

Bird Flu: also known as H5N1, highly pathogenic avian influenza or HPAI
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Lake Erie Advocates meeting Jan. 22, 2025

- 1) HPAI infects birds (like poultry) and mammals (like cows, cats, mice)
 - a. Humans are currently sporadically infected
 - i. No person-person spread documented yet**
 1. But the close contact with millions of sick, infected animals increases the risk of viral mutations occurring that could result in human-human spread
 - a. Also, the use of employees that may want to decline public health monitoring may make this harder to track if/when spread begins to occur
 2. Hard to get a handle currently on the number of infections nationwide
 3. From the CDC website
 - a. “CDC and state and local health departments monitor people exposed to infected birds, poultry, dairy cows and other animals for 10 days after exposure. Between March 24, 2024, and now” (January 11, 2025)
 - i. 12,700 people monitored
 1. 8,100 with exposures to dairy cows
 2. 4,600 with exposures to birds and other animals including poultry (non-dairy cow source)
 - ii. As of Jan 7, 66 cases in the US with 1 death – most of the exposures are through cows > chickens – and no human to human spread reported at this time
 1. External reporting of public health information is paused effective 1/21/2025 – 2/1/2025 per the acting head of HHS (barring critical health and safety releases)
 - iii. Ohio division of wildlife concerned that 15 dead geese in BG may have had HPAI
 - ii. The last round of HPAI in 2022 did not have person-person spread
- 2) Transmission is through respiratory and GI routes (eating or drinking infected products)
 - a. Incubation period can be up to 10 days
 - b. So if you are exposed to someone/something who is sick, it may take up to 10 day before you show symptoms

3) Clinical manifestations

- a. Upper respiratory tract infections especially with eye symptoms
- b. Pneumonia
- c. Sepsis (which is a very serious infection) and death
 - i. In previous years, case fatality proportions have been >50%

4) Diagnosis

- a. Need to send specimens to the state Department of Health for HPAI testing – the current flu tests on the market are not designed to detect H5N1
 - i. swabs of eyes, noses, and mouths needed

5) Prevention

- a. Don't touch dead/sick birds
- b. Don't drink raw milk
 - i. Viral particles have been detected in pasteurized milk but not infectious virions to date
- c. Seasonal flu vaccine does not protect against H5N1
 - i. When flu vaccines are developed, they are aimed against specific Hs and Ns and the seasonal flu vaccine protects against the following
 - 1. One H1N1, one H3N2, one influenza B/Victoria lineage and (previously) one influenza B/Yamagata lineage
 - ii. WHO has in place several H5N1 “candidate vaccine viruses” that are ready to use for development for HPAI if human-human spread occurs (should be <6 months to get shots-in-arms)
 - 1. The US is withdrawing from WHO effective January 20, 2025 – not sure how this will impact our flu vaccine development
<https://www.whitehouse.gov/presidential-actions/2025/01/withdrawing-the-united-states-from-the-worldhealth-organization/>
 - iii. But the Holy Grail of flu research is a one-and-done universal vaccine
- d. N95 airborne precautions (these are special masks that filter out viruses) with eye shields



