Influenza at the human-animal interface
Summary and assessment, from 8 April to 13 May 2022

- **New infections**: From 8 April to 13 May 2022, two human cases of infection with avian influenza A(H5) viruses, one human case of infection with an avian influenza A(H3N8) virus and one human case of infection with an influenza A(H1N1) variant virus were reported officially.

- **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). 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 7 April 2022, one human case of influenza A(H5N6) virus infection was reported from China and one human case of influenza A(H5N1) virus infection was reported from the United States of America (USA).

On 11 April 2022, the National Health Commission of the People’s Republic of China notified WHO of a case of A(H5N6) virus infection in a 56-year-old male from Sichuan province, who had illness onset on 31 March 2022. He was hospitalized for severe pneumonia on 4 April and was in a severe condition at the time of reporting. He had exposure to dead backyard chickens before onset of illness, however, none of the environmental samples collected from his backyard tested positive for A(H5) viruses. No family members had developed symptoms at the time of reporting.

On 29 April 2022, the USA notified WHO of a case influenza A(H5) virus infection in a man from the state of Colorado. On 20 April 2022, he developed fatigue during participation in poultry depopulation activities from 18 to 22 April 2022 at a commercial poultry facility where influenza A(H5N1) virus had been confirmed in poultry. On 20 April, a respiratory sample was collected, and initial testing was completed on 25 April and indicated an influenza A virus but lacking reactivity with reverse transcription polymerase chain reaction (RT-PCR) tests for the hemagglutinin (HA) gene of contemporary seasonal influenza viruses of A(H1) or A(H3) subtypes. On 26 April, the patient was

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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 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).
isolated and treated with antivirals. The patient did not report symptoms other than fatigue, was not hospitalized and has since recovered. The sample was received and tested at the United States Centers for Disease Control and Prevention (US CDC) on 27 April, and influenza A(H5) virus was confirmed by RT-PCR. The neuraminidase N1 subtype was subsequently confirmed by sequence analysis. According to the US CDC, it is possible that the detection of A(H5N1) virus in this specimen is a result of surface contamination of the nasal cavity.

Samples from close contacts of the case and persons who participated in depopulation at the same facility all tested negative for influenza. Several close contacts of the patient have been recommended to receive influenza antiviral prophylaxis and are being monitored. At the time of reporting, the investigation was ongoing to determine if there are additional close contacts. Thus far, no evidence of human-to-human transmission of influenza A (H5N1) virus in this event has been identified.

This is the first reported detection of avian influenza A(H5N1) in a human in the USA. Since December 2021, avian influenza A(H5N1) highly pathogenic viruses have been detected in North America in both wild and domestic birds, for the first time since 2015. Since then, additional detections of the virus have been reported across Canada and the USA. The virus was likely introduced into North America and spread through wild migratory birds and subsequently spread between farms by movement of infected poultry and fomites.

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, Asia, Europe and North America.

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 rise in numbers of reported human cases of A(H5N6) infection since 2021 may reflect the spread of these viruses in poultry, an increased diagnostic capacity and awareness for respiratory illness aetiology amongst human health systems. 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(H3N8) viruses**

Since the last risk assessment on 7 April 2022, one human case of infection with an influenza A(H3N8) virus was reported from China.

On 25 April 2022, China reported a case of A(H3N8) influenza virus infection in a four-year-old boy from Henan province, with onset of symptoms on 5 April 2022, including cough, shortness of breath. He developed severe pneumonia with respiratory failure and was hospitalized on 10 April and in critical condition at the time of reporting. On 24 April, the National Influenza Center of the Chinese Center for Disease Control and Prevention tested the specimen sent from Henan Province and confirmed the influenza A virus in the sample was the A(H3N8) subtype and all genes were of avian origin. The case had exposure to chickens that had been raised in his backyard. The patient participated in the cooking and consumption of chickens before onset of illness. Clinical observation and sampling of the case’s close contacts revealed no further infections or symptoms of illness. Preliminary investigations into the source of exposure of this case have yielded A(H3N8)-positive samples from the chicken coops in the patient’s backyard and from live poultry markets in the area.

Based on the information currently available, this is the first case of human infection of avian influenza A(H3N8) reported globally. Avian influenza A(H3N8) viruses are commonly detected in domestic and wild birds globally. Canine and equine lineage A(H3N8) viruses are also commonly detected in dogs and horses, respectively.

**Risk Assessment:**

1. **What is the likelihood that additional human cases of infection with avian influenza A(H3N8) viruses will occur?**

   Avian influenza A viruses in aquatic birds provide all the genetic diversity required for the emergence of pandemic influenza viruses for humans, animals, and birds. Depending on geographic location and subtype, the genetic characteristics of these viruses differ. Most of the detected human cases of infection with avian influenza viruses are exposed to avian influenza viruses through contact with infected birds or contaminated environments. Influenza A(H3N8) viruses circulate widely in wild birds and other animals and influenza A(H3N8) viruses have recently been isolated from the environment of wild and domestic birds in China. Since avian influenza viruses continue to circulate in birds, further human cases cannot be excluded but the risk is currently low. The risk assessment may be updated with further virologic and epidemiologic information.

2. **What is the risk of sustained human-to-human transmission of A(H3N8) influenza viruses?**

   Current evidence suggests that this virus does not have the ability of sustained transmission among humans, thus the likelihood is low, however the public health impact should this occur would be major. Since little information on this virus is currently available, the confidence in this assessment is low.

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3. What is the risk of international spread of A(H3N8) influenza viruses by travellers?
Should infected individuals from affected areas travel internationally, their infection may be detected and the public health impact if this were to occur would be minor. Further community-level spread is considered unlikely as this virus has not acquired the ability to transmit easily among humans. However, if this were to occur, the public health impact would be major.

A more detailed assessment of risk associated specifically with influenza A(H3N8) has been published here.

Swine Influenza Viruses

Current situation:

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

On 11 May 2022, the Germany notified WHO about the detection of a laboratory-confirmed human case of infection with a swine-origin influenza A(H1N1) virus. A 34-year individual from the federal state of North Rhine-Westphalia developed illness, including fever, cough, sore throat, rhinorrhea, headache and myalgia, on 21 March 2022. During routine sentinel surveillance, a nasal swab sample was collected on 24 March and on 29 March, an influenza A virus was detected in the sample. The sample was tested at the National Influenza Centre (NIC) at the Robert Koch Institute in Germany. The sample underwent whole genome sequencing with complete sequence established on 5 May 2022. Sequencing results pointed to a Eurasian avian-like (EA) swine A(H1N1)v virus. Further antigenic characterization was underway at the time of reporting. The patient was not hospitalized and has since recovered. The patient had no direct contact with pigs. However, the patient lives in a region with many swine farms and has contacts who are swine farmers. Further epidemiological investigations are underway including voluntary serological testing for close contacts of the case.

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.
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 and related products 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 has developed practical guidance for integrated surveillance in the context of the cocirculation of SARS-CoV-2 and influenza viruses. The guidance is available here: https://www.who.int/publications/i/item/WHO-2019-nCoV-Integrated_sentinel_surveillance-2022.1.
- All human infections caused by a new subtype of influenza virus are notifiable under the International Health Regulations (IHR, 2005). State Parties to the IHR (2005) are required to immediately notify WHO of any laboratory-confirmed case of a recent human infection caused by an influenza A virus with the potential to cause a pandemic. 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 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

5 World Health Organization. Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations (2005).
7 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
8 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/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
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
OFFLU
http://www.offlu.org/