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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Editors: Nathan Claveau, Vincent Cicculi, Mélanie Nguyen Marzine, Eric Rosenthal, Diana Molino, Douae Ammour, Mario Delgado-Ortega, Dahlia Chebbah, Sandrine Halfen, Rana Lebdy, Yoann Allier, Mathilde Certoux, Armelle Pasquet, Eric D'Ortenzio, Charly Kengne, Amandine Verga Gerard

ANRS Emerging Infectious Diseases - Paris, France

Situation at a glance

- In 2025, 18 human cases of A(H5N1) infection were reported in Cambodia, including 9 deaths, and 30 cases globally. No evidence of human-to-human transmission has been identified.
- The 2025-2026 influenza season is characterized by an early onset and high intensity in Europe and in France, driven by the circulation of the A(H3N2) variant K strain, which has become predominant, as well as the continued circulation of A(H1N1)pdm09. All age groups are affected, with a particularly marked impact among children under 5 years of age and adults aged 65 years and older.

Scientific articles

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

2026-02-03

Advancing A(H5N1) influenza risk assessment in ferrets through comparative evaluation of airborne virus shedding patterns.

Journal: Nat Commun

Authors: Joanna A Pulit-Penaloza, Troy J Kieran, Nicole Brock, Jessica A Belser, Xiangjie Sun, Hui Zeng, Claudia Pappas, Juan A De La Cruz, Yasuko Hatta, Han Di, C Todd Davis, Terrence M Tumpey, Taronna R Maines

This study evaluates A(H5N1) pandemic potential in ferrets, finding fatal disease and variable direct contact transmission. B3.13 strains show higher airborne shedding than D1.1, with correlations between nasal viral loads, airborne shedding, and transmissibility. No airb

See details

2026-02-05

Detecting Influenza A(H5N1) Viruses through Severe Acute Respiratory Infection Surveillance, Cambodia.

Journal: Emerg Infect Dis

Authors: William W Davis, Kathrine R Tan, Borann Sar, Alyssa Finlay, Heng Seng, Vicheth Long, Savuth Chin, Darapheak Chau, Kim Sreng Leang, Mich Vann, Sovandara Lam, Dara Chan, Ly Vannara Tek, Sovann Ly, Timothy M Uyeki

Of 19 human cases of avian influenza A(H5N1) virus infection detected during January 2023-March 2025 in Cambodia, 12 (63%) were detected directly by surveillance for severe acute respiratory infection (SARI) or indirectly by testing ill close contacts. SARI surveillance can supplement other surveillance sources for identifying H5N1 cases.

See details

2026-02-27

Mapping the specificity of H3N2 strain-specific and cross-reactive human neutralizing antibodies elicited by the 2025-2026 influenza vaccine.

Journal: medRxiv

Authors: Jiaojiao Liu, Sydney Gang, Caroline Kikawa, Alesandra J Rodriguez, Shuk Hang Li, Naiqing Ye, Tachianna Griffiths, Elizabeth M Drapeau, Reilly K Atkinson, Andrea N Loes, Ronald G Collman, James A Ferguson, Julianna Han, Andrew B Ward, Jesse D Bloom, Scott E Hensley

The 2025-2026 H3N2 vaccine shows moderate effectiveness against subclade K, eliciting neutralizing antibodies targeting conserved antigenic sites A, D, and E, with partial effectiveness explained by these findings.

See details

2026-02-20

Baloxavir outperforms oseltamivir, favipiravir, and amantadine in treating lethal influenza A(H5N1) HA clade 2.3.4.4b infection in mice.

Journal: Nat Commun

Authors: Konstantin Andreev, Jeremy C Jones, Ahmed Kandeil, Peter Vogel, Richard J Webby, Elena A Govorkova

Baloxavir outperformed oseltamivir, favipiravir, and amantadine in treating lethal H5N1 in mice, offering full protection, reducing viral replication, and preventing neuroinvasion.

See details

2026-03-03

Potent efficacy of an NA-targeting antibody against a broad spectrum of H5N1 influenza viruses.

Journal: Nat Commun

Authors: Saya Moriyama, Julia di Iulio, Fabrizia Zatta, Kevin Hauser, Hideki Asanuma, Hector E Muñoz, John M Errico, Yu Adachi, Ha V Dang, Nadine Czudnochowski, Eita Sasaki, Alex Chen, Yi-Pei Chen, Ryutaro Kotaki, Alessia Peter, Eneida Vetti, Taishi Onodera, M Cyrus Maher, Laura E Rosen, Masayuki Shirakura, Gyorgy Snell, Hideki Hasegawa, Yoshimasa Takahashi, Davide Corti, Matteo Samuele Pizzuto

FNI9, a monoclonal antibody targeting neuraminidase, shows broad in vitro activity against diverse H5N1 pseudoparticles and prophylactic protection in mice. It binds to conserved NA residues, exhibits low escapability, high fitness costs, and minimal spread likelihood for

See details

2026-02-27

Seasonal vaccine-induced immunity shows preserved cross-reactivity to H3N2 subclade K in adults.

