

From: Flu Div Clear (CDC)
Sent: Thu, 4 Apr 2024 15:56:51 +0000
To: Flu Div Clear (CDC)
Subject: Re: CDC Influenza Division: Updated H5N1 Bird Flu Key Points
Attachments: CDC H5N1 Bird Flu Key Points 4.4.24.pdf

Apologies, the KPs were missing in the previous email.
thank you.

From: Flu Div Clear (CDC)
Sent: Thursday, April 4, 2024 3:51 PM
Subject: CDC Influenza Division: Updated H5N1 Bird Flu Key Points

Good Morning,

Please find attached key points summarizing the H5N1 bird flu current situation in the U.S. and globally, including recent detections of A(H5N1) in cattle and one human infection in the U.S.. These key points are meant to support consistent messaging around influenza and can be shared with partners; however, they should not be posted in any public facing web content.

On April 1, 2024, CDC published a [web spotlight](#) confirming that a person in the United States has tested positive for the highly pathogenic avian influenza (HPAI) A(5HN1) virus, as reported by Texas. CDC's risk assessment for the general public remains low.

On April 2, 2024, CDC published a [web spotlight](#) on a technical summary highlighting CDC's analysis of genetic sequences of highly pathogenic avian influenza A(H5N1) viruses in Texas.

Influenza Division members, remember you can access the key points by visiting [FluPort](#), the Influenza Division SharePoint Portal.

Note to our partners: The attached key points contain the latest information about influenza this season. They are shared with our partners as a means of providing awareness of flu activity and other pertinent flu-related information, and as a helpful tool to maintain consistency in communicating flu-related messages. The key points are **not** intended for distribution to the public or posting to public web sites. Please visit <http://www.cdc.gov/flu/> for content to share with the public.

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

Date: April 4, 2024

Summary

Against a backdrop of ongoing widespread circulation of influenza A(H5N1) viruses (“H5N1 bird flu”) in wild birds with outbreaks in poultry, and sporadic infections in some mammals (most recently cows) and people CDC has confirmed the first human infection with H5N1 virus presumably from a cow. Outbreaks of H5N1 bird flu in cows across several states is ongoing. These are the first known infections of H5N1 bird flu in cattle and only the second human case of A(H5N1) bird flu ever reported in the United States. CDC believes the current public health risk assessment from these recent developments continues to be low; however, people who have job-related or recreational exposures to infected birds and other animals are at higher risk of infection and should take appropriate precautions outlined in [CDC updated and expanded interim recommendations](#).

This is a [developing situation](#) and CDC will provide updates as new information becomes available.

In this Document:

- [Current U.S. Risk Assessment](#)
- [Human Infection with Influenza A\(H5N1\) Virus in the US](#)
 - [Genetic Sequencing of A\(H5N1\) Specimen from Recent Human Infection](#)
- [Bird Flu in Mammals](#)
 - [Recent HPAI Virus Detections in Dairy Cows](#)
 - [Genetic Sequencing Information on A\(H5N1\) Virus from Infected Cattle](#)
- [Information for People with Potential Exposure to Dead or Sick Animals](#)
- [Recommendations for Clinicians](#)
- [Preventive Actions for the General Public](#)
 - [What to do if you Find a Dead Bird or Other Animal](#)
- [If You Have Contact with Infected Bird\(s\) or Other Animal \(s\) and Get Sick](#)
- [What CDC is Doing](#)
 - [Bird Flu Vaccines](#)
 - [Antivirals](#)
- [Background](#)
 - [Understanding Highly Pathogenic Avian Influenza \(HPAI\) and Low Pathogenic Avian Influenza \(LPAI\)](#)
- [Links for More Information](#)
- [Guidance Documents](#)

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

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

Date: April 4, 2024

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 9,100 wild birds and more than 82 million commercial and backyard poultry in the United States have been affected by A(H5N1) bird flu.
 - More than 8,000 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.
- 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, veterinarians and veterinary staff, and waterfowl hunters and anyone else with exposure to infected animals or their contaminated surfaces.
 - There are existing federal recommendations around bird flu exposures for different groups of people, including [hunters](#), [poultry producers](#), [farmers](#), and the [general](#)

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

Date: April 4, 2024

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

Date: April 4, 2024

- 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>

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

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

Date: April 4, 2024

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.
- USDA has now also confirmed the presence of HPAI in dairy herds in Michigan and Ohio 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.

