



## Influenza at the human-animal interface

Summary and assessment, from 9 August to 1 October 2021<sup>1</sup>

- **New infections<sup>2</sup>:** Since the previous update on 8 August 2021, ten human cases of infection with avian influenza A(H5N6) viruses, two human cases of infection with avian influenza A(H9N2) viruses, five human cases of infection with influenza A(H1N1) variant viruses and two human cases of infection with influenza A(H1N2) variant viruses were reported officially.<sup>3</sup> One human case of infection with an influenza A(H5N6) virus, one human case of infection with an influenza A(H9N2) virus, two human cases of infection with influenza A(H1N1) variant viruses, two human cases of infection with influenza A(H1N2) variant viruses and one human case of infection with an influenza A(H3N2) variant virus were also detected.
- **Risk assessment:** The overall public health risk from currently known influenza viruses at the human-animal interface has not changed, and the likelihood of sustained human-to-human transmission of these viruses remains low. Human infections with viruses of animal origin are expected at the human-animal interface wherever these viruses circulate in animals.
- **Risk management:** Selection of new candidate vaccine viruses (CVVs) for zoonotic influenza viruses for pandemic preparedness purposes was done during a recent WHO consultation.<sup>4</sup>
- **IHR compliance:** All human infections caused by a new influenza subtype are required to be reported under the International Health Regulations (IHR, 2005).<sup>5</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

#### **Current situation:**

##### **Avian influenza A(H5) viruses**

Since the last risk assessment on 8 August 2021, 11 cases of influenza A(H5N6) virus infection were reported from China to WHO.

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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> Joint announcement of FAO, OIE and WHO. Standardization of terminology for the influenza virus variants infecting humans: Update, 30 January 2014. [Standardization of terminology for the influenza virus variants infecting humans: Update.](#)

<sup>4</sup> World Health Organization. Antigenic and genetic characteristics of zoonotic influenza viruses and candidate vaccine viruses developed for potential use in human vaccines. Available at:

<https://www.who.int/teams/global-influenza-programme/vaccines/who-recommendations>

<sup>5</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 \(2005\).](#)

**Table 1. Human cases of influenza A(H5N6) reported to WHO from China from 9 August to 1 October 2021.**

Onset date	Reporting province	Gender	Age	Hospitalization date	Condition at time of reporting	Poultry exposure
26 July 2021	Hunan	F	55	1 August 2021	Severe	Yes
31 July 2021	Guangdong	F	52	31 July 2021	Critical	Yes
2 Aug 2021	Hunan	M	54	2 Aug 2021	Mild	Yes
14 Aug 2021	Guangxi	F	26	19 Aug 2021	Fatal	Yes
17 Aug 2021	Guangxi	M	55	17 Aug 2021	Critical	Yes
23 Aug 2021	Guangxi	M	55	30 Aug 2021	Severe	Yes
25 Aug 2021	Guangxi	F	48	29 Aug 2021	Severe	Yes
28 Aug 2021*	Hunan	F	58	Not available	Not available	Yes
8 Sept 2021	Hunan	F	40	9 Sept 2021	Severe	Yes
13 Sept 2021	Guangdong	M	53	18 Sept 2021	Severe	Yes
16 Sept 2021	Chongqing	M	72	19 Sept 2021	Fatal	Yes

\*This case was reported to WHO during the September 2021 WHO Consultation on the Composition of Influenza Virus Vaccines for Use in the 2022 Southern Hemisphere Influenza Season.

Two cases reported from Hunan province (55-year-old woman and 54-year old man) were related (husband and wife). This would be the first reported cluster of A(H5N6) cases but common exposure appears more likely than human-to-human transmission. The wife purchased a freshly slaughtered duck from a live poultry market and the husband, together with his, wife cooked the duck purchased from the market before his onset of illness.

No suspected cases were detected among close contacts of the other cases at the time of reporting. All other cases were sporadic infections due to exposure to live poultry or live poultry markets except for one for which the exposure history was unclear at the time of reporting.

According to reports received by the World Organisation for Animal Health (OIE), various influenza A(H5) subtypes continue to be detected in birds in Africa, Europe and Asia.

