

Special Pathogen Outbreak Situation Report:

Highly Pathogenic Avian Influenza

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Medicine

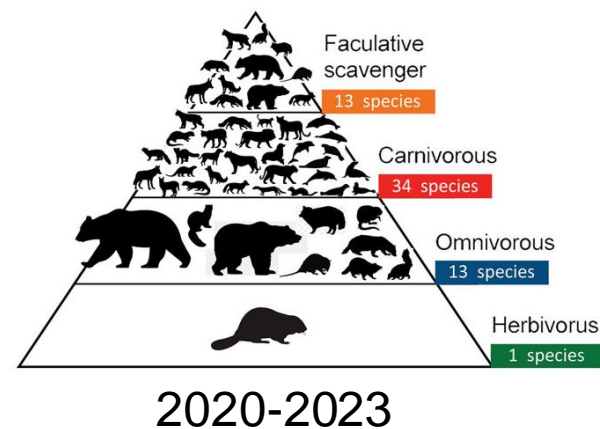
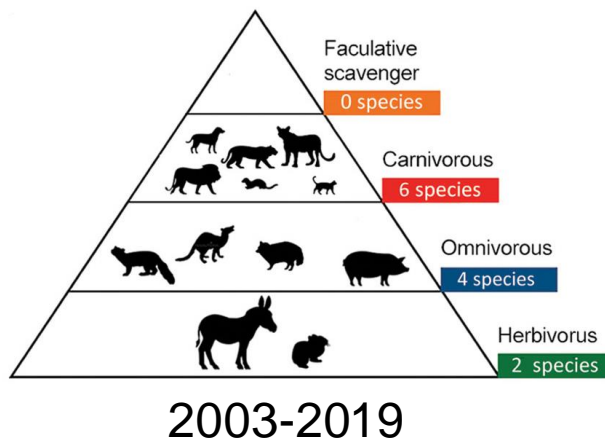
Influenza A in Birds

- Low Pathogenic Avian Influenza (LPAI)
 - Asymptomatic or mild disease in birds
 - Can mutate into HPAI
- Highly Pathogenic Avian Influenza (HPAI)
 - Severe disease with high mortality in birds
 - Can affect different birds differently- H5/H7 viruses have close to 100% mortality in chickens, but ducks tend to be asymptomatic
- Rapid spread through poultry flocks
- Over 100,000,000 birds in 48 US states affected since January 2022



Influenza A(H5N1) in Mammals

- 26 countries have reported >48 mammal species infected with Influenza A(H5N1)
- Potential sources of infection
 - Close contact with infected birds
 - Mammal to mammal transmission
 - Contaminated equipment



Influenza A(H5N1) in Humans

- Human infections with HPAI A(H5N1) virus have been reported in 23 countries since 1997
 - About 900 total cases
 - Severe pneumonia and death in about 50% of cases
- Spillover to humans has been associated with close contact with infected animals, particularly poultry
 - Birds shed the virus in saliva, mucous and feces
 - Humans are exposed through the respiratory tract or mucous membranes
- What is the risk?
 - Sporadic infections, but no sustained human-to-human transmission noted for H5N1 yet
 - If this occurs, there is pandemic potential
 - Historic precedent: 1918 influenza “Spanish Flu” (H1N1) likely had avian origins



Cumulative number of confirmed human cases[†] for avian influenza A(H5N1) reported to WHO, 2003-2024

