Highly Pathogenic Avian Influenza and North American Wild Birds: Frequently Asked Questions

Provided by the Interagency Steering Committee for Surveillance for Highly Pathogenic Avian Influenza in Wild Birds:

USDA, Animal and Plant Health Inspection Service
U.S. Geological Survey
U.S. Fish and Wildlife Service
Centers for Disease Control and Prevention
National Flyway Council

1. Why is there concern about avian influenza in wild birds?

During 2015, highly pathogenic avian influenza (HPAI) virus, subtype H5N2 was associated with a large domestic poultry outbreak in North America that affected over 49 million domestic birds. This outbreak was the most costly animal health emergency in the U.S. Department of Agriculture's history.

The spread of HPAI in commercial poultry and backyard flocks in 2014-2015 cost approximately $1 billion and required the expertise of thousands of state and federal government employees, contractors and industry partners.

While domestic poultry were the primary species affected, this virus was also detected in wild birds and was associated with mortality in some species. Prior to the poultry outbreaks during December 2014, three HPAI H5 viruses were detected in wild waterfowl in association with a mortality event in Washington State. An H5N2 subtype was subsequently also detected in wild birds during 2015.

For wild birds, a total of 98 HPAI positives were detected between December 2014 and June 2015 from a total of 7,084 samples. The majority of these were hunter-harvested waterfowl collected in the Pacific Flyway, but 16 HPAI positives were associated with three wild bird mortality events involving snow geese (*Chen caerulescens*) and ringed-necked ducks (*Aythya collaris*) in the Mississippi Flyway. Seven captive raptors were also reported to have died from these viruses after being fed meat from infected wild waterfowl.

Although experts agree that wild birds and other wildlife can carry and spread avian influenza viruses in the environment, little is known about the role wildlife plays in spreading the disease to domestic poultry.

2. What are the different types of avian influenza?

Avian influenza (AI) is a disease in birds caused by influenza type A viruses. These viruses are endemic in some wild birds (such as wild ducks, swans, geese, shorebirds, and gulls) and can infect domestic poultry (such as chickens, turkeys, pheasants, quail, domestic ducks, geese, and guinea fowl).

Influenza type A viruses are divided into subtypes based on two proteins on the surface of the virus. These proteins are called hemagglutinin (HA), of which there are 16 (H1-H16), and neuraminidase (NA), of which there are 9 (N1-N9). There are 16 different HA subtypes and 9 different NA subtypes. Many different combinations of HA and NA proteins are possible (i.e., H5N1, H5N2, H7N2, H7N8, etc.)

AI viruses are also classified into two groups based upon the ability of a particular virus strain to produce disease in chickens: highly pathogenic avian influenza (HPAI) or low pathogenic avian influenza (LPAI).

- HPAI viruses cause high mortality in poultry and occasionally high death rates in certain species of wild birds.
- LPAI viruses can cause a variety of outcomes in poultry ranging from no apparent clinical signs to moderate death rates. LPAI viruses usually cause little to no signs in wild birds.

H5 and H7 LPAI viruses have the potential to mutate or evolve into HPAI viruses and are therefore closely monitored by animal health officials.

3. What do we know about avian influenza in wild birds?

The majority of AI viruses naturally found in wild birds do not consist of H5 or H7 subtypes. While these viruses are not officially classified as LPAI or HPAI, they can exchange their genetic material with LPAI and HPAI viruses to create new strains of pathogenic viruses.

Wild waterfowl are often infected with AI viruses and do not usually show signs of disease.

When wild birds are infected with an HPAI virus, it may cause significant disease depending on the specific virus and species it infects. However, the detection of Eurasian H5 HPAI in apparently healthy hunter-harvested wild ducks indicates that they can be actively infected and shedding virus without exhibiting obvious signs of illness.

Active infection of Eurasian H5 HPAI has been confirmed in multiple Canada geese and has been associated with clinical signs (e.g., swimming in circles, twisted necks, tremors) prior to death. Some raptor species (hawks, falcons, eagles and owls) appear to be highly vulnerable to Eurasian H5 HPAI virus infection. Raptor species from which HPAI has been detected include red-tailed hawk (*Buteo jamaicensis*), Cooper's hawk (*Accipiter cooperii*), captive gyrfalcons (*Falco rusticolus*), peregrine falcon (*F. peregrinus*), captive great-horned owl (*Bubo virginianus*), snowy owl (*B. scandiacus*), and bald eagle (*Haliaeetus leucocephalus*).

Testing sick and dead raptors during the 2014-2015 outbreak identified Eurasian H5 HPAI infection as causing or contributing to their deaths. However, it is not yet clear whether HPAI-infected raptors have a high disease mortality rate (that is, the number of infected raptors that die from HPAI compared to number of raptors at risk).

4. How is avian influenza spread?

State and federal government experts continue to evaluate how HPAI viruses can spread and impact wild and domestic birds.

The global spread of HPAI H5N8 has been driven in large part by migratory waterfowl. Knowledge about migratory patterns and intercontinental associations of waterfowl, as well as genetic analyses of viral strains support the hypothesis that HPAI H5N8 entered North America from Asia via migratory birds.

Wild waterfowl and other species shed the virus into the environment through their oral and nasal secretions and feces.

