

## Influenza at the human-animal interface

Summary and assessment, from 10 December 2020 to 29 January 2021<sup>1</sup>

- **New infections<sup>2</sup>:** Since the previous update on 9 December 2020, four human infections with avian influenza A(H5N6) viruses, eight human infections with avian influenza A(H9N2) viruses, six human infections with influenza A(H1N1) variant viruses, one human infection with an influenza A(H1N2) variant virus, and one human infection with an influenza A(H3N2) variant virus were reported.<sup>3</sup>
- **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.
- **IHR compliance:** All human infections caused by a new influenza subtype are required to be reported under the International Health Regulations (IHR, 2005).<sup>4</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 9 December 2020, four new laboratory-confirmed human cases of influenza A(H5N6) virus infection were reported from China to WHO.

On 18 December 2020, China notified WHO of a 54-year-old female farmer from Hunan Province infected with an influenza A(H5N6) virus and who had exposure to domestic live poultry prior to the onset of her illness. She developed symptoms on 8 December 2020, was hospitalized on 13 December and remains hospitalized. Environmental samples from the patient's poultry farm tested positive for influenza A(H5N6) viruses.

On 6 January 2021, China notified WHO of an additional confirmed case of human infection with avian influenza A(H5N6) virus in a 51-year-old male from Chongqing Municipality who had exposure to a live poultry market prior to the onset of illness. He developed symptoms on 18 December 2020, was hospitalized on 28 December and remains hospitalized.

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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 yearly report on human cases of influenza at the human-animal interface published in the Weekly Epidemiological Record. Available at: [www.who.int/wer/en/](http://www.who.int/wer/en/)

<sup>3</sup> Standardization of terminology for the influenza virus variants infecting humans: Update. Available at: [https://www.who.int/influenza/gisrs\\_laboratory/terminology\\_variant/en/](https://www.who.int/influenza/gisrs_laboratory/terminology_variant/en/)

<sup>4</sup> World Health Organization. Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations (2005). Available at: [www.who.int/ihr/Case\\_Definitions.pdf](http://www.who.int/ihr/Case_Definitions.pdf)

On 24 January 2021, China notified WHO of two additional confirmed cases of human infection with avian influenza A(H5N6) viruses. One infection was confirmed in a 3-year-old female from Guizhou province who developed symptoms on 21 November 2020. She was hospitalized on 28 November and passed away on 22 December 2020. Another infection was confirmed in a 1-year-old female from Anhui province who developed mild symptoms on 22 December 2020, was detected through influenza-like illness (ILI) surveillance and has recovered. Both of these cases had exposure to poultry from a live poultry market.

At the time of reporting, no further cases were suspected among close family contacts of these cases. Further characterization of the viruses from these patients, where available, is underway.

A total of 29 laboratory-confirmed cases of human infection with influenza A(H5N6) virus have been reported to WHO from China since 2014.

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 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 environments, further human cases can be expected.

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

Even though small clusters of A(H5) virus infections have been reported previously including those involving healthcare 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 influenza A(H7N9) virus detections in animals in recent months.<sup>5</sup>

Overall, the risk assessment has not changed.

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

Six laboratory-confirmed human cases of influenza A(H9N2) virus infection were reported from China to WHO on 9 December 2020 and were not included in the previous update of the same date. An additional two cases were reported from China to WHO after 9 December (see Table 1).

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<sup>5</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)

All eight cases reportedly had mild illnesses, were detected through ILI surveillance and have recovered. Additionally, no clusters of cases have been reported. Further characterization of the viruses from these patients, where available, is underway.

Table 1. Human cases of influenza A(H9N2) reported to WHO from China from 9 December 2020-28 January 2021.

Date reported to WHO	Onset date	Reporting province*	Gender	Age (years)	Live poultry exposure
9 December 2020	17 July 2019	Hubei	F	8 months	Yes
9 December 2020	1 June 2020	Guizhou	F	6	Yes
9 December 2020	20 Sept 2020	Guangxi	F	6	Yes
9 December 2020	27 Sept 2020	Guizhou	F	8	Yes
9 December 2020	19 Oct 2020	Henan	F	4	No
9 December 2020	29 Nov 2020	Hunan	F	52	Yes
4 January 2021	28 Dec 2020	Guangdong	M	1	Yes
14 January 2021	2 Jan 2021	Fujian	F	52	Yes

\*Potential exposure location is same as reporting province for all these cases.

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 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(H1N1) variant virus (A(H1N1)v)**

On 17 December 2020, the Netherlands notified WHO of a human infection with a Eurasian avian-like swine influenza A(H1N1) virus.

The patient, an adult male, had an impaired immune system and was admitted to hospital for a procedure in early September 2020. The patient developed an influenza-like illness on 8 September 2020, shortly after the procedure. One day after onset of symptoms, the patient tested positive for influenza A virus. The patient recovered and was discharged from hospital. The patient had no direct contact with pigs or other animals during the incubation period. Whole genome sequencing characterized the virus as a Eurasian avian-like swine influenza A(H1N1) virus, similar to one previously detected in a human in 2016 in the Netherlands.

