

Influenza at the human-animal interface

Summary and assessment, 21 January to 25 February 2016

- **New infections¹:** In this update, new human infections with A(H7N9), A(H9N2) and A(H1N1)v viruses were reported.
- **Risk assessment outcome:** The overall public health risk from currently known influenza viruses at the human-animal interface has not changed. Since animals are reservoirs for influenza, further human infections with viruses of animal origin can be expected but the likelihood of sustained human-to-human transmission remains low.
- **Reporting:** All human infections caused by a new influenza subtype are reportable 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.
- **Highlights:** The WHO Consultation and Information Meeting on the Composition of Influenza Virus Vaccines for the Northern Hemisphere (2016-2017) was held on 22-25 February 2016.³ As zoonotic influenza viruses continue to be identified and often evolve both genetically and antigenically, two candidate influenza vaccine viruses (CVV) were proposed during the meeting as part of the global strategy for pandemic preparedness: Influenza A(H5) A/chicken/Viet Nam/NCVD-15A59/2015-like and influenza A(H1N1)v A/Hunan/42443/2015-like.

Avian Influenza Viruses

Avian influenza A(H5) viruses

Current situation:

No new human A(H5) virus infections were notified to WHO in this reporting period.

Since 2003, a total of 846 laboratory-confirmed cases of human infection with avian influenza A(H5N1) virus, including 449 deaths, have been reported to WHO from 16 countries (Figure 1). In addition, a total of 10 laboratory-confirmed cases of human infection with avian influenza A(H5N6) virus, including 6 deaths, have been detected in China since 2013. Although other influenza A(H5) viruses have the potential to cause disease in humans, no human cases have been reported so far. According to reports received by the World Organisation for Animal Health (OIE), various influenza A(H5) subtypes, such as influenza A(H5N1), A(H5N2), A(H5N6), A(H5N8) and A(H5N9), continue to be detected in birds in West Africa, Europe and Asia.

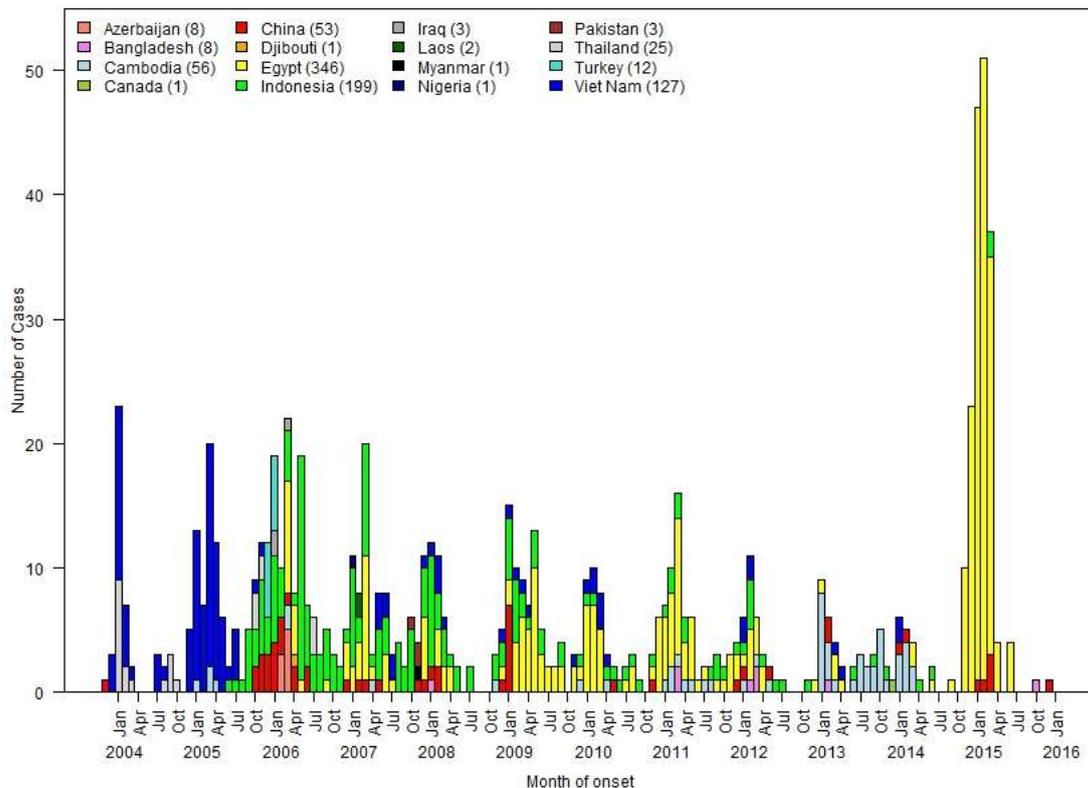
¹ For epidemiological and virological features of human infections with animal influenza viruses not reported in this assessment, see the yearly report on human cases of influenza at the human-animal interface published in the Weekly Epidemiological Record. www.who.int/wer/en/

