Department of Animal Science

BIOSECURITY IS CRITICAL TO PREVENT AVIAN INFLUENZA

February 2025

Tom Tabler, *Professor and Extension Poultry Specialist, Department of Animal Science, University of Tennessee Institute of Agriculture*

Tanner Thornton, *Graduate Research Assistant, Department of Animal Science, University of Tennessee Institute of Agriculture*

Jonathan Moon, *Extension Instructor, Department of Poultry Science, Mississippi State University*

Pramir Maharjan, *Assistant Professor and Extension Poultry Specialist, Department of Food and Animal Sciences, Tennessee State University*

Tannah Christensen, *Extension Instructor, Department of Poultry Science, Mississippi State University*

After the number of confirmed cases fell throughout much of 2024, highly pathogenic avian influenza (HPAI) returned with a vengeance in November 2024 and has continued into early 2025. Anyone involved with poultry production, from large-scale commercial producers to small backyard flock keepers with only three or four chickens, should review their biosecurity practices and take all steps necessary to assure the health and safety of their flocks.

The state of Georgia suspended all poultry exhibitions, shows, swaps, meets and sales until further notice on January 17, 2025, in response to an avian influenza outbreak on a commercial broiler breeder farm. The Tennessee State Veterinarian's office and the Tennessee Department of Agriculture Animal Health Division continue to closely monitor the avian influenza situation in Tennessee with the goal of avoiding such a response in Tennessee. As of January 23, 2025, since the start of the HPAI H5N1 outbreak in the U.S. on February 8, 2022, 141.35 million birds have been affected. HPAI has been detected in a total of 1,443 flocks in all 50 states. Of those, 662 flocks have been commercial, and 781 have been backyard flocks.

A troubling new addition to the avian influenza outbreak occurred in early 2024 when HPAI was first detected in dairy cattle in Texas. As of January 23, 2025, since the first detection in dairy cattle on March 25, 2024, there have been 937 confirmed cases in dairy herds in 16 states. California alone has 720 of these confirmed cases with 35 confirmed cases in the last 30 days.

While HPAI H5N1 is not a new virus, this **current version is one of the most worrisome in recent history**. This has been due, in part, because of its rapid global spread, persistence across all seasons (especially concerning is the persistence throughout warmer summer months when influenza viruses typically show a decline) and the spillover into mammalian populations (particularly, the recent spillover into dairy cattle).

Vaccination is not currently an option, and antibiotics do not work against viruses. That makes biosecurity the **most effective tool in our toolbox**. However, you must use that tool every day and every time you visit your flock. Having a biosecurity program for your farm that isn't followed every time is useless and puts your flock at increased risk of avian influenza.

Avian influenza in the U.S.

H5N1 avian influenza is caused by an Influenza A virus that can infect commercial poultry, backyard flocks, captive game birds such as quail and pheasants, numerous species of wild birds like raptors (hawks, eagles, and falcons) and scavengers (vultures and crows) and especially waterfowl like ducks, geese, swans, and various shore birds. Songbirds appear much less likely than waterfowl to contract avian influenza and are less likely to shed large amounts of the virus, meaning they do not transmit the disease easily.

At the time, the 2014-2015 avian influenza outbreak was the deadliest animal health emergency that the U.S. had faced. In that outbreak, the United States Department of Agriculture (USDA) confirmed over 230 detections of HPAI in the U.S. affecting approximately 50 million birds. These birds either died or were euthanized to control spread of the disease. Several smaller isolated HPAI outbreaks occurred in 2016 and 2017. However, in 2022, the current ongoing H5N1outbreak quickly spread HPAI infections across the U.S., impacting all types of both wild birds and domestic commercial and backyard avian flocks in each of the four major migratory bird flyways within the continental U.S. (1. Pacific, 2. Central, 3. Mississippi, and 4. Atlantic) (Figure 1.).

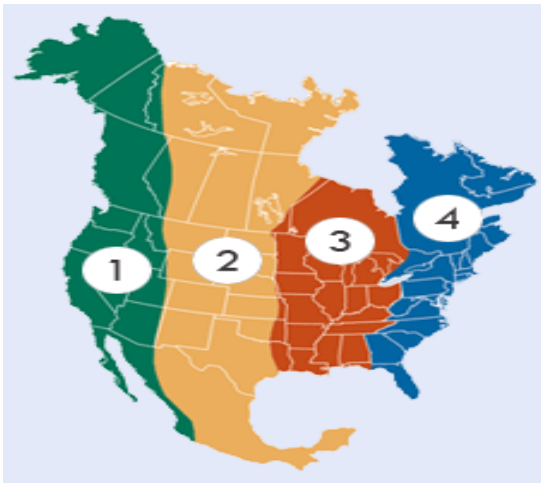

Figure 1. Major North American migratory bird flyways. Source: USGS.gov.

