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CDC Avian Influenza A(H5N1) (“H5N1 Bird Flu”) Key Points

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What CDC is Doing about the Situation in the United States

Recent updates as of May 3, 2024:

- CDC continues to respond to the public health challenge posed by a multistate outbreak of avian influenza A(H5N1) virus, or “A(H5N1) virus,” in [dairy cows and other animals in the United States](#). CDC is working in collaboration with the U.S. Department of Agriculture (USDA), the Food and Drug Administration (FDA), state public health and animal health officials, and other partners using a [One Health approach](#).
- Currently, one human case has been confirmed in a person with exposure to presumably infected dairy cows [reported](#) by Texas on April 1, 2024.
- CDC’s response to this outbreak of influenza A(H5N1) virus in dairy cattle and other animals most recently includes:
 - Continuing to support states that are monitoring people with exposure to cows, birds, or other domestic or wild animals infected or potentially infected with avian influenza A(H5N1) viruses. Testing of symptomatic people who have exposures is being done by state or local officials, and CDC is conducting confirmatory testing when needed.
 - Monitoring and testing data are now being [reported](#) and will be updated weekly on Fridays. Since March 2024, at least 220 people have been monitored for A(H5N1) after relevant exposures and at least 30 people have been tested.

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- Having ongoing discussions with multiple states about state-led field investigations to explore key scientific and public health questions related to the ongoing outbreak.
 - CDC is playing a coordinating role with regard to investigation protocols so that data collection can be standardized across states and results can be pooled.
 - In addition, CDC has multilingual and multidisciplinary epidemiological field teams ready to deploy to support on-site studies if requested.
- Continuing work to better characterize the virus from the human case in Texas.
 - Beginning cell and animal laboratory studies, including to:
 - Learn how the virus reproduces in both human and cow respiratory tract epithelial cells and cow mammary epithelial cells.
 - Assess the severity of illness and transmissibility of the virus under different scenarios by infecting ferrets and assessing the outcome. Ferrets are used as a model for people because they get sick and spread influenza viruses in a manner similar to humans.
- Testing human sera (blood) from people previously vaccinated with pre-pandemic A(H5) vaccines during clinical trials to see how their antibodies cross-react to the virus isolated from the human case in Texas.
 - Data to date – including genetic analysis and testing of ferret antisera from multiple clade 2.3.4.4b candidate vaccine viruses (CVVs) – suggest vaccination will offer good cross-protection against cattle outbreak viruses. (The human case in Texas was a 2.3.4.4b virus).
 - Antigenic characterization of the virus isolated from the human case in Texas (A/Texas/37/2024) with ferret antisera produced against existing pre-pandemic CVVs confirmed clade 2.3.4.4b A(H5) CVVs have good cross-reactivity to this virus.
- Engaging with manufacturers of commercial diagnostic tests and clinical partners to make progress toward the goal of having a A(H5N1) test that is widely available for consumers.
- Working so that states can conduct A(H5N1) testing on eye specimens.
 - This week, use of eye swabs with the CDC H5 assay was approved by the CDC Clinical Laboratory Improvement Amendment (CLIA) director for use at CDC, which means results can be reported back for patient care.
 - Originally, the A(H5N1) test was designed for use with respiratory specimens.
- Developing information for health care provider organizations to share with their membership related to the health concerns around consumption of raw milk in the context of the current A(H5N1) outbreak, since A(H5N1) virus fragments have been detected at high levels in raw milk.
 - CDC and FDA recommend against the consumption of raw milk.
 - [Testing at FDA](#) has indicated that pasteurization kills A(H5N1) virus in milk.
- Continuing to engage One Health partner organizations from public health, agriculture, wildlife, milk regulatory officials, and others to share information and ensure preparedness to prevent and respond to this emerging infectious disease threat and for any potential human infections.
- Continuing to monitor flu surveillance data, especially in areas where A(H5N1) viruses have been detected in dairy cattle or other animals, for any unusual trends in flu-like illness, flu, or conjunctivitis.
- CDC maintains a webpage on [How CDC is monitoring influenza data to better understand the current avian influenza A \(H5N1\) situation in people](#) that is updated weekly.

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- CDC flu surveillance systems show no indicators of unusual flu activity in people, including avian influenza A(H5N1) viruses, for the most recent week.
- Past updates on CDC's ongoing work can be found online: [What CDC is Doing to Respond to Bird Flu Outbreaks in Dairy Cows and Other Animals in the United States | Avian Influenza \(Flu\)](#).

