

Influenza at the human-animal interface

Summary and assessment, 22 November to 19 December 2016

- **New infections¹:** Since the previous update, new human infections with influenza A(H5N6), A(H7N9), A(H1N2)v and A(H3N2)v viruses were reported.
- **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. Further human infections with viruses of animal origin is expected.
- **IHR compliance:** All human infections caused by a new influenza subtype are required to be reported under the International Health Regulations (IHR, 2005).² This includes any animal and non-circulating seasonal viruses. Information from these notifications will continue to inform risk assessments for influenza at the human-animal interface.

Avian Influenza Viruses

Avian influenza A(H5) viruses

Current situation:

Since the last update³, one new laboratory-confirmed human case of influenza A(H5N6) virus infection was reported to WHO on 1 December 2016.

A 30-year-old female living in Guangxi Province developed symptoms on 8 November 2016. She was admitted to hospital on 18 November 2016, and at the time of notification, was in critical condition. She had a history of exposure to dead poultry prior to illness onset. 127 close contacts are being monitored, and at the time of notification, none of the close contacts have experienced symptoms. The epidemiological investigation is ongoing.

A total of 16 laboratory-confirmed cases of human infection with influenza A(H5N6) virus, including six deaths, have been reported to WHO from China since 2014.⁴

According to the animal health authorities in China^{5,6}, influenza A(H5N6) viruses have been detected in poultry in recent months in many provinces in the country, including those reporting human cases.

¹ 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. www.who.int/wer/en/

² World Health Organization. Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations (2005). www.who.int/ihr/Case_Definitions.pdf

³ www.who.int/influenza/human_animal_interface/Influenza_Summary_IRA_HA_interface_07_19_2016.pdf

⁴ A mild case of infection with an avian influenza A(H5) virus occurred in a child in China in February 2014 and was reported to WHO. The virus was retrospectively subtyped as an A(H5N6) one year later but no additional specimens remain to confirm this at the National Influenza Center in Beijing. Hence, the case is regarded as an infection with an A(H5N1) virus, but is likely the first human case of infection with an A(H5N6) virus.

⁵ <http://www.moa.gov.cn/zwillm/tzgg/gb/sygb/>

⁶ http://www.oie.int/wahis_2/public/wahid.php/Reviewreport/Review?page_refer=MapFullEventReport&reportid=19897

Although other influenza A(H5) subtype viruses have the potential to cause disease in humans, no human cases, other than those with influenza A(H5N1) and A(H5N6), have been reported so far. According to reports received by the World Organisation for Animal Health (OIE), various influenza A(H5) subtypes continue to be detected in birds in West Africa, Europe and Asia. There have also been numerous detections of influenza A(H5N8) viruses in wild birds and domestic poultry in several countries in Africa, Asia and Europe since June 2016. For more information on the background and public health risk of these viruses, please see the WHO assessment of risk associated with influenza A(H5N8) virus [here](#).

Influenza A(H5) viruses are highly diverse and continue to evolve. Further details about these viruses can be found in the September 2016 WHO report of the antigenic and genetic characteristics of zoonotic influenza viruses, including the development of two new candidate vaccine viruses for pandemic preparedness.⁷

Risk Assessment:

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

Current situation:

During this reporting period, China reported eight laboratory-confirmed human cases of influenza A(H7N9) virus infection to WHO between 10 and 19 December 2016. For more details on these cases, see Table 1 below and the [Disease Outbreak News](#).

Six cases were reported in mainland China, one case was reported in Hong Kong Special Administrative Region (SAR), and another case was reported in Macao SAR. All cases were male and all but one were severe infections. The case in Macao occurred in a poultry vendor who had contact with infected poultry imported from Guangdong province. The vendor was tested for

⁷ www.who.int/influenza/vaccines/virus/characteristics_virus_vaccines/en/

influenza A(H7N9) following the detection of A(H7) virus in the poultry, both on 13 Dec 2016. Thus far, this case has not exhibited symptoms of illness. Another individual in contact with the poultry tested negative for A(H7N9) virus.

On the 19 of December, the Department of Health, Hong Kong SAR, reported a case of influenza A(H7N9) infection in a man with chronic underlying conditions. He visited Guangdong province before illness onset and was hospitalized with respiratory symptoms immediately after returning to Hong Kong on 9 Dec 2016. Initial testing on 9 December 2016 was negative for influenza. His clinical condition deteriorated with development of fever on 17 December and a sample from the patient tested positive for the A(H7N9) virus on 19 December. The patient had visited live bird markets. Monitoring of close contacts is ongoing.