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

Date: April 4, 2024

- 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](#)
- 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](#),

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

Date: April 4, 2024

[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](#)
 - People should not prepare or eat uncooked or undercooked food or related uncooked food products.
 - People should not consume unpasteurized (raw) milk, or raw cheeses, from animals with suspected or confirmed A(H5N1) virus infection (avian influenza or bird flu).
 - 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.

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

Date: April 4, 2024

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,
 - 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.

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

Date: April 4, 2024

What CDC Is Doing about the Situation in the United States

- 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 8,000 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, 189 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.
 - 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](#)

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

Date: April 4, 2024

[Summary](#) or [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 flu 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](#).

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

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

Date: April 4, 2024

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.
- 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 and causing severe illness in people.
- 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.
- 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](#). Although clade 2.3.4.4b A(H5N1) viruses (H5N6, H5N8) have circulated longer, 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.

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

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

Date: April 4, 2024

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](#)
 - Bird flu spotlights: [Avian Influenza News & Spotlights](#)
 - Bird flu timeline: [Highlights in the History of Avian Influenza \(Bird Flu\) Timeline – 2020-2024.](#)

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

Date: April 4, 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 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 \(Flu\) \(cdc.gov\)](#)
 - [Recommendations for Worker Protection and Use of Personal Protective Equipment \(PPE\) to Reduce Exposure to Highly Pathogenic Avian Influenza A H5 Viruses | Avian Influenza \(Flu\) \(cdc.gov\)](#)
 - [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 \(Flu\) \(cdc.gov\)](#)
- 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 \(HAN\) Health Advisory](#) summarizing the agency’s recommendations for testing and treatment of patients with possible A(H5N1) virus exposure/infection. (Issued April 29, 2022)
- 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](#)

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

Date: April 4, 2024

- APHIS Recommendations for Highly Pathogenic Avian Influenza (HPAI) H5N1 Virus in Livestock
For State Animal Health Officials, Accredited Veterinarians and Producers : [vs-recommendations-hpai-livestock.pdf \(usda.gov\)](https://www.usda.gov/vs-recommendations-hpai-livestock.pdf)

From: Uyeki, Timothy M. (CDC/NCIRD/ID)
Sent: Wed, 3 Apr 2024 01:48:46 +0000
To: Davis, Charles (Todd) (CDC/NCIRD/ID); Barnes, John R. (CDC/NCIRD/ID)
Subject: RE: Chat later today/evening?

Hi Todd – great work! Let me know when you are free to chat briefly tomorrow. I may be able to chat between 9-10 AM or 11 AM to 1 PM as long as meetings don't pop up.

Thanks,
Tim

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Tuesday, April 2, 2024 9:07 PM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fqg9@cdc.gov>
Subject: Re: Chat later today/evening?

Hi Tim.

The report went up tonight. Here's the link.

<https://www.cdc.gov/flu/avianflu/spotlights/2023-2024/h5n1-analysis-texas.htm>

I'll try to catch up tomorrow.

Thanks,
Todd

Get [Outlook for iOS](#)

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Tuesday, April 2, 2024 4:47:50 PM
To: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fqg9@cdc.gov>
Subject: RE: Chat later today/evening?

No worries, the Technical Report looks very good. John & I chatted about it a little bit. Is the report coming out this evening or tomorrow?

I'm happy to chat briefly whenever is convenient for you, now or this evening or tomorrow about what John and I discussed.

Thanks,
Tim

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Tuesday, April 2, 2024 5:35 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fqg9@cdc.gov>; Uyeki, Timothy M. (CDC/NCIRD/ID)

<tmu0@cdc.gov>

Subject: RE: Chat later today/evening?

Sorry, John/Tim.

Got way laid by this technical report trying to go out.

Will have to catch up later.