Background on CDC's Role and Responsibilities

- CDC is the lead agency for human health.
- The U.S. Department of Interior and USDA are the lead federal departments for outbreak investigation and control in wild birds and agriculture, and USDA APHIS is the lead agency for such activities in domestic birds and agricultural livestock.
- CDC is working closely with USDA to monitor the current H5N1 bird flu situation and will review existing guidance on an ongoing basis to determine if updates are needed.
- CDC also is working with USDA and state partners to monitor for infections in exposed persons in the states where detections in poultry, backyard flocks, or other animals have occurred.
 - People who have been exposed to infected birds, poultry, or other animals are actively monitored for 10 days after exposure.
 - To date, public health departments have monitored more than 9,000 people in 52 jurisdictions who were exposed to birds/poultry or other animals infected with A(H5N1) virus and reported this information to CDC.
 - Of these, over 200 people who were being monitored showed symptoms and were subsequently tested for novel influenza A and seasonal flu viruses along with other respiratory viruses.
- CDC will help with surveillance, contact tracing, and other steps to monitor for and reduce spread in jurisdictions where human infections with A(H5N1) virus are identified.
 - CDC's diagnostic tools that are used to detect seasonal influenza viruses also can detect novel influenza A viruses including A(H5N1) viruses.
 - These diagnostic tools are used at more than 100 public health laboratories in all 50 U.S. states and have been shared internationally as well.
- CDC will continue its ongoing assessment of the risk posed by these viruses, including conducting additional laboratory work to further characterize current A(H5N1) viruses.
- CDC is engaged in broad outreach to the public to raise awareness about the current situation and that the current risk to the general public's health is low, but that there are certain groups of people who are at greater risk of infection who should take precautions.
- A jointly conducted audit of CDC and USDA outreach activities was conducted to ensure that all potentially affected groups are being reached through existing channels.
 - All of CDC's current A(H5N1) virus materials are available in Spanish and English, and CDC is working closely with state and local health departments to determine and address if other language or access barriers exist.
- CDC is engaging public health partner organizations to share information and ensure preparedness for any potential human infections.
- CDC has determined that:
 - These bird flu viruses can be detected using CDC's diagnostic tools for seasonal influenza viruses which are used at more than 100 public health laboratories in all 50 U.S. states.

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- Genetic sequencing suggests that currently available FDA-approved antiviral treatments for seasonal flu would work against these viruses.
- Two existing HPAI A(H5N1) candidate vaccine viruses that are already available to manufacturers, and which could be used to make vaccine if needed.
- More information on laboratory data is available [above](#) in this document.
- CDC will provide updates on this situation as needed on the [Avian Influenza Current Situation Summary, Current H5N1 Bird Flu Situation in Dairy Cows](#) and [Avian News & Spotlights](#) pages.

Bird Flu Vaccines

- As part of pandemic preparedness activities and as a WHO Collaborating Center, CDC regularly develops candidate vaccine viruses (CVVs)—viruses made for production of vaccine—for novel bird flu viruses with pandemic potential.
- CDC has two HPAI H5N1 CVV that could be used to produce vaccine for people if needed.
 - Further, there are no markers known to be associated with influenza antiviral resistance found in the virus sequences from the patient’s specimen and the virus is very closely related to two existing A(H5N1) candidate vaccine viruses that are already available to manufacturers, and which could be used to make vaccine if needed.
 - Because influenza viruses are constantly changing, CDC continually analyses viruses to identify genetic changes that suggest these viruses might spread more easily to and between people, and cause serious illness in people, or for changes that suggest reduced susceptibility to antivirals, as well as changes in the virus that might mean a new vaccine virus should be developed.

Antivirals

- There are four commercially available FDA-approved prescription antiviral treatment drugs recommended for influenza.
 - CDC’s preliminary genetic analysis of currently circulating A(H5N1) viruses suggests these viruses are susceptible to commercially available, FDA-approved currently recommended, flu antivirals.
- CDC will continue to monitor these viruses and update and adjust guidance as needed.
- If antiviral chemoprophylaxis is initiated, oseltamivir treatment dosing (one dose twice daily) is recommended instead of the antiviral chemoprophylaxis regimen for seasonal influenza. Specific dosage recommendations for treatment by age group is available: [Influenza Antiviral Medications: Summary for Clinicians](#).

Current Situation and Risk Assessment in the United States

- Despite detections of influenza A(H5N1) viruses in U.S. cattle in multiple states, CDC believes the current H5N1 public health risk assessment for the general public remains low; however, risk depends on exposure, and people with more exposure are at greater risk of infection.
- In the United States, ongoing outbreaks of H5N1 bird flu in wild birds and poultry and now cattle have been caused by clade 2.3.4.4b A(H5N1) bird flu viruses. Globally these are the most common A(H5N1) viruses.
- There have been sporadic spillover events into some mammals, including but not limited to, wild or feral animals such as foxes, bears, and seals; stray or domestic animals such as cats

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and dogs; farmed animals such as mink and foxes, livestock such as [goats](#) and [cows](#), and zoo animals such as [tigers](#) and [leopards](#).

- While two human cases of A(H5N1) in people have been reported to CDC since 2022, H5N1 remains mainly an agricultural issue in poultry and now in dairy cows.
- As of April 2024, A(H5N1) viruses have been found in wild birds in 50 states and in commercial and backyard poultry in 48 states.
- At this time:
 - More than 9,200 wild birds and more than 90 million commercial and backyard poultry in the United States have been affected by A(H5N1) bird flu.
 - More than 9,000 people in the United States have been or are being monitored following exposure to infected birds/poultry.
 - Cows infected with HPAI A(H5N1) virus have been detected in several states.
- Most infections between 2022 and 2024 have been associated with poultry exposures.
- 26 H5N1 bird flu detections in humans have been reported globally since January 2022.
 - Of these 26 documented cases, seven have died.
 - Of note, eight reported cases were likely due to transient environmental contamination of the upper respiratory tract and not H5N1 virus infection.
- No person-to-person spread has been identified associated with these contemporary A(H5N1) viruses.
- A(H5N1) bird flu viruses detected in the United States since late 2021 are different from earlier A(H5N1) viruses that emerged in 1996 that were associated with hundreds of human cases with a mortality rate of about 50 percent.
- The predominant clade of A(H5N1) virus, called clade 2.3.4.4b, appears well-adapted to spread efficiently among wild birds and poultry in many regions of the world and was first identified in wild birds sampled in the United States in late 2021.
- Illnesses in humans from avian influenza virus infections have ranged from very mild/no signs or symptoms to severe illness, including death in other countries.
- In the United States, the two reported human cases of H5N1 bird flu occurred in 2022 and 2024.
 - The 2022 case only reported fatigue was associated with infected poultry exposure.
 - The 2024 case only experienced conjunctivitis and was associated with exposure to cows presumed to be infected with A(H5N1) virus.
 - Both patients had very mild illness and recovered.
- Based on past experience with earlier A(H5N1) viruses and what is known about this group of contemporary A(H5N1) viruses from existing epidemiologic and genetic sequence data, CDC believes the current public health risk from H5N1 bird flu to the general public is low.
- The ongoing spread of HPAI A(H5N1) viruses among wild birds, with outbreaks in commercial and backyard poultry flocks, and in dairy cattle, with sporadic infections of other mammals, are likely to result in increased exposures among people, which may increase the risk, and the number of, human infections.
 - This is especially true for people with work-related or recreational exposures to infected animals (wild birds, poultry, dairy cows), particularly poultry workers, outbreak responders, backyard bird flock owners, livestock farmers and workers, slaughterhouse workers performing certain tasks on lactating dairy cattle, veterinarians and veterinary staff, and waterfowl hunters and anyone else with exposure to infected animals or their contaminated surfaces.

