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Poultry Extension Collaborative newsletter

A collaboration between Purdue University, University of Arkansas, University of Georgia, and Virginia Tech

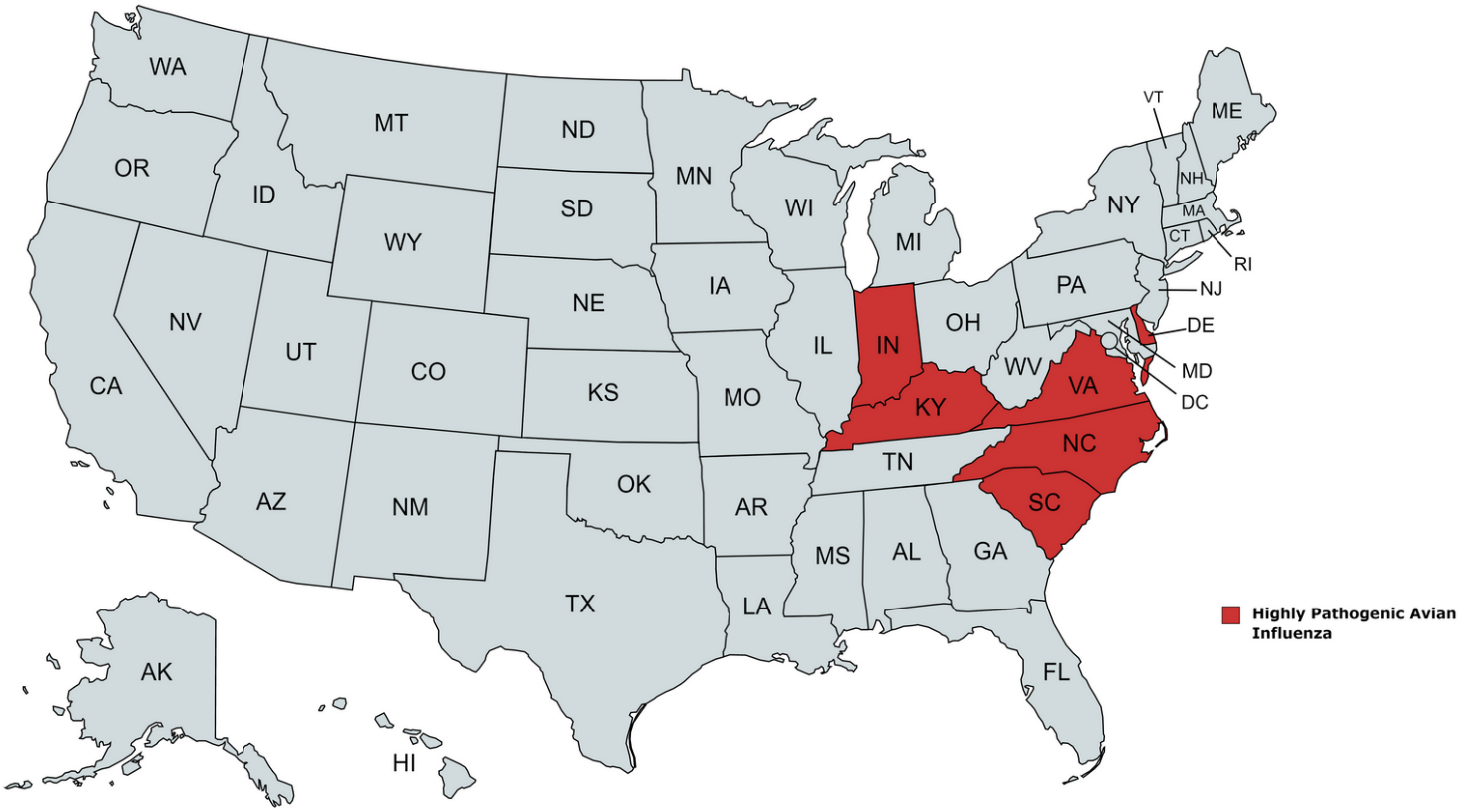


Figure 1. U.S. States with confirmed HPAI cases in February 2022. Map created with MapChart

Extension collaborative for the poultry industry

- About the virus
- Clinical signs
- Virus transmission
- Prevention
- Reporting requirement
- Wild and domestic birds

Avian Influenza

A highly pathogenic strain of Avian Influenza (sometimes called bird flu) is currently spreading across the United States. The virus has been detected in six States since January 2022 (see Figure 1).

Authors: Dr. Marisa Erasmus, Purdue University
Dr. Leonie Jacobs, Virginia Tech
Dr. Prafulla Regmi, University of Georgia
Dr. Shawna Weimer, University of Arkansas

Avian influenza: about the virus

Avian influenza (**AI**) is an infection caused by Type A influenza viruses that are capable of causing at least 75% mortality in poultry.