Also on 17 December 2020, China notified WHO of a human infection with a Eurasian avian-like swine influenza A(H1N1) virus. On 25 January 2021, China notified WHO of four additional human infections with Eurasian avian-like swine influenza A(H1N1) viruses (see Table 2). All had mild illness and exposure to swine prior to onset of illness was unknown. No family clusters were reported. All were detected through ILI surveillance and all have recovered.

Table 2. Human cases of influenza A(H1N1)v reported to WHO from China from 9 December 2020-28 January 2021.

Date reported to WHO	Onset date	Reporting province	Gender	Age (years)	Swine exposure
17 Dec 2020	16 Nov 2020	Guangdong	M	11 months	Unknown
25 Jan 2021	19 Aug 2020	Hubei	M	1	Unknown
25 Jan 2021	11 Oct 2020	Liaoning	F	2	Unknown
25 Jan 2021	22 Nov 2020	Yunnan	F	1	Unknown
25 Jan 2021	1 Jan 2021	Shandong	M	2	Unknown

#### **Influenza A(H1N2) variant virus (A(H1N2)v)**

On December 15, 2020, Brazil notified WHO of a human infection with an influenza A(H1N2)v virus. The patient is a 4-year-old female from the State of Paraná who had onset of illness on 16 November 2020. The patient lives on a farm that is also functions as a swine slaughterhouse. No symptomatic contacts were found among the patient's family. The patient was not hospitalized, received antivirals and has recovered.

An unsubtypeable influenza A virus was detected in the sample collected as part of routine hospital surveillance for respiratory viruses. The sample was sent to the Laboratory of Respiratory Viruses and Measles of the Oswaldo Cruz Institute (Fiocruz), the National Influenza Center (NIC) in Rio de Janeiro, and whole genome sequencing characterized this virus as an influenza A(H1N2)v virus. On preliminary analysis, the virus differs from previous influenza A(H1N2)v viruses detected in humans in Brazil with the haemagglutinin gene (HA) derived from influenza A(H1N1)pdm09-like viruses circulating in swine in the region instead of the previously detected human seasonal-like delta lineage of A(H1) swine influenza viruses. Further characterization of the virus from the patient is ongoing.

#### **Influenza A(H3N2) variant virus (A(H3N2)v)**

On 23 January 2021, the United States of America (USA) notified WHO of a human infection with a swine influenza A(H3N2) virus.

The patient, a child from the state of Wisconsin, developed mild respiratory disease on 13 January 2021 and a sample was collected the following day. Testing at the state public health laboratory indicated a presumptive influenza A(H3N2)v virus infection and on 22 January, the United States Centers for Disease Control and Prevention (CDC) confirmed the infection. The patient lives on a farm where swine are present and investigation into the source of exposure is underway.

Symptomatic household contacts tested negative for influenza A viruses. The patient was not hospitalized, received antiviral medications and has recovered. Sequencing of the virus by the CDC revealed it is similar to A(H3N2) viruses circulating in swine in the mid-western USA during 2019-2020. Viruses related to this A(H3N2)v virus were previously circulating as human seasonal A(H3N2) viruses until around 2010-2011 when they entered the USA swine population. Further characterization of the virus is underway.

This is the first human infection with an influenza A(H3N2)v virus identified in the USA in 2021. One case was also reported to WHO in 2020.

#### **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 exposed 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.

#### **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 [www.who.int/influenza/resources/publications/outbreak\\_investigation\\_protocol/en/](http://www.who.int/influenza/resources/publications/outbreak_investigation_protocol/en/).
- 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>6</sup> State Parties to the IHR (2005) are required to immediately notify WHO of any laboratory-confirmed<sup>7</sup> case of a recent human infection caused by an influenza A virus with the potential to cause a pandemic<sup>8</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>9</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

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

WHO Protocol to investigate non-seasonal influenza and other emerging acute respiratory diseases

[http://www.who.int/influenza/resources/publications/outbreak\\_investigation\\_protocol/en/](http://www.who.int/influenza/resources/publications/outbreak_investigation_protocol/en/)

Cumulative Number of Confirmed Human Cases of Avian Influenza A(H5N1) Reported to WHO

[http://www.who.int/influenza/human\\_animal\\_interface/H5N1\\_cumulative\\_table\\_archives/en/](http://www.who.int/influenza/human_animal_interface/H5N1_cumulative_table_archives/en/)

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: Web portal on Avian Influenza

<http://www.oie.int/animal-health-in-the-world/web-portal-on-avian-influenza/>

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

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

OFFLU

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

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<sup>6</sup> World Health Organization. Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations (2005). Available at: [www.who.int/ihr/Case\\_Definitions.pdf](http://www.who.int/ihr/Case_Definitions.pdf)

<sup>7</sup> World Health Organization. Manual for the laboratory diagnosis and virological surveillance of influenza (2011). Available at: [www.who.int/influenza/gisrs\\_laboratory/manual\\_diagnosis\\_surveillance\\_influenza/en/](http://www.who.int/influenza/gisrs_laboratory/manual_diagnosis_surveillance_influenza/en/)

<sup>8</sup> [https://www.who.int/influenza/resources/pip\\_framework/en/](https://www.who.int/influenza/resources/pip_framework/en/)

<sup>9</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: [www.who.int/influenza/gisrs\\_laboratory/ivpp\\_sharing\\_guidance/en/](http://www.who.int/influenza/gisrs_laboratory/ivpp_sharing_guidance/en/)