

MONTHLY SCIENTIFIC REVIEW **ON AVIAN INFLUENZA A (H5N1, H1N1, H3N2)**

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All informations comes from a valid and credible source.

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Situation at a glance

- In 2026, Cambodia reported 5 human cases of A(H5N1), including 1 death.
- In 2025, 18 human cases of A(H5N1) occurred in Cambodia, including 9 deaths, and 30 cases were reported globally. No human-to-human transmission has been identified.
- On 25 March, the first human case of A(H9N2) in Europe was reported in Italy, in a traveler returning from a non-European country.
- In late June, a case of avian influenza H5N1 was detected in a bird in Western Australia. This is the first time this H5 subtype (H5N1, clade 2.3.4.4b) has been identified in an animal in Australia.

Scientific articles

This section presents relevant articles published on peer-reviewed scientific journals or pre-print platforms.

2026-06-29

Sex differences in vaccine-induced neuraminidase cross-recognition and protection against H5N1 in mice.

Journal: bioRxiv

Authors: Sabal Chaulagain, Annie Werner, Maclaine A Parish, Sattya Narayan Talukdar, Brittany A Seibert, Tianle Zhang, Jennifer A Liu, Cosette Schneider, Lynda Coughlan, Andrew Pekosz, Sabra L Klein

Female mice exhibit stronger vaccine-induced IgG responses than males, particularly against neuraminidase (NA), with enhanced IgG2b titers and FcγRIV binding, leading to greater NA inhibition and faster viral clearance after H5N1 challenge. These sex differences in NA-spe

[See details](#)

2026-07-25

Contribution of E190D and Q226H Mutations in HA to the Receptor-Binding Profile of D1.1 Genotype H5N1 Viruses.

Journal: Influenza Other Respir Viruses

Authors: Yang Fang, Lei Yang, Shumei Zou, Liqi Liu, Wenfei Zhu, Dayan Wang

HA-E190D and HA-Q226H mutations in D1.1 H5N1 viruses were evaluated for receptor binding. E190D slightly reduced $\alpha 2,3$ -sialic acid affinity; Q226H impaired both $\alpha 2,3$ and $\alpha 2,6$ binding. Neither mutation enhances human receptor binding, suggesting limited potential for increased human transmissibility and public health risk at present.

[See details](#)

2026-07-14

High pathogenicity avian influenza A (H5N1) viruses isolated from poultry and wild birds in Japan during the 2024-2025 season.

Journal: Microbiol Spectr

Authors: Yoshihiro Takadate, Hayate Nishiura, Asuka Kumagai, Junki Mine, Ryota Tsunekuni, Saki Sakuma, Kosuke Soda, Mana Esaki, Kosuke Okuya, Kei Nabeshima, Takahiro Hiono, Hiroki Takakuwa, Tatsufumi Usui, Makoto Ozawa, Manabu Onuma, Norikazu Isoda, Yoshihiro Sakoda, Yuko Uchida, Kohtaro Miyazawa

H5N1 HPAI viruses in Japan (2024–2025) belonged to clade 2.3.4.4b subgroups G2d and G2c, with 11 genotypes; G2d-0 was dominant. Reassortment generated novel genotypes. All showed high pathogenicity in chickens, with G2d-0 and G2c-13 exhibiting high shedding, indicating st

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2026-06-05

Antibody Transcytosis and Neutralizing Activity in Respiratory Epithelial Cells.

Journal: bioRxiv

Authors: Eduardo U Anaya, Yee Vue, Maggie Li, Jessica D Resnick, Nico J Swanson, David J Sullivan, Andrew Pekosz

Serum-derived IgG and IgA specific for SARS-CoV-2 and influenza A virus undergo FcRn- and pIgR-mediated transcytosis across human nasal and bronchial epithelial cells, with IgG more efficient in basal cells and IgA in nasal cells. Both retain neutralizing activity post-tr

[See details](#)

2026-07-21

Genomic Characterization and Structural Insights Into the Evolution of Influenza A(H1N1)pdm09 in Northeast India From 2009 to 2024.

