National Center for Immunization and Respiratory Diseases (NCIRD)

CDC's Flu Surveillance Systems Can Detect Avian Influenza A(H5N1) Virus Infections

May 8, 2024, 5:15 PM EDT

Updates on respiratory illness and vaccine-preventable diseases.

The world is watching an outbreak of avian influenza A(H5N1) viruses among U.S. dairy cows with spread between cows, to other animals, and one reported human case. Dairy cows are a new and unexpected host of this virus, which has been spreading mostly among wild birds and poultry in the United States since January 2022, with sporadic infections in other species. The emergence of this virus in a new animal host impacts a new part of agriculture requiring the development of new processes and trusted partnerships. And the potential for this virus to spread in new or different ways between animals or to people poses new public health challenges.

Some have questioned whether public health is able to watch this virus closely enough that it can detect important changes in a timely way.

CDC uses many flu surveillance systems, which provide visibility over whether this virus is spreading in people, and which are being fine-tuned and expanded with supplemental studies and analysis for the current situation. These public health systems are routinely used to detect rare events, like single human infections with flu viruses that usually spread in pigs, but when coupled with monitoring of exposed people and analysis of animal sequences associated with this bovine outbreak, this system is further enhanced to detect transmission and early changes in this virus.

- CDC monitors influenza activity, including that caused by novel influenza viruses like avian influenza A(H5N1) through the following methods:
    - Monitoring through existing flu surveillance systems
        - Surveillance for Novel Influenza A Viruses
        - Virologic Surveillance: U.S. WHO Collaborating Laboratories System and
            - National Respiratory and Enteric Virus Surveillance System (NREVSS)
        - U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet)
        - Influenza Hospitalization Surveillance Network (FluSurv-NET)
        - National Healthcare Safety Network (NHSN) Hospitalization Surveillance
        - National Center for Health Statistics (NCHS) Mortality Surveillance Data
        - Influenza-Associated Pediatric Mortality Surveillance System
        - National Syndromic Surveillance Program (NSSP)
        - National Wastewater Surveillance System (NWSS)
    - Outbreak specific activities
        - Human monitoring and testing in states
        - Enhanced flu surveillance
        - Planned epidemiologic studies

CDC's flu surveillance is a comprehensive and collaborative effort which includes multiple systems that monitor indicators of flu activity, such as illnesses, hospitalizations, and deaths due to flu. These systems are used to monitor for signals and trends in seasonal as well as novel influenza virus infections. Influenza viruses can undergo abrupt, major changes ("antigenic shift")

that result in a novel (new) influenza virus that is different from currently circulating human seasonal influenza viruses. This system is also optimally designed to detect a rare event/novel influenza virus among influenza positive surveillance specimens tested at public health laboratories in all states for effective intervention and control measures. Together, the multiple components of CDC's surveillance systems described below can detect this and inform the public health response.

Surveillance for Novel Influenza Viruses

Human cases of novel flu are nationally notifiable, which means CDC, states and Council of State and Territorial Epidemiologists (CSTE) agree that cases associated with a novel influenza virus should be reported to CDC and investigated. CDC publicly reports information about these human cases. This is important to facilitate prompt awareness and accelerate the implementation of public health responses to limit the spread and impact of these novel viruses.

Virologic Surveillance

In all 50 states, more than 100 public health laboratories use a number of different CDC diagnostic tests to detect both seasonal influenza viruses and novel influenza A viruses, including a test that specifically detects A(H5) viruses. About 140,000 of these H5-specific tests are already pre-positioned at the state and local level and another 750,000 tests are available for distribution if needed. CDC also continues to engage manufacturers of commercial diagnostic tests with the goal of having an A(H5N1) test that is widely available if needed.

Because influenza viruses are constantly changing, CDC performs ongoing analyses of seasonal and novel influenza viruses to identify genetic changes that might allow for spread more easily to and between people, more serious illness in people, reduce susceptibility to antivirals, affect the sensitivity of diagnostic assays, or reduce neutralization of the virus by vaccine induced antibodies. For this A(H5N1) response, CDC sequenced, analyzed, and publicly posted the full genome of the virus from the human case in Texas and has analyzed hundreds of posted cattle sequences to inform the agency's ongoing public health risk assessment. To date, both the human and the cattle sequences remain primarily avian viruses and lack changes that would make them better adapted to spread between people. Ongoing analysis of specimens received from public health laboratories also serve as an important source of viruses to create candidate vaccine viruses for potential vaccine development, and CDC also analyzes these specimens for susceptibility to influenza antivirals.

