

MONTHLY SCIENTIFIC REVIEW **ON AVIAN INFLUENZA A (H5N1)**

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All informations comes from a valid and credible source.

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Situation at a glance

- Avian influenza A(H5N1) is an infectious disease caused by an influenza A virus.
- From January 1, 2003, to September 29, 2025, a total of 991 human cases of avian influenza A(H5N1) and 476 deaths (a case fatality rate of 48%) have been reported to WHO from 24 countries.
- The 11 recent deaths that occurred in Cambodia (8), India (2), and Mexico (1) were associated with direct contact with poultry and/or wild birds.
- No person-to-person transmission has been identified in any of these cases.

Scientific articles

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

2025-09-08

Influenza A virus circumvents the innate immune response through the sequestration of double-stranded RNA.

Journal: J Virol

Authors: Masahiro Nakano, Sho Miyamoto, Chiho Ohnishi, Chiharu Nogami, Nanami Hirose, Yoko Fujita-Fujiharu, Yukiko Muramoto, Takeshi Noda

IAV evades innate immunity by sequestering dsRNA in the nucleus, primarily through NS1 and NEP. NS1 masks dsRNA, preventing detection, while NEP may aid in nuclear retention. In NS1's absence, dsRNA moves to the cytoplasm, activating interferon regulatory factor 3 and triggering an immune response.

[See details](#)

2025-07-30

Febrile temperature activates the innate immune response by promoting aberrant influenza A virus RNA synthesis.

Journal: bioRxiv

Authors: Karishma Bisht, Daniel R Weilandt, Caitlin H Lamb, Elizaveta Elshina, Cameron Myhrvold, Aartjan J W Te Velthuis

Fever during influenza A virus (IAV) infection enhances antiviral signaling and aberrant viral RNA synthesis, leading to increased interferon production and potential dysregulation of cytokine production. This occurs due to differential production of viral proteins and the presence of mini viral RNAs with dysregulated template loops, which activate the innate immune response.

[See details](#)

2025-09-05

COG6 is an essential host factor for influenza A virus infection.

Journal: Microbiol Spectr

Authors: Daobin Feng, Jiaohan Guo, Jingjing Yan, Jian Chen, Longfei Ding, Xinyu Zhu, Zhilu Chen, Yangyang Hu, Miaomiao Zhang, Jian Liu, Cuisong Zhu, Mingbin Liu, Chen Zhao, Xiaoyan Zhang, Jianqing Xu

The study identifies COG6 as a crucial host factor for influenza A virus (IAV) replication, using CRISPR/Cas9 screening. COG6 is essential for proper sialic acid presentation and prevents lysosomal degradation of viral proteins. Disrupting COG6 or other COG subunits impairs IAV replication, suggesting the COG complex's role in IAV infection.

[See details](#)

2025-09-28

Intranasal vaccine induces broad and long-lasting immunity against the hemagglutinin stem of group 2 influenza A viruses.

Journal: Antiviral Res

Authors: Wanyue Zhang, Jérémie Prévost, Angela Sloan, Levi Tamming, Annabelle Pfeifle, Caroline Gravel, Sathya N Thulasi Raman, Gary Van Domselaar, Michael J W Johnston, Lisheng Wang, Simon Sauve, Michael Rosu-Myles, Darwyn Kobasa, Anh Tran, Wangxue Chen, Xu Zhang, David Safronetz, Xuguang Li

The study engineered an intranasal adenoviral vector vaccine (Ad-HA2) expressing a consensus hemagglutinin stem sequence, providing broad and long-lasting protection against group 2 influenza A viruses, including H3N2 and H7N9. The vaccine elicited robust HA2-specific immune responses in both the upper and lower respiratory tracts, with significant antibody-dependent cellular cytotoxicity (ADCC) activity in serum. An immunogenic C-terminus region of the HA2 consensus sequence was identified, activating both CD4+ and CD8+ T cel

[See details](#)

2025-09-23

Heat shock protein A1L restricts influenza A virus by ubiquitination of NA.

Journal: J Virol

Authors: Yan Yan, Jianan Xu, Zhen Chen, Yuting Xu, Linlong Qin, Lingyan Zhao, Hongli Zhang, Xiaoxiao Feng, Chaoliang Yao, Yu Huang, Jiyong Zhou, Tingjuan Deng

HSPA1L, a host heat shock protein, binds to and promotes ubiquitination of the influenza A virus (IAV) neuraminidase (NA) protein at K242, leading to its autophagic degradation and suppression of viral replication. A mutant IAV with a K242R mutation in NA showed enhanced replication and resistance to HSPA1L, highlighting the role of this ubiquitination site in viral control.

[See details](#)

2025-09-23

The 5'-end segment-specific noncoding region of influenza A virus regulates both competitive multi-segment RNA transcription and selective genome packaging during infection.