Journal: medRxiv

Authors: Adria Wilson, Brian Lerman, Reima Ramsamooj, Jacob Mischka, Jordan Ehrenhaus, Ashley Aracena, Yusuf Figueroa, Keith Farrugia, Ana S Gonzalez-Reiche, Jessica Nardulli, Zain Khalil, Charles Gleason, Eniko Hermann, Komal Srivastava, Emilia Mia Sordillo, Harm van Bakel, Anass Abbad, Florian Krammer, Viviana Simon

Seasonal influenza vaccination in adults boosts antibody titers against H3N2 subclade K, suggesting preserved cross-reactivity and minimal antigenic drift, contrary to ferret-based predictions.

See details

2026-02-20

Influenza vaccine effectiveness from nine studies during drifted A(H3N2) subclade K predominance, Europe, September 2025 to January 2026.

Journal: Euro Surveill

Authors: Heloise Lucaccioni, Diogo Fp Marques, Freja Kirsebom, Hanne-Dorthe Emborg, Mark Hamilton, Heather Whitaker, Amanda Bolt Botnen, Magda Bucholc, Francisco Pozo, Nick Andrews, Ramona Trebbien, Safraj Shahul Hameed, Karina Lauenborg Møller, Mark G O'Doherty, Jamie Lopez-Bernal, Kirsty Morrison, Simon Cottrell, Suzanne Wilton, Angela Mc Rose, Esther Kissling, European IVE group

This study reports influenza vaccine effectiveness (VE) of 25-45% during the 2025/26 European season, dominated by drifted A(H3N2) subclade K, with higher VE in children (47-72%). Vaccination remains beneficial and should be promoted alongside other preventive measures.

See details

2026-02-20

Influenza A(H3N2) subclade K (J.2.4.1) viruses associated with a surge at a university health clinic, Arizona, the United States, November to early December 2025.

Journal: Euro Surveill

Authors: Matthew Scotch, Temitope Oc Faleye, Angelica Urquidez-Negrete, Bradley Bobbett, Veronica Boyle, Kelly Conard, Lucy Sublasky-Rodriguez, Vel Murugan

A(H3N2) subclade K (J.2.4.1) with shared HA mutations was identified during a 2025 U.S. university influenza surge, showing reduced vaccine efficacy (mean protection 0.13). Phylodynamic analysis indicated multiple introductions and campus-to-community spread, emphasizing

See details

2026-02-27

Avian Influenza H5N1 Infection During Pregnancy: Preparing for the Next Flu Pandemic and Improving Perinatal Outcomes.

Journal: Viruses

Authors: Matthew J Zuber, Callie L Brown, Cara B Janusz

This review summarizes the epidemiology, risks, and unique adaptations of avian H5N1 infection during pregnancy, emphasizing the need for targeted vaccine strategies and optimized peripartum care to mitigate risks in a future flu pandemic.

See details

2026-02-13

Reduced neutralising antibody responses against emerging 2025/26 influenza A(H1N1)pdm09 subclade D.3.1 and A(H3N2) subclade K viruses among healthcare workers, Finland, August to October 2025.

Journal: Euro Surveill

Authors: Niina Ikonen, Anu Haveri, Erika Lindh, Oona Liedes, Saimi Vara, Sari H Pakkanen, Anu Kantele, Tea Nieminen, Veli-Jukka Anttila, Hanna Välimaa, Merit Melin, Carita Savolainen-Kopra, Hanna Nohynek

The study found that Finnish healthcare workers had reduced neutralizing antibody responses against emerging 2025/26 influenza A(H1N1)pdm09 subclade D.3.1 and A(H3N2) subclade K viruses, despite vaccination with the 2024/25 vaccine.

See details

2026-02-27

Genomic Evolution of Influenza A(H1N1)pdm09 and A/H3N2 Viruses Among Children in Wuhan, China, Spanning the COVID-19 Pandemic (2020-2023).

Journal: Viruses

Authors: Muhammad Arif Rizwan, Ying Li, Jiaming Huang, Haizhou Liu, Muhammad Noman, Ismaila Damilare Isiaka, Hebin Chen, Wenqing Li, Yuehu Liu, Huaying Wang, Yuyi Xiao, Yi Yan, Xiaoxia Lu, Di Liu

Low influenza A positivity (3.43%) in Wuhan children (2020-2023), with H1N1pdm09 predominant. Phylogenetic analysis identified clade 6B.1A.5a.2 for H1N1 and 3C.2a1b.2a.2b for H3N2, with key mutations and reassortment events noted, emphasizing continued surveillance and vaccine updates.