-----Original Appointment-----

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>

Sent: Tuesday, April 2, 2024 2:33 PM

To: Barnes, John R. (CDC/NCIRD/ID); Davis, Charles (Todd) (CDC/NCIRD/ID); Uyeki, Timothy M. (CDC/NCIRD/ID)

Subject: Chat later today/evening?

When: Tuesday, April 2, 2024 5:00 PM-5:30 PM (UTC-05:00) Eastern Time (US & Canada).

Where: Microsoft Teams Meeting

Microsoft Teams [Need help?](#)

Join the meeting now

Meeting ID:

Passcode:

Dial-in by phone

United States, Atlanta

United States (Toll-free)

[Find a local number](#)

Phone conference ID:

For organizers: [Meeting options](#) | [Reset dial-in PIN](#)

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Sent: Tuesday, April 2, 2024 2:21 PM

To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Uyeki, Timothy M. (CDC/NCIRD/ID)

<tmu0@cdc.gov>

Subject: RE: Chat later today/evening?

Hi Tim/John.

I've got some time from 3:30-4 but then busy from 4-5pm.

Todd

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>

Sent: Tuesday, April 2, 2024 2:01 PM

To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>

Subject: RE: Chat later today/evening?

I am available. Would love to shade towards 4 as [b](6) the fam is already thrilled with me this week.

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>

Sent: Tuesday, April 2, 2024 12:08 PM

To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>

Subject: Chat later today/evening?

John and Todd – any chance to chat briefly (15-20 minutes) late this afternoon or this evening? I might be free after 4 PM and am happy to chat in the early evening, whenever is convenient for you guys.

Thanks,

Tim

From: Uyeki, Timothy M. (CDC/NCIRD/ID)

Sent: Monday, April 1, 2024 9:22 AM

To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>

Subject: RE: Ct values and your thoughts

John – thanks,

(b)(5)

Thanks,

Tim

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>
Sent: Monday, April 1, 2024 9:13 AM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Ct values and your thoughts

Tim,

(b)(5)

John

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Sunday, March 31, 2024 8:59 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: Ct values and your thoughts

Hi John and Todd – what were the Ct values on the NP and on the conjunctival specimens? When I spoke with Cynthia with the Lubbock TX lab very late Thursday night with Angie Trujillo and Ashely Fowlkes, I recall that her lab found Cts of 32-35 for H5A/H5B, and 17-19 for H5B/H5A. (Although Cynthia specified “ocular” – it was a conjunctival swab.) Hope virus will be isolated from both specimens.

I apologize but because the individual had conjunctivitis and there were other anecdotal reports of conjunctivitis, I recommended both a conjunctival swab and an upper respiratory tract swab - the intent was for H5 testing but also to allow for other respiratory virus testing (e.g., adenovirus). Because I was aware of rare cases of H5N1 conjunctivitis, I did that. Now I am glad I made those recommendations.

My opinion is that in such persons with conjunctivitis, with or without respiratory symptoms, in addition to a conjunctival swab, a combined nasal/throat swab should be collected as well as an NP swab. The reason is that the yield for H5N1 virus is going to be highest in a throat swab and lowest in an NP swab – the opposite is true for detection of seasonal influenza viruses (NP swab is the best clinical specimen).

In trying to understand why this individual has conjunctivitis only without any respiratory symptoms, it's hard for me to believe that aerosolization of virus would only deposit on the conjunctivae without inhalation of small particles into the lower respiratory tract. (b)(5)

(b)(5)

(b)(5)

There's a lot going on in the cow and in the dairy milking environment with equipment, etc., that we don't understand. Critics will say that we don't have proof of cow-to-human transmission; they might even criticize that assessment if we had the identical virus from cows at the same farm the worker with conjunctivitis is working at – but it is highly likely that won't be possible. The analogy is that we refer to avian-to-human transmission (an epidemiological assessment) when H5N1 patients have a history of exposure to sick or dead poultry or visiting a live poultry market. So, I am comfortable with at least saying the case is suggestive of cow-to-human H5N1 virus transmission, although the mechanism is unclear. There's a lot more to learn about H5N1 virus infection and viral shedding in cows, and USDA must have investigated this in more detail, and haven't disclosed this.