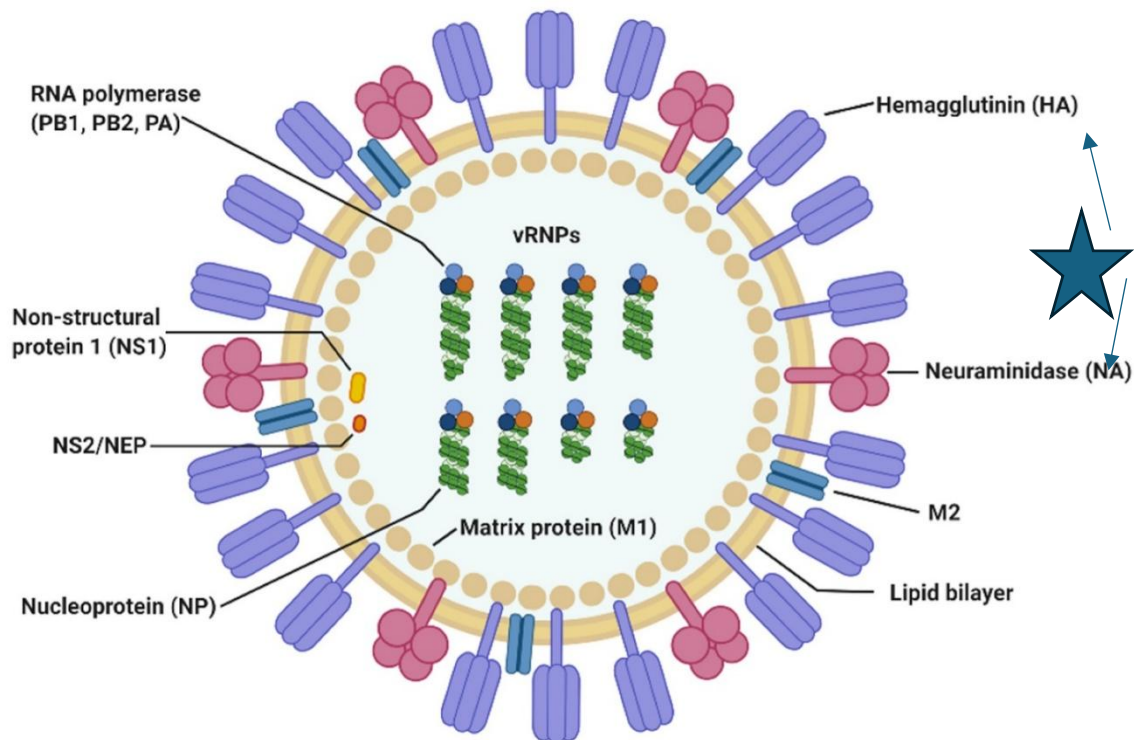
e.

6) Treatment

- a. Oseltamavir (Tamiflu) is effective for treatment and PEP

7) Updates are not currently available due to Presidential Executive Order ceasing all public announcements from CDC.

- a. <https://www.cdc.gov/bird-flu/situation-summary/index.html>



Picture from Wikipedia – influenza A virus

The H and N proteins on the outside of the virus are what your body forms an antibody against – and that is what changes and mutates each season

Two big types of mutations: drift versus shift

1) Antigenic drift

- a. Small mutations in the genes that change the H and the N a little bit – and allow the flu virus to escape (to some extent) the immune system

2) Antigenic shift

- a. These are major changes in the influenza A genes (does not happen with other types of influenza viruses)
- b. This occurs when you have mixing of genes from influenza viruses from different species – specifically pigs – birds – humans**

How can a human pandemic with HPAI get started? Several ways

Step 1) set up crowded conditions where birds, pigs, and humans come in contact with each other

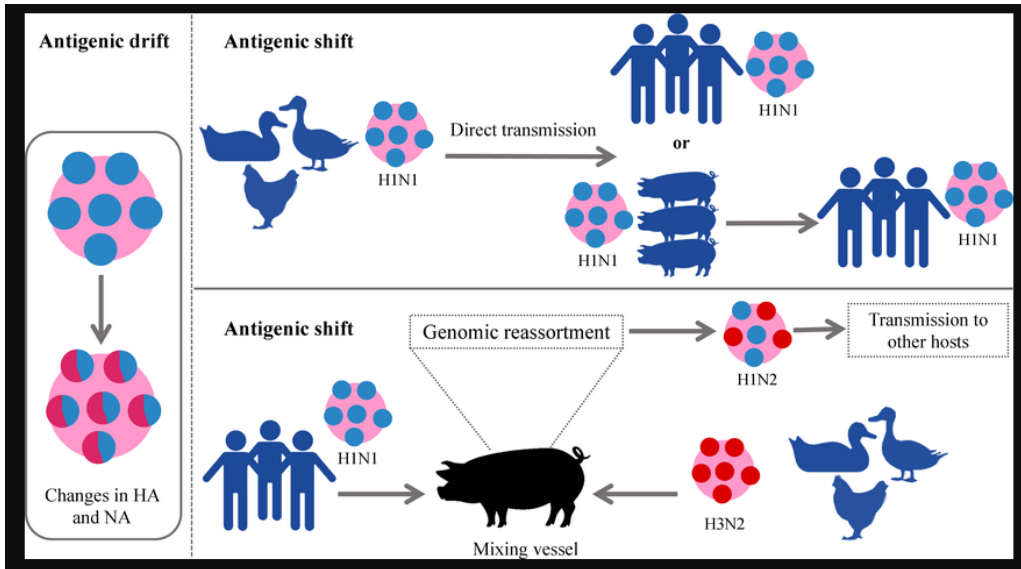
Step 2) a pig picks up a bird flu strain that humans do not have any antibodies against and also a human flu virus that has great spread potential (ie, reproduces beautifully in the nose and throat)