Country	2003-2009*		2010-2014*		2015-2019*		2020		2021		2022		2023		2024		Total	
	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths	cases	deaths
Azerbaijan	8	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	8	5
Bangladesh	1	0	6	1	1	0	0	0	0	0	0	0	0	0	0	0	8	1
Cambodia	9	7	47	30	0	0	0	0	0	0	0	0	6	4	5	1	67	42
Canada	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Chile	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
China	38	25	9	5	6	1	0	0	0	0	1	1	1	0	0	0	55	32
Djibouti	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Ecuador	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Egypt	90	27	120	50	149	43	0	0	0	0	0	0	0	0	0	0	359	120
India	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	1	1
Indonesia	162	134	35	31	3	3	0	0	0	0	0	0	0	0	0	0	200	168
Iraq	3	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	2
Lao People's Democratic Republic	2	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	3	2
Myanmar	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Nepal	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	1
Nigeria	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Pakistan	3	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1
Spain	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0
Thailand	25	17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25	17
Turkey	12	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	12	4
United Kingdom	0	0	0	0	0	0	0	0	1	0	0	0	4	0	0	0	5	0
United States of America	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0
Viet Nam	112	57	15	7	0	0	0	0	0	0	1	0	0	0	0	0	128	64
Total	468	282	233	125	160	48	1	0	2	1	6	1	12	4	5	1	887	462

*2003-2009, 2010-2014 and 2015-2019 total figures. Breakdowns by year available on subsequent tables.

[†]This count includes reported detections in asymptomatic individuals. In some cases, the confirmation of infection versus transient contamination of the nasopharynx/oropharynx with virus particles after exposure to infected birds or contaminated environment remains inconclusive. Total number of cases includes number of deaths.

WHO reports only laboratory-confirmed cases. All dates refer to onset of illness.

Source: WHO/GIP, data in HQ as of 26 February 2024.