Journal: J Med Virol

Authors: Neelanjana Sarmah, Aktarul Islam Siddique, Mousumi Dutta, Sobnom Gogoi, Parismita Borah, Parishmita Boruah, Dimpu Gogoi, Aniruddha Jakharia, Nargis K Bali, Nalini Sharma, Clarissa Jane Lyndoh, Biswajyoti Borkakoty

Long-term genomic surveillance of Influenza A(H1N1)pdm09 in Northeast India (2009–2024) reveals persistent HA mutations (e.g., S202I, K71Q, N146D) and clade 6B.1A.5a.2a dominance. Acquisition of a new N-glycosylation site at residue 179 post-2017 and epitope-altering subs

[See details](#)

2026-07-23

Oseltamivir Resistance in Human Influenza A(H5N1) and A(H7N9) Infections: A Mini Review.

Journal: Open Forum Infect Dis

Authors: Yacine Abed, Guy Boivin

Oseltamivir resistance in human A(H5N1) and A(H7N9) infections is driven by subtype-specific neuraminidase mutations—H274Y and N294S in H5N1, R292K in H7N9—compromising treatment efficacy. Despite antiviral use, severe outcomes and high mortality persist, underscoring the urgent need for enhanced therapeutic strategies against these avian influenza viruses.

[See details](#)

2026-07-22

Molecular Surveillance and Genomic Characterization of Influenza A(H3N2) Viruses From a Secondary-Care Surveillance Site in Pakistan During the 2025-2026 Winter Season.

Journal: J Med Virol

Authors: Aamir Javed, Jamal Hayat, Syed Adnan Haider, Zunera Jamal, Rabia Hakim, Qasim Ali, Mir Muhammad Hassan Bullo, Muhammad Tahir, Muhammad Salman, Yusra Javed, Yasir Waheed, Massab Umair

Influenza A(H3N2) dominated ILI cases in Islamabad (24.1%) during 2025-2026, primarily affecting 11-20-year-olds. Whole-genome sequencing of 21 isolates identified subclade K (52.4%) as predominant, clustering with recent global strains and WHO-recommended 2026-2027 vacci

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2026-06-05

The Q226H Mutation in Avian H5N1 Hemagglutinin Mediates a Path towards Structural Adaptation in Humans.

Journal: bioRxiv

Authors: Ross A Edwards, Oluwafemi F Adu, Egor P Tchesnokov, Dana Kocincova, Emma Woolner, Zoe Turner, Duong T Bui, Lara K Mahal, Nathan Zelyas, John S Klassen, Andrei P Drabovich, Kalyan Das, Matthias Götze

The Q226H mutation in avian H5N1 hemagglutinin enables binding to human α 2-6 sialic acid receptors, facilitating potential human adaptation. Cryo-EM structures reveal conformational changes in glycan binding, indicating a structural pathway for host switching. Pre-existin

[See details](#)

2026-07-24

Mapping Reported Modes of Transmission of Highly Pathogenic Avian Influenza A (H5N1) to Humans: A Scoping Review.

Journal: One Health

Authors: Nicole Billias, Victoria D'Alessandro, Dimitra V Pouliopoulou, Jessica J Wong, Erin Miller, Jessica P Hopkins, Eleni C Boutsikari, Lauren E Cipriano, Tiago da Veiga Pereira, Jennie Johnstone, Saverio Stranges, J Scott Weese, Joy C MacDermid, Kieran L Quinn, David N Fisman, Pavlos Bobos

This scoping review identified 120 sources reporting H5N1 transmission to humans, with animal-to-human (90.8%), environment-to-human (26.7%), and human-to-human (11.7%) routes. Entry occurred via mucosal surfaces, inhalation, ingestion, or percutaneous exposure. Findings

[See details](#)

2026-07-27

Porcine Airway Organoids Reveal Strain-Associated Replication and Epithelial Host Response Signatures of a Reassortant H1N1 Virus.

Journal: Emerg Microbes Infect

Authors: Hyewon Lee, Yeojin Shin, Ji-Young Heo, Aaron Yu, Jae Han Park, Keonwoo Cho, Hyun Sung Park, Dong-Hoon Chae, Jiho Kim, Sooyeon Jee, Chanwoo Kim, Mi-Kyung Oh, Daesub Song, Kyung-Rok Yu

Porcine airway organoids (pAOs) enable phenotypic and transcriptomic profiling of reassortant H1N1 viruses. SNU01/H1N1/2023 showed higher viral yield and host responses closer to 2009 pandemic strain CA04 than classical swine strain GC0503, with enhanced antiviral/inflamm

[See details](#)

Relevant news

This section presents official reports from health agencies, manufacturers and press releases with reliable sources.