Table 1: Human cases of influenza A(H7N9) reported from 22 November to 19 December 2016

Province or region reporting (province of assumed exposure, if different from reporting province or region)	Age	Sex	Date of onset ⁸ (yyyy/mm/dd)	Case condition at time of reporting	Exposure history
Fujian	59	M	2016/11/9	Severe	Market poultry
Guangdong	80	M	2016/11/9	Severe	Market and domestic poultry
Jiangsu	58	M	2016/11/11	Severe	No
Jiangsu	63	M	2016/11/6	Severe	Market poultry
Jiangsu	32	M	2016/11/15	Severe	Market poultry
Jiangsu	64	M	2016/11/20	Severe	Market poultry
Macao SAR	58	M	2016/12/13 (date of testing)	Asymptomatic	Poultry
Hong Kong SAR	75	M	Between 2016/12/08 and 2016/12/19	Severe	Live bird market

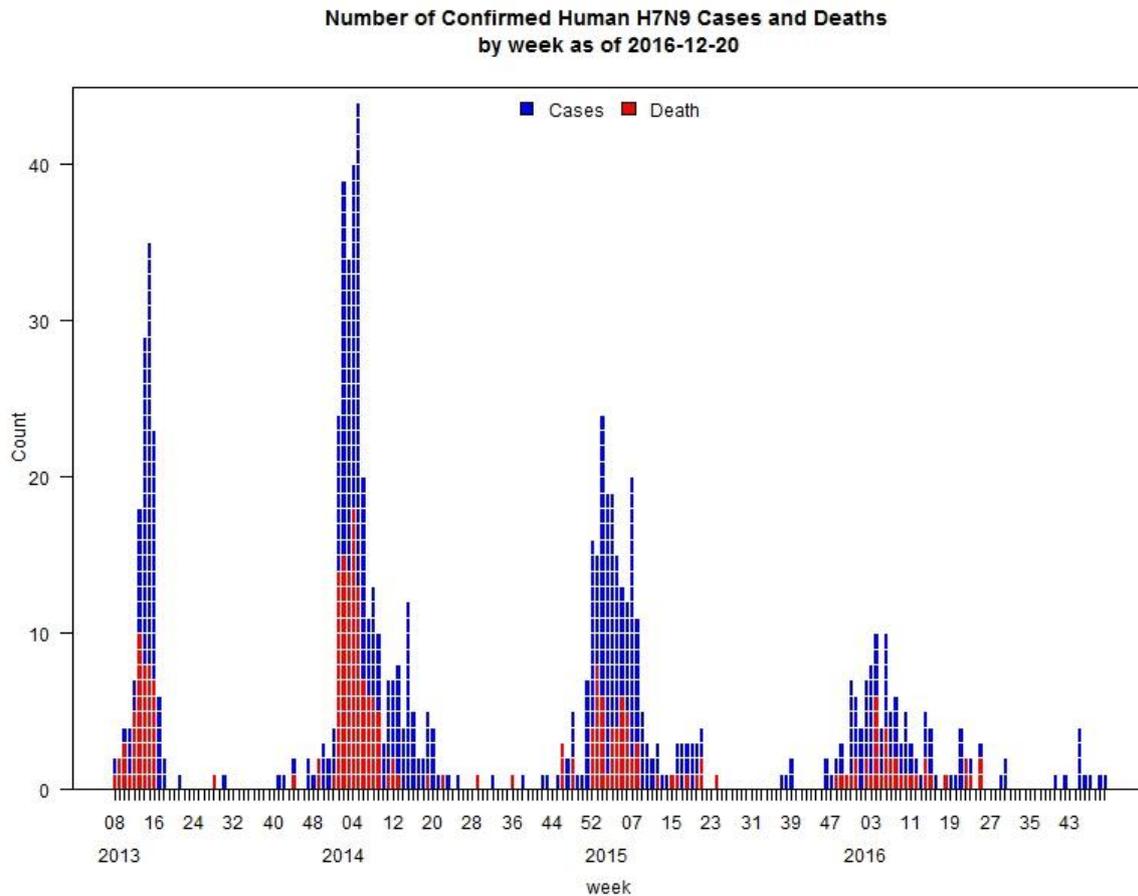
A total of 808 laboratory-confirmed cases of human infection with avian influenza A(H7N9) viruses, including at least 322 deaths⁹, have been reported to WHO (Figure 2). According to reports received by the Food and Agriculture Organization (FAO) on surveillance activities for avian influenza A(H7N9) viruses in China¹⁰, positives among virological samples continue to be detected mainly from live bird markets, vendors and some commercial or breeding farms.

⁸ Unless otherwise noted.

⁹ Total number of fatal cases is published on a monthly basis by China National Health and Family Planning Commission.