Sorry to write a lot of thoughts besides my question about the Ct values. Any thoughts?

Thanks,

Tim

From: Uyeki, Timothy M. (CDC/NCIRD/ID)
Sent: Tue, 2 Apr 2024 18:38:48 +0000
To: Barnes, John R. (CDC/NCIRD/ID); Davis, Charles (Todd) (CDC/NCIRD/ID)
Subject: RE: Chat later today/evening?

Great, thanks!!

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>
Sent: Tuesday, April 2, 2024 2:34 PM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Chat later today/evening?

Should get an invite soon.

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Tuesday, April 2, 2024 2:30 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Chat later today/evening?

Let's do 5 PM – I am a novice and ignoramus about this, but I will try to set up a Teams call and send an invite.

Thanks,
Tim

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>
Sent: Tuesday, April 2, 2024 2:28 PM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Chat later today/evening?

5 works

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Tuesday, April 2, 2024 2:23 PM
To: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>
Subject: RE: Chat later today/evening?

Thanks. John – is 5 PM possible?
If not, I can get off my call from 3-4 to chat at 330 PM if that works best.
(b)(6) is MUCH more important than anything else.

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Tuesday, April 2, 2024 2:21 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Subject: RE: Chat later today/evening?

Hi Tim/John.

I've got some time from 3:30-4 but then busy from 4-5pm.

Todd

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>
Sent: Tuesday, April 2, 2024 2:01 PM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Chat later today/evening?

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Sent: Tuesday, April 2, 2024 12:08 PM
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Sent: Monday, April 1, 2024 9:22 AM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Ct values and your thoughts

John – thanks, [b](5)
[b](5)

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Tim

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Sent: Monday, April 1, 2024 9:13 AM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Ct values and your thoughts

Tim,

You are correct in your recollection and we found a similar difference in Ct values during our testing- essentially Conjunctival swab Ct18, NP Ct 33. James, Todd and I were discussing earlier and we were speculating that the NP detection could be just drainage from the nasolacrimal duct but it is hard to tell. Basically, it is an estimated 5 log difference in genome copies detected in the CS vs the NP. I think we should be able to gain some more information via the sequencing run. We are going very deep on the NGS for that one and can see if there are viral subpopulations associated with additional mammalian adaptation. I think it is safe to say that we have some cows that have PB2627K at least that mutation really doesn't make sense to me as a change we got in the human only. I think it is very likely that this was cow to human transmission, as that mutation is less common in birds, it can happen (current Cambodia outbreak), but it isn't as common.

John

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Sunday, March 31, 2024 8:59 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: Ct values and your thoughts

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(b)(5)

(b)(5)

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Sorry to write a lot of thoughts besides my question about the Ct values. Any thoughts?

Thanks,

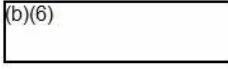
Tim

From: Uyeki, Timothy M. (CDC/NCIRD/ID)
Sent: Wed, 3 Apr 2024 22:00:52 +0000
To: Davis, Charles (Todd) (CDC/NCIRD/ID); Barnes, John R. (CDC/NCIRD/ID)
Subject: RE: Chat later today/evening?

Great, thanks!

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Wednesday, April 3, 2024 6:01 PM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fqz9@cdc.gov>
Subject: RE: Chat later today/evening?

(b)(6)



From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Wednesday, April 3, 2024 6:00 PM
To: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fqz9@cdc.gov>
Subject: RE: Chat later today/evening?

Sounds good. Thanks. What is your number so I can look out – I get Spam calls very frequently!

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Wednesday, April 3, 2024 5:59 PM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fqz9@cdc.gov>
Subject: RE: Chat later today/evening?

Hi Tim.

Headed to my car soon. Can I call you about 6:10?
Todd

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Wednesday, April 3, 2024 5:58 PM
To: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fqz9@cdc.gov>
Subject: RE: Chat later today/evening?

Hi Todd – great work on the technical summary. Any chance we can chat briefly this evening – can be by cell phone when convenient. My CDC cell phone is 404-384-9040, and can receive texts.
If possible, let me know when is good for you and what number I should call you at.
Thanks,
Tim

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Tuesday, April 2, 2024 5:35 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Subject: RE: Chat later today/evening?