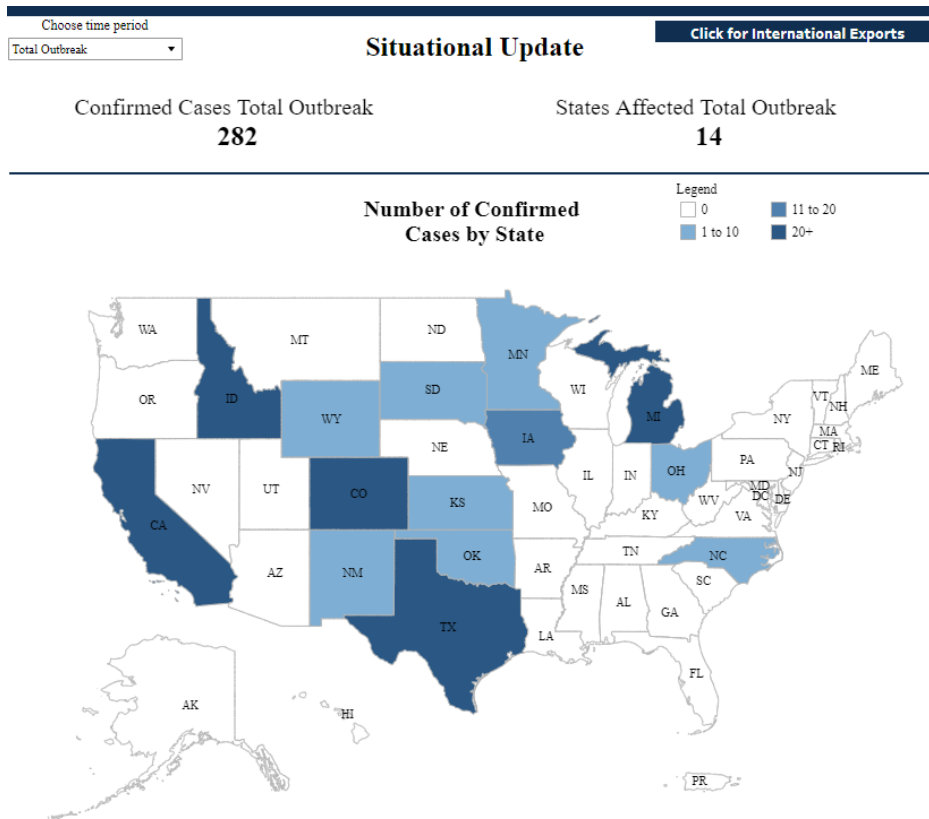


Case fatality rate = 52%



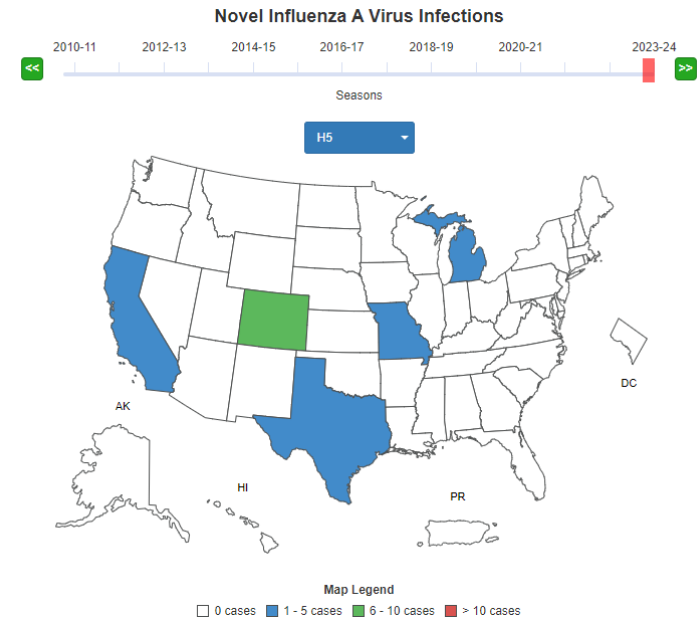
Influenza A(H5N1) in Cattle

- Currently 14 US States have Influenza A(H5N1) outbreaks in dairy cattle
 - Spread between herds, into nearby poultry flocks, and barn cats



Human cases of Avian Influenza in the US

- A person tested positive for Influenza A(H5N1) in 2022 in Colorado
 - Direct exposure to infected poultry
 - Symptoms included fatigue
 - Treated with oseltamivir, recovered
- Thus far, 16 human cases have been reported in the US this year
 - 15 had occupational exposure to dairy cattle or infected poultry
 - One patient in Missouri with no known contact with cattle or poultry
 - 7 additional contacts (6 HCWs) reported illness- serology pending
 - All presented with conjunctivitis and/or respiratory symptoms
 - All patients have recovered



Conjunctivitis with subconjunctival hemorrhage (Uyeki et al. NEJM 2024)



Influenza A(H5N1): Investigation

- CDC/USDA/FDA/other agencies are working together
 - Various public health teams are investigating the outbreak
 - Testing of dairy and poultry farm workers in order to understand occupational risk factors
 - >5000 people monitored
 - 240 people tested
 - Testing of cows and milk supply
 - Surveillance of other species (wild and farm)
 - Viral sequencing
 - No major changes were identified in patient vs cattle specimens
 - No markers of antiviral resistance

The New York Times

Person Infected With Bird Flu in Texas After Contact With Cattle

The case adds another worrying wrinkle to a global outbreak that has devastated bird and marine mammal populations, and recently appeared in cattle herds.

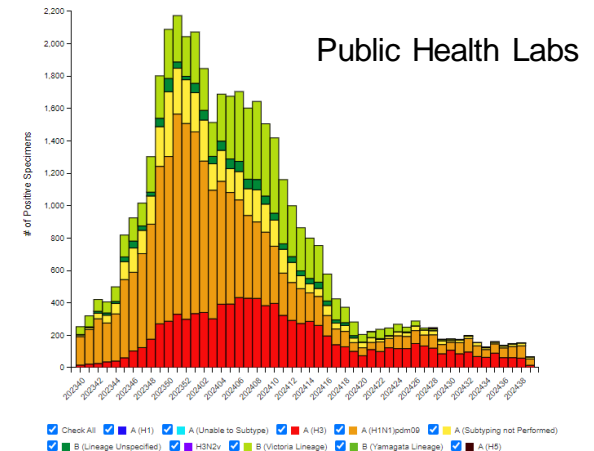
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Influenza A(H5N1): Investigation