5. Can wild birds spread avian influenza to domestic poultry?

Although it is possible for domestic poultry to become infected with AI from direct contact with wild birds, it is more likely that AI viruses are spread indirectly to poultry on contaminated feed, clothing and equipment.

Agricultural agencies encourage producers to prevent wild birds and other wildlife from coming into direct contact with their poultry, as well as wild bird fecal material and secretions from being accidentally transported on boots, equipment, and feed to their birds.

6. Can avian influenza affect people?

While rare, human infections with avian influenza viruses have occurred. The Centers for Disease Control and Prevention considers the risk to the general public from HPAI H5 infections in wild birds, backyard flocks, and commercial poultry, to be low.

To date, no humans or other mammals have shown signs of disease from the HPAI viruses found in North America but field personnel handling live or dead wild birds should take appropriate precautions including wearing protective clothing when handling sick wildlife or potentially diseased wildlife or carcasses.

7. What avian influenza surveillance has been done in wild birds?

In an effort to learn more about the impacts of HPAI on wild birds and the role wild birds may play in the spread of the virus, experts from the U.S. Department of Agriculture, U.S. Department of the Interior, and state natural resources/conservation departments are gathering samples from live-captured and hunter-harvested dabbling ducks, as well as from morbidity and mortality events of all wild bird species.

Between December 2014 and June 2015, HPAI was confirmed in wild birds in California, Idaho, Kansas, Kentucky, Minnesota, Missouri, Nevada, Oregon, Utah, Washington, Wisconsin and Wyoming. Additionally, there was evidence of HPAI H5 genetic material from a wild waterfowl sample collected in New Mexico.

Between July 2015 to March 2016, state and federal agencies tested more than 45,000 apparently healthy wild birds for avian influenza in targeted areas throughout the United States. Only two of these samples tested positive for the presence of HPAI genetic material, and neither of these was confirmed positive. Details regarding wild bird HPAI detections are available on the USDA website (December 2014-June 2015, July 2015-June 2016). State and federal scientists continue to monitor for HPAI viruses through the Interagency National Avian Influenza Surveillance Program. Between July 2016 and June 2017 state and federal agencies will test more than 30,000 apparently healthy wild birds for avian influenza in targeted areas throughout the United States.

Wildlife managers should continue to be alert for morbidity and mortality in wild birds and immediately report observations to state or federal wildlife health professionals.

Wildlife management agencies that investigate morbidity and mortality events independently or in collaboration with other diagnostic laboratories are strongly encouraged to report these events to the USGS National Wildlife Health Center using this reporting form so that information can be captured on a national scale and displayed on WHISPers, a wildlife health information sharing website, to increase situational awareness.

Continued surveillance for HPAI in wild birds will facilitate early detection, situational awareness, and appropriate response to these viruses.

Wild bird surveillance, in particular the investigation of wild bird mortality events, provides an important early detection mechanism that alerts agencies and producers to the presence of viruses of concern in the environment.

When initial detections in wild birds occur, federal agencies work with state natural resource/conservation departments to conduct enhanced morbidity/mortality and hunter-harvest surveillance in wild birds.

8. What is the latest avian influenza research?

Because of HPAI's devastating impacts on poultry and its potential impacts on wild birds, experts are studying how HPAI viruses evolve and spread among species and the environment.

Scientists are studying:

- primary influenza virus transmission routes in natural hosts
- phylogenetics and evolution of AI viruses
- the role wildlife species (such as small birds and mammals) living near people play in moving AI viruses within and between poultry operations
- the role wild birds and other wildlife play in the long-distance intercontinental movement of AI viruses

9. How can I learn more?

The U.S. Interagency Strategic Plan for Early Detection and Monitoring for Avian Influenzas of Significance in Wild Birds describes a unified national system for migratory wild bird sampling involving Federal, State, university and non-governmental organizations. The 2015 Surveillance Plan for Highly Pathogenic Avian Influenza in Waterfowl in the United States outlines the specific wild bird surveillance efforts for 2015-2016. Both plans were written by the Interagency Steering Committee for Surveillance for HPAI in Wild Birds. This committee is comprised of experts from USDA-APHIS Wildlife Services and Veterinary Services, U.S. Geological Survey, U.S. Fish and Wildlife Service, Centers for Disease Control and Prevention, and the National Flyway Council.

Useful Links

- Avian Influenza Guidance for Hunters Factsheet
- Biosecurity and Wild Birds
- California Department of Fish and Wildlife, Avian Influenza
- Centers for Disease Control and Prevention, Information on Avian Influenza
- Hunter Wallet Card
- Indiana Department of Natural Resources, Avian Flu
- Minnesota Department of Natural Resources, Avian Influenza
- Prevent Avian Influenza at Your Farm: Improve Your Biosecurity with Simple Wildlife Management Practices
- The Cornell Lab of Ornithology, Bird Flu

- U.S. Fish and Wildlife Service, Highly Pathogenic Avian Influenza
- USGS Alaska Science Center, Avian Influenza Overview
- USGS National Wildlife Health Center
    - WHISPers
    - Wildlife Health Bulletins
    - AI page
- USGS Role and Response to Highly Pathogenic Avian Influenza

Relevant Publications

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