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 World Health Organization. WHO consultation and information meeting on the composition of influenza virus vaccines for the Northern Hemisphere 2016-2017.

www.who.int/influenza/vaccines/virus/recommendations/consultation201602/en/index2.html

Figure 1: Epidemiological curve of avian influenza A(H5N1) cases in humans by week of onset, 2004-2016



The A(H5N1) virus outbreaks in poultry in West Africa continue since 2014 with increasing reports from Nigeria. No human infections associated with these outbreaks in West Africa have been identified to date.

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(H5N1) 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:

Since the last update, China reported 28 new laboratory-confirmed human cases of avian influenza A(H7N9) virus infection to WHO (Table 1). Onset dates ranged from 21 December 2015 to 25 January 2016. Cases ranged in age from 14 to 91 years, with a median age of 58 years. Of these 28 cases, 18 (64%) were male. The majority (25 cases, 89%) reported exposure to live poultry or live poultry markets; the exposure history of three cases is unknown or no clear exposure to poultry. Cases were reported from six provinces: Zhejiang (13), Jiangsu (5), Guangdong (4), Fujian (3), Shanghai (2) and Hunan (1).

Additionally, one laboratory-confirmed case of avian influenza A(H7N9) virus infection was reported to WHO from Hong Kong Special Administrative Region (SAR) (Table 1). The case was a 60-year-old male resident of Hong Kong SAR. The patient developed symptoms on 8 February 2016 and was admitted to hospital on 11 February. A nasopharyngeal aspirate collected on 12 February tested negative for influenza A virus. The case was discharged on 15 February. On 23 February, the sample taken on 12 February was re-tested and found positive for A(H7N9) virus. The patient was re-admitted to hospital for isolation and is currently in a stable condition. Prior to illness onset, the case worked in Jiangsu Province in China where he reported visiting a live poultry market. He returned to Hong Kong SAR on 5 February. The epidemiological investigations including contact monitoring are ongoing.

A total of 722 laboratory-confirmed cases of human infection with avian influenza A(H7N9) viruses, including at least 286 deaths⁴, have been reported to WHO (Figure 2, Table 1). According to reports received by the Food and Agriculture Organization (FAO) on surveillance activities for avian influenza A(H7N9) viruses in China⁵, positives among virological samples continue to be detected mainly from live bird markets, vendors and some commercial or breeding farms.

Table 1: Human cases of avian influenza A(H7N9) reported in 21 January-25 February 2016

Country	Province	Age	Sex	Date of onset (yyyy/mm/dd)	Case condition at time of reporting	Exposure to
China	Shanghai	60	M	2015/12/21	Critical	Live poultry market
China	Zhejiang	50	M	2015/12/27	Critical	Live poultry market and domestic poultry
China	Zhejiang	55	M	2015/12/21	Critical	Live poultry market and slaughtering poultry
China	Guangdong	58	F	2015/12/24	Died	Environment with domestic poultry
China	Zhejiang	77	F	2015/12/31	Died	unknown
China	Shanghai	58	F	2016/1/1	Critical	Live poultry market and domestic poultry
China	Jiangsu	56	M	2016/1/1	Died	Live poultry market

