Influenza at the human-animal interface

Summary and risk assessment, from 23 April to 27 May 2025[1]

- **New human cases[2]:** From 23 April to 27 May 2025, based on reporting date, the detection of influenza A(H5N1) in three humans, the detection of influenza A(H9N2) virus in eight humans and the detection of influenza A(H10N3) in one human were reported officially.
- **Circulation of influenza viruses with zoonotic potential in animals:** High pathogenicity avian influenza (HPAI) outbreaks in poultry and non-poultry animals continue to be reported to the World Organisation for Animal Health (WOAH).[3] The Food and Agriculture Organization of the United Nations (FAO) also provides a global update on avian influenza viruses with pandemic potential.[4]
- **Risk assessment[5]:** Sustained human to human transmission has not been reported in these events. Based on information available at the time of the risk assessment, the overall public health risk from currently known influenza viruses circulating at the human-animal interface has not changed and remains low. The occurrence of sustained human-to-human transmission of the viruses characterized so far from these events is currently considered unlikely. Human infections with viruses of animal origin are infrequent, and they are not unexpected at the human-animal interface.
- **IHR compliance:** All human infections caused by a new influenza subtype are required to be reported under the International Health Regulations (IHR, 2005).[6] This includes any influenza A virus that has demonstrated the capacity to infect a human and its haemagglutinin (HA) gene (or protein) is not a mutated form of those, i.e. A(H1) or A(H3), circulating widely in the human population. Information from these notifications is critical to inform risk assessments for influenza at the human-animal interface.

Avian influenza viruses in humans

Current situation:

Since the last risk assessment of 22 April 2025, laboratory-confirmed human cases of A(H5N1) infection were reported to WHO from Bangladesh and China.

[1] This summary and assessment covers information confirmed during this period and may include information received outside of this period.

[2] For epidemiological and virological features of human infections with animal influenza viruses not reported in this assessment, see the reports on human cases of influenza at the human-animal interface published in the Weekly Epidemiological Record here.

[3] World Organisation for Animal Health (WOAH). Avian influenza. Global situation. Available at: https://www.woah.org/en/disease/avian-influenza/#ui-id-2.

[4] Food and Agriculture Organization of the United Nations (FAO). Global Avian Influenza Viruses with Zoonotic Potential situation update. Available at: https://www.fao.org/animal-health/situation-updates/global-aiv-with-zoonotic-potential.

[5] World Health Organization (2012). Rapid risk assessment of acute public health events. World Health Organization. Available at: https://iris.who.int/handle/10665/70810.

[6] World Health Organization. Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations (2005).

A(H5N1), Bangladesh

A human infection with an H5 clade 2.3.2.1a A(H5N1) virus was detected in a sample collected from a child in Khulna Division in April 2025, who recovered from his illness. Genetic sequence data are available in GISAID (E EPI_ISL_19875512; submission date 18 May 2025; Institute of Epidemiology, Disease Control & Research (IEDCR); Virology - National Influenza Centre (NIC)). WHO was notified of this case on 4 May 2025. In March 2025, an avian influenza A(H5N1) outbreak was reported in poultry in the same district (Jessore) where the case resides.[7]

A second human infection with an H5 clade 2.3.2.1a A(H5N1) virus was retrospectively detected in a sample collected from a child in Khulna Division in February 2025, who recovered from his illness, according to genetic sequence data available in GISAID (EPI_ISL_19882255; submission date 26 May 2025; Institute of Epidemiology, Disease Control & Research (IEDCR); Virology - National Influenza Centre (NIC)). WHO was notified of this case on 27 May 2025.

A(H5N1), China

On 10 May 2025, China notified WHO of one confirmed case of human infection with an avian influenza A(H5N1) virus in an adult traveling from Viet Nam that was detected through routine screening at the port of entry in China. The case was admitted to hospital in China on 7 April and had recovered at the time of notification. The likely source of exposure was domestic poultry at the case's home.

According to reports received by WOAH, various influenza A(H5) subtypes continue to be detected in wild and domestic birds in Africa, the Americas, Asia and Europe. Infections in non-human mammals are also reported, including in marine and terrestrial mammals.[8] A list of bird and mammalian species affected by HPAI A(H5) viruses is maintained by FAO.[9]

Risk Assessment for avian influenza A(H5) viruses:

1. What is the current global public health risk of additional human cases of infection with avian influenza A(H5) viruses?

Most human cases so far have been documented as infections in people exposed to A(H5) viruses, for example, through contact with infected poultry or contaminated environments, including live poultry markets, and occasionally infected mammals and contaminated environments. While the viruses continue to be detected in animals and related environments humans are exposed to, further human cases associated with such exposures are expected but unusual. The impact for public health if additional cases are detected is minimal. The current overall global public health risk of additional human cases is low.