Journal: J Virol

Authors: Zining Liu, Lei Zhang, Wenyu Zhang, Yuerong Lai, Tao Deng

Truncation of the 5'-end ssNCR of the influenza A virus reduces HA mRNA levels and impairs HA vRNA packaging. An adaptive mutation upstream of the truncation site restores these functions, suggesting a regulatory role for RNA secondary structures in both transcription and genome packaging.

[See details](#)

2025-09-23

Ciliated cells promote high infectious potential of influenza A virus through the efficient intracellular activation of hemagglutinin.

Journal: J Virol

Authors: Zijian Guo, Victoria S Banas, Yuanyuan He, Elizabeth Weiland, Jian Xu, Yangjie Tan, Zhaoxi Xiao, Steven L Brody, Adrianus C M Boon, James W Janetka, Michael D Vahey

The study finds that in differentiated human airway epithelial cells, ciliated cells activate the influenza A virus fusion protein, hemagglutinin (HA), more efficiently than non-ciliated cells. This activation occurs intracellularly in the Golgi, which may limit the effectiveness of host-directed protease inhibitors as antivirals. The findings highlight the role of cellular tropism in viral pathogenesis and have implications for developing antiviral strategies.

[See details](#)

2025-09-04

Cross-reactive human antibody responses to H5N1 influenza virus neuraminidase are shaped by immune history.

Journal: medRxiv

Authors: Jordan T Ort, Ashley Sobel Leonard, Shuk Hang Li, Reilly K Atkinson, Lydia M Mendoza, Marcos Costa Vieira, Sydney Gang, Sarah Cobey, Scott E Hensley

The study found that individuals primed with H1N1 in childhood had higher cross-reactive NA antibodies against H5N1, unlike those primed with H2N2 or H3N2. Contemporary H1N1 infections in children also elicited these antibodies, indicating that immune history significantly influences the generation of cross-reactive NA antibodies against H5N1.

[See details](#)

2025-09-07

Dairy Environments with Milk Exposure are Most Likely to Have Detection of Influenza A Virus.

Journal: medRxiv

Authors: C Stenkamp-Strahm, B McCluskey, B Melody, B Christensen, N Urie, N Amey, R Lomkin, A J Campbell, S S Lakdawala, J Lombard

The study identified key environmental locations on H5N1-affected dairy farms where influenza A virus (IAV) was most frequently detected, including milking equipment, parlor surfaces, and wastewater systems. The viral load in these environmental samples was generally lower than in bulk tank milk. The likelihood of IAV detection increased with the duration of the outbreak, and the viral load varied by sample category.

[See details](#)

2025-09-23

Sources and sinks of influenza A virus genomic diversity in swine from 2009 to 2022 in the United States.

Journal: J Virol

Authors: Garrett M Janzen, Blake T Inderski, Jennifer Chang, Zebulun W Arendsee, Alicia Janas-Martindale, Mia Kim Torchetti, Amy L Baker, Tavis K Anderson

The study analyzed U.S. swine influenza A virus (IAV) data from 2009 to 2022, identifying dominant clades and genomic diversity hotspots, particularly in Midwest states. The findings highlight the role of swine transport in IAV diversity and suggest targeted interventions in these regions could improve animal health and pandemic preparedness.

[See details](#)

2025-09-20

Developing and Benchmarking One Health Genomic Surveillance Tools for Influenza A Virus in Wastewater.

Journal: bioRxiv

Authors: Minxi Jiang, Audrey L W Wang, James B Thissen, Kara L Nelson, Lenore Pipes, Rose S Kantor

The study evaluated four targeted enrichment methods for whole-genome sequencing of Influenza A Virus (IAV) in wastewater, finding that a custom HA tiled-amplicon panel was sensitive and cost-effective for known subtypes, while probe-capture methods showed potential for broader surveillance despite higher costs. Ultrafiltration-based virus concentration outperformed other methods.

[See details](#)

2025-07-27

Primary bovine embryonic fibroblasts support seasonal influenza A virus infection and demonstrate variable fitness of HPAI H5N1.

Journal: bioRxiv

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

The study investigates the use of Primary Bovine Embryonic Fibroblasts (BeEFs) as a model for studying influenza A virus (IAV) infections in cattle. It compares viral fitness and replication dynamics of HPAI H5N1 strains in BeEFs and chicken DF-1 cells, demonstrating increased fitness of bovine-origin HPAI H5N1 and bovine susceptibility to human seasonal IAV.

[See details](#)

Relevant news

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

2025-07-29

H5N1 avian flu hospitalizes Cambodian man

Source: CIDRAP

A 26-year-old Cambodian man is hospitalized with H5N1 avian flu, marking the country's 14th case this year, with a 50% fatality rate. The patient had recent exposure to sick chickens. Global health groups updated the risk assessment, noting a spike in human infections and increased risk for those with frequent animal exposure. The virus is a reassortant of older and newer H5N1 clades.