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- There are existing federal recommendations around bird flu exposures for different groups of people, including [hunters](#), [poultry producers](#), [farmers](#), and the [general public](#), as well as [health care providers](#).
 - CDC also has interim guidance for [Prevention, Monitoring, and Public Health Investigations for HPAI H5N1](#).
 - [Specific recommendations](#) for farmers; poultry, backyard flock, and livestock owners; and worker protection are also available.
- CDC also has guidance documents including [recommendations for personal protective equipment](#) and information for people exposed to infected birds and other animals and [guidance for testing and treatment](#) of suspected or confirmed human cases to prevent severe illness and spread to other people.
- Given that past human infections with bird flu viruses have resulted mostly from close contact with infected birds/poultry and, to a much lesser extent, other infected animals, some ongoing sporadic human infections with contemporary A(H5N1) viruses would not be surprising, especially among people with exposures who do not take recommended precautions (like wearing personal protective equipment, for example).
- Sporadic human infections in the current context would not significantly change CDC's risk assessment.
- However, identification of multiple simultaneous instances of A(H5N1) viruses spreading from birds or other animals to people or of certain genetic changes in virus specimens could change CDC's risk assessment because they could indicate the virus is adapting to spread more easily from birds or animals to people.
- Additionally, if limited, non-sustained, person-to-person spread with this virus were to occur, that would also raise the public health threat because it could mean the virus is adapting to spread between people.
 - Rare small clusters of limited, non-sustained, human-to-human A(H5N1) virus spread happened in other countries from 2004-2007 without any changes in A(H5N1) viruses.
- Sustained human-to-human spread is needed for a pandemic to occur.
- Because of the potential for influenza viruses to constantly change, continued surveillance and preparedness efforts are critical, and CDC is taking measures to be ready in case the risk assessment changes.

Human Infection with Influenza A(H5N1) in the US

- Most recently, in late March of 2024, a [person in Texas tested positive for H5N1 bird flu](#).
- This infection occurred in a person who had direct exposure to cattle presumed to be infected with H5N1 bird flu.
- The patient reported eye redness as their only symptom (consistent with conjunctivitis) and is recovering.
- This is the second case of H5N1 bird flu ever reported in the United States. The first occurred in 2022 in [a person in Colorado](#) who had exposure to infected poultry.
- Human infections with avian influenza viruses are uncommon but have occurred sporadically, mostly from exposure to infected birds, with some reported infections resulting in severe disease in other countries.

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- Human infections with bird flu from an intermediary host, are very rare, but have occurred in the United States in 2016 (cat-to-human spread of H7N2 bird flu) and 2024 (cow-to-human spread of H5N1 bird flu).
- CDC has been monitoring for illness among people exposed to A(H5N1) virus-infected birds since these outbreaks were first detected in U.S. wild birds and poultry.
- CDC continues to work with USDA, FDA, and state health departments to also monitor people exposed to infected birds and sick cattle.
- Because of the potential for influenza viruses to constantly change, continued surveillance and preparedness efforts are critical, and CDC is taking measures to be ready in case the public health risk assessment changes.

Genetic Sequencing of A(H5N1) Specimen from Recent Human Infection

- CDC has sequenced the influenza virus genome identified in a specimen collected from the patient in Texas who was confirmed to be infected with A(H5N1) virus and compared these with A(H5N1) sequences from cattle, wild birds and poultry.
- The virus sequences are HA clade 2.3.4.4b HPAI A(H5N1) with each individual gene segment closely related to viruses detected in dairy cattle available from USDA testing in Texas.
- While minor changes were identified in the virus sequence from the patient specimen compared to the viral sequences from cattle, both cattle and human sequences maintain primarily avian genetic characteristics and for the most part lack changes that would make them better adapted to infect mammals.
- The genome for the human isolate had one change (PB2 E627K) that is known to be associated with viral adaptation to mammalian hosts, and which has been detected before in people and other mammals infected with HPAI A(H5N1) virus and other avian influenza subtypes (e.g., H7N9), but with no evidence of onward spread among people.
- Viruses can undergo changes in a host as they replicate after infection.
- Further, there are no markers known to be associated with influenza antiviral resistance found in the virus sequences from the patient's specimen and the virus is very closely related to two existing HPAI A(H5N1) candidate vaccine viruses that are already available to manufacturers, and which could be used to make vaccine if needed.
- Overall, the genetic analysis of HPAI A(H5N1) viruses in Texas supports CDC's conclusion that the human health risk currently remains low.
- Using next-generation technologies, CDC was able to sequence the influenza viruses directly from clinical specimens collected from the patient in Texas. These technologies also allowed for rapid, detailed analysis of the virus genome sequences, which CDC was able to complete within 24 hours of receiving the samples.
- Read the full report: <https://www.cdc.gov/flu/avianflu/spotlights/2023-2024/h5n1-analysis-texas.htm>