#### Risk Assessment:

##### **1. What is the likelihood that additional human cases of infection with avian influenza A(H5) viruses will occur?**

The overall risk assessment is unchanged. Most human cases were sporadic infections exposed to A(H5) viruses through contact with infected poultry or contaminated environments, including live poultry markets. Since the viruses continue to be detected in animals and related environments, further human cases can be expected. The detection of influenza A(H5) virus in nasopharyngeal/oropharyngeal samples collected from individuals in close contact with infected poultry or other birds, whether the individuals are symptomatic or not, is not unexpected. Good quality serological investigations may be useful in differentiating infection from localized contamination (not true infection) in these cases and allow for better assessment of the risk of human infection.

##### **2. What is the likelihood of human-to-human transmission of avian influenza A(H5) viruses?**

This is the first family cluster of influenza A(H5N6) cases reported. In this case, human-human transmission was reportedly less likely than common exposure to poultry. Even though small clusters of A(H5) virus infections have been reported previously including those involving health care workers, current epidemiological and virological evidence suggests that influenza A(H5) viruses have not acquired the ability of sustained transmission among humans, thus the likelihood is low.

### **3. What is the risk 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 evidence suggests these viruses have not acquired the ability to transmit easily among humans.

#### **Avian influenza A(H7N9) viruses**

There have been no publicly available reports from animal health authorities in China or other countries on positive influenza A(H7N9) virus detections in animals in recent months.<sup>6</sup>

Overall, the risk assessment has not changed.

#### **Avian influenza A(H9N2) viruses**

Since the last risk assessment on 8 August 2021, three human cases of infection with influenza A(H9N2) viruses were reported from China.

**Table 2. Human cases of influenza A(H9N2) reported to WHO from China from 9 August to 1 October 2021.**

Onset date	Reporting province	Gender	Age	Condition at time of reporting	Poultry exposure	Detected in influenza-like illness (ILI) surveillance
3 June 2021*	Jiangsu	F	8	Not available	Not available	Not available
23 Aug 2021	Hunan	F	1.5	Mild	Yes	Yes
6 Sept 2021	Guizhou	M	11	Mild	Yes	Yes

\*This case was reported to WHO during the September 2021 WHO Consultation on the Composition of Influenza Virus Vaccines for Use in the 2022 Southern Hemisphere Influenza Season.

Avian influenza A(H9N2) viruses are enzootic in poultry in Asia and increasingly reported in poultry in Africa.

#### **Risk Assessment:**

##### **1. What is the likelihood that additional human cases of infection with avian influenza A(H9N2) viruses will occur?**

Most human cases follow exposure to the A(H9N2) virus through contact with infected poultry or contaminated environments. Human infection tends to result in mild clinical illness in most cases. Since the virus continues to be detected in poultry populations, further human cases can be expected.

##### **2. What is the likelihood of human-to-human transmission of avian influenza A(H9N2) viruses?**

No case clusters have been reported. Current epidemiologic and virologic evidence suggests that influenza A(H9N2) viruses assessed by GISRS have not acquired the ability of sustained transmission among humans, thus the likelihood is low.

##### **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

<sup>6</sup> Food and Agriculture Organization of the United Nations. H7N9 Situation Update. [www.fao.org/ag/againfo/programmes/en/empres/H7N9/situation\\_update.html](http://www.fao.org/ag/againfo/programmes/en/empres/H7N9/situation_update.html)

level spread is considered unlikely as the A(H9N2) virus subtype has not been confirmed to have acquired the ability to transmit easily among humans.

### Swine Influenza Viruses

#### **Current situation:**

##### **Influenza A(H1) variant viruses (A(H1)v)**

Since the last risk assessment on 8 August 2021, five human cases of infection with influenza A(H1N1)v viruses were reported from China. One was reported to WHO during the February 2021 WHO Consultation on the Composition of Influenza Virus Vaccines for Use in the 2021-22 Northern Hemisphere Influenza Season and four were reported to WHO during the September 2021 WHO Consultation on the Composition of Influenza Virus Vaccines for Use in the 2022 Southern Hemisphere Influenza Season. All were subsequently reported to WHO under the IHR on 9 October 2021. All were detected in routine influenza-like illness (ILI) surveillance. The exposure history of these cases was unknown.