2026-07-09

Cattle, egg-laying poultry in Utah hit with H5N1 avian flu

Source: CIDRAP

H5N1 avian influenza has infected at least eight dairy cows in Utah over two weeks, with 26 cattle cases nationally in the past 30 days (15 in Idaho, 3 in Texas). This year, 72 cattle cases have been confirmed, compared to 171 in 2023 and 917 in 2024. Concurrently, Utah r

[See details](#)

2026-06-04

Avian flu confirmed in Texas, Idaho cows

Source: CIDRAP

Highly pathogenic avian influenza (H5N1) confirmed in dairy cattle in Texas and Idaho, with 15 dairies affected in 30 days; Texas herd quarantined, milk diverted or destroyed. No human health or commercial milk supply risk per USDA APHIS. Concurrently, H5N1 detected in In

[See details](#)

2026-08-07

Cumulative number of confirmed human cases for avian influenza A(H5N1) reported to WHO, 2003-2026, 7 August 2026

Source: WHO

WHO provides monthly updates on confirmed human A(H5N1) cases. Only unusual or higher-risk events appear in Disease Outbreak News. Member States must report every sporadic human H5N1 or novel influenza infection under IHR (2005). The cumulative report summarizes global case data from 2003–2026 to support ongoing risk assessment and surveillance.

[**See details**](#)

Clinical Studies

This section presents relevant clinical trials.

2025-11-16

Immunogenicity and Safety of 2 Doses of Avian Influenza A (H5N1) Vaccine Administered 3 vs. 8 Weeks Apart

Status: Active not recruiting

Sponsor(s): Canadian Immunization Research Network, Dalhousie University, IWK Health Centre, Public Health Agency of Canada (PHAC), Canadian Center for Vaccinology, CHU de Quebec-Universite Laval, Vaccine Evaluation Center, Canada, McGill University Health Centre/ Research Institute of the McGill University Health Centre

This study evaluates the immunogenicity and safety of two doses of Arepanrix™ H5N1 vaccine administered 3 versus 8 weeks apart in high-risk individuals, addressing the lack of data on optimal dosing intervals for this vaccine, particularly in the context of emerging H5N1 clade 2.3.4.4b strains in North America.

[See details](#)

2024-06-21

Single Dose Texas 2017 (H3N2) Challenge Study

Status: Completed

Sponsor(s): Duke University, United States Department of Defense, Owlstone Ltd, Darwin Biosciences

Controlled human infection study using recombinant H3N2 (A/Texas/71/2017) in 34-40 healthy adults (18-45) with $\leq 1:40$ baseline antibody titers; 6 sham controls. Intranasal virus (targeting 60-80% attack rate) or placebo administered. Clinical, immunological, digital, breath

[See details](#)

2025-10-10

BPL-1357 Against H1N1 Influenza Virus Challenge

Status: Recruiting

Sponsor(s): National Institute of Allergy and Infectious Diseases (NIAID)

This study evaluates BPL-1357, an experimental influenza vaccine, in healthy adults aged 18–55 via two phases: Phase A assesses safety and immunogenicity after intramuscular or intranasal administration with placebo controls, including clinical monitoring and symptom trac

[See details](#)

2026-03-31

Study of Different Formulations of Vaccines Encoding the RSV Monovalent Antigen or the Flu H5 Antigen in Participants 18 to 49 Years of Age

Status: Recruiting

Sponsor(s): Sanofi (Belgium)

This study evaluates safety and immunogenicity of RSV monovalent and Flu H5 antigen vaccines in healthy adults aged 18–49, across two stages with varying durations: 6–7 months per participant depending on treatment arm.