NEJM Publication: Highly Pathogenic Avian Influenza A(H5N1) Virus Infection in a Dairy Farm Worker

- CDC published an article on May 3, 2024, summarizing the recent Highly Pathogenic Avian Influenza A(H5N1) virus infection in a dairy farm worker.
- Amid a multi-state outbreak of H5N1 bird flu in dairy cattle, an adult dairy farm worker developed eye redness and discomfort in late March 2024. Testing of an eye swab and an upper respiratory

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tract swab from the worker confirmed highly pathogenic avian influenza (HPAI) A(H5N1) virus infection. The worker only experienced eye symptoms, was treated with the antiviral drug oral oseltamivir, and recovered fully. There was no evidence of human-to-human spread of HPAI A(H5N1) virus.

- HPAI A(H5N1) virus was isolated from a dairy farm worker in Texas who experienced conjunctivitis. The dairy worker was exposed to cows that were presumed to be infected with HPAI A(H5N1).
- The isolated virus was similar to viruses that have infected dairy cows at dairy farms in Texas and other states. The worker was treated with the antiviral drug oral oseltamivir and fully recovered. Household contacts received post-exposure prophylaxis with oral oseltamivir, and none developed any illness. -
- The isolated virus was closely related to viruses detected in dairy cattle and other bird flu viruses detected in wild birds in Texas during March 2024. This virus showed no changes that would indicate increased risk of spread to humans. CDC is working with USDA and state and local partners to monitor for potential HPAI A(H5N1) bird flu infections in people.
- CDC is also testing human sera (blood) from people previously vaccinated with pre-pandemic A(H5) vaccines to see how it reacts to the virus from the human case in Texas. Data to date – including genetic analysis and testing of ferret antisera from multiple clade 2.3.4.4b candidate vaccine viruses – suggest vaccination will offer good cross-protection against cattle outbreak viruses (The human case in Texas was a 2.3.4.4b virus).
- These findings suggest that cow-to-human spread of HPAI A(H5N1) occurred. The worker denied contact with sick or dead wild birds, poultry, or other animals. The worker wore gloves only and was exposed to well appearing and ill dairy cows with the same signs of illness reported at other dairy farms in the area with confirmed HPAI A(H5N1) virus infection. No specimens from cows at the worker’s farm were available for testing, so the cows were presumed to be infected with HPAI A(H5N1) virus, but not confirmed. This would be the first known human infection with influenza A(H5N1) from a cow.
- This work was a collaboration between Texas Department of State Health Services Region 1 public health, the Texas Department of State Health Services, the CDC Laboratory Response Network-Biological facility located within the Texas Tech Bioterrorism Response Laboratory, and the Influenza Division, CDC. Local public health (Texas DSHS Region 1) staff collected the clinical specimens that led to identification of presumptive A(H5) virus at the Lubbock laboratory, and CDC confirmed HPAI A(H5N1) virus infection in two clinical specimens, isolated the virus, and characterized the virus, including complete genetic sequencing.
- CDC provided recommendations for isolation of the patient, antiviral treatment, and post-exposure prophylaxis. Local public health provided oseltamivir for the case-patient and household contacts, recommended home isolation for the case-patient, and helped follow-up the worker.
- While previously reported in other venues, this is the first peer-reviewed publication on this case.
- CDC’s role is to protect human health by monitoring and investigating potential human infections with novel influenza viruses, including HPAI A(H5N1) viruses.
 - This includes surveillance of potential cases and performing genetic sequencing of these viruses to identify any adaptations that would increase the risk of spread to humans.
 - CDC has issued recommendations for monitoring of exposed dairy farm workers and others, use of personal protective equipment, influenza testing, antiviral treatment, post-exposure antiviral prophylaxis, and other preventive measures.

Laboratory Work to Assess Viral Fitness and Potential Severity

- To assess the human health risk posed by highly pathogenic avian influenza (HPAI) A(H5N1) viruses, CDC researchers perform laboratory testing of A(H5N1) virus specimens obtained from infected people.
- All research with HPAI viruses is conducted under biosafety level 3 containment, including enhancements required by the U.S. Department of Agriculture and the Select Agent Program outlined in [Biosafety in Microbiological and Biomedical Laboratories](#).
- After receiving a virus specimen, laboratorians grow stocks of the virus in chicken eggs or mammalian cells. Each virus stock undergoes testing to exclude the presence of other subtypes of influenza virus.
- Laboratory tests are designed to evaluate the following characteristics of an influenza virus:
 - the ability of an influenza virus to replicate in a human respiratory tract cell line;
 - to cause disease in a living host (pathogenicity); and
 - to spread from one host to another (transmissibility).

Virus Replication

- To assess the ability of the virus to replicate, researchers perform studies *in vitro*, (in a glass flask), using human bronchial epithelial cells as a model.
- With the recent detection of A(H5N1) viruses in unpasteurized milk from infected cows, CDC researchers plan to also assess the ability of the viruses to replicate in human and bovine mammary epithelial cells.