CDC monitors for unusual increases in flu activity by tracking the percentage of specimens tested that are positive for influenza viruses based on data reported from approximately 300 clinical laboratories located throughout all 50 states, Puerto Rico, Guam, and the District of Columbia.

Data are reported through either the U.S. WHO Collaborating Laboratories System or National Respiratory and Enteric Virus Surveillance System (NREVSS).

Surveillance of Flu Illness Activity

- U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet) collects information from more than 4,100 outpatient providers and emergency departments about visits for respiratory illness referred to as influenza-like illness (ILI).
- Influenza Hospitalization Surveillance Network (FluSurv-NET) is part of the Respiratory Virus Hospitalization Surveillance Network (RESP-NET), which is designed to conduct population-based surveillance for laboratory-confirmed flu, COVID-19, and respiratory syncytial virus (RSV)-associated hospitalizations.
- National Healthcare Safety Network (NHSN) Hospitalization Surveillance collects the number of flu-associated hospital admissions, ICU hospitalizations, and hospital admissions rates from hospitals throughout the United States.
- National Syndromic Surveillance Program (NSSP) collects, analyzes, and shares electronic health data received from emergency departments (EDs). By tracking all flu diagnoses among patients in EDs, public health practitioners can detect unusual levels of flu in near real-time.
- National Wastewater Surveillance System (NWSS) has more than 600 sites reporting influenza A data to CDC. This monitoring detects but does not distinguish influenza A(H5N1) from other influenza A subtypes nor can it distinguish between human and non-human sources of A(H5N1), including dairy cattle or run-off from affected industries.

Together, these systems provide strong insight into flu activity in the United States, and collectively, for the most recent week, they currently show no indicators of unusual flu activity in people, including A(H5N1).

In response to the outbreak of A(H5N1) in dairy cows and other animals in the United States, CDC is developing additional surveillance and research activities to help address key public health questions. CDC is in 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 is maintaining multilingual and multidisciplinary epidemiological field teams ready to deploy to support on-site studies when requested. The purpose of this work, alongside our interagency partners including the US Department of Agriculture, US Department of Health and Human Services, Food and Drug Administration, and National Institutes of Health, is to better understand the current outbreak in animals and the public health and One Health implications of the emergence of this virus in dairy cattle.

There's more work to do to ensure our nation has the best possible visibility into potential human infections. The dairy industry represents a new sector within U.S. agriculture exposed to this virus, and CDC is in the process of building new relationships and the trust needed to have uniform access to developments in the field, across every impacted state and to provide support where and when needed. That work is urgent and underway. It is imperative that we curtail the opportunities for A(H5N1) viruses to spread further and evolve to pose a greater risk to the public's health. Protecting public health, and in this situation in particular, the health of the people at greatest risk of infection, is a vital priority, and testing is critical in the long term to stay ahead of avian flu.

Actions for the Public

- CDC believes the current risk to the general public remains low; however, people with close or long unprotected exposures (without the use of personal protective equipment, or PPE) to infected birds or other animals (including livestock), or to environments contaminated by infected birds or other animals, are at greater risk of infection.
    - People exposed to A(H5N1)-infected birds or other animals (including people wearing recommended PPE) should be monitored for signs and symptoms of acute respiratory illness beginning after their first exposure and for 10 days after their last exposure.
    - Persons who develop any illness symptoms after exposure to A(H5N1) virus infected birds or other animals should seek prompt medical evaluation for possible influenza testing and antiviral treatment by their clinician or public health department.
    - The FDA and USDA have indicated that based on the information currently available, the U.S. commercial milk supply is safe, however, A(H5N1) viruses have been detected in raw milk. The FDA has a long-standing recommendation to consumers not to consume raw milk (milk that has not been pasteurized) or raw milk products.
- Specific recommendations for farmers; poultry, backyard flock, and livestock owners; and worker protection are also available.
- More information on protective actions for people is available at H5N1 Bird Flu: Current Situation Summary | Avian Influenza (Flu) (cdc.gov).

Last Reviewed: May 8, 2024