Avian influenza viruses fall under the family of Orthomyxoviridae, which is the same family as the swine flu virus and the virus that cause seasonal flu in humans. These viruses carry specific proteins on their surface – hemagglutinin (HA) and neuraminidase (NA).

Sixteen HA and 9 NA subtypes have been identified so far and the nomenclature (naming) of a virus strain is based on the type of HA and NA they possess.

Photo: Leonie Jacobs

Low-Path and High-Path

AI viruses are classified by their **pathogenicity (low or high)**, this is the ability of a particular virus strain to produce disease in domestic poultry.

The replication of low-pathogenic avian influenza (**LPAI**) only occurs locally whereas HPAI can replicate systemically, which means it affects the entire body rather than a single organ or body part. LPAI generally does not cause mortality but can cause respiratory disease and/or drop in egg production.

- **HPAI**: causes at least 75% mortality in 4-8 wk old chickens
- **LPAI**: causes no significant mortality but some signs of disease in domestic poultry

Highly pathogenic avian influenza is a notifiable disease which means that by law, HPAI has to be reported to appropriate government authorities. Animal health professionals are required to report HPAI to their state animal health official and the United States Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS)

Did you know?

Avian Influenza is not a new disease and has been around for over 100 years.

How does Avian Influenza spread?

- **Through contact with contaminated objects or surfaces**

For example, if a person wears boots that have contaminated feces on them, then their boots can carry the virus particles to other areas where birds may come into contact with the virus.

- **Through contact with respiratory droplets or feces of infected birds in the air**

Virus particles can be present in the air from carriers that defecate, exhale, sneeze, or cough. These droplets can carry and transmit the virus, infecting other birds or people that inhale virus particles.

Early detection of HPAI: we can hear it coming

Fast onset and lack of clear clinical signs make HPAI outbreaks very challenging to control, and as a result it is difficult to prevent transmission between flocks. Early detection can help producers and public health officials to plan for mass depopulation of infected flocks and promptly set up quarantine zones.

New research has shown that early detection of avian influenza infection is possible with the help of technology.

Images from thermal cameras have been observed to detect fever response during HPAI infection at least 24 hours before the clinical symptoms are exhibited.

Similarly, vocal analysis with machine learning can detect avian influenza, infectious bronchitis, and Newcastle disease infections by an accuracy of over 90%.

Albeit experimental at this stage, technology should be explored further so that early detection is feasible in a real life setting.

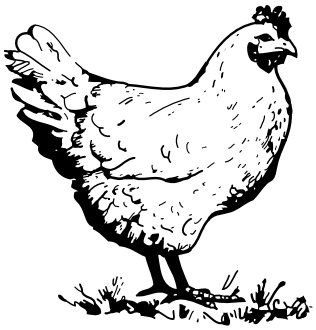
Consequences of Avian Influenza

Highly pathogenic avian influenza (**HPAI**) can have severe economic consequences, causing financial losses due to lost poultry products, supply chain disruptions and costs associated with disease containment and control. Therefore, it is important that HPAI cases are detected and reported early.

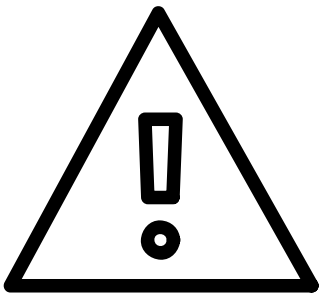
Some highly pathogenic strains of Avian Influenza are **zoonotic**, meaning the virus can infect both humans and birds. Zoonotic pathogens can cause disease in animals and humans and can be transmitted between both. Although uncommon, infections with the virus in humans can be caused by direct transmission from birds.

Avian influenza can have severe consequences for animal health and animal welfare. Some types of birds develop severe disease, whereas other types of birds serve as hosts of the virus without developing symptoms, but this depends on the specific virus subtype.

Clinical signs of HPAI



- Swelling of the head, eyelids, comb, wattles, and hocks
- Purple discoloration of the wattles, combs, and legs
- Nasal discharge
- Coughing, sneezing
- Lack of coordination
- Less active than typical
- Diarrhea
- Egg laying birds may experience a drop in egg production or eggs that are misshapen or soft-shelled



All poultry owners should report sick birds or unusual bird deaths to State/Federal officials, either through their state veterinarian or through USDA's toll-free number at 1-866-536-7593.

Prevention: biosecurity is key

TIP!

USDA checklists, videos and other tools for biosecurity can be found here

Biosecurity is important at any level of poultry farming, for both humans and the birds. Biosecurity includes preventative measures to keep diseases at bay (nothing comes **IN**), reduce the transmission of diseases to other flocks (nothing goes **OUT**), and promote human health by reducing zoonotic pathogens.