¹⁰ Food and Agriculture Organization. H7N9 situation update. www.fao.org/ag/againfo/programmes/en/empres/H7N9/situation_update.html

Figure 2: Epidemiological curve of avian influenza A(H7N9) cases in humans by week of onset, 2013-2016



Risk Assessment:

1. **What is the likelihood that additional human cases of infection with avian influenza A(H7N9) viruses will occur?** Most human cases are exposed to the A(H7N9) virus through contact with infected poultry or contaminated environments, including live poultry markets. Since the virus continues to be detected in animals and environments, further human cases can be expected. Additional sporadic human cases of influenza A(H7N9) in other provinces in China that have not yet reported human cases are also expected.
2. **What is the likelihood of human-to-human transmission of avian influenza A(H7N9) viruses?** Even though small clusters of cases have been reported, including those involving healthcare workers, current epidemiological and virological evidence suggests that this virus has 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(H7N9) 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 this virus has not acquired the ability to transmit easily among humans.

Swine Influenza Viruses

Current situation:

Influenza A(H1N2)v viruses

One human infection with a novel influenza A virus was detected in the state of Iowa.¹¹ The person was infected with an influenza A (H1N2) variant (H1N2v) virus. The patient was not hospitalized, and has fully recovered from their illness. No human-to-human transmission has been identified and the case reported close contact with swine in the week prior to illness onset. Characterization of the virus from this case indicates it is similar to A(H1N2) viruses currently circulating in swine in the USA and that have been isolated from previous human cases.

This is the ninth case of A(H1N2)v influenza virus infection detected in the USA since 2005 and the fourth detected in 2016. Most cases are associated with mild illness and two have been hospitalized.

Influenza A(H3N2)v viruses

On 16 December 2016, WHO was notified of a confirmed human case of influenza A(H3N2) variant virus in Canada. The case developed respiratory infection symptoms on 24 October 2016, was hospitalized on 8 November 2016 with the diagnosis of pneumonia, and has recovered. The case has confirmed exposure to ill swine on a farm. Animal health and epidemiological investigations are ongoing. Partial sequence analysis of all 8 gene segments of the virus isolated from the case indicates they are closely related to influenza A(H3N2) swine influenza viruses currently circulating in swine in North America.

This is the first human case of A/Indiana/08/2011-like H3N2v influenza virus infection reported to WHO from Canada. Human infection with influenza A(H3N2)v viruses detected elsewhere have typically resulted in mild disease, although some have been hospitalized and at least one A(H3N2)v-associated death has been reported.

Risk Assessment:

- 1. What is the likelihood that additional human cases of infection with *swine influenza viruses* will occur?** Influenza A(H1N2) and A(H3N2) 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 the *swine influenza viruses* through contact with infected swine or contaminated environments. Human infection tends to result in mild clinical illness, although some cases have been hospitalized with more severe disease and one fatal case has been reported. 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*?** No case clusters have been reported. Current evidence suggests that these viruses have not acquired the ability of sustained transmission among humans, thus the likelihood is low.

¹¹ FluView: 2016-2017 Influenza Season Week 46 ending November 19, 2016, Centers for Disease Control and Prevention, USA. (www.cdc.gov/flu/weekly/weeklyarchives2016-2017/Week46.htm, accessed 13 November 2016).

- 4. What is the risk of international spread of swine influenza 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 this virus has 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 regard 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 faeces. Travellers should also wash their hands often with soap and water. Travellers 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 virological, epidemiological 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. 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.
- All human infections caused by a new influenza subtype are notifiable under the International Health Regulations (IHR, 2005).¹² State Parties to the IHR (2005) are required to immediately notify WHO of any laboratory-confirmed¹³ case of a recent human infection caused by an influenza A virus with the potential to cause a pandemic.⁶ Evidence of illness is not required for this report.
- It is critical that influenza viruses from animals and people are fully characterized in appropriate animal or human health influenza reference laboratories and reported according to international standards. Under WHO's Pandemic Influenza Preparedness (PIP) Framework, Member States are expected to share their 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

http://www.who.int/influenza/human_animal_interface/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/

¹² World Health Organization. Case definitions for the four diseases requiring notification in all circumstances under the International Health Regulations (2005). www.who.int/ihr/Case_Definitions.pdf

¹³ World Health Organization. Manual for the laboratory diagnosis and virological surveillance of influenza (2011). www.who.int/influenza/gisrs_laboratory/manual_diagnosis_surveillance_influenza/en/

Avian Influenza A(H7N9) Information

http://who.int/influenza/human_animal_interface/influenza_h7n9/en/index.html

WHO Avian Influenza Food Safety Issues

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>