**Table 3. Human cases of influenza A(H1N1)v reported to WHO from China from 9 August to 9 October 2021.**

Onset date	Reporting province	Gender	Age	Condition at time of reporting
27 Dec 2020	Tianjin	F	6	Mild
27 Jan 2021	Sichuan	F	65	Mild
7 Feb 2021	Gansu	M	13	Pneumonia
28 Feb 2021	Gansu	M	4	Mild
1 March 2021	Hunan	M	1	Mild

Two adult human cases of infection with influenza A(H1N1)v viruses were detected in the state of Wisconsin in the USA since the last risk assessment.<sup>7</sup> One was hospitalized and both have recovered. Both cases attended a fair with a swine exhibit prior to illness onset. No human-to-human transmission of the virus was identified associated with this event.

On 3 September 2021, the French National Reference Center for respiratory diseases (NRC) confirmed via whole genome sequencing a human infection caused by an influenza A(H1N2)v virus in a male aged between 60-69 years in the Brittany region of France. He developed an acute respiratory infection on 14 August 2021, sought medical attention on 18 August and was subsequently admitted to the intensive care unit (ICU). He had several comorbidities and was on immunosuppressive treatment. A specimen collected on 18 August tested positive for influenza A virus by RT-PCR and negative for SARS-CoV-2. He was treated with antivirals, was discharged from hospital on 25 August. He had a history of exposure to swine from a farm the week prior to illness onset, though the link between exposure and infection cannot be confirmed.

A preliminary epidemiological investigation determined that none of the patient's contacts had similar influenza-like symptoms. At the time of reporting, further investigations, including serological investigations, were ongoing to identify any other co-exposed persons or close contacts. Health authorities in the region were requested to be alert to any person in contact with pigs, and presenting symptoms of acute respiratory infection (fever, sore throat, headache, cough) for further investigation.

<sup>7</sup> United States of America Centers for Disease Control and Prevention. FluView summary ending on August 14, 2021. Available at: [www.cdc.gov/flu/weekly/weeklyarchives2020-2021/week32.htm](http://www.cdc.gov/flu/weekly/weeklyarchives2020-2021/week32.htm).

On 30 September 2021, WHO received a notification of a human case of infection with an influenza A(H1N2)v virus in Austria in an immunocompromised 29-year-old male in the province of Upper Austria. He sought medical attention for an influenza-like illness on 31 August 2021. A specimen collected on tested negative for other respiratory pathogens and positive for influenza A virus by RT-PCR on 1 September 2021. He was hospitalized from 1 to 3 September 2021 as a precaution and was treated with antivirals. As of 12 September, he tested negative for influenza A and has recovered. He had a history of exposure to swine on a farm where he lived and worked.

An epidemiological investigation determined that none of the patient's contacts tested positive for influenza A viruses. Several samples collected from pigs on the farm tested positive for an influenza A(H1N2) virus similar to the one detected in the human case. The virus from the human case is undergoing further characterization at a WHO Collaborating Centre.

Two additional human cases of infection with influenza A(H1N2)v viruses were detected in the USA since the last risk assessment, one in Iowa<sup>8</sup> and the other in Ohio<sup>9</sup>. Both children were not hospitalized and have recovered. In the case from Iowa, no human-to-human transmission was identified. In the case from Ohio, neither the patient nor members of the household reported contact with swine. Thus, it was concluded that limited human-to-human transmission may have occurred.

### **Influenza A(H3) variant viruses (A(H3)v)**

One human case of infection with influenza A(H3N2)v virus was detected in the state of Iowa in the USA since the last risk assessment.<sup>8</sup> The child was not hospitalized and has recovered and no human-to-human transmission was identified.

#### **Risk Assessment:**

##### **1. What is the likelihood that additional human cases of infection with swine influenza viruses will occur?**

Swine influenza viruses circulate in swine populations in many regions of the world. Depending on geographic location, the genetic characteristics of these viruses differ. Most human cases are sporadic and due to exposure to swine influenza viruses through contact with infected animals or contaminated environments. Human infection tends to result in mild clinical illness in most cases. Since these viruses continue to be detected in swine populations, further human cases can be expected.