See details

2026-02-05

Gasdermin E is dispensable for H1N1 influenza virus pathogenesis in mice.

Journal: Microbiol Spectr

Authors: Samuel Speaks, Jonathan Papa, Matthew McFadden, Jack E Roettger, Benjamin D Liu, Shreenath Mohan, Brendan M Reznik, Steve Leumi, Jana M Cable, Adriana Forero, Jacob S Yount

GSDME deficiency in mice did not affect weight loss, survival, lung dysfunction, or inflammatory responses during H1N1 infection, suggesting GSDME is dispensable in H1N1 pathogenesis.

See details

2026-02-23

Emergence and antigenic characterisation of influenza A(H3N2) viruses with hemagglutinin substitutions N158K and K189R during the 2024/25 influenza season.

Journal: bioRxiv

Authors: Björn Koel, Alexander Mp Byrne, Sam Turner, Sarah James, Ruth Harvey, Monica Galiano, Christine Carr, Pascal Lexmond, Mark Pronk, Ruonan Liang, Geert-Jan Boons, Robert P de Vries, Dirk Eggink, Nicola Lewis, Derek Smith, Adam Meijer, Ron Fouchier

Influenza A(H3N2) variants with N158K and K189R substitutions emerged in Latin America, spread in the Netherlands, and showed antigenic distinctness from 2025/26 vaccine strains, indicating potential vaccine escape.

See details

2026-03-06

Reverse genetic rescue and propagation of human influenza A(H3N2) master virus seed in HEK-293 suspension cells.

Journal: Virology

Authors: Subrata Barman, Rekha Iyengar, Lance Miller, Jasmine C M Turner, John Franks, Catherine Willis, Shanthi Vadali, Giuliana Medrano, Adam Rubrum, Michael Meagher, Richard J Webby

HEK-293 suspension cells successfully rescued and propagated A/Texas/71/2017 (H3N2) virus, overcoming Vero cell limitations, aiding universal influenza vaccine development.

See details

2026-02-20

Retraction note: Moderate protection from vaccination against influenza A(H3N2) subclade K in Beijing, China, September to December 2025 (Euro Surveill. 2026;31(2)).

Journal: Euro Surveill

Authors: Eurosurveillance editorial team

See details

2026-02-06

Interim 2025/26 influenza vaccine effectiveness estimates with immuno-epidemiological considerations for A(H3N2) subclade K protection, Canada, January 2026.

Journal: Euro Surveill

Authors: Lea Separovic, Suzana Sabaiduc, Yuping Zhan, Samantha E Kaweski, Romy Olsha, Maan Hasso, Richard G Mather, Sara Carazo, Christine Lacroix, Isabelle Meunier, Lila N Salhi, James A Dickinson, Nathan Zelyas, Agatha N Jassem, Katie Dover, Charlene Ranadheera, Ruimin Gao, Nathalie Bastien, Danuta M Skowronski

Interim 2025/26 data from Canada's Sentinel Network shows influenza vaccination reduced medically-attended acute respiratory illness risk by 40% for A(H3N2), including subclade K, and 30% for A(H1N1)pdm09, with immuno-epidemiological factors discussed for subclade K protection despite vaccine mismatch.

See details

2026-02-23

Primary bovine embryonic fibroblasts demonstrate variable fitness following infection with highly pathogenic avian influenza H5N1 strains and are susceptible to a recently circulating human 2009 pandemic lineage H1N1 strain.

Journal: Microbiol Spectr

Authors: Grace K Wenger, Deann T Snyder, Justin R Prigge, Allyson H Turner, Sara A Jaffrani, Edward E Schmidt, Emily A Bruce, Emma K Loveday

BeEFs exhibit α-2,3 sialic acid expression, supporting HPAI H5N1 fitness and susceptibility to 2022 H1N1pdm09-like strain, highlighting zoonotic adaptation and potential coinfection risks.

See details

2026-02-11

MHC class II functions as a host-specific entry receptor for representative human and swine H3N2 influenza A viruses.

Journal: Nat Commun

Authors: Matias Cardenas, Sasha Compton, C Joaquin Caceres, Adolfo García-Sastre, Daniel R Perez, Daniela S Rajao

H3N2 influenza A viruses can use MHCII as an alternative entry receptor in a host-specific manner, with human and swine-adapted viruses preferring human HLA and swine SLA, respectively. Mutations near the HA receptor-binding site can expand this tropism, suggesting implications for viral pathogenesis and cross-species adaptation.

