical to 2019 with notable exception coccidiosis jump in rank to #5 from #8. Blackhead ranking also increased to #11 from #18 the prior year, and the number of reported cases decreased by 15%. Cases of Turkey Reovirus increased 12+% and dropped in rank to #19 from #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 #12 from #14). In July 2011 the sale of roxarsone was suspended; September 30, 2013, the FDA marketing authorization NADA was withdrawn.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 Nitarsone (see **blackhead**) approval was withdrawn December 31, 2015.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 4.0 (from 3.7 in prior year) and stayed at #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 has not proved a a viable option for the industry.

ORT (*Ornithobacterium rhinotracheale*) stayed at #4 ranking in 2020 and 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.

Coccidiosis increased to #5 from #8 ranking 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 and/or live vaccines and the subsequent development of immunity. Table 4 summarizes the US turkey production coccidia control products (n=260.0 million head, survey total) and ionophores represent the majority, 60% (62%, 2019; 44%, 2018; 55%, 2017) of heads for an average use of 7.0 (7.3, 7.7 and 7.5, 2019 - 2017) months during the 12-month survey period. Chemical anticoccidials account for 28% (29%, 30% and 33%, 2019 - 2017) head and 5.5 (5.5, 4.6 and 4.5, 2019 - 2017) months. Coccidia vaccination was limited to 11% (10%, 10% and 7%, 2019 - 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, reported at 23% (27%, 28% and 14%, 2019 - 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. Phytonutrients 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.

Leg problems are ranked #7 in 2020 (#6, 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 #8 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.

Turkey Arthritis Reovirus (TARV) also called, **Turkey Reovirus Digital Flexor Tendon Rupture** (TR-DFTR), was recognized as a newly emerging disease in 2011. A unique reovirus has been isolated and identified as the cause of tenosynovitis and digital flexor tendon rupture in commercial turkeys. Clinical signs in young flocks are reportedly mild to nonexistent, but can develop into lameness and/or abnormal gait in older flocks, starting at about 12 weeks of age. Affected flocks may also report an increased incidence of aortic ruptures and poor flock performance (weight gain, uniformity). Research 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 dropped to #19 rank from #9 in 2019 and #17 in 2018 (Table 1) with >548 "definitive" and "suspect" cases or flocks (Table 2). In 2019 the NTF Reovirus Subcommittee released three documents to the industry, including the **case definitions and nomenclature**. Second, the **Reovirus Diagnostic & Testing Reference Sheet** listing contacts of 6 TARV researchers and the tests available. The third document was the results of an industry survey titled, **Economic Impact of Turkey Arthritis Reovirus**, reporting an average of 5.6 cent increased cost per pound for flocks affected by TARV compared to the companies' surveyed production costs for unaffected flocks. TARV 2019 Survey reports approximately 2% incidence of all turkeys produced annually and primarily affects toms (approximately 5% incidence of toms produced annually). The severity of impact on the industry could be as high as $33.7 million with highly pathogenic strains of TARV.

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 uni- 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 uni- 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 subsynovium in acute cases, progressing to prominent subsynovial and peritendon fibrosis in chronic cases. Secondary bacterial infections (e.g., Staphylococcus) occasionally occur and are accompanied by heterophilic inflammation. 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. TR-DFTR is an identified critical research need.

Blackhead[1,2], also known as Histomoniasis, increased to position #11 from #18 (#11, 8, 9, 13 in 2018 - 2015, respectively). There were 82 reported cases of blackhead in 2020, down from 96 in 2019, and (Table 2) a decrease from the peak of 127 in 2018. Histomoniasis occurs regionally and seasonally in turkeys, and

[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.

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 two-question survey as to inciting factors that might be associated with a blackhead break. Of those 16 respondents reporting 82 blackhead cases in 2020, 23% (n=19) reported a coccidiosis diagnosis and 23% (n=19) reported a colibacillosis (*E. coli*) diagnosis prior to the blackhead break. Sixteen respondents equal to 62% of survey reported one or more cases of blackhead (54%, 63%, 2019; 74%, 2017). Of the 82 reported cases at least 11% (n=9) were destroyed to alleviate animal suffering and due to excess morbidity and mortality. Without efficacious approved pharmaceuticals, early diagnosis and start of interventions is considered part of 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.