2. What is the likelihood of sustained human-to-human transmission of currently circulating avian influenza A(H5) viruses?

No sustained human-to-human transmission has been identified associated with the recent reported human infections with avian influenza A(H5). There has been no reported human-to-human transmission of A(H5N1) viruses since 2007, although there may be gaps in investigations. In 2007

[7] WOAH. WAHIS. Bangladesh - High pathogenicity avian influenza viruses (poultry) (Inf. with). Event 6351. Available at: https://wahis.woah.org/#/in-event/6351/dashboard.

[8] World Organisation for Animal Health (WOAH). Avian influenza. Global situation. Available at: https://www.woah.org/en/disease/avian-influenza/#ui-id-2.

[9] Food and Agriculture Organization of the United Nations. Global Avian Influenza Viruses with Zoonotic Potential situation update. Available at: https://www.fao.org/animal-health/situation-updates/global-aiv-with-zoonotic-potential/bird-species-affected-by-h5nx-hpai/en.

and the years prior, small clusters[10] of A(H5) virus infections in humans were reported, including some involving health care workers, where limited human-to-human transmission could not be excluded; however, sustained human-to-human transmission was not reported.

Available evidence suggests that the currently circulating influenza A(H5) viruses have not acquired the ability to efficiently transmit between people, therefore the likelihood of sustained human-to-human transmission is thus currently considered unlikely at this time.

3. What is the likelihood of international spread of avian influenza A(H5) viruses by travellers?
Should infected individuals from affected areas travel internationally, their infection may be detected in another country during travel or after arrival. If this were to occur, further community-level spread is considered unlikely as current evidence suggests these viruses have not acquired the ability to transmit easily among humans.

A(H9N2), China

Since the last risk assessment of 22 April 2025, eight human cases of infection with A(H9N2) influenza viruses were notified to WHO from China on 10 May 2025. The cases were detected in Guizhou (two), Hunan (four) and Yunnan (one) provinces and Chongqing municipality (one). Seven cases were in children. All cases had symptom onset in April 2025. One of the cases (a child) was hospitalized with pneumonia and a respiratory syncytial virus infection at the time of detection but had recovered at the time of reporting. The other cases involved mild illnesses, were detected through the influenza-like illness (ILI) surveillance system, and the cases have recovered. All cases but one had a known history of exposure to poultry prior to the onset of symptoms. In all but one of the cases with known poultry exposure, environmental samples collected from areas associated with the cases tested positive for influenza A(H9) virus. No further cases were detected among contacts of these cases and there was no epidemiological link between the cases.

Risk Assessment for avian influenza A(H9N2):

1. What is the global public health risk of additional human cases of infection with avian influenza A(H9N2) viruses?
Most human cases follow exposure to the A(H9N2) virus through contact with infected poultry or contaminated environments. Most human infections of A(H9N2) to date have resulted in mild clinical illness. Nearly 130 human infections with A(H9N2) cases have been reported to date since 2003, and six of these have been severe or fatal and three of these were known to have underlying medical conditions. Since the virus is endemic in poultry in multiple countries in Africa and Asia[11], further human cases associated with exposure to infected poultry are expected but remain unusual. The impact to public health if additional cases are detected is minimal. The overall global public health risk of additional human cases is low.

2. What is the likelihood of sustained human-to-human transmission of avian influenza A(H9N2) viruses?
At the present time, no sustained human-to-human transmission has been identified associated with the event described above. Current evidence suggests that influenza A(H9N2) viruses from these cases have not acquired the ability of sustained transmission among humans, therefore sustained human-to-human transmission is thus currently considered unlikely.

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[10] A cluster is defined as two or more persons with onset of symptoms within the same 14-day period and who are associated with a specific setting, such as a classroom, workplace, household, extended family, hospital, other residential institution, military barracks or recreational camp.
[11] Food and Agriculture Organization of the United Nations (FAO). Global Avian Influenza Viruses with Zoonotic Potential situation update. Available at: https://www.fao.org/animal-health/situation-updates/global-aiv-with-zoonotic-potential.

3. What is the likelihood of international spread of avian influenza A(H9N2) virus by travellers?
Should infected individuals from affected areas travel internationally, their infection may be detected in another country during travel or after arrival. If this were to occur, further community level spread is considered unlikely as current evidence suggests the A(H9N2) virus subtype has not acquired the ability to transmit easily among humans.

