

## **Influenza at the human-animal interface**

Summary and risk assessment, from 28 September to 1 November 2024<sup>1</sup>

- **New human cases<sup>2</sup>:** From 28 September to 1 November 2024, the detection of influenza A(H5) virus in 30 humans and influenza A(H9N2) virus in one human were reported officially.
- **Circulation of influenza viruses with zoonotic potential in animals:** high pathogenicity avian influenza (HPAI) events in poultry and non-poultry continue to be reported to the World Organisation for Animal Health (WOAH).<sup>3</sup> The Food and Agriculture Organization of the United Nations (FAO) also provides a global update on avian influenza viruses with pandemic potential.<sup>4</sup>
- **Risk assessment<sup>5</sup>:** Based on information available at the time of the risk assessment, the overall public health risk from currently known influenza viruses at the human-animal interface has not changed, and the occurrence of sustained human-to-human transmission of these viruses is currently considered unlikely. Although human infections with viruses of animal origin are infrequent, 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).<sup>6</sup> This includes any influenza A virus that has demonstrated the capacity to infect a human and its haemagglutinin 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:**

#### **A(H5), United States of America (USA)**

Since the last risk assessment of 27 September 2024, influenza A(H5) virus has been detected in 30 humans in the USA; of these, 20 cases were detected in California and 16 of those have been confirmed through partial or whole genome sequencing as clade 2.3.4.4b A(H5N1) viruses, closely related to those detected in dairy cattle. Whole genome sequences from nine of these indicate the viruses are of the B3.13 genotype which is the same genotype detected in dairy cattle.

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<sup>1</sup> This summary and assessment covers information confirmed during this period and may include information received outside of this period.

<sup>2</sup> 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](#).

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

<sup>4</sup> 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>.

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

<sup>6</sup> World Health Organization. Case definitions for the 4 diseases requiring notification to WHO in all circumstances under the International Health Regulations (2005). [Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations \(2005\)](#).

The ten cases reported in Washington reportedly had exposure to poultry infected with avian influenza viruses. Genetic sequencing of three of these cases confirms that all are A(H5N1) viruses from clade 2.3.4.4b and that all are closely related genetically to the viruses causing infections in poultry on the farm where depopulation was conducted. CDC has successfully obtained partial gene sequences for viruses from three cases in Washington with other cases pending sequence analysis.<sup>7</sup>

All cases were reported as adults > 18 years of age; all had reported mild illness and none were hospitalized, and all had recovered or were recovering at the time of reporting. All cases reported mild symptoms. Cases had onsets of illness between 28 September and 26 October 2024.

Intensive epidemiological investigation of the case previously reported in Missouri with unknown exposure could not identify any link to an animal or animal product exposure; serology testing of the case and six contacts was negative for five contacts and showed weak immune signals in the sample from the case and one household contact who reported identical symptoms onset. These findings support a single common exposure, which remains unknown, rather than human-to-human transmission.<sup>8,9</sup>

Low pathogenicity and high pathogenicity avian influenza (HPAI) viruses have been detected in birds in the United States. Since 2022, the HPAI A(H5) virus has been detected in commercial and backyard flocks in 48 states, impacting over 100 million birds. To date, 37 people have tested positive for A(H5) virus in the United States since 2022, with all but one of these cases occurring in 2024. All cases have been associated with exposure to either A(H5N1)-infected poultry or dairy cattle, except for one case where the exposure source could not be identified. A(H5N1) virus infections in dairy cattle and wild and domestic birds continue to be reported in the USA.<sup>10</sup>

According to reports received by WOA, various influenza A(H5) subtypes continue to be detected in wild and domestic birds in Asia, Europe and the Americas. Infections in non-human mammals are also reported, including in marine and land mammals.<sup>11</sup> A list of bird and mammalian species affected by HPAI A(H5) viruses is maintained by FAO.<sup>12</sup>

## **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 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

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<sup>7</sup> CDC A(H5N1) Bird Flu Response Update November 4, 2024. Available at: <https://www.cdc.gov/bird-flu/spotlights/h5n1-response-11012024.html>.