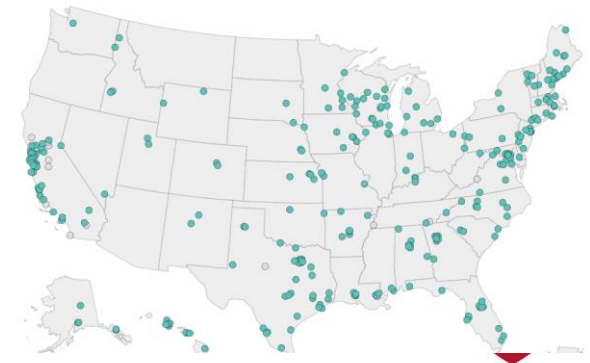
- Monitoring of Influenza-Like Illness (ILI) diagnoses, ED visits and diagnostic test utilization (in humans)- no uptick noted yet
 - Public health labs, clinical labs
- Wastewater surveillance- 600 sites
 - Limitation: source (human vs animal vs product) not determined
- USDA/HHS providing financial assistance to producers to support increased biosecurity
 - Still some reluctance to report...

Influenza Positive Tests Reported to CDC by Public Health Laboratories, National Summary, 2023-24 Season, week ending Sep 28, 2024



Click on the legend below to see detections.

Wastewater Surveillance



How safe is the milk supply?

- Viral genetic material found in retail milk (raw as well as pasteurized)
 - ‘Genetic material’ does not mean “live virus”
 - FDA/USDA are “confident in the pasteurization process”
 - Viral culture on pasteurized milk and other products has been negative thus far
 - FDA has recommended that the dairy industry not manufacture or sell raw milk or raw milk products from infected or exposed cows
- What does this mean?
 - The virus is likely more widespread than initially thought
 - Nationwide surveillance is being conducted, looking at all stages of milk production
 - 99% of milk produced on dairy farms and sold in stores undergoes pasteurization



What to know about the bird flu outbreak in the US after virus fragments found in milk samples



How safe is the meat supply?

- USDA evaluated ground beef
 - Retail beef has tested negative thus far
 - Study where H5N1 was inoculated into ground beef patties (May 2024)
 - Burger patties were cooked to three different temperatures (120, 145 and 160 degrees Fahrenheit), and virus presence was measured after cooking.
 - **There was no virus present in the burgers cooked to 145 (medium) or 160 (well done) degrees**

Healthcare & Pharmaceuticals

Properly cooked hamburgers pose no bird flu risk, US study finds



By Tom Polansek and Julie Steenhuisen


May 17, 2024 9:04 AM CDT · Updated 5 days ago



[nature](#) > [articles](#) > article

Article | Published: 25 September 2024

H5N1 clade 2.3.4.4b dynamics in experimentally infected calves and cows

[Nico Joel Halwe](#), [Konner Cool](#), [Angele Breithaupt](#), [Jacob Schön](#), [Jessie D. Trujillo](#), [Mohammed Nooruzaman](#), [Taeyong Kwon](#), [Ann Kathrin Ahrens](#), [Tobias Britzke](#), [Chester D. McDowell](#), [Ronja Piesche](#), [Gagandeep Singh](#), [Vinicius Pinho dos Reis](#), [Sujan Kafle](#), [Anne Pohlmann](#), [Natasha N. Gaudreault](#), [Björn Corleis](#), [Franco Matias Ferreyra](#), [Mariano Carossino](#), [Udeni B. R. Balasuriya](#), [Lisa Hensley](#), [Igor Morozov](#), [Lina M. Covaleda](#), [Diego Diel](#), ... [Juergen A. Richt](#)  [+ Show authors](#)

- In dairy cows:
 - No nasal shedding
 - Severe mammary gland infection (necrotizing mastitis), high fever
 - Rapidly compromised milk production
 - Very high viral titers in milk
 - Milk and milking procedures (not respiratory spread) are likely the primary route of transmission between cattle