A(H10N3), China

On 10 May 2025, China notified WHO of one confirmed case of human infection with avian influenza A(H10N3) virus in an adult from Shaanxi province. The case developed symptoms on 13 April 2025, was admitted to hospital on 18 April with pneumonia and was improving at the time of notification. According to the notification, the case had exposure to backyard poultry. No additional cases have been reported among family members. Environmental samples collected from the backyard tested negative for influenza A(H10) virus.

Risk Assessment for avian influenza A(H10N3):

1. What is the global public health risk of additional human cases of infection with avian influenza A(H10N3) viruses?
Human infections with avian influenza A(H10) viruses have been detected and reported previously. The circulation and epidemiology of these viruses in birds have been previously reported.[12] Avian influenza A(H10N3) viruses with different genetic characteristics have been detected previously in wild birds since the 1970s and more recently spilled over to poultry in some countries. As long as the virus continues to circulate in birds, further human cases can be expected but remain unusual. The impact to public health if additional sporadic cases are detected is minimal. The overall global public health risk of additional sporadic human cases is low.

2. What is the likelihood of sustained human-to-human transmission of avian influenza A(H10N3) viruses?
No sustained human-to-human transmission has been identified associated with the event described above or past events with human cases of influenza A(H10N3) viruses. Current epidemiologic and virologic evidence suggests that contemporary influenza A(H10N3) viruses assessed by the Global Influenza Surveillance and response System (GISRS) have not acquired the ability of sustained transmission among humans, therefore sustained human-to-human transmission is thus currently considered unlikely.

3. What is the likelihood of international spread of avian influenza A(H10N3) virus by travellers?
Should infected individuals from affected areas travel internationally, their infection may be detected in another country during travel or after arrival. If this were to occur, further community level spread is considered unlikely based on current limited evidence.

Overall risk management recommendations:

Surveillance and investigations

- Due to the constantly evolving nature of influenza viruses, WHO continues to stress the importance of global strategic surveillance in animals and humans to detect virologic, epidemiologic and clinical changes associated with circulating influenza viruses that may affect human (or animal) health. Continued vigilance is needed within affected and neighbouring areas to detect infections in animals and humans. Close collaboration with the animal health and

[12] Wang X, Yu H, Ma Y, Zhang P, Wang X, Liang J et al. 2025. The novel H10N3 avian influenza virus acquired airborne transmission among chickens: an increasing threat to public health. [Pre-print] mBio 16:e02363-24. https://doi.org/10.1128/mbio.02363-24.

environment sectors is essential to understand the extent of the risk of human exposure and to prevent and control the spread of animal influenza. WHO has published guidance on surveillance for human infections with avian influenza A(H5) viruses.

- As the extent of influenza virus circulation in animals is not clear, epidemiologic and virologic surveillance and the follow-up of suspected human cases should continue systematically. Guidance on investigation of non-seasonal influenza and other emerging acute respiratory diseases has been published on the WHO website.
- Countries should increase avian influenza surveillance in domestic and wild birds, enhance surveillance for early detection in cattle populations in countries where HPAI is known to be circulating, include HPAI as a differential diagnosis in non-avian species, including cattle and other livestock populations, with high risk of exposure to HPAI viruses; monitor and investigate cases in non-avian species, including livestock, report cases of HPAI in all animal species, including unusual hosts, to WOAH and other international organizations, share genetic sequences of avian influenza viruses in publicly available databases, implement preventive and early response measures to break the HPAI transmission cycle among animals through movement restrictions of infected livestock holdings and strict biosecurity measures in all holdings, employ good production and hygiene practices when handing animal products, and protect persons in contact with suspected/infected animals.[13]
- When there has been human exposure to a known outbreak of an influenza A virus in domestic poultry, wild birds or other animals – or when there has been an identified human case of infection with such a virus – enhanced surveillance in potentially exposed human populations becomes necessary. Enhanced surveillance should consider the health care seeking behaviour of the population, and could include a range of active and passive health care and/or community-based approaches, including: enhanced surveillance in local influenza-like illness (ILI)/SARI systems, active screening in hospitals and of groups that may be at higher occupational risk of exposure, and inclusion of other sources such as traditional healers, private practitioners and private diagnostic laboratories.
- Vigilance for the emergence of novel influenza viruses of pandemic potential should be maintained at all times including during a non-influenza emergency. In the context of the co-circulation of SARS-CoV-2 and influenza viruses, WHO has updated and published practical guidance for integrated surveillance.