Sorry, John/Tim.

Got way laid by this technical report trying to go out.

Will have to catch up later.

-----Original Appointment-----

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>
Sent: Tuesday, April 2, 2024 2:33 PM
To: Barnes, John R. (CDC/NCIRD/ID); Davis, Charles (Todd) (CDC/NCIRD/ID); Uyeki, Timothy M. (CDC/NCIRD/ID)
Subject: Chat later today/evening?
When: Tuesday, April 2, 2024 5:00 PM-5:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

Microsoft Teams [Need help?](#)

[Join the meeting now](#)

Meeting ID: (b)(6)

Passcode: (b)(6)

Dial-in by phone

(b)(6) United States, Atlanta

(b)(6) United States (Toll-free)

[Find a local number](#)

Phone conference ID (b)(6)

For organizers: [Meeting options](#) | [Reset dial-in PIN](#)

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Tuesday, April 2, 2024 2:21 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzg9@cdc.gov>; Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
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Thanks,
Tim

From: Uyeki, Timothy M. (CDC/NCIRD/ID)
Sent: Monday, April 1, 2024 9:22 AM
To: Barnes, John R. (CDC/NCIRD/ID) <fzg9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Ct values and your thoughts

John – thanks, I'm wondering if what is happening is that workers have virus contaminated on their hands whether they are using gloves or not (I don't think gloves are being used) and then touching their face/eyes and that is how conjunctivitis is occurring, rather than inhalation of aerosolized virus – that would explain the absence of respiratory symptoms, and only local (conjunctivae) infection, and the NP detection may not be representative of true infection (also due to lack of or limited alpha 2,3 receptors)

in the nasopharynx. Unfortunately, we won't have virus from cows at the same farm that this worker is working at. Hope the NGS can be informative.

Thanks,
Tim

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>
Sent: Monday, April 1, 2024 9:13 AM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Ct values and your thoughts

Tim,

You are correct in your recollection and we found a similar difference in Ct values during our testing- essentially Conjunctival swab Ct18, NP Ct 33. James, Todd and I were discussing earlier and we were speculating that the NP detection could be just drainage from the nasolacrimal duct but it is hard to tell. Basically, it is an estimated 5 log difference in genome copies detected in the CS vs the NP. I think we should be able to gain some more information via the sequencing run. We are going very deep on the NGS for that one and can see if there are viral subpopulations associated with additional mammalian adaptation. I think it is safe to say that we have some cows that have PB2627K at least that mutation really doesn't make sense to me as a change we got in the human only. I think it is very likely that this was cow to human transmission, as that mutation is less common in birds, it can happen (current Cambodia outbreak), but it isn't as common.

John

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Sunday, March 31, 2024 8:59 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: Ct values and your thoughts

Hi John and Todd – what were the Ct values on the NP and on the conjunctival specimens? When I spoke with Cynthia with the Lubbock TX lab very late Thursday night with Angie Trujillo and Ashely Fowlkes, I recall that her lab found Cts of 32-35 for H5A/H5B, and 17-19 for H5B/H5A. (Although Cynthia specified “ocular” – it was a conjunctival swab.) Hope virus will be isolated from both specimens.

I apologize but because the individual had conjunctivitis and there were other anecdotal reports of conjunctivitis, I recommended both a conjunctival swab and an upper respiratory tract swab - the intent was for H5 testing but also to allow for other respiratory virus testing (e.g., adenovirus). Because I was aware of rare cases of H5N1 conjunctivitis, I did that. Now I am glad I made those recommendations.

My opinion is that in such persons with conjunctivitis, with or without respiratory symptoms, in addition to a conjunctival swab, a combined nasal/throat swab should be collected as well as an NP swab. The reason is that the yield for H5N1 virus is going to be highest in a throat swab and lowest in an NP swab – the opposite is true for detection of seasonal influenza viruses (NP swab is the best clinical specimen).