Severity of Associated Disease

- To evaluate the ability of the virus to cause disease and to spread in humans, researchers perform experiments in ferrets. Ferrets are commonly used as models for humans in the study of influenza viruses because they are susceptible to influenza virus infection and display clinical signs of infection similar to those in humans.
- The ability of the virus to cause disease in humans is evaluated by infecting ferrets with the virus and observing them daily for clinical signs of disease, such as increased body temperature, weight loss, nasal discharge, diarrhea, and difficulty breathing.
- Researchers also assess the ability of the virus to replicate in ferrets and to spread beyond the animals' respiratory tract to other parts of the body.

Transmissibility

- Another group of ferrets is used to assess the ability of the virus to spread from infected animals to healthy animals.
- Researchers do this by performing experiments in ferrets to test for spread by three routes:
 - via direct or close contact, with healthy and infected ferrets in the same cage;
 - via contaminated surfaces (fomites), with healthy and infected ferrets swapping cages;

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- and via respiratory droplets, with healthy and infected ferrets in side-by-side cages separated by a wall with holes in it.
- While past studies have consistently indicated that avian influenza A(H5) viruses are able to spread between them in close contact, researchers have never observed efficient spread of any H5 viruses in ferrets via respiratory droplets.
- Although important information is extrapolated from studies in ferrets, the findings are not always indicative of what is happening in humans.
- Similar work to what is described here was performed using the virus from the human case in Chile. Those findings were published in [March](#) in the journal *Emerging Microbes & Infections*.
- The findings of this type of scientific research are used to assess the risk to human health posed by these viruses in an iterative, ongoing way.

A(H5N1) Bird Flu in Mammals

- Although A(H5N1) viruses primarily infect different types of wild birds and domestic poultry, A(H5N1) viruses can infect other animals as well.
- Spread of A(H5N1) viruses between birds and mammals have occurred globally, with recent detections in polar bears, elephant seals, goats, and cows. A complete listing of mammalian detections is [available](#).
- Infections in mammals can occur after exposure to sick or dead birds or other animals.
- Sporadic A(H5N1) virus infections of mammals have been reported for 20 years in different countries that have outbreaks in poultry or wild birds.
- A(H5N1) viruses have previously been known to occasionally infect mammals that eat (presumably infected) birds or poultry and mammals that are exposed to environments contaminated with virus.
- Some limited mammal to mammal transmission has [been documented in cattle in the United States](#).
- The reports of A(H5N1) virus infections in some mammals globally, including in the United States and Canada, may continue to occur as H5N1 bird flu continues to spread widely in wild birds.
- The wide geographic spread of A(H5N1) viruses in wild birds, poultry, and some other mammals could create additional opportunities for people to be exposed to these viruses.
- Therefore, there could also be an increase in sporadic human infections resulting from bird and animal exposures, even if the risk of these viruses spreading from birds or animals to people has not increased.

USDA Reports Recent HPAI Virus Detections in Dairy Cows

- USDA has reported [recent detections](#) of [highly pathogenic avian influenza](#) (HPAI) in dairy cows and is monitoring the situation.
 - Updated information can be found on the USDA website: [Highly Pathogenic Avian Influenza \(HPAI\) Detections in Livestock | Animal and Plant Health Inspection Service \(usda.gov\)](#)
- USDA reported that sick cows are experiencing decreased lactation, low appetite, and other symptoms.

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- USDA has now also confirmed the presence of HPAI in dairy herds in several states that had recently received cows from Texas. Spread of symptoms among these herds indicates that spread of HPAI between cattle cannot be ruled out.
- USDA and partners continue to monitor this closely and have advised veterinarians and producers to practice good biosecurity, test animals before necessary movements, minimize animal movements, and isolate sick cattle from the herd.
- Among the dairies whose herds are exhibiting symptoms, the affected animals have recovered after isolation with little to no associated mortality reported.
- Additional information from USDA can be found online:
 - [Detection of Highly Pathogenic Avian Influenza in Dairy Herds: Frequently Asked Questions](#)

Genetic Sequencing Information on A(H5N1) Virus from Infected Cattle

- Initial testing has not found changes to the virus that would make it more transmissible to humans.
- Preliminary analysis of the virus from the infected cattle indicates that, current FDA-approved flu antiviral medications are believed to be effective.
- The virus is very closely related to two existing HPAI A(H5N1) candidate vaccine viruses that are already available to manufacturers, and which could be used to make vaccine if needed.
- Seasonal flu vaccines do not provide protection against these viruses. Analysis of virus samples is ongoing.
- Additional information on the virus detected in cattle can be found on USDA's website.

Information for People with Potential Exposure to Dead or Sick Animals

- CDC is working with USDA and local public health agencies to monitor worker health and safety, and to identify any health issues directly related to HPAI.
- CDC has updated and expanded recommendations: [Highly Pathogenic Avian Influenza A\(H5N1\) Virus in Animals: Interim Recommendations for Prevention, Monitoring, and Public Health Investigations | Avian Influenza \(Flu\)](#).
- People who have job-related exposures to infected birds and other animals are at higher risk of A(H5N1) virus infection and should take appropriate precautions outlined in CDC recommendations.
 - Poultry farmers and poultry workers, backyard bird flock owners, livestock farmers and workers (including dairy workers), veterinarians and veterinary staff, and responders should avoid contact with surfaces that appear to be contaminated with animal feces, raw milk, litter, or materials contaminated by birds or other animals with suspected or confirmed bird flu virus infection.
 - People with relevant exposures should wear recommended PPE such as an N95 filtering facepiece respirator, eye protection, and gloves, and perform thorough hand washing after contact. (e.g., see: PPE recommended for poultry workers) when in direct contact with sick or dead birds or other animals, carcasses, feces, raw milk, or litter from potentially infected birds or other animals, and when going into any buildings with or that have had sick or dead birds or other animals, carcasses, feces, or litter from potentially infected birds or other animals. Additional information on PPE can be found [online](#).
- Hunters should dress game birds in the field when possible and practice good biosecurity to prevent any potential disease spread. Biosecurity information is available on [USDA's website](#)

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- People with direct or close contact with sick or dead animals, including wild birds (wild birds can be infected with bird flu viruses without appearing sick) with confirmed A(H5N1) virus infection, should be monitored for any signs and symptoms of illness for **10 days** after the last known exposure.