The turkey industry continues to work to reduce **Salmonella** (#6) colonization in birds. **Poult enteritis of unknown etiologies** has changed in importance, to position #10 (#12, 8, 10, 14 from 2019 – 2016). **Turkey Coronavirus** (TCV), as a defined cause of enteritis, was ranked #29 (#29, 30, 30, 31 from 2019 – 2016), with 27 reported cases, from 95 (2019) and 185 (2018) previous years (Table 2).

Protozoal Enteritis, attributed to flagellated protozoa, *Cochlosoma*, *Tetratrichomonas* and *Hexamita*, ranked #15, changed from #16; 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*.

Late mortality ranked #9 health issue and changed from #10 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.

Round Worms (*Ascaridia dissimilis*) ranked #14, and has positioned between #14 - #19 since 2015. The industry is concerned that reduced sensitivity to anthelmintics is an issue[3]. High worm burdens can be associated with **necrotic enteritis** (#16) and the cause of high mortality in flocks.

THRV (Turkey Hepatitis Reovirus) is a new disease issue added to this survey in 2020 and ranking #18. THRV affected flocks ranged in age from 7 to 46 days with a median age of 15.5 days. Mortality peaks and subsides in a week and the cumulative mortality is 3-8%. Dr. M. Lighty (2019, personal communication) describes THRV as "over the past two years, turkey companies in the United States have reported an increased incidence of viral hepatitis in poults caused by reovirus. This appears to be an emerging disease caused by a previously recognized pathogen. Gross lesions range from subtle mottling to multifocal white/gray/tan foci in the livers; mild hepatomegaly has also been noted in some cases. Histopathology on

[3] Collins JB, Jordan B, Baldwin L, Hebron C, Paras K, Vidyashankar AN, Kaplan RM. Resistance to fenbendazole in Ascaridia dissimilis, an important nematode parasite of turkeys. Poult Sci. 2019 Nov 1;98(11):5412-5415. doi: 10.3382/ps/pez379. PMID: 31328783.

these livers shows severe multifocal hepatocellular necrosis with infiltration by macrophages, lymphocytes, plasma cells, and/or heterophils. Necrotic hepatocytes may fuse to form multinucleated syncytial cells and there is often marked fibrin accumulation in necrotic areas…. Morbidity and mortality due to reoviral hepatitis can be highly variable. Risk factors for development of the disease and the economic significance of this disease on the turkey industry are not fully understood at this time." There are indications from the field that flocks developing hepatitis as poults can go on to develop turkey reoviral arthritis during grow out.

Heat stress ranked #22 in 2019 compared to #20 prior year. Tunnel ventilated barns allow growers to manage heat stress better than in years past. Poult Enteritis Mortality Syndrome (**PEMS**) ranked #30 versus #32 previously. Avian Metapneumovirus (**AmPV**) ranked #34 since 2017.

Mycoplasma synoviae (**MS**, infectious synovitis) infections, ranked #31 (#24, 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 21 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 31 cases of MG reported (Table 2).

The health of turkeys is a top priority of industry members, and the National Turkey Federation (NTF) works to support the industry in endeavors to promote advancements in turkey health. NTF's **Turkey Health Task Force**, established in 2017, along with NTF staff, has continued working to find innovative solutions for the top disease challenges facing the turkey industry. The task force has continued to focus its efforts on accelerating the development and approval of turkey health products and support research to improve turkey health. The actions of the task force aim to address disease challenges that have the greatest impact on the turkey industry. As part of this effort, NTF has previously worked to develop economic impact models for turkey-specific diseases with the help of the NTF Turkey Health and Welfare Committee and industry members throughout the production process along with APHIS Veterinary Services staff. NTF plans to continue these efforts and surveys are underway to better understand the impact of issues frequently identified in industry-wide surveys, including Clostridial Dermatitis and *Ornithobacterium rhinotracheale*. Currently, limited options for effective disease management are available to the turkey industry. NTF supports reduced regulatory barriers for new turkey health product approvals to assist the turkey industry in raising healthy turkeys to produce safe and nutritious turkey products.

