

BIRD FLU H5N1 – IS THERE A RISK TO PUBLIC HEALTH?

Situation:

On January 7, 2025, the first human patient diagnosed with H5N1 died, raising concerns for the general public. The patient was confirmed infected on December 18, 2024, through routine surveillance when they were hospitalized with severe respiratory illness. The patient was 65 years old with underlying health conditions and appeared to have been infected from exposure to backyard poultry and wild birds.

First, the CDC still maintains that the risk to the general public remains low. They do, however, caution those that come into contact with wild birds, poultry, or dairy cows that they are at a higher risk. The CDC is providing information for those potentially exposed to H5N1 birds - <https://www.cdc.gov/bird-flu/prevention/farm-workers.html>. For such people Personal Protection Equipment (PPE) is recommended. The CDC also provides flyers on the proper use of PPE, found at the same website. The information is available in both English and Spanish.

Background material:

H5N1 is an influenza virus that primarily affects birds but in the last couple of years has started to affect mammals, including dairy cows. In 2024 there were 66 confirmed human cases of H5N1 in the USA, although there have been many more globally. Of these 66 cases, 40 were work-related to exposure (to dairy cows). The highest incidence of human infections has been confirmed in California (37), Washington (11), and Colorado (10). There have also been two confirmed cases in Michigan and one each in Iowa, Louisiana, Missouri, Oregon, Texas, and Wisconsin.

Symptoms of H5N1:

A December 2024 article from the New England Journal of Medicine¹ described 46 human cases of H5N1 confirmed between March through October 2024. The cases were primarily due to exposure to infected poultry (20) or infected dairy cows (25). One had no identified exposure and was hospitalized with non-respiratory systems and the H5N1 confirmed through routine surveillance. None of the other patients were hospitalized. Of these, 93% had conjunctivitis (pinkeye), 49% had a fever, and 36% had respiratory symptoms only. The median duration of the illness for which they have data (16 patients) was 4 days. Most patients (87%) received oseltamivir (Tamiflu). There has been no known person-to-person transmission.

From the CDC - symptoms can include:

- Eye redness and irritation (conjunctivitis)
- Fever (temperature of 100°F [37.8°C] or greater) or feeling feverish
- Cough
- Sore throat
- Runny or stuffy nose
- Muscle or body aches
- Headaches

¹ Garg, S. et al. 2024. Highly Pathogenic Avian Influenza A (H5N1) virus infections in humans. The New England Journal of Medicine. Published December 31, 2024, and available online at <https://www.nejm.org/doi/pdf/10.1056/NEJMoa2414610>

- Fatigue
- Shortness of breath or difficulty breathing
- Less common signs and symptoms include diarrhea, nausea, vomiting, or seizures.

Should there be a concern?

While the Louisiana patient is the only severe case of H5N1 in the USA, a Canadian case occurred in November 2024². The case involved a 13-year-old girl who was overweight and had mild asthma. She went to the hospital with a case of conjunctivitis in both eyes and a day-old fever. She was discharged without treatment but returned a few days later with a cough, vomiting and diarrhea and was in respiratory distress and acute kidney injury. She was treated with oseltamivir and recovered.

Genomic testing of the H5N1 virus obtained from both patients showed important mutations that lead to the respiratory symptoms. The mutation in the H5 hemagglutinin (the ‘H’ in the H5N1 designation) gene resulted in increased binding to a receptor that facilitates virus entry into cells in the human respiratory tract and enabled viral replication. The pre-mutation virus was not able to enter cells in the human respiratory tract. The mutation occurred in the patient, but no person-to-person transmission was observed.

As a follow up to the previous articles, an editorial published in The New England Journal of Medicine³ concluded that the CDC still designates the public risk of H5N1 is low and we have candidate vaccines and antivirals available to try to mitigate severe influenza in the case of wider spread. The influenza A virus is highly susceptible to mutations. There is concern for changes to the HA gene resulting in increased binding to the human airway receptors and a need for increased gene testing during surveillance has been recommended.

Conclusions:

Anyone who comes into contact with wild birds, poultry, dairy cows and other mammals should use proper personal protection equipment – gloves and mask at a minimum. Report any sick or dead wild birds using the Kentucky Department of Fish and Wildlife. Call 1-800-858-1549 from 8:00 AM to 4:30 PM (Eastern) on weekdays. Poultry owners who think their birds are sick please immediately call the Kentucky Sick Bird Hotline at 866-536-7593. This hotline is available for bird owners in Kentucky who are dealing with unusual signs of illness or increased mortality in their flock or livestock.

Additional resources:

- KDA's Factsheet: Avian Influenza in Kentucky – Information for bird owners - https://www.kyagr.com/statevet/documents/HPAI_Avian_Influenza_HANDOUT.pdf
- KY Fish and Wildlife avian influenza webpage - <https://fw.ky.gov/Wildlife/Pages/AvianInfluenza.aspx>

² Correspondence: Critical illness in an adolescent with Influenza A (H5N1) virus infection. The New England Journal of Medicine. Published December 31, 2024, and available online at <https://www.nejm.org/doi/pdf/10.1056/NEJMc2415890>

³ Ison, M.G. and J. Marrazzo. 2024. Editorial: The emerging threat of H5N1 to human health. The New England Journal of Medicine. Published December 31, 2024, and available online at <https://www.nejm.org/doi/pdf/10.1056/NEJMe2416323>