##### **2. What is the likelihood of human-to-human transmission of swine influenza viruses?**

Current evidence suggests that these viruses have not acquired the ability of sustained transmission among humans, thus the likelihood is low.

##### **3. What is the likelihood of international spread of swine influenza viruses by travelers?**

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 these viruses have not acquired the ability to transmit easily among humans.

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<sup>8</sup> United States of America Centers for Disease Control and Prevention. FluView summary ending on September 4, 2021. Available at: [www.cdc.gov/flu/weekly/weeklyarchives2020-2021/week35.htm](http://www.cdc.gov/flu/weekly/weeklyarchives2020-2021/week35.htm).

<sup>9</sup> United States of America Centers for Disease Control and Prevention. FluView summary ending on September 18, 2021. Available at: [www.cdc.gov/flu/weekly/weeklyarchives2020-2021/week37.htm](http://www.cdc.gov/flu/weekly/weeklyarchives2020-2021/week37.htm)

For more information on A(H5), A(H7), A(H9N2), A(H1)v and A(H3)v viruses, please see the September 2021 report: [Antigenic and genetic characteristics of zoonotic influenza viruses and candidate vaccine viruses developed for potential use in human vaccines.](#)

### **Overall Risk Management Recommendations:**

- WHO does not advise special traveler 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 from countries affected by these influenza viruses, refer to OIE guidance.
- WHO advises that travelers 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. Travelers should follow good food safety and good food hygiene practices.
- Due to the constantly evolving nature of influenza viruses, WHO continues to stress the importance of global surveillance 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. Collaboration between the animal and human health sectors is essential. As the extent of virus circulation in animals is not clear, epidemiological and virological surveillance and the follow-up of suspected human cases should remain high. Guidance on investigation of non-seasonal influenza and other emerging acute respiratory diseases has been published on the WHO website here: <https://www.who.int/publications/i/item/WHO-WHE-IHM-GIP-2018.2>.
- In the current COVID-19 pandemic, vigilance for the emergence of novel influenza viruses of pandemic potential should be maintained. WHO is developing practical guidance to prepare for the upcoming influenza season and influenza emergencies in the context of the cocirculation of SARS-CoV-2 and influenza viruses.
- All human infections caused by a new subtype of influenza virus are notifiable under the International Health Regulations (IHR, 2005).<sup>10</sup> State Parties to the IHR (2005) are required to immediately notify WHO of any laboratory-confirmed<sup>11</sup> case of a recent human infection caused by an influenza A virus with the potential to cause a pandemic<sup>12</sup>. Evidence of illness is not required for this report.
- 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 regular and **timely basis**<sup>13</sup> with the Global Influenza Surveillance and Response System (GISRS), a WHO-coordinated network of public health laboratories. The viruses are used by the public health laboratories to assess the risk of pandemic influenza and to develop candidate vaccine viruses.

### **Links:**

WHO Human-Animal Interface web page

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<sup>10</sup> World Health Organization. [Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations \(2005\).](#)

<sup>11</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>12</sup> World Health Organization. Pandemic influenza preparedness framework for the sharing of influenza viruses and access to vaccines and other benefits. Available at: <https://apps.who.int/iris/handle/10665/44796>

<sup>13</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>

<https://www.who.int/teams/global-influenza-programme/avian-influenza>

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>

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 Influenza A(H7N9) Information

[http://www.who.int/influenza/human\\_animal\\_interface/influenza\\_h7n9/en/](http://www.who.int/influenza/human_animal_interface/influenza_h7n9/en/)

WHO Avian Influenza Food Safety Issues

[http://www.who.int/foodsafety/areas\\_work/zoonose/avian/en/](http://www.who.int/foodsafety/areas_work/zoonose/avian/en/)

World Organisation of Animal Health (OIE) web page: Avian Influenza

<https://www.oie.int/en/disease/avian-influenza/>

Food and Agriculture Organization of the UN (FAO) webpage: Avian Influenza

<http://www.fao.org/avianflu/en/index.html>

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<http://www.offlu.org/index.html>