Preprint

A One Health Investigation into H5N1 Avian Influenza Virus

Epizootics on Two Dairy Farms

Ismaila Shittu, PhD^{1†}, Diego Silva, MD^{1†}, Judith U. Oguzie, DVM¹, Lyudmyla V. Marushchak, PhD¹, Gene G. Olinger, PhD², John A. Lednicky, PhD³⁻⁴, Claudia M. Trujillo-Vargas, PhD¹, Nicholas E. Schneider, DVM⁵, Haiping Hao, PhD⁶ and Gregory C. Gray, MD^{1,7-9}

- Researchers from the University of Texas Medical Branch studied 2 Texas dairy farms with previous H5N1 outbreaks
 - Collected multiple specimens from cows, milk and farm workers
 - H5N1 detected in 64% of milk, 2.6% of cows
 - 2 farm workers with a history of recent respiratory illness had elevated neutralizing antibodies
 - One worked in the cafeteria at the farm and reported being around others who were ill

“I am very confident there are more people being infected than we know about.” Dr. Gregory Gray, UTMB



Guidance for Healthcare Facilities and Clinicians

2 attractions pulled from Iowa State Fair due to avian influenza concerns

Story by Griffin Wright • 1h • 2 min read

Health Topics mentioned in this article

+4 Q&A: Bird Flu

+110 Q&A: Flu



Identify, Isolate and Inform

- Avian Influenza can present like any other viral illness with acute respiratory illness and/or conjunctivitis
 - Mild illness: (e.g., cough, sore throat, conjunctivitis, fever, rhinorrhea, fatigue, myalgia, arthralgia, headache, gastrointestinal manifestations)
 - Moderate to severe illness: (e.g., shortness of breath, altered mental status, seizures, other severe symptoms)
- Key Steps:
 - Suspicion of a viral syndrome
 - Ask about epidemiologic risk



Identify, Isolate and Inform

CDC: Consider the possibility of infection with novel influenza A viruses with the potential to cause severe disease in humans in patients who present with influenza-like illness (ILI) or acute respiratory infection (ARI)

AND

- Persons who have had contact with potentially infected sick or dead birds, livestock, or other animals within the week before symptom onset
 - Handling, slaughtering, defeathering, butchering, culling, preparing for consumption or consuming uncooked or undercooked food or related uncooked food products, including unpasteurized (raw) milk or other unpasteurized dairy products
- Direct contact with water or surfaces contaminated with feces, unpasteurized (raw) milk or unpasteurized dairy products, or parts (carcasses, internal organs, etc.) of potentially infected animals
- Persons who have had prolonged exposure to potentially infected birds or other animals in a confined space
- Exposure to a person who is a confirmed, probable, or symptomatic suspected case of human infection with H5N1



Identify, Isolate and Inform

- Our approach at Nebraska Medicine
 - Caveat: this is not a ‘one size fits all’ situation
 - We assess ‘fever, cough, or rash’ as well as history of travel at intake on all patients
 - If a patient answers ‘yes’ to the symptom questions, a mask is provided and the patient is triaged according to symptoms and severity of illness

AVIAN INFLUENZA A (H5N1) SCREENING PROTOCOL

REMINDER: ONE CHART GENERAL TRAVEL SCREENING for all patients entering a Nebraska Medicine facility will continue but is NOT Avian Influenza specific at this time.

- Further assessment (by provider)
 - “Have you or an immediate family member had direct contact with cows, poultry, or wild birds in the last 14 days?”
 - We will consider adding additional questions if circumstances or risk factors change
 - More human cases, sustained transmission, local cases
 - Cases linked to consumption of raw milk or other products
 - Other factors...