The impact of **SARS-CoV-2 (COVID-19)** was felt throughout the country in 2020, and the turkey industry, like most industries, faced unprecedented situations. Because COVID-19 was a new virus first observed in humans in 2019, substantial knowledge gaps needed immediate attention to better understand the virus, including the susceptibility of animals to COVID-19, whether COVID-19 could be transmitted by food products and the ability of the virus to persist in the environment. While the virus is still not well understood, several research groups have worked to address concerns of COVID-19 in poultry products and further the understand the transmission of the virus. Initial research conducted by USDA ARS and the FAO has indicated chickens, turkeys, ducks, quail and geese are not able to become infected with COVID-19. In addition, chicken eggs, commonly used to grow viruses for vaccine antigen, were unable to grow the virus. Further, current research suggests that contact with poultry and other livestock and consumption of meat and poultry productions are unlikely sources of COVID-19 transmission to humans.

Blackhead continues to be a top disease of concern for the turkey industry, as it results in significant mortality, and the pursuit to find efficacious preventative and control options for blackhead remain top priorities for the industry. In 2019, FDA provided the Turkey Health 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. Although a product has not yet been identified to be submitted under the MUMS designation, NTF remains optimistic that benefits of MUMS status can incentivize the prioritization of the development of new molecules to mitigate blackhead.

Turkey Arthritis Reovirus (TARV) and other related leg issues continue to be an industry-wide concern. In December, NTF published the results of an industry-wide survey on the economic impact of TARV. Though the average increase in production cost per pound for flocks affected by TARV reported was 5.6 cents in comparison to unaffected flocks, the virus increased costs as high as 15 cents per pound for TARV affected flocks. The report indicated the impact could be as high as $33.7 million dollars with highly pathogenic strains of TARV. Approximately 226 million pounds were affected with 5 percent of toms produced annually diagnosed with TARV. It is important to note that while the economic impact of TARV to the turkey industry is considerable, the impact of TARV on an individual turkey producer that may only have two flocks per year can be especially burdensome.

There is currently no treatment for TARV and the industry lacks reliable and cost-effective diagnostic tools to identify TARV in turkey flocks. Therefore, research and advancement for prevention and treatment options for TARV are of significant interest to the turkey industry. NTF hosted two meetings this year to facilitate conversations between members in live production, veterinarians, members of the allied industry and researchers to discuss opportunities to increase coordination efforts to mitigate TARV. As part of this effort, the group developed case definitions to improve consistency of reporting and an isolate nomenclature to streamline the naming of isolates and reduce on duplication of sequencing detailed below.

<u>National Turkey Federation Turkey Arthritis Reovirus Case Definitions:</u>

- Definitive diagnosis requires the veterinarian to fulfill these three criteria: (1) observation of typical gross lesions, (2) rule out other causes of lameness in turkeys (e.g., osteomyelitis, primary bacterial arthritis, muscle rupture, footpad dermatitis, Mycoplasma synovitis, dietary deficiencies) and (3) isolation of reovirus, referred to as turkey arthritis reovirus (TARV), from the gastrocnemius and/or digital flexor tendon in embryonated eggs or cell culture.
- Suspect diagnosis requires the veterinarian to fulfill these two criteria: (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, dietary deficiencies).

<u>National Turkey Federation Turkey Arthritis Reovirus Isolate Nomenclature:</u>

- Species (tk/ck) /US/State (bird location)/ Isolate ID/ Tissue (spelled out)/ Year
- Example: TRV/US/GA//UMN-1234/Tendon/ 2018

Highly Pathogenic Avian Influenza (HPAI) continues to be a focus for the U.S. poultry industry. Since the outbreak in 2015, detection, prevention and response across the industry has greatly improved. In March and April, 11 commercial turkey farms were affected by an outbreak of low pathogenic avian influenza (LPAI) in North and South Carolina. In addition, one commercial turkey farm was affected by **HPAI** in South Carolina. Flocks were swiftly depopulated to control the spread of the disease. Following, thorough cleaning and disinfecting were conducted on the farms in addition to increased surveillance of commercial flocks in the surrounding areas. USDA published a set of 14 biosecurity principles of the National Poultry Improvement Plan (NPIP) in 2017 that serve as the basis for biosecurity at poultry facilities. Strict biosecurity remains important to prevent avian influenza outbreaks and routine testing is essential to identify flocks positive for avian influenza as early as possible.