Recommendations for Clinicians

- Clinicians should consider the possibility of HPAI A(H5N1) virus infection in persons showing signs or symptoms of acute respiratory illness who have relevant exposure history.
- If a person is symptomatic, they need to be isolated, and the state/local health department should be notified.
 - Respiratory specimens should be collected for influenza testing using PPE, including for avian influenza A viruses at the state health department.
 - More information is available at: [Recommendations for State Health Departments](#).
- Recommended infection prevention and control measures should be followed when collecting respiratory specimens and evaluating symptomatic persons who have been potentially exposed to novel influenza A viruses associated with severe disease in infected persons, including HPAI A(H5) virus.
- Any symptomatic persons among those being monitored after exposure should be started on empiric oseltamivir treatment as soon as possible even before testing results are available.
- Recommendations for use of antivirals following exposure to HPAI A(H5) virus are available at [Highly Pathogenic Avian Influenza A\(H5N1\) Virus in Animals: Interim Recommendations for Prevention, Monitoring, and Public Health Investigations | Avian Influenza \(Flu\) \(cdc.gov\)](#).
- If a person tests positive for influenza A(H5N1) virus, all close contacts should be identified and monitored, and antivirals are recommended for some persons.

Preventive Actions for the General Public

- While the risk to the general public remains low in the United States, there are several actions you can take to protect yourself against getting sick with bird flu:
 - People should avoid contact with poultry, wild birds, and other animals that appear ill or are dead and avoid contact with surfaces that appear to be contaminated with feces from wild birds and other animals or domestic poultry.
 - If you must handle wild birds or sick or dead poultry or other animals, minimize direct contact by wearing proper personal protective equipment (PPE) and following CDC guidance at [Recommendations for Worker Protection and Use of Personal Protective Equipment \(PPE\) to Reduce Exposure to Novel Influenza A Viruses Associated with Severe Disease in Humans](#).
 - More information is available at [Prevention and Antiviral Treatment of Bird Flu Viruses in People | Avian Influenza \(Flu\) \(cdc.gov\)](#).
- It is safe to eat properly handled and cooked poultry and meat and drink pasteurized milk in the United States
 - The U.S. agriculture industry maintains rigorous health and safety standards, including routine monitoring for avian influenza. The proper handling and cooking of poultry, meat, and eggs to the right internal temperature kills bacteria and viruses, including bird flu viruses.
 - Information about safe internal temperatures for different kinds of foods can be found online: [Four Steps to Food Safety | CDC](#)

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- People should not prepare or eat uncooked or undercooked food or related uncooked food products.
- Eating uncooked or undercooked poultry or beef can make you sick.
- In addition, people should not eat or drink raw milk or products made with raw milk. More information is available at [How to Prevent Food Poisoning](#).
- Choosing pasteurized milk is the best way to keep you and your family safe. More information is available at [Fast Facts About Raw Milk](#).
- Consumers are reminded to handle raw poultry hygienically and cook all poultry and poultry products (including eggs), as well as beef thoroughly before eating.
 - While there is no evidence that any human cases of bird flu virus infection have been acquired by eating properly cooked poultry products, consumption of uncooked poultry and poultry products (like blood) was suspected as the source of highly pathogenic bird flu virus infection in a small number of cases in Southeast Asia.

What to do if you Find a Dead Bird or Other Animal

- State and local agencies have different policies for collecting and testing birds or other animals, so check with your state health department, state veterinary diagnostic laboratory, or state wildlife agency for information about reporting dead birds or other animals in your area.
- If local authorities tell you to simply dispose of the bird or other animal's carcass (body), don't handle it with your bare hands. Use gloves or an inverted plastic bag to place the carcass in a garbage bag, which can then be disposed of in your regular trash.
- To report unusual signs in birds or other animals you have seen in the wild, call 1-866-536-7593.

If You Have Contact with Birds or Animals Infected with Bird Flu and Get Sick

- People who have had direct contact with infected bird(s) or other animals who develop any illness symptoms within 10 days of their last exposure to infected birds or other animals should immediately notify a health care provider about their exposure so they can be evaluated and tested for bird flu virus infection and other possible causes of their symptoms.
- Also, [if you have been in contact with sick birds or animals](#) or surfaces contaminated by them and you have not already been in contact with your state or local health department, contact your state or local health department right away.
- Signs and symptoms of bird flu virus infection are non-specific and variable and may include:
 - 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,
 - fatigue,
 - eye redness (or conjunctivitis),
 - shortness of breath or difficulty breathing.
- Less common signs and symptoms are:
 - diarrhea,
 - nausea,

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- vomiting, or
 - seizures.
- It is important to remember that infection with influenza viruses, including bird flu viruses, does not always cause fever. Fever may not occur in infected persons of any age, particularly in persons 65 years and older or people who have weakened immune systems due to disease or medications.
 - Respiratory specimens will be collected for influenza testing at a state public health laboratory and may also be tested locally for influenza and other infectious diseases. A health care provider can assess whether testing for other infectious diseases is indicated based upon signs, symptoms, history of exposures, clinical examination findings and the local epidemiology of other pathogens, including other respiratory viruses that may be circulating among people (e.g., SARS-CoV-2).
 - A seasonal flu antiviral medication can be prescribed for treatment of bird flu virus infection. Antiviral treatment works best when taken as soon as possible after symptoms begin.
- People who become sick within 10 days of their exposure to infected birds or other animals should isolate at home away from their household members and should not go to work or school until they are proven not to have bird flu virus infection and have recovered from their illness. The local or state public health department can assist in monitoring and advising when isolation is no longer required.
- Close contacts (family members, etc.) of people who have been exposed to bird flu viruses should monitor their health and report to their health care provider any new symptoms, especially respiratory symptoms, within 10 days of the exposure.

