



THE NORTHEAST WILDLIFE DISEASE COOPERATIVE

<http://sites.tufts.edu/nwdc>

Avian Influenza

Other Names: Bird Flu, Fowl Plague, Fowl Pest, Avian Flu, Type A Influenza

Cause

Avian influenza (AI) is caused by various strains of the influenza A virus. There are many different strains of avian influenza that are divided into 2 categories based on the severity of disease they cause in poultry. Low Pathogenic Avian Influenzas (LPAI) cause only mild clinical disease, while Highly Pathogenic Avian Influenzas (HPAI) cause more severe clinical disease and spread more rapidly. LPAI strains are capable of mutating into HPAI strains. Wild birds, especially shorebirds and waterfowl, are often naturally infected with LPAI viruses with no apparent disease.

Significance

Humans may contract the virus by coming in contact with infected poultry or inert objects contaminated by infected birds. People who handle wild birds may also be at risk of being exposed to the virus. Hunters should take certain precautions such as wearing gloves when handling and cleaning game birds, washing hands, and cooking meat thoroughly (to a temperature of at least 165° F).

Highly pathogenic strains of AI can cause pandemics, but to become a pandemic virus, an LP virus must first mutate to an HP virus. It then must exchange genetic material with a human influenza (HI) virus in order to infect humans. Finally, it must adapt to the upper respiratory tract of humans in order to spread rapidly. AI H5N1 is a highly pathogenic strain of avian influenza that originated in Asia and is now endemic in this area. H5N1 is not known to readily transmit from human to human, but it has the potential to evolve to do so. At

this time, no strains of HPAI are thought to be ready to become pandemic viruses.

Highly pathogenic strains are of great concern to domestic poultry producers. In December of 2014, AI (H5N2) was reported in a flock of backyard turkeys in British Columbia, Canada and wild waterfowl in Washington State, USA. Since this outbreak, cases of HPAI (H5N2, H5N8, and a new H5N1) have been reported in commercial chickens and turkeys and backyard ducks, chickens, and turkeys in Arkansas, California, Idaho, Indiana, Iowa, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, Oregon, South Dakota, Washington, and Wisconsin. At this point it would appear that the virus has reassorted its genetic material, mixing strains from Eurasia, Korea, and North America. These new strains are found primarily in dabbling ducks, though they do not appear to cause disease in most cases. The role of wild birds in transmission of the viruses to domestic fowl remains unclear. For more information regarding these outbreaks, see the APHIS website at <http://www.aphis.usda.gov/>.



A female wood duck with severe neurological signs from highly pathogenic avian influenza. Photo courtesy of www.cdc.gov

Species Affected

Wild birds are natural reservoirs for all known strains of the avian influenza virus (AIV). Aquatic birds such as waterfowl and shorebirds are most often associated with the virus, but many other wild bird species can be infected. The virus can be transmitted to domestic birds including chickens, turkeys, pheasants, quail, ducks, and geese. Avian influenza is primarily adapted to birds so it is not easily transmitted to mammals. However, pigs, horses, dogs, cats, marine mammals, and humans can rarely become infected. The virus is capable of evolving and some strains can become better adapted to infecting humans or other mammalian hosts.

Distribution

Avian influenza viruses are distributed worldwide and have been isolated on all continents except Antarctica. Waterfowl and shorebirds can carry the disease long distances during their natural migrations. The virus can also spread from country to country by importation of infected birds and bird products. Avian influenza can spread from farm to farm via movement of infected birds or people carrying the virus on their clothing, boots, contaminated equipment, and feed.

H5N1 is a particularly infectious and fatal strain of the virus that was originally reported in China in 2003 and has since spread to the Middle East, Europe, Africa, and Russia. There have been outbreaks of highly pathogenic AI in domestic poultry in the United States, though there have been no recorded outbreaks of AIV in New England.

Transmission

The AI virus reproduces primarily in the intestinal tract of infected birds and is shed in high concentrations in the feces. Wild birds are usually exposed by consuming infected water during normal feeding behaviors. The virus is less commonly shed in saliva and nasal secretions, so coming into contact with these fluids can infect these birds as well. Domestic birds can obtain AIV by coming in contact with a contaminated environment or, less commonly, from coming in direct contact with infected wild birds. The virus can survive for long periods of time in the environment, especially in water at colder temperatures. It can also survive on

straw and animal bedding, equipment, and on clothes and shoes, meaning humans can spread the disease if proper hygiene is not maintained. A recent study has also shown that skunks carry and shed large amounts of the virus and could potentially play a big role in the spread of an AIV outbreak. Humans and other mammals can also become infected following direct contact with infected wild or domestic birds or contaminated materials. Human to human transmission of AIV is unlikely.

Clinical Signs

Wild birds usually show no clinical signs when infected with LPAI. HPAI strains are more likely to cause clinical disease. Signs of HPAI in wild birds include respiratory problems such as coughing and sneezing. Neurologic signs may also be observed. Different species of wild birds vary in susceptibility to infection and may show a variety of clinical signs depending on which organ systems are affected.

HPAI strains are highly infectious and fatal in domestic birds. They experience acute disease characterized by hemorrhage, depression, rapid progression of disease, and high mortality rates.

Diagnosis

Clinical signs and post mortem lesions may lead to suspicion of AI, but a definitive diagnosis is reached by virus isolation or other laboratory tests. Genetic characterization of the strain is an important part of the diagnosis.

Treatment

There is no treatment for AIV in wild birds.

Management/Prevention

Avian influenza is a major threat to domestic poultry flocks, so the United States conducts continuous surveillance for this disease in domestic and wild birds. Migratory wild bird populations are monitored by testing live birds, hunter killed birds, and the environment for the presence of AI virus. To help prevent the spread of this virus, domestic birds should not come in contact with wild birds or any surfaces that have been contaminated by feces or secretions of wild birds. Poultry producers must implement strict

biosecurity measures to prevent AIV from infecting their flocks. Avian influenza occurs naturally in wild birds and usually does not result in clinical disease, so there are currently no methods to control AIV in wild populations and vaccination of wild birds is not considered an effective preventative measure.

Suggested Reading

Avian Flu. Pennsylvania Department of Health.
www.portal.state.pa.us/portal/server.pt/community/pandemic/14146/what_is_avian_influenza_%28bird_flu%29_/558008

Avian Influenza. General Disease Information Sheets. OIE: World Organisation for Animal Health.
www.oie.int/en/animal-health-in-the-world/disease-information-summaries

Avian Influenza Surveillance of Wild Birds. United States Geological Survey.
www.nwhc.usgs.gov/disease_information/avian_influenza/index.jsp

Centers for Disease Control and Prevention (CDC). Avian Influenza (Bird Flu).
www.cdc.gov/flu/avianflu/

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Van Campen, H., and G. Early. 2001. Orthomyxovirus and paramyxovirus infections. Pages 271-279 in E. S. Williams and I. K. Barker, editors. Infectious diseases of wild mammals. Iowa State University Press, Ames, Iowa, USA.

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<http://goo.gl/3LPD7A>