[See details](#)

2025-06-16

Pilot Influenza Challenge Study

Status: Active not recruiting

Sponsor(s): Daniel Hoft, MD, PhD

This pilot influenza challenge study infects healthy volunteers with H3N2 to assess symptom kinetics, viral shedding, and immune responses. Participants are monitored inpatient for ≥ 10 days with daily NP swabs, blood draws (pre- and post-infection), and FLU PRO Diary Card

[See details](#)

2026-03-25

Phase 2a Study of the Efficacy and Safety of TRX-100 in a Human Influenza A Challenge Model

Status: Not yet recruiting

Sponsor(s): Traws Pharma, Inc.

This will be a randomized, double-blind, placebo-controlled proof of concept study to evaluate the prophylactic efficacy and safety of orally administered TRX-100 in healthy adults challenged with influenza A/France/759/2021 (H1N1) virus.

[See details](#)

2024-04-16

A Study to Find and Confirm the Dose and Assess Safety, Reactogenicity and Immune Response of a Vaccine Against Pandemic H5N1 Influenza Virus in Healthy Younger and Older Adults

Status: Completed

Sponsor(s): GlaxoSmithKline (Group)

The aim of this study is to evaluate the safety, reactogenicity and immunogenicity of the Flu Pandemic messenger RNA (mRNA) vaccine (including dose-finding and dose-confirmation) administered in healthy adults 18 to 85 years of age.

[See details](#)

Guidelines and practical information

This section lists official manuals of recommendations for clinical practice or public health policy published by leading health organizations.

January 2024	Interim Guidance for Employers to Reduce Exposure to Avian Influenza A Viruses for People Working with Animals
August 2024	Practical interim guidance to reduce the risk of infection in people exposed to avian influenza viruses
June 2024	Highly Pathogenic Avian Influenza A(H5N1) Virus in Animals: Interim Recommendations for Prevention, Monitoring, and Public Health Investigations (CDC)
June 2024	Prevention and Antiviral Treatment of Avian Influenza A Viruses in People (CDC)
May 2024	Avis du COVARS du 24 mai 2024 - Point sur la situation liée au virus influenza H5N1 (MESRI)
December 2023	Considerations for emergency vaccination of wild birds against high pathogenicity avian influenza in specific situations (WOAH)
June 2023	Enhanced surveillance of severe avian influenza virus infections in hospital settings in the EU/EEA (ECDC)
January 2022	Guidelines for the clinical management of severe illness from influenza virus infections (WHO)
December 2021	Avis relatif à la prévention de la transmission à l'homme des virus influenza porcins et aviaires (HCSP)

Fact sheets

Transmission

Influenza A viruses are segmented, negative-sense single-stranded RNA viruses, members of the Orthomyxoviridae family. The antigenic diversity of these viruses arises from two surface glycoproteins: hemagglutinin (HA) and neuraminidase (NA). Combinations of these proteins create numerous influenza subtypes, with currently 18 HA and 11 NA subtypes recognized in the environment. Although avian influenza viruses spread mainly among waterfowl, particularly Anseriformes and Charadriiformes, as well as in other susceptible bird species such as Galliformes. Unlike most other avian influenza viruses, A(H5N1) 2.3.4.4b has infected more than 200 mammal species and they can occasionally infect humans but no sustained human-to-human transmission has been identified.

Diagnosis

Appropriate samples for influenza tests should be rapidly taken and processed from patients with a relevant exposure history within ten days preceding symptom onset. A(H5N1) viruses have been detected in raw milk from infected dairy cows in some locations.

Symptoms

The incubation period for A(H5N1) infection is typically two to five days after the last known exposure. A(H5N1) influenza virus infection can cause a range of diseases in humans, from mild to severe, and in some cases, it can even be fatal. Symptoms are primarily respiratory, including fever, malaise, cough, sore throat, and muscle aches. Other early symptoms may include conjunctivitis and other non-respiratory symptoms. The infection can quickly progress to severe respiratory illness and neurological changes. A(H5N1) virus has also been detected in asymptomatic individuals.

Treatment

Influenza patients should be managed properly to prevent severe illness and death. Patients with laboratory-confirmed should be treated with antiviral medicines like oseltamivir as soon as possible.

Vaccination

Vaccine development leading to the licensure of three H5N1 vaccines - clade 1 and 2.1 - by the FDA and EMA under the trade name Audenz® / Aflunox®, Prebrandix® / Pumarix®, and Foclivia® / Adjupanrix®.