Almost **three times as many birds have been lost as in 2014-2015**, and the avian influenza virus is now in much of the domestic wild bird population (starlings, blackbirds, raptors, vultures, etc.) with no end to the outbreak in sight.

Isolated cases of human infections have also occurred with this most recent outbreak of HPAI. At the time of this writing, there have been **67 confirmed human cases of H5N1** in the U.S. One person, with other underlying health issues has died. Most human cases appear as mild illnesses, such as conjunctivitis (pink eye), with mild respiratory symptoms, and the victims fully recover in a few days.

Currently, the Centers for Disease Control (CDC) consider the health risk to humans from the H5N1 outbreak to be low. Even though the CDC considers the current risk to the public to be low, persons with exposure to infected animals, or contaminated materials, including raw cow's milk and products made from raw milk, are at higher risk for H5N1 virus infection and should take recommended precautions, including using personal protective equipment (PPE). The CDC also recommends avoiding exposure to sick or dead animals. If unable to avoid exposure, the CDC recommends that PPE should be worn when in direct or close contact (within six feet) with sick or dead animals including commercial poultry, wild birds, backyard flocks or other animals, animal manure, litter or materials potentially contaminated with the H5N1 virus. PPE includes disposable head/hair covers, properly fitted unvented or indirectly vented safety goggles, a NIOSH-approved particulate respirator (N95® facemask), disposable fluid-resistant coveralls, disposable gloves and boots or boot covers.

Avian influenza viruses occur naturally in wild migratory birds and can infect domestic poultry (chickens, turkeys, ducks, quail, pheasants and guinea fowl). Avian influenza viruses are classified as either low-pathogenic (LPAI) or highly pathogenic (HPAI). Low-pathogenic avian influenza causes only mild disease in poultry. Highly pathogenic avian influenza is a much more dangerous and deadly form of the disease with death rates as high as 95-100 percent in domestic poultry. Migrating waterfowl often carry LPAI that can sometimes mutate to HPAI in domestic poultry. Unfortunately, in the current outbreak, migrating waterfowl in all four major flyways are carrying HPAI that can easily infect domestic poultry. In addition, across the country, increased numbers of migrating waterfowl have been lost to HPAI and are being fed upon by scavengers such as vultures and raptors such as hawks and eagles.

While rare, mammals such as bears, large wild cats, racoons, skunks, marine mammals (seals and otters) and others may also feed upon HPAI-affected waterfowl and become infected. In addition, **domestic house/barn cats are extremely susceptible to avian influenza**. In fact, barn cats dying at multiple dairy farms helped veterinarians discover the avian influenza virus in dairy cattle. House/barn cats most often become infected by consuming unpasteurized raw milk or raw or undercooked meat containing the HPAI virus. Other potential sources include exposure to infected wild birds or poultry and exposure to people who work on affected farms and to their clothing and other fomites. As a result of the

increasing number of avian and mammalian species affected, this has increased the amount of avian influenza virus in the environment and increased the risk to domestic poultry.

Possible signs of HPAI in poultry include extreme drop in water intake, unusual quietness in the flock with decreased vocalization, respiratory distress, decreased appetite, decreased egg production, abnormal egg shape (including wrinkles in the shell), diarrhea, and swelling or purple discoloration of the head, eyelids, comb, wattles, and legs.

Currently, several companies are working on a poultry vaccine for avian influenza. All vaccine development and approval are strictly regulated by the USDA. At the time of this writing, there is **no widely available and effective vaccine** to prevent HPAI. Should the USDA authorize vaccine use in the future, careful consideration will be given regarding vaccine efficacy, the impacts of vaccine use in the field and the potential impacts vaccine use might have on poultry trade and the export market, especially where broiler meat export is concerned. The U.S. exports around 17 to 20 percent of its broiler chicken production each year, second only to Brazil which exports approximately 33 percent of its broiler production. Lesser amounts of U.S. turkey meat (~11 percent) and table eggs (~4 percent) are destined for the export market. Mexico is the major destination for U.S. broiler and turkey meat exports. Mexico and Canada are the largest export markets for U.S. table eggs.

Importance of biosecurity

Biosecurity is the practice utilized to limit the spread of disease-causing organisms. In the case of HPAI, biosecurity means doing everything possible on your poultry operation to prevent disease from reaching your poultry flock or prevent it from leaving and spreading to other nearby flocks, should it occur. The avian influenza virus is in the nasal secretions and manure of infected birds. The virus can move through 1) direct and 2) indirect transmission routes:

1) **Direct transmission** (physical contact between sick and healthy birds)
2) **Indirect transmission** (disease agent is carried to susceptible individuals by):
    - Humans (possibly the #1 threat)
    - Contaminated feed
    - Contaminated water
    - Contaminated environment (for birds with outdoor access)
    - Shared equipment (not cleaned or disinfected)
    - Rodents, wild animals and insects (maintain a rodent control program, use bait stations)
    - Pets