Notifying WHO

- All human infections caused by a new subtype of influenza virus are notifiable under the International Health Regulations (IHR, 2005).[14] State Parties to the IHR (2005) are required to immediately notify WHO of any laboratory-confirmed[15] case of a recent human infection caused by an influenza A virus with the potential to cause a pandemic[16]. Evidence of illness is not required for this report.
- WHO published the case definition for human infections with avian influenza A(H5) virus requiring notification under IHR (2005): https://www.who.int/teams/global-influenza-programme/avian-influenza/case-definitions.

Virus sharing and risk assessment

[13] World Organisation for Animal Health. Statement on High Pathogenicity Avian Influenza in Cattle, 6 December 2024. Available at: https://www.woah.org/en/high-pathogenicity-avian-influenza-hpai-in-cattle/.
[14] World Health Organization. Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations (2005).
[15] World Health Organization. Manual for the laboratory diagnosis and virological surveillance of influenza (2011). Available at: https://apps.who.int/iris/handle/10665/44518
[16] World Health Organization. Pandemic influenza preparedness framework for the sharing of influenza viruses and access to vaccines and other benefits, 2nd edition. Available at: https://iris.who.int/handle/10665/341850

- It is critical that these influenza viruses from animals or from people are fully characterized in appropriate animal or human health influenza reference laboratories. Under WHO's Pandemic Influenza Preparedness (PIP) Framework, Member States are expected to share influenza viruses with pandemic potential on a **timely basis**[17] with a WHO Collaborating Centre for influenza of GISRS. The viruses are used by the public health laboratories to assess the risk of pandemic influenza and to develop candidate vaccine viruses.
- The Tool for Influenza Pandemic Risk Assessment (TIPRA) provides an in-depth assessment of risk associated with some zoonotic influenza viruses – notably the likelihood of the virus gaining human-to-human transmissibility, and the impact should the virus gain such transmissibility. TIPRA maps relative risk amongst viruses assessed using multiple elements. The results of TIPRA complement those of the risk assessment provided here, and those of prior TIPRA analyses will be published at http://www.who.int/teams/global-influenza-programme/avian-influenza/tool-for-influenza-pandemic-risk-assessment-(tipra).

Risk reduction

- Given the observed extent and frequency of avian influenza in poultry, wild birds and some wild and domestic mammals, the public should avoid contact with animals that are sick or dead from unknown causes, including wild animals, and should report dead birds and mammals or request their removal by contacting local wildlife or veterinary authorities.
- Eggs, poultry meat and other poultry food products should be properly cooked and properly handled during food preparation. Due to the potential health risks to consumers, raw milk should be avoided. WHO advises consuming pasteurized milk. If pasteurized milk isn't available, heating raw milk until it boils makes it safer for consumption.
- WHO has published practical interim guidance to reduce the risk of infection in people exposed to avian influenza viruses.

Trade and travellers

- WHO advises that travellers to countries with known outbreaks of animal influenza should avoid farms, contact with animals in live animal markets, entering areas where animals may be slaughtered, or contact with any surfaces that appear to be contaminated with animal excreta. Travelers should also wash their hands often with soap and water. All individuals should follow good food safety and hygiene practices.
- WHO does not advise special traveller screening at points of entry or restrictions with regards to the current situation of influenza viruses at the human-animal interface. For recommendations on safe trade in animals and related products from countries affected by these influenza viruses, refer to WOAH guidance.

Links:

WHO Human-Animal Interface web page
https://www.who.int/teams/global-influenza-programme/avian-influenza
WHO Influenza (Avian and other zoonotic) fact sheet
https://www.who.int/news-room/fact-sheets/detail/influenza-(avian-and-other-zoonotic)
WHO Protocol to investigate non-seasonal influenza and other emerging acute respiratory diseases
https://www.who.int/publications/i/item/WHO-WHE-IHM-GIP-2018.2
WHO Public health resource pack for countries experiencing outbreaks of influenza in animals:
https://www.who.int/publications/i/item/9789240076884

[17] World Health Organization. Operational guidance on sharing influenza viruses with human pandemic potential (IVPP) under the Pandemic Influenza Preparedness (PIP) Framework (2017). Available at: https://apps.who.int/iris/handle/10665/259402.

Cumulative Number of Confirmed Human Cases of Avian Influenza A(H5N1) Reported to WHO
https://www.who.int/teams/global-influenza-programme/avian-influenza/avian-a-h5n1-virus
Avian Influenza A(H7N9) Information
https://www.who.int/teams/global-influenza-programme/avian-influenza/avian-influenza-a-(h7n9)-virus
World Organisation of Animal Health (WOAH) web page: Avian Influenza
https://www.woah.org/en/home/
Food and Agriculture Organization of the United Nations (FAO) webpage: Avian Influenza
https://www.fao.org/animal-health/avian-flu-qa/en/
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http://www.offlu.org/