Background

- Avian influenza (bird flu) refers to the disease caused by infection with avian (bird) influenza (flu) type A viruses.
- These viruses naturally spread among wild aquatic birds worldwide and can infect domestic poultry and other bird and animal species.
- Avian influenza viruses do not normally infect humans; however, sporadic human infections with avian influenza viruses have occurred.
- Human infections with avian influenza viruses have usually happened after close, prolonged, unprotected exposure to infected birds or an environment that has been contaminated by infected birds (e.g., feces, saliva, or mucous).
- A(H5N1) is one sub-type of bird flu, which is a [disease of birds](#). There are many other subtypes of avian influenza A viruses, including A(H5N6), A(H5N8), A(H7N9), [and others](#).
- There are also different groups of A(H5N1) viruses.
- A(H5N1) virus has been circulating among birds and poultry in different parts of the world for many years and continuing to evolve into different groups that are referred to as clades.
 - The predominant clade of A(H5N1) virus, called clade 2.3.4.4b, appears well-adapted to spread efficiently among wild birds and poultry in many regions of the world and was first identified in wild birds sampled in the United States in late 2021.
- Wild birds can carry these viruses without getting sick, but domestic poultry get very sick and often die from these viruses.

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- CDC has been comparing the properties of current A(H5N1) viruses to past A(H5N1) viruses and has found that current A(H5N1) viruses detected in the United States during late 2021 to the present are different from earlier A(H5N1) viruses.
- So far, current avian influenza A(H5N1) viruses lack changes seen in the past that have been associated with infecting people more easily.
- USDA has publicly posted genetic sequencing for A(H5N1) viruses in the United States.
- These viruses are from [clade 2.3.4.4b](#), which is the predominant A(H5N1) bird flu virus worldwide at this time.
- Clade 2.3.4.4b A(H5N6) and A(H5N8) viruses have circulated longer than clade 2.3.4.4b A(H5N1) viruses. Clade 2.3.4.4b A(H5N1) viruses have only circulated in wild birds and poultry in recent years, after most previous human A(H5N1) cases occurred.
- Current A(H5N1) viruses were first identified in Europe during the fall of 2020 and spread across Europe and into Africa, the Middle East and Asia, becoming the predominant subtype globally by fall of 2021.
- Current A(H5N1) viruses have been spreading in wild birds in much of the world and have caused sporadic poultry infections and poultry outbreaks and sporadic infections in mammals in many countries, [including the United States](#).
- Ancestors of these A(H5N1) viruses first emerged in southern China and led to large poultry outbreaks in Hong Kong in 1997, which resulted in 18 human infections.
 - The bird outbreak was controlled, but the A(H5N1) viruses were not eradicated in birds and re-surfaced in 2003 to spread widely in birds throughout Asia, and later in Africa, Europe, and the Middle East, causing sporadic human infections.
- No known human-to-human spread has occurred with the A(H5N1) virus that is currently circulating in birds in the United States and globally.
- Sporadic human cases of H5N1 bird flu reported with A(H5N1) viruses circulating in birds since 2021 have occurred following exposure to infected poultry, with one case following exposure to infected cattle. Human infections were rare during past A(H5N1) virus outbreaks that have occurred in poultry globally.
- Globally since 2003, countries have reported rare, sporadic human infections with A(H5N1) viruses to the World Health Organization (WHO).
- Monthly case counts are available on the [WHO website](#).

Understanding Highly Pathogenic Avian Influenza (HPAI) and Low Pathogenic Avian Influenza (LPAI)

- Avian influenza A viruses are classified into the following two categories: low pathogenic avian influenza (LPAI) A viruses and highly pathogenic avian influenza (HPAI) A viruses.
- The categories refer to molecular characteristics of a virus and the virus's ability to cause disease and mortality in chickens in a laboratory setting.
 - **Low Pathogenic Avian Influenza (LPAI):** Low pathogenic avian influenza viruses cause either no signs of disease or mild disease in chickens/poultry (such as ruffled feathers and a drop in egg production).
 - Most avian influenza A viruses are low pathogenic and cause few signs of disease in infected wild birds.
 - In poultry, some low-pathogenic viruses can mutate into highly pathogenic avian influenza viruses.
 - **Highly Pathogenic Avian Influenza (HPAI):** Highly pathogenic avian influenza