See details

Relevant news

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

2026-02-05

Federal testing improves detection of H5N1 avian flu in US dairy herds

Source: CIDRAP

H5N1 avian flu RNA was found in 36% of US retail milk samples during the 2024–25 outbreak, with later samples showing a decrease to 6.9% positivity. Federal testing mandates improved detection, aligning infection patterns with official reports and suggesting enhanced surveillance controlled the spread.

See details

2026-02-19

Avian flu continues spread in Pennsylvania egg, turkey facilities

Source: CIDRAP

H5N1 avian flu outbreaks in Pennsylvania, primarily in Lancaster County, affected 2.6M egg-laying birds, 1.4M birds at another site, 30,000 turkeys, and 179,000 broilers. Nationwide, 51 flocks (23 commercial, 28 backyard) affected 8.97M birds in 30 days. Pennsylvania has

See details

Clinical Studies

This section presents relevant clinical trials.

2024-09-23

Dose, Safety, and Pathogenicity of a New Influenza A H3N2 Challenge Strain

Status: Completed

Sponsor(s): hVIVO (United Kingdom)

This study aims to determine the optimal dose, safety, and pathogenicity of a new Influenza A H3N2 challenge strain in healthy adults aged 18-55. Part A will randomly allocate 40 participants to receive one of two virus doses. Part B will use the findings from Part A to administer the most appropriate dose(s) to further participants.

See details

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 compares the immunogenicity and safety of the H5N1 vaccine (Arepanrix™) administered in two doses, either 3 or 8 weeks apart, to inform optimal dosing intervals for high-risk individuals.

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

This study uses a controlled human infection model with H3N2 (A/Texas/71/2017) to identify early infection markers in exhaled breath and saliva, recruiting 40 healthy volunteers.

See details

2025-02-23

H5N1 Milk Detection Study

Status: Recruiting

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

This study investigates if consuming pasteurized milk containing inactive H5N1 virus particles can lead to detectable viral presence in the nose or throat, and if it elicits an antibody response. Findings aim to inform CDC's understanding of milk consumption's impact on flu surveillance.

See details

2025-04-27

Human Infection Study of H3N2 Influenza in Healthy Adults

Status: Active not recruiting

Sponsor(s): University of Melbourne, National Institute of Allergy and Infectious Diseases (NIAID), WHO Collaborating Centre for Reference and Research on Influenza

This study investigates immune responses to H3N2 influenza in healthy adults (18-50) during and post-infection in a controlled inpatient setting, using a clinically-researched H3N2 challenge virus, anticipating mild-to-moderate symptoms. It marks Australia's first flu challenge study.

See details

2025-10-10

BPL-1357 Against H1N1 Influenza Virus Challenge

Status: Not yet recruiting

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

This study evaluates an experimental flu vaccine (BPL-1357) against H1N1 in healthy adults. It involves two phases: Phase A includes outpatient vaccinations and monitoring, while Phase B involves hospital-based viral challenge and follow-up. Participants receive either nasal, injectable, or placebo vaccines to assess efficacy and safety.

See details

2025-11-27

Establishing a Controlled Human Infection Model for Influenza H3N2 as a Foundation for Pandemic Preparedness

Status: Not yet recruiting

Sponsor(s): Dalhousie University, Canadian Center for Vaccinology, McGill University Health Centre/Research Institute of the McGill University Health Centre

The overall objective is to establish an influenza Controlled Human Infection Model (CHIM) in Canada that can be used to assess the safety and efficacy of candidate vaccines, biologics, and therapeutics targeting influenza viruses.

See details

2024-09-25

GEneRating Mucosal Immunity After INfluenzA Infection and Vaccination in Lung and Lymphoid TissuE

Status: Recruiting

Sponsor(s): Imperial College London, Imperial College Healthcare NHS Trust

This experimental medicine study aims to compare immune responses in healthy adult volunteers aged 18-40 years against influenza vaccination and infection in the upper and lower respiratory tract, following administration of a live-attenuated influenza vaccine delivered by nasal spray versus influenza A (H3N2) viral challenge.

See details

2025-06-16

Pilot Influenza Challenge Study

Status: Active not recruiting

Sponsor(s): Daniel Hoft, MD, PhD

This pilot study investigates influenza infection and immune response in healthy participants challenged with H3N2, tracking symptom onset, antibody protection, and immune response timing through inpatient monitoring, daily symptom tracking, and frequent blood/NP swab collection.

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® / Afllunox ®, Preprandix® / Pumarix®, and Foclivia® / Adjupanrix®.