In October, APHIS issued their final rule updating the NPIP to align with changes in the poultry industry and incorporate new scientific information and technologies into the NPIP. These updates were approved by representatives from across the poultry industry at the 2018 NPIP Biennial Conference, and a draft rule was published in December 2019. This is the final step in the rulemaking process. Among other important updates, of most interest to the turkey industry is the clarification of low pathogenic avian influenza (LPAI) regulations on indemnity and compensation. These sections amend the terms and definitions of H5/H7 LPAI infection (infected) and H5/H7 LPAI exposed. The new terms proposed were H5/H7 LPAI virus exposed (noninfectious) and H5/H7 LPAI virus actively infected (infectious). The revision to these

terms does not change APHIS' response policies for LPAI events. Compensation for cleaning and disinfection (virus elimination) of premises, conveyances and materials that encountered poultry infected with or exposed to H5/H7 LPAI will continue to be determined using the current APHIS flat-rate virus elimination (VE) calculator. These revisions to terminology in the final rule do not pertain to the conditions for payment, nor how payment is calculated. APHIS is in the process of discontinuing the use of the indemnity calculator in favor of a different appraisal apparatus, and NTF has been working closely with the agency to make sure turkey is valued fairly.

Although not a major turkey health concern, ***Salmonella*** continues to be reported as a top priority for the turkey industry in this survey. NTF continues to assist the turkey industry in efforts to reduce *Salmonella* throughout turkey production and processing. In the last year, NTF has hosted three meetings for industry members focused on *Salmonella.* As part of the discussions on reduction strategies, NTF updated its *Salmonella* Risk Mitigation Practices document that details best practices to be considered at all sectors of the supply chain, including breeder and hatchery, commercial production and processing operations. This document is located on EatTurkey.org. While this document is not all encompassing and every intervention may not be appropriate in all operations, the best practices included are potential strategies for reducing *Salmonella.* However, there is still a need for the development of interventions to mitigate *Salmonella*, and NTF continues to support research with the objectives of improving the understanding of *Salmonella* and products that reduce colonization of *Salmonella* in turkeys.

The approval of new **anticoccidials** remains a significant need for the turkey industry. There currently is one commercial vaccine available and the number of chemical anticoccidials approved and available for turkeys on the market are limited. The lack of efficacious options is a challenge for the industry as a whole but is especially burdensome for antibiotic free production.

Autogenous biologics play an integral role in the disease prevention and control programs of turkey producers. In addition, autogenous biologics are frequently a component of food safety programs because of their effectiveness at reducing the colonization in turkeys of pathogens associated with foodborne illness. Veterinarians work with live production specialists and farmers to supervise the day-to-day management of disease for turkey flocks, and therefore have most adequate knowledge of health needs of the animals for which they oversee. Members of the Turkey Health Task Force and NTF staff continue to advocate for policies that accelerate the approval of safe and effective biologics to assist the turkey industry with managing important pathogens. CVB published Draft Veterinary Services Memorandum No. 800.69 Draft No. 638 in June that would extend the isolate approval length for autogenous biologics from two years to up to six years. NTF supported the extension on the use of autogenous isolates on a justifiable basis when previous use of the autogenous biologic was deemed beneficial to flock health by the veterinarian, and to NTF's knowledge there is no scientific basis for concern related to the proposed option for autogenous isolate extensions. A final draft is expected in late 2020 or early 2021.

FDA released the **annual antimicrobial sales and distribution data for 2018**. Though there was a slight increase (9 percent) in the sales and distribution of medically important antimicrobials from 2017 through 2018, the overall decrease from 2015 remains significant at 38 percent. Tetracyclines, which represent the largest volume of these domestic sales (3,974,179 kg in 2018), increased by 12 percent from 2017 through 2018. Of the 2018 domestic sales and distribution of medically important antimicrobials approved for use in food-producing animals tetracyclines accounted for 66 percent, penicillins for 12 percent, macrolides for 8 percent, sulfas for 5 percent, aminoglycosides for 5 percent, lincosamides for 2 percent, cephalosporins for 1 percent and fluoroquinolones for less than 1 percent. NTF continues to support the judicious use of antimicrobials to manage turkey health issues.

FDA is currently evaluating the interpretation of **zero-day withdrawal times** assigned to new animal drugs. Since the 1980s, FDA has assumed that poultry spent at least 6 hours withdrawn from drugs prior to slaughter due to transit process and additional times for other livestock. However, FDA sought comments to determine if its assumptions are correct based on current industry practices. Based on a survey conducted to understand current industry practices, NTF submitted comments noting that six hours is an

appropriate zero-day withdrawal period especially given that government sampling of turkey products consistently shows virtually no violative residues in turkey meat produced in the United States. Determination by FDA on the interpretation of zero-day withdrawal times is expected in the next year.