During the 2014-2015 HPAI outbreak, USDA developed six biosecurity steps to help keep flocks safe. It is still critical to practice these steps today:

1. Keep your distance.

2. Keep it clean.

3. Don't haul disease home.

4. Don't borrow disease from your neighbor.

5. Know the warning signs of infectious diseases

- Extreme drop in water intake (perhaps the first indication that something is wrong).
- Unusual quietness within the flock (little or no normal vocalization or sound level).
- Coughing, sneezing, watery eyes, nasal discharge and gasping for breath.
- Purple discoloration of the wattles, comb and legs.
- Swelling around the eyes, neck and head.
- Lethargy, huddling, depression and decreased feed intake.
- Green or watery diarrhea.
- Drop in egg production and/or increase in soft- or thin-shelled and misshapen eggs.
- Rapid and unexplained increase in mortality.

6. Report sick birds

For commercial poultry growers, contact:

- Your service technician or live production manager.

For backyard flock keepers, contact:

- Your local county Extension agent.
- Your local veterinarian.
- Tennessee State University Extension poultry specialist (615-963-5823).
- University of Tennessee Extension poultry specialist (931-486-2129).
- Tennessee Department of Agriculture Poultry Program Coordinator (615-361-4997).
- C. E. Kord Animal Health Diagnostic Laboratory (615-837-5125).
- Tennessee State Veterinarian's office (615-837-5120).

Your local county agent or veterinarian may not be a chicken person, but they will know how to get you in touch with folks that are chicken people. Much of biosecurity is simple common sense, especially if you have spent much time around chickens. If you are new to chickens, biosecurity is one of the first things you need to learn. There are three components to a good biosecurity program, and all are critical to protecting your flock…**isolation, traffic control, and sanitation**. You must practice all three to have a good biosecurity program. Otherwise, you are putting your flock at a greater risk of disease. If you frequent locations other poultry growers frequent (the parts store, poultry supply store, feed store or co-op, local coffee shop or café, etc.), you should take a shower and change clothes and boots when you get home *before* you go check the chickens. Don't track something you picked up in town back to your flock. Keep a visitor's log of everyone that has been around your birds. For the best protection of your flock, that logbook should have very few names in it. The greater the traffic flow around your birds, the greater the disease risk. Clean and disinfect everything and everyone. Use hand sanitizer and footbaths. Dedicate boots in each control room that are

only worn inside the chicken house or use disposable boots in each house and change boots between houses. Do not track something inside that you may have picked up walking between houses. Remember, the virus is in the manure of infected birds. If you unknowingly walk through HPAI infected manure and track it into the poultry house, you have put HPAI in the house, and it will spread from there. Developing, maintaining, and constantly improving a proper biosecurity plan for your farm as a preventative against HPAI will be much less expensive and less stressful and will require less time and labor than dealing with an avian influenza break. Biosecurity is not a sure-fire, ironclad, 100 percent guarantee that your flock will not get avian influenza, but for now, it's the best defense we have.

Summary

Avian influenza continues to threaten commercial and backyard poultry flocks across the country. Commercial table egg and turkey flocks appear most at risk, although, the threat extends to commercial broiler breeder, broiler, duck, and backyard flocks as well. Multiple companies are working on an avian influenza vaccine. However, large-scale avian influenza vaccination is currently not an option and would require USDA authorization. That means **biosecurity remains our best defense against avian influenza breaks in our flocks**. Biosecurity does require additional effort on the part of the producer, and it must be practiced every single time you visit your flock. It only takes a breach in biosecurity one time to expose your flock to avian influenza. The extra time and effort to practice good biosecurity…isolation…traffic control…sanitation, is nothing compared to the additional work, time, money and stress associated with an avian influenza break.

Follow the biosecurity steps listed above each time you visit your flock. Know who to call for assistance and get help immediately if you notice clinical signs of avian influenza or other infectious disease in your flock. Or, if you notice, as my poultry veterinarian friend Dustan Clark at the University of Arkansas would say, that your birds suddenly just "ain't doing right." You know your flock better than anyone, so watch them closely for anything out of the ordinary. Do not wait for things to worsen…seek help immediately if something is wrong. Avian influenza will continue to threaten U.S. poultry flocks into the foreseeable future. We are nowhere near out of the woods just yet, and with the start of the 2025 Chick Chain season across Tennessee and much of the rest of the country and spring waterfowl migration season back north just around the corner, biosecurity is more critical than ever. Remain vigilant and take all necessary precautions to keep your commercial, backyard and Chick Chain flocks safe.

UTIA.TENNESSEE.EDU

Real. Life. Solutions.™

D 236 01/25 Programs in agriculture and natural resources, 4-H youth development, family and consumer sciences, and resource development. University of Tennessee Institute of Agriculture, U.S. Department of Agriculture and county governments cooperating. UT Extension provides equal opportunities in programs and employment.