Identify, Isolate and Inform

- Place a mask on the patient
- Isolate the patient and utilize appropriate PPE
 - Standard, contact, and airborne precautions
 - Gown, N95 respirator, eye protection, gloves
 - Meticulous hand hygiene
 - Preference for an airborne infection isolation room (AIIR) if available
 - If AIIR is not available, place the patient in a private room with the door closed, and the patient should continue to wear a mask
- Environmental infection control considerations
 - Standard cleaning and disinfection
 - Waste is Category B

[Health Alert Network \(HAN\) - 00506 | Highly Pathogenic Avian Influenza A\(H5N1\) Virus: Identification of Human Infection and Recommendations for Investigations and Response \(cdc.gov\)](#)

[Highly Pathogenic Avian Influenza A\(H5N1\) Virus in Animals: Interim Recommendations for Prevention, Monitoring, and Public Health Investigations | Avian Influenza \(Flu\) \(cdc.gov\)](#)



Identify, Isolate and Inform

- ✓ Notify Infection Control and follow available local guidance
- ✓ Notify appropriate medical teams who will care for the patient
- ✓ Notify appropriate hospital/departmental leaders
- ✓ Notify state and local health departments to discuss the scenario and arrange for testing for influenza A(H5N1)



Patient Management: Testing

- Available at CDC/Public Health Labs
- No currently available commercial lab assays
 - This may change
- Consult your local lab for guidance on testing algorithm
 - Antigen tests and some PCR tests will not differentiate subtypes

*Local Example: On the respiratory pathogen panel (RPP) **at our institution**, there are four possible results for influenza A:

Influenza A (no subtype)

Influenza A H1

Influenza A H1-2009

Influenza A H3

*Avian Influenza will come back as Influenza A (no subtype), which should trigger further evaluation



Patient Management: Testing

- Discuss the specifics of specimen collection with the health department to ensure appropriate specimens are collected, packaged and transported
 - Recommend: (i) a nasopharyngeal swab, or (ii) a nasal aspirate or wash, or (iii) two swabs combined into one viral transport media vial (e.g., a nasal or nasopharyngeal swab combined with an oropharyngeal swab).
 - A single nasal or oropharyngeal swab is also acceptable.
 - For patients with severe lower respiratory tract illness, a lower respiratory tract specimen (e.g., an endotracheal aspirate or bronchoalveolar lavage fluid) should be collected
 - Specimens should be placed into sterile viral transport media and immediately placed on refrigerant gel-packs or at 4°C (refrigerator) for transport to the laboratory.
 - If the patient has conjunctivitis (with or without respiratory symptoms) collect a conjunctival swab for testing



Patient Management: Treatment

- If there is a high suspicion for influenza A(H5N1), initiate empiric antiviral treatment
 - Do not delay treatment while awaiting laboratory results
 - Treat regardless of duration of illness
 - Oseltamivir 75 mg po twice daily x 5 days
 - Longer treatment courses can be considered for severely ill patients
 - Prophylaxis dose for close contacts is the same as the treatment dose (*Note: this is different from seasonal influenza*)



Healthcare & Pharmaceuticals | Biopharma

Sanofi, GSK, CSL tapped to expand US bird flu vaccine supply

By Reuters

October 4, 2024 5:20 PM CDT · Updated 2 days ago



Resources



Resources on Current H5N1 Outbreak:

- [Health Alert Network \(HAN\) - 00506 | Highly Pathogenic Avian Influenza A\(H5N1\) Virus: Identification of Human Infection and Recommendations for Investigations and Response \(cdc.gov\)](#)
- [NETEC: Identify, Isolate, and Inform](#)
- [Introduction to the 2024 Joint Commission Standards for Infection Control](#)
- [The Transmission](#) – Unofficial H5N1 Map
- [PPE from A to Z: PAPRs for Respiratory Protection](#)

Special Pathogen

Outbreak Information:

- [The Program for Monitoring Emerging Diseases \(ProMED\)](#)
- The Transmission (UNMC Global Center for Health Security) - [Subscribe](#) to weekly email!
- [CDC Health Alert Network](#) – Sign up for [Email Updates](#)

NETEC

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NETEC Consultation Resources (Assess your readiness) :

- [NETEC SPORSA - Hospitals](#)
- [NETEC SPORSA - EMS](#)
- [NETEC Long Term Care Workbook](#)

Region 7 RESPTC:

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