In trying to understand why this individual has conjunctivitis only without any respiratory symptoms, it's hard for me to believe that aerosolization of virus would only deposit on the conjunctivae without inhalation of small particles into the lower respiratory tract. [REDACTED] (b)(5)

(b)(5)

There's a lot going on in the cow and in the dairy milking environment with equipment, etc., that we don't understand. Critics will say that we don't have proof of cow-to-human transmission; they might even criticize that assessment if we had the identical virus from cows at the same farm the worker with conjunctivitis is working at – but it is highly likely that won't be possible. The analogy is that we refer to avian-to-human transmission (an epidemiological assessment) when H5N1 patients have a history of exposure to sick or dead poultry or visiting a live poultry market. So, I am comfortable with at least saying the case is suggestive of cow-to-human H5N1 virus transmission, although the mechanism is unclear. There's a lot more to learn about H5N1 virus infection and viral shedding in cows, and USDA must have investigated this in more detail, and haven't disclosed this.

Sorry to write a lot of thoughts besides my question about the Ct values. Any thoughts?

Thanks,

Tim

From: Uyeki, Timothy M. (CDC/NCIRD/ID)
Sent: Wed, 3 Apr 2024 22:05:44 +0000
To: Davis, Charles (Todd) (CDC/NCIRD/ID); Barnes, John R. (CDC/NCIRD/ID)
Subject: RE: Chat later today/evening?

CIDRAP piece on the sequences:

<https://www.cidrap.umn.edu/avian-influenza-bird-flu/cdc-sequencing-h5n1-avian-flu-samples-patient-fields-new-clinical-clues>

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Wednesday, April 3, 2024 6:01 PM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fq9@cdc.gov>
Subject: RE: Chat later today/evening?

(b)(6)

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Wednesday, April 3, 2024 6:00 PM
To: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fq9@cdc.gov>
Subject: RE: Chat later today/evening?

Sounds good. Thanks. What is your number so I can look out – I get Spam calls very frequently!

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Wednesday, April 3, 2024 5:59 PM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fq9@cdc.gov>
Subject: RE: Chat later today/evening?

Hi Tim.

Headed to my car soon. Can I call you about 6:10?
Todd

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Wednesday, April 3, 2024 5:58 PM
To: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>; Barnes, John R. (CDC/NCIRD/ID) <fq9@cdc.gov>
Subject: RE: Chat later today/evening?

Hi Todd – great work on the technical summary. Any chance we can chat briefly this evening – can be by cell phone when convenient. My CDC cell phone is 404-384-9040, and can receive texts.
If possible, let me know when is good for you and what number I should call you at.

Thanks,
Tim

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Tuesday, April 2, 2024 5:35 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Subject: RE: Chat later today/evening?

Sorry, John/Tim.

Got way laid by this technical report trying to go out.

Will have to catch up later.

-----Original Appointment-----

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>
Sent: Tuesday, April 2, 2024 2:33 PM
To: Barnes, John R. (CDC/NCIRD/ID); Davis, Charles (Todd) (CDC/NCIRD/ID); Uyeki, Timothy M. (CDC/NCIRD/ID)
Subject: Chat later today/evening?
When: Tuesday, April 2, 2024 5:00 PM-5:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Microsoft Teams Meeting

Microsoft Teams [Need help?](#)

Join the meeting now

Meeting ID: (b)(6)

Passcode: (b)(6)

Dial-in by phone

(b)(6) United States, Atlanta

(b)(6) United States (Toll-free)

[Find a local number](#)

Phone conference ID: (b)(6)

For organizers: [Meeting options](#) | [Reset dial-in PIN](#)

From: Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Sent: Tuesday, April 2, 2024 2:21 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Subject: RE: Chat later today/evening?

Hi Tim/John.

I've got some time from 3:30-4 but then busy from 4-5pm.

Todd

From: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>
Sent: Tuesday, April 2, 2024 2:01 PM
To: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: RE: Chat later today/evening?

I am available. Would love to shade towards 4 (b)(6) .. the fam is already thrilled with me this week.

From: Uyeki, Timothy M. (CDC/NCIRD/ID) <tmu0@cdc.gov>
Sent: Tuesday, April 2, 2024 12:08 PM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
Subject: Chat later today/evening?