<sup>8</sup> World Health Organization. Influenza at the human-animal interface, Summary and risk assessment, from 20 July to 27 September 2024. Available at: [https://cdn.who.int/media/docs/default-source/influenza/human-animal-interface-risk-assessments/influenza-at-the-human-animal-interface-summary-and-assessment--from-20-july-to-27-september-2024.pdf?sfvrsn=355e503c\\_1&download=true](https://cdn.who.int/media/docs/default-source/influenza/human-animal-interface-risk-assessments/influenza-at-the-human-animal-interface-summary-and-assessment--from-20-july-to-27-september-2024.pdf?sfvrsn=355e503c_1&download=true).

<sup>9</sup> United States Centers for Disease Control and Prevention. CDC Report on Missouri H5N1 Serology Testing. Available at: <https://www.cdc.gov/bird-flu/spotlights/missouri-h5n1-serology-testing.html>.

<sup>10</sup> United States Department of Agriculture. Highly Pathogenic Avian Influenza (HPAI) Detections in Livestock, 19 July 2024. Available at: <https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/livestock>.

<sup>11</sup> World Organisation for Animal Health (WOAH). Avian influenza. Global situation. Available at: <https://www.woah.org/en/disease/avian-influenza/#ui-id-2>.

<sup>12</sup> 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>.

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 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 and the years prior, small clusters 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 influenza A(H5) viruses circulating have not acquired the ability to efficiently transmit between people, therefore 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 27 September 2024, one human case of infection with an A(H9N2) influenza virus was notified to WHO from China on 9 October 2024 in a 3-year-old boy from Chongqing municipality. He had an onset of illness on 4 September and on 5 September, he was seen at a hospital for fever and runny nose. He had mild illness, was not hospitalized and has recovered. Respiratory samples were collected on the same day as part of routine influenza-like illness surveillance were confirmed positive for influenza A(H9N2) on 19 September.

According to the notification, the case had exposure to a live poultry market before onset of illness or travel history prior to the onset of illness. All close contacts have completed their 10-day follow up, with no additional cases found. Environmental samples collected from the market tested positive for influenza A(H9) viruses.

### **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 in most cases. 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<sup>13</sup>, 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.

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<sup>13</sup> 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>.

## **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.

## **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.

### **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 environment sectors is essential to understand the extent of the risk of human exposure and to prevent and control the spread of animal influenza.
- 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 maintain enhanced surveillance in domestic and wild birds, 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, prevent the introduction and spread in animals by implementing through strict biosecurity measures in livestock holdings, employ good production and hygiene practices when handling animal products, and protect persons in contact with suspected/infected animals.<sup>14</sup>
- 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.

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<sup>14</sup> World Organisation for Animal Health. Statement on High Pathogenicity Avian Influenza in Cattle, 8 June 2024. Available at: <https://www.woah.org/en/high-pathogenicity-avian-influenza-in-cattle/#:~:text=The%20recently%20reported%20detections%20of,H5N1%20viruses%20becoming%20better%20adapted.>

- 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 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).<sup>15</sup> State Parties to the IHR (2005) are required to immediately notify WHO of any laboratory-confirmed<sup>16</sup> case of a recent human infection caused by an influenza A virus with the potential to cause a pandemic<sup>17</sup>. Evidence of illness is not required for this report.

#### *Virus sharing and risk assessment*

- 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**.<sup>18</sup> 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-\(tipra\)](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

<sup>15</sup> World Health Organization. [Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations \(2005\)](#).

<sup>16</sup> World Health Organization. Manual for the laboratory diagnosis and virological surveillance of influenza (2011). Available at: <https://apps.who.int/iris/handle/10665/44518>

<sup>17</sup> World Health Organization. Pandemic influenza preparedness framework for the sharing of influenza viruses and access to vaccines and other benefits, 2<sup>nd</sup> edition. Available at: <https://iris.who.int/handle/10665/341850>

<sup>18</sup> 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/10665/25940>

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-\(avian-and-other-zoonotic\)](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>

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](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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