NTF remains in regular contact with officials at FDA to monitor the timeline of several **key CVM items** including, those listed below, and to communicate needs of the turkey industry.

- A concept paper on updating the medically important drugs listed in Appendix A of FDA's Guidance for Industry #152 is anticipated this fall. The paper is expected to detail FDA's proposed process for updating the list of drugs and how the drugs would fall using this process.
- A concept paper on the duration of use for animal drugs is projected to publish in early fall for comment.
- A coordinated publication on antibiotic use is anticipated to be out by the end of 2020. This publication would include industry data from Dr. Randy Singer like the information reported in 2019.
- A package of four guidance documents should be released from FDA related to data necessary for drug approvals. NTF continues to be a vocal advocate supporting flexibility on this issue.

In 2020, APHIS made $10 million available for the **National Animal Disease Preparedness and Response Program (NADPRP)**. The NADPRP sought proposals for projects that will advance capabilities and capacities related to rapid large-scale animal depopulation and carcass disposal in a high-consequence animal disease outbreak or enhance U.S. livestock biosecurity. NTF continues to work with members and executives from state associations on application efforts to secure funding for projects that address turkey industry needs as part of this important program. In addition, $5 million was made available for the strengthening of the **National Animal Health Laboratory Network (NAHLN)**. 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 2016 that was fully funded in the 2018 Farm Bill. This program is an important for disease prevention and response preparedness, especially for foreign disease threats to the U.S. poultry and livestock industries.

In 2019, **turkey production** decreased from 7,598,289.00 to 7,432,801.00 pounds (live weight) and decreased to 229,000,000 head with an average live weight of 32.22 lbs. In 2018, 244,750,000 head were produced with an average live weight of 31.12 lbs. **Per capita consumption** for turkey products decreased from 16.2 in 2018 to 16.0 in 2019. (Reference: National Turkey Federation Sourcebook, pending publication October 2019).

Table 1. Turkey health survey (August 2019 - 2020) of professionals in US turkey production ranking current disease issues (1= no issue to 5 = severe problem). n=26.

Issue	Score Average (1-5)	Score Mode (1-5)
Lack of approved, efficacious drugs	4.5	5
Colibacillosis	4.2	5
Clostridial Dermatitis (Cellulitis)	4.0	5
Ornithobacterium rhinotracheale (ORT)	3.8	3
Coccidiosis	3.6	5
Salmonella	3.5	4
Leg Problems	3.2	4
Bordetella avium	3.2	3
Late Mortality	3.1	4
Poult Enteritis of unknown etiologies	2.9	2
Blackhead (Histomoniasis)	2.8	1
Cholera	2.8	3
Cannibalism	2.7	3
Round Worms (*Ascaridia dissimilis*)	2.6	3
Protozoal Enteritis (Flagellated)	2.6	1
Necrotic enteritis	2.6	3
Tibial Dyschondroplasia (TDC, Osteochondrosis)	2.5	2
THRV (Turkey Hepatitis Reovirus)	2.5	1
TR-DFTR (Turkey Reovirus Digital Flexor Tendon Rupture)	2.5	1
Avian Influenza	2.4	1
Breast Blisters and Breast Buttons	2.3	3
Heat stress	2.2	2
Bleeders (aortic, hepatic ruptures)	2.0	1
Osteomyelitis (OM)	1.9	2
Newcastle Disease Virus (NDV)	1.9	1
Shaky Leg Syndrome	1.8	2
Turkey Coronavirus	1.8	1
Mycoplasma gallisepticum (MG)	1.7	1
Fractures	1.7	1
PEMS (Poult Enteritis Mortality Syndrome)	1.6	1
Mycoplasma synoviae (MS)	1.6	1
H3N2 (H1N1) Swine Influenza	1.4	1
Erysipelas	1.4	1
Avian Metapneumovirus	1.2	1
Spondylolisthesis (Kinky-Back)	1.2	1
Mycoplasma meleagridis (MM)	1.1	1

Table 2. Turkey health survey (August 2019 - 2020) of professionals in US turkey production reporting cases of diseases. n=26.

