

Influenza at the human-animal interface

Summary and assessment, from 2 October 2021 to 13 December 2021¹

- **New infections²:** Since the previous update on 1 October 2021, nine human cases of infection with avian influenza A(H5N6) viruses, four human cases of infection with avian influenza A(H9N2) viruses and one human case of infection with an influenza A(H1N2) variant virus were reported officially. Three human cases of infection with influenza A(H1N1) variant viruses, one human case of infection with an influenza A(H1N2) variant virus, one human case with influenza A(H1Nx) variant virus 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.
- **IHR compliance:** All human infections caused by a new influenza subtype are required to be reported under the International Health Regulations (IHR, 2005).³ 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 1 October August 2021, nine cases of influenza A(H5N6) virus infection were reported from China to WHO.

Table 1. Human cases of influenza A(H5N6) reported to WHO from China from 1 October 2021 to 7 December 2021.

Onset date	Reporting province	Gender	Age	Hospitalization date	Condition at time of reporting	Poultry exposure
26 Sept 2021	Hunan	M	66	27 Sept 2021	Severe	Yes
3 Oct 2021	Hunan	F	60	13 Oct 2021	Critical	Yes
20 Oct 2021	Guangdong	M	52	21 Oct 2021	Critical	Yes
17 Nov 2021	Sichuan	F	54	19 Nov 2021	Deceased, 23 Nov 2021	Yes
15 Nov 2021	Guangxi	M	3	16 Nov 2021	Severe	Yes

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](#).

³World 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 \(2005\)](#).

22 Nov 2021	Hunan	M	49	25 Nov 2021	Severe	Yes
24 Nov 2021	Hunan	M	72	29 Nov 2021	Severe	Yes
4 Dec 2021	Hunan	M	58	Not hospitalized	Mild	Yes
3 Dec 2021	Guangdong	M	68	7 Dec 2021	Critical	Yes

The fatal case (the 54-year-old woman from Sichuan) reportedly had underlying conditions. No clusters of cases were reported associated with these cases. Environmental samples collected from backyard poultry or live poultry markets linked to some of these cases have tested positive for Influenza A(H5) by the local public health institutions.

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 can be useful in differentiating infection in humans from localized contamination and allow for better assessment of the associated risk.

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 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.

A more detailed assessment of risk associated specifically with influenza A(H5N6) has been published [here](#).

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.⁴

Overall, the risk assessment has not changed.

Avian influenza A(H9N2) viruses

⁴ Food and Agriculture Organization of the United Nations. H7N9 Situation Update. www.fao.org/ag/againfo/programmes/en/empres/H7N9/situation_update.html

Since the last risk assessment on 1 October 2021, four 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 1 October 2021 to 3 December 2021.

Onset date	Reporting province	Gender	Age	Hospitalization date	Condition at time of reporting	Poultry exposure	Detected in ILI surveillance
26 Sept 2021	Guangdong	F	3	Not hospitalized	Mild	Yes	Yes
29 Oct 2021	Guizhou	M	39	29 Oct 2021	Deceased, 1 Nov 2021	Yes	No
28 Nov 2021	Guangdong	M	7	Not hospitalized	Mild	Yes	Yes
6 Dec 2021	Guangdong	F	7	Not hospitalized	Mild	Yes	Yes

No clusters of cases were reported associated with these cases. The fatal case was reported to have had underlying medical conditions including a weakened immune system.

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(H1) variant viruses (A(H1)v)

Since the last risk assessment on 1 October 2021, five human cases of infection with influenza A(H1)v viruses were detected in the United States of America (USA).^{5,6}

Table 3. Human cases of influenza A(H1)v detected in the USA from 1 October 2021 to 3 December 2021.

Subtype	Onset date	State	Age	Status	Swine exposure
A(H1N1)v	1 Sept 2021	North Dakota	<18 years	Recovered	Yes
A(H1N1)v	18 Sept 2021	Iowa	≥18 years	Recovered	Yes
A(H1N1)v	22 Sept 2021	Iowa	≥18 years	Recovered	Yes
A(H1N2)v	21 Sept 2021	Indiana	≥18 years	Recovered	Yes
A(H1Nx)v	30 Oct 2021	Oklahoma	≥18 years	Died (underlying conditions)	Yes

One of these cases were hospitalized, but had underlying conditions and died, and no ongoing human-to-human transmission was identified associated with these detections.

Additionally, on 1 December 2021, the Public Health Agency of Canada (PHAC) notified PAHO/WHO of one laboratory confirmed case of human infection with influenza A(H1N2) variant virus (A(H1N2)v) in Manitoba province. The case is a person ≥ 18 years of age who was exposed to swine through the workplace. The case had an onset of non-severe symptoms (cough, headache, fever and runny nose) on 2 October 2021. Initial test results were negative for SARS-CoV-2 and positive for influenza A. A sample was collected on 12 October and sent to Canada's National Microbiology Laboratory (NML) as part of routine influenza surveillance. On 8 November, the NML sent the samples to the United States Centers for Disease Control and Prevention (US CDC) for subtyping and further characterization. On 29 November 2021, the NML confirmed that the US CDC detected A(H1N2)v by real-time PCR. The case did not require hospitalization and has since recovered. The case reported occupational exposure to swine at a swine farm. Multiple swine samples determined that A(H1N2) was circulating in the farm's swine population between September and November 2021. There were no detections of illness among close household and workplace contacts of the case.

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

Since the last risk assessment on 1 October August 2021, one human infection with an influenza A(H3N2)v virus was detected in Ohio, USA. The patient is <18 years of age had an onset of illness on 10 October 2021, was not hospitalized, and has recovered. No swine contact or fair attendance was

⁵ <https://www.cdc.gov/flu/weekly/weeklyarchives2021-2022/week41.htm>

⁶ <https://www.cdc.gov/flu/weekly/weeklyarchives2021-2022/week43.htm>

identified prior to illness onset and thus, human-to-human transmission was considered possible. No ongoing human-to-human transmission was identified.⁷

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 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 from countries affected by these influenza viruses, refer to OIE guidance.
- 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. 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.

⁷ <https://www.cdc.gov/flu/weekly/weeklyarchives2021-2022/week41.htm>

- All human infections caused by a new subtype of influenza virus are notifiable under the International Health Regulations (IHR, 2005).⁸ State Parties to the IHR (2005) are required to immediately notify WHO of any laboratory-confirmed⁹ case of a recent human infection caused by an influenza A virus with the potential to cause a pandemic¹⁰. 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**¹¹ 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

<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/

WHO Avian Influenza Food Safety Issues

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>

OFFLU

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

⁸ World Health Organization. [Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations \(2005\)](#).

⁹ World Health Organization. Manual for the laboratory diagnosis and virological surveillance of influenza (2011). Available at: <https://apps.who.int/iris/handle/10665/44518>

¹⁰ 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>

¹¹ 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>