- viruses cause severe disease and high mortality in infected poultry.
- Only some avian influenza A(H5) and A(H7) viruses are classified as HPAI A viruses, while most A(H5) and A(H7) viruses circulating among birds are LPAI A viruses.
 - HPAI A(H5) or A(H7) virus infections can cause disease that affects multiple internal organs with mortality up to 90% to 100% in chickens, often within 48 hours.
 - However, ducks can be infected without any signs of illness. HPAI A(H5) and A(H7) virus infections in poultry also can spill back into wild birds, resulting in further geographic spread of the virus as those birds migrate. While some wild bird species can be infected with some HPAI A(H5) or A(H7) virus subtypes without appearing sick, other HPAI A(H5) and A(H7) virus subtypes can cause severe disease and mortality in some infected wild birds as well as in infected poultry.
- Both HPAI and LPAI viruses can spread rapidly through poultry flocks.
 - HPAI and LPAI designations do not refer to or correlate with the severity of illness in cases of human infection with these viruses.
 - Both LPAI and HPAI A viruses have caused mild to severe illness in infected humans.
 - There are genetic and antigenic differences between the influenza A virus subtypes that typically infect only birds and those that can infect birds and people.
 - Wild birds can carry HPAI viruses without showing symptoms, but these viruses can cause illness and death in domestic poultry.
 - Infected birds shed bird flu viruses in their saliva, mucous, and feces.
 - Human infections with bird flu viruses can happen when enough virus gets into a person's eyes, nose or mouth or is inhaled.
 - The greatest risk for infections to occur continues to be among people with close or prolonged unprotected contact with infected birds or contaminated environments.
 - Illnesses in humans from avian influenza virus infections have ranged from mild (e.g., eye infection, upper respiratory symptoms) to severe illness (e.g., pneumonia), sometimes resulting in death.
 - The spread of avian influenza viruses from one sick person to another is very rare, and when it has happened, it has not led to sustained spread among people.
 - People with avian influenza virus infections may have mild to severe illness.

Links for More Information

- CDC is providing the latest bird flu information and updates on the following pages:
 - Current situation page: [Avian Influenza Current Situation Summary](#)
 - Current situation in dairy cows: [Current H5N1 Bird Flu Situation in Dairy Cows](#)
 - [How CDC is monitoring influenza data to better understand the current avian influenza A \(H5N1\) situation in people](#)
 - Bird flu spotlights: [Avian Influenza News & Spotlights](#)
 - Bird flu timeline: [Highlights in the History of Avian Influenza \(Bird Flu\) Timeline – 2020-2024](#).
 - H5N1 Technical reports (for technical audiences): [H5N1 Technical Report | Avian Influenza \(Flu\) \(cdc.gov\)](#).
- [Other agencies](#) are responsible for monitoring for disease in poultry and wild birds and wildlife.
- [Backyard Flock Owners: Take Steps to Protect Yourself from Avian Influenza \(Bird Flu\) | Avian](#)

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[Influenza \(Flu\) \(cdc.gov\)](#)

- [Bird Flu in Pets and Other Animals | Avian Influenza \(Flu\) \(cdc.gov\)](#)

One Health Information for Farms

- [Farm Animals | Healthy Pets, Healthy People | CDC](#)
- [Stay Healthy When Working with Farm Animals](#)

Guidance Documents

- CDC has guidance documents including recommendations for personal protective equipment and information for people exposed to birds or other animals infected with avian influenza viruses.
 - [Highly Pathogenic Avian Influenza A\(H5N1\) Virus in Animals: Interim Recommendations for Prevention, Monitoring, and Public Health Investigations | Avian Influenza \(Flu\) \(cdc.gov\)](#)
 - [Updated Interim Recommendations for Worker Protection and Use of Personal Protective Equipment \(PPE\) to Reduce Exposure to Novel Influenza A Viruses Associated with Disease in Humans Fact Sheet: Protect Yourself from H5N1 When Working with Farm Animals: in English and Spanish.](#)
 - [Information for People Exposed to Birds Infected with Avian Influenza Viruses of Public Health Concern | Avian Influenza \(Flu\) \(cdc.gov\)](#)
 - [Self-Observation for Illness for Responders to Poultry Outbreaks of Avian Influenza | Avian Influenza \(Flu\) \(cdc.gov\)](#)
 - [Considerations for Veterinarians: Evaluating and Handling of Cats Potentially Exposed to Highly Pathogenic Avian Influenza A\(H5N1\) Virus | Avian Influenza \(Flu\) \(cdc.gov\)](#)
- CDC also has guidance for testing and treatment of suspected cases to prevent severe illness and transmission to other people.
 - [Interim Guidance on Testing, Specimen Collection, and Processing for Patients with Suspected Infection with Novel Influenza A Viruses with the Potential to Cause Severe Disease in Humans | Avian Influenza \(Flu\) \(cdc.gov\)](#)
 - [Case Definitions for Investigations of Human Infection with Avian Influenza A Viruses in the United States \(cdc.gov\)](#)
 - [Interim Guidance on Influenza Antiviral Chemoprophylaxis of Persons Exposed to Birds with Avian Influenza A Viruses Associated with Severe Human Disease or with the Potential to Cause Severe Human Disease | Avian Influenza \(Flu\) \(cdc.gov\)](#)
 - [Chemoprophylaxis](#) is not routinely recommended for personnel involved in handling sick birds or decontaminating affected environments (including animal disposal) who used proper personal protective equipment.
 - CDC has guidance for clinicians in a [Health Alert Network \(HAN\)](#), the agency's recommendations for testing and treatment of patients with possible A(H5N1) virus exposure/infection. (Issued April 5, 2024)
- USDA/APHIS has created guidance for local, state, and federal public health authorities on monitoring of people potentially exposed to avian influenza viruses during official United States Department of Agriculture Animal and Plant Health Inspection Service (APHIS) response activities in the United States. [APHIS PH monitoring plan for AI responders](#)
- APHIS Recommendations for Highly Pathogenic Avian Influenza (HPAI) H5N1 Virus in Livestock For State Animal Health Officials, Accredited Veterinarians and Producers : [vs-](#)

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[recommendations-hpai-livestock.pdf \(usda.gov\)](#)