Tips for biosecurity

- Consider a certified seller when purchasing new birds. NPIP-certified sellers have their flocks tested for specific viruses and bacteria such as avian influenza and salmonella. These sellers are listed by state here (IN)
- Vaccinate against common diseases to promote immunity (IN and OUT)
- Quarantine new additions for 2-4 weeks to ensure new birds are healthy (IN)
- Wash hands before handling poultry (IN) and after handling poultry (OUT)
- Reduce the chance of pest infestation by properly storing food in enclosed containers and clean up feces and diseased birds (IN)
- Discourage wild birds from coming close (no bird feeders, bird baths, access to ponds) (IN)
- Avoid contact with other poultry flocks that are not your own (IN and OUT)
- Visitors to your flock should be 3-day poultry and swine free (no contact with birds or swine) (IN)
- Use designated shoes and clothing when interacting with your flock (IN and OUT)
- Clean and disinfect equipment, tools and housing (bleach ¾ cup to 1 gallon of water). Cleaning alone will reduce 80-85% of microorganisms. (OUT)

NPIP certified sellers of poultry can ensure birds are tested for specific viruses or bacteria

Can humans get sick from eating products from poultry with avian influenza?

Poultry products do not spread avian flu, and cooking poultry products to 165F kills illness-causing germs

Wild birds and avian influenza

Some birds are **carriers** of avian flu, which means they can spread the virus but they may not get sick from the virus. Over 100 species of wild birds can carry influenza viruses.

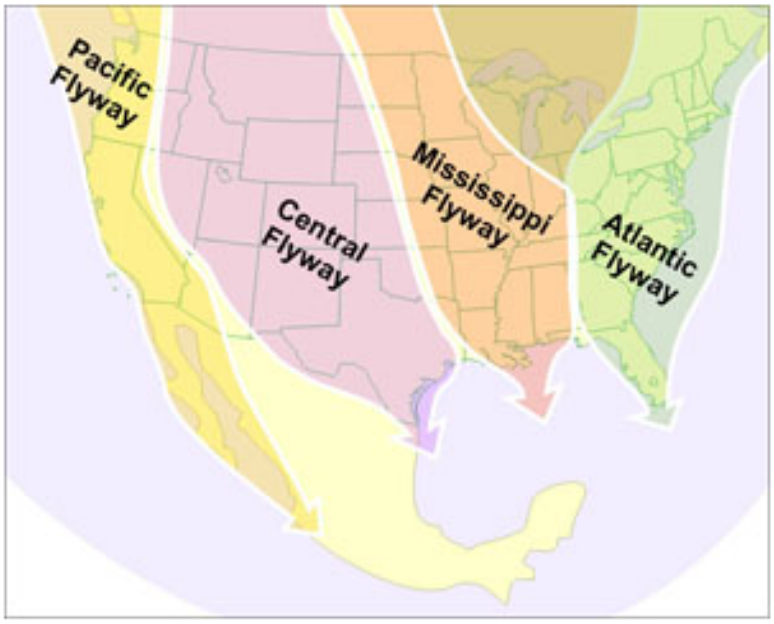
Wild waterfowl (ducks, geese and swans) and shore birds are considered to be the natural hosts of avian influenza, and serve as reservoirs of the virus.

These types of birds spend a lot of time moving between different locations, including longer distance movements through migration, which may provide chances for the birds to come into contact with the virus and spread the virus.

Most avian influenza viruses detected in wild waterfowl are LPAI viruses.

Waterfowl are considered natural hosts of avian influenza (images: Pixabay)

North American Flyways



Map Source: U.S. Fish and Wildlife Service

Migratory birds follow routes, called flyways, to and from their northern breeding grounds in the summer and southern grounds in the winter. There are four major flyways in North America: Pacific, Central, Mississippi, and Atlantic.

The USDA-APHIS maintains a wild bird surveillance program that tests large numbers of wild birds in the North American flyways. It is common for wild birds to test positive for avian influenza because the virus can be freely transmitted amongst populations without any signs of illness.

Which domestic birds can get avian influenza?

Domestic poultry, including turkeys, chickens, ducks, geese, quail and pheasants, can all become infected with avian influenza, but they do not all respond to the virus in the same way.

For example, in chickens, disease can spread very rapidly, resulting in rapid death without overt symptoms depending on the specific virus subtype.

In other species, such as ducks and geese, certain avian flu subtypes cause neurological symptoms (for example, slow movement and tremors) before death occurs, whereas other avian flu subtypes may not cause any symptoms in ducks.

Domestic poultry can be infected with avian influenza (images: Pixabay)

Sources and additional resources

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- USDA resources on best biosecurity practices.
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