Cases (##) of	2020	2019	2018	2017	2016	2015	2014
Blackhead (Histomoniasis)	82	96	127	109	101	55	61
Mycoplasma synoviae (MS)	21	25	35	33	20	24	41
Turkey Coronavirus (TCV)	27	95	185	12	6	119	43
Turkey Reovirus Digital Flexor Tendon Rupture	548	486	234	182	31	146	150
Mycoplasma gallispecticum (MG)	31	30	50	52	29	31	17

Table 2a. Turkey Blackhead (Histomoniasis) survey (August 2019 - 2020) of professionals in US turkey production.

	n=	%
How many cases (##) of Blackhead (Histomoniasis) did you confirm in last 12-months (since Aug.)?	82	-
How many blackhead flocks/barns destroyed?	9	11%
How many respondents?	26	-
How many respondents reported blackhead?	16	62%
How many cases of Blackhead (Histomoniasis) diagnosed ...		
… coccidiosis prior to Blackhead break?	19	23%
… colibacillosis (*E. coli*) prior to Blackhead break?	19	23%

Table 3. In-feed and In-water FDA approved medications for turkeys. ^ = Not currently marketed. G = Includes label claim for improved weight, gain and feed conversion. ® All trademarks or trade names are property of their respective owners. *CAUTION: Federal law restricts medicated feed containing this veterinary feed directive (VFD) drug to use by or on the order of a licensed veterinarian. *Extralabel Drug Use (EDLU) is not permitted in feed. **CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian. Species can vary, observe label indications. ® ™ All trademarks or trade names are property of their respective owners.

VFD Medications	Non VFD Medications
Albamix (Novobiocin)^	Albac® (Bacitracin Zinc)^G
Aureomycin® (Chlortetracycline)	Amprol® (Amprolium)
ChlorMax® (Chlortetracycline)	Avatec® (Lasalocid)
Deracin® (Chlortetracycline)	BMD® (Bacitracin Methylene Disalicylate)G
Neo-Oxy® (Neomycin + Oxytetracycline)	Clinacox® (Diclazuril)^
Neo-Terramycin® (Neomycin + Oxytetracycline)	Coban® (Monensin)
Pennchlor® (Chlortetracycline)	Coyden® (Clopidol)^C
Pennox® (Oxytetracycline)	Flavomycin® (Bambermycin)G
Pharmastatin (Nystatin)^	PMD® (Bacitracin Methylene Disalicylate)G
RofenAid® (Sulfadimethoxine + Ormetoprim)	Safe-Guard® (Fenbendazole)
Terramycin® (Oxytetracycline)	Stenorol® (Halofuginone)^
	Topmax™ (Ractopamine)^
	Zoamix® (Zoalene)

Prescription Medications*	Non Script Medications

Chloronex® (Chlortetracycline) CTC Soluble (Chlortetracycline) Di-Methox® 12.5% (Sulfadimethoxine)^ Gallimycin® PFC (Erythromycin)^ NeoMed® 325 Soluble Powder (Neomycin Sulfate) Neo-Sol® (Neomycin Sulfate) Oxytet® Soluble (Oxytetracycline) PenAqua Sol-G® (Penicillin G Potassium) Pennchlor 64® (Chlortetracycline) Pennox 343® (Oxytetracycline) PoultrySulfa® (Sulfamerazine, Sulfamethazine, Sulfaquinoxaline)^ R-PEN® (Penicillin G Potassium) SpecLINX-50 (Lincomycin + Spectinomycin) Sulmet® (Sodium Sulfamethazine) Sul-Q-Nox® 31.92% (Sulfaquinoxalone) Tetra-Bac® 324 (Tetracycline) TetraMed® 324 HCA (Tetracycline) Tetroxy® HCA Soluble (Oxytetracycline) Tet-Sol™ 324 Soluble (Tetracycline) Tylan® Soluble (Tylosin Tartrate) Tylovet® Soluble (Tylosin Tartrate)	Amprol (Amprolium) BMD® Soluble (Bacitracin Methylene-Disalicylate)[G]

Table 4. Turkey health survey (August 2019 – August 2020) of professionals in US turkey production coccidia control programs (n=260.0 million head).

Program	How many months (average)	How many head (count divided by total survey count)?
Ionophore	7.0	60%
Chemical	5.5	28%
Alternative (Phytonutrients)	4.7	23%
Vaccine	5.5	11%