[See details](#)

2025-08-11

H5N1 avian flu detections pick up in UK poultry

Source: CIDRAP

The UK has seen a recent surge in H5N1 avian flu outbreaks in commercial poultry, with 10 cases reported in the past two weeks. This increase is notable as it deviates from the typical summer pattern and follows a period of lowered threat levels. Other countries, including Ireland, Taiwan, Canada, and Cambodia, have also reported recent H5 detections. The last US outbreak was in early July.

[See details](#)

2025-09-18

Minnesota reports first H5N1 detection in poultry since April

Source: CIDRAP

Minnesota detected H5N1 in a commercial turkey farm, marking the state's first case since April. The outbreak, involving 20,000 turkeys, is not surprising given the fall migration of wild waterfowl. Additionally, the USDA reported 15 more H5N1 detections in wild birds across the country and one in a raccoon from Minnesota.

[See details](#)

2025-08-06

Cambodia announces 15th human H5N1 infection of the year

Source: CIDRAP

Cambodia reports its 15th H5N1 case this year, a 6-year-old girl with severe symptoms, following exposure to sick poultry. The case-fatality rate is 46.6% for 2024, with 57.5% since 2005. Recent cases involve a reassortant virus, with a rise in infections since late 2023.

[See details](#)

2025-09-04

FDA warns of H5N1 avian flu detection in raw cat food

Source: CIDRAP

The FDA detected H5N1 avian influenza in raw cat food, linked to a cat's illness and death. The contaminated food, Rawr Raw Cat Food Chicken Eats, was sold nationwide. Whole-genome sequencing confirmed the presence of the B3.13 H5N1 genotype, previously detected in dairy cows and poultry. The company disputes the FDA's handling of the investigation.

[See details](#)

2025-08-04

Air, wastewater may play roles in H5N1 transmission on dairy farms

Source: CIDRAP

The study detected H5N1 viral RNA and infectious virus in air samples from milking parlors and housing areas, indicating airborne spread. Contaminated wastewater, including manure lagoons and fields, also harbored H5N1, suggesting another transmission route. Whole-genome sequencing revealed amino acid variants, aiding in tracking intra-herd transmission. The findings underscore the need for comprehensive mitigation strategies, including respiratory protection, disinfection, and identification of infected cows.

[See details](#)

2025-09-15

USDA confirms first H5N1 avian flu detection in Nebraska dairy cows

Source: CIDRAP

The USDA has detected H5N1 avian flu in a Nebraska dairy herd, with genetic analysis linking it to a clade and genotype found in other dairy herds. The virus is similar to strains circulating in California. The herd has been quarantined, and investigations are ongoing to limit spread. While detections in cattle have decreased, poultry outbreaks are rising, particularly in nearby states.

[See details](#)

2025-07-24

Ferret study suggests seasonal flu immunity may protect against severe H5N1 infection

Source: CIDRAP

Ferret studies demonstrate that prior immunity to seasonal flu viruses, particularly 2009 H1N1, reduces the severity of H5N1 infection. Ferrets with H1N1 immunity showed milder symptoms and better survival rates. This suggests that existing immunity from seasonal flu may contribute to the observed mildness of recent human H5N1 cases.

[See details](#)

2025-08-26

AI tool can help identify patients who may have H5N1 avian flu, researchers say

Source: CIDRAP

The AI tool, using a generative large-language model, efficiently analyzed 13,494 emergency department visits to identify 76 high-risk patients for H5N1 avian flu based on symptoms and risk factors, with minimal human input and cost.

[See details](#)

2025-09-05

Earlier H5N1 detection adds to Texas dairy herd total; researchers can't pinpoint source of California child's illness

Source: CIDRAP

The USDA reported an additional H5N1-infected herd in Texas, increasing the national total to 1,079 herds across 17 states, with no new cattle detections in the past 30 days. Another H5N1 outbreak occurred at a South Dakota turkey farm. In California, a child's H5N1 infection source remains unknown. The child, exhibiting flu-like symptoms, tested positive for H5N1 (B3.13 genotype). No human-to-human transmission was detected. The source of infection is suspected to be environmental, with no evidence linking it to poultry. Ongo

[See details](#)

2025-08-12

Report details first suspected H5 avian flu detections in seabirds in Antarctica

Source: CIDRAP

The study detected suspected H5 HPAIV in 9 out of 115 sampled seabirds (penguins and cormorants) in Antarctica, with no clinical signs of infection. The findings suggest a potential expansion of the virus into the continent, posing a risk to susceptible bird species.

[See details](#)

Clinical Studies

This section presents relevant clinical trials.

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](#)

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: Recruiting

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](#)

2024-08-15

BARDA BP-I-23-001 H5 Influenza

Status: Completed

Sponsor(s): Biomedical Advanced Research and Development Authority, Rho Federal Systems Division, Inc., ICON plc

This BARDA-sponsored, randomized, double-blind, phase 2 study is designed to assess safety and immunogenicity of A/H5 inactivated monovalent influenza vaccines at different antigen dose levels adjuvanted with AS03 or MF59.

[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®, Preprandix® / Pumarix®, and Foclivia® / Adjupanix®.