Step 3) the pig (aka –the mixing vessel) gets infected with both viruses – and the viruses undergo genetic reassortment – and a strain is born that has the new bird proteins on the outside that are

new to the human immune system AND also all the old proteins that let the flu strain spread easily from human to human

Step 4) a human gets infected from the mixing vessel (the pig) – infection goes undetected – the human spreads the virus into the community – and (with apologies to George Orwell) it's not 1984 – it's 1918!!!

How can this happen in real life? A pig gets infected by wild birds – or drinks raw milk from an infected cow - on a farm where workers also have human flu in circulation. The pig gets infected with both – and the genes reassortment occurs – and then the spread begins to humans who are in an immunologically “naïve.”



Rcheulishvili, Nino & Papukashvili, Dimitri & Liu, Cong & Ji, Yang & He, Yunjiao & Wang, Peng. (2022). Promising strategy for developing mRNA-based universal influenza virus vaccine for human population, poultry, and pigs– focus on the bigger picture. *Frontiers in Immunology*. 13. 10.3389/fimmu.2022.1025884.



<https://www.independent.co.uk/news/world/europe/pigs-drink-cows-milk-austrian-farm-a7198756.html>

Time Period: January 05 - January 11, 2025

H5 Detection

53 sites (15.8%)

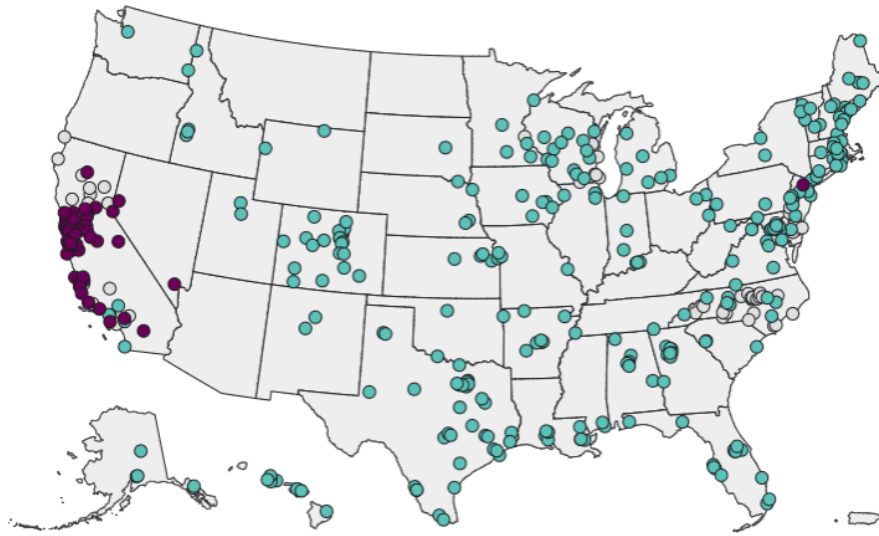
No Detection

282 sites (84.2%)

No samples in last week

61 sites

Click on the legend below to see detections.



Select a detection type below to add or remove it from the map.

H5 Detection No Detection No Samples in Last Week

Data 01/16/2025

Monitoring for HPAI in wastewater – used to be updated every Friday until suspended by President Trump’s Executive Orders January 22, 2025, along with withdrawing from the World Health Organization.

If you are interested in more information on the types of influenza:

There are four types of influenza viruses – A, B, C, and D. Influenza C causes very mild disease so it is essentially ignored. Influenza A >B cause severe disease in humans and are covered in current vaccines. The influenza A viruses are classified by two groups of proteins, hemagglutinins and neuraminidase (H1 to H17 and N1 to N9). Avian flu is usually H5 or H7 subtypes. Spanish flu and swine flu were an H1N1, for example, and Hong Kong flu in 1968-69 was an H3N2. Influenza A is panzoonotic but influenza B is limited to humans only and influenza D is limited to cows. Influenza B viruses are named by lineage (Yamagata or Victoria)