John and Todd – any chance to chat briefly (15-20 minutes) late this afternoon or this evening? I might be free after 4 PM and am happy to chat in the early evening, whenever is convenient for you guys.

Thanks,

Tim

From: Uyeki, Timothy M. (CDC/NCIRD/ID)
Sent: Monday, April 1, 2024 9:22 AM
To: Barnes, John R. (CDC/NCIRD/ID) <fzq9@cdc.gov>; Davis, Charles (Todd) (CDC/NCIRD/ID) <eou8@cdc.gov>
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John – thanks, (b)(5)

(b)(5)

(b)(5)

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(b)(5)

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Thanks,
Tim

From: Uyeki, Timothy M. (CDC/NCIRD/ID)
Sent: Wed, 17 Apr 2024 04:54:25 +0000
To: Clinical Management Team Meetings; VIRY, Julie; MCGLOUGHLIN, Steven
Cc: MCGLOUGHLIN, Steven; RYLANCE, Jamie; DIAZ, Janet Victoria; Yee Sin Leo; Guyatt, Gordon
Subject: RE: Clinical management of influenza guideline - GDG review
Attachments: guideline_7825-0_0-202403291247_watermark Tim Uyeki All comments.pdf
Importance: High

All – I added a lot of minor suggested edits and corrections in addition to what I had previously sent up through page 16. The attached version has edits and corrections after page 16 - I presume that my suggested edits to the recommendations through page 16 will be applied to the same recommendations sections later in this guideline document so I did not repeat those suggested edits and comments in the more detailed later sections. Needs to be more consistency in use of terms throughout.

Thanks,
Tim

From: Uyeki, Timothy M. (CDC/NCIRD/ID)
Sent: Sunday, April 7, 2024 4:32 PM
To: Clinical Management Team Meetings <CMTM@who.int>; VIRY, Julie <viryj@who.int>
Cc: MCGLOUGHLIN, Steven <mcglooughlins@who.int>; RYLANCE, Jamie <rylancej@who.int>; DIAZ, Janet Victoria <diazj@who.int>; Yee Sin Leo <yee_sin_leo@ncid.sg>; Guyatt, Gordon <guyatt@mcmaster.ca>
Subject: RE: Clinical management of influenza guideline - GDG review

Thanks for sharing – great to see this. I attached suggested minor edits for consideration to the recommendations up through page 16. It may take me a while (likely another 7-10 days to have time to review the entire document and the testing evidence) because of the situation with highly pathogenic avian influenza A(H5N1) virus infections of dairy cows in multiple U.S. states and one confirmed human case to date (mild illness) – I believe some cases have been missed. We are in a Center response (fortunately not an all-CDC response) and there is a ton of stuff going on with many meetings and urgent guidance documents that I am involved with. Therefore, I wanted to at least send edits for consideration on the recommendations first and will try to review the rest of the document as I have time. (Not sure when I will have time to work on my tax returns before the deadline in one week and that will be a priority.....)

Thanks,
Tim

From: Clinical Management Team Meetings <CMTM@who.int>
Sent: Friday, March 29, 2024 9:06 AM
Subject: Clinical management of influenza guideline - GDG review

CAUTION: This email originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Dear GDG colleagues,

We are delighted to share with you the draft Clinical management of influenza guideline for your review, with recommendations for :

- patients with non-severe symptomatic influenza (section 8),
- patients with severe symptomatic influenza (section 9),
- antivirals for preventing influenza among persons with exposure to influenza virus but without infection (section 10),
- diagnostic testing strategies to diagnose influenza virus in patients with suspected influenza (section 11)

You will notice in the guideline we now have received the review of observational studies and included a sentence in the guideline for both:

- Risk Factors review (section 6.1) - attached
- Prognosis review (section 6.2) - to be shared shortly

Please review these sections closely and we have also included the slide deck that was provided by the systematic reviewers.

Kindly review the draft guideline attached and share your feedback with us by **COB Tuesday 9 April** if it is feasible.

Many thanks in advance for your continued support.

Warm regards,

On behalf of Janet DIAZ, Lead Clinical Management team,

Julie