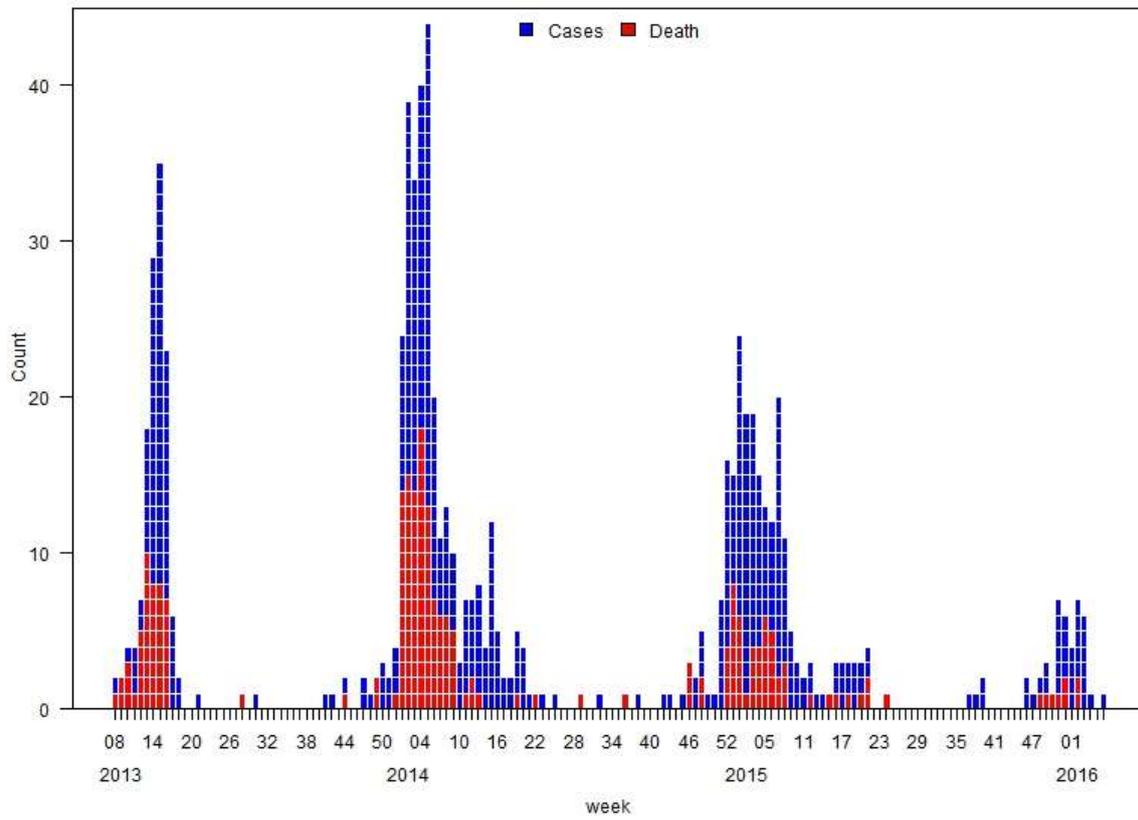
⁴ Total number of fatal cases is based on the report made during the Vaccine Composition Meeting in February 2016 by the WHO Collaborating Center in China.

⁵ Food and Agriculture Organization. H7N9 situation update.

www.fao.org/ag/againfo/programmes/en/empres/H7N9/situation_update.html

China	Zhejiang	14	M	2016/1/6	Mild	Environment with domestic poultry
China	Guangdong	34	M	2016/1/7	Severe	Live poultry market
China	Zhejiang	69	M	2016/1/12	Critical	Live poultry market and domestic poultry
China	Guangdong	34	M	2015/12/25	Severe	Live poultry market
China	Jiangsu	77	M	2016/1/1	Critical	Unknown
China	Zhejiang	76	M	2016/1/11	Died	Raw poultry meat
China	Jiangsu	73	F	2016/1/5	Critical	Live poultry market
China	Fujian	60	F	2016/1/13	Critical	Environment with domestic poultry
China	Fujian	51	F	2015/12/31	Severe	Poultry industry and live poultry market
China	Zhejiang	54	F	2016/1/8	Critical	Live poultry market and domestic poultry
China	Zhejiang	52	F	2016/1/12	Severe	Live poultry market
China	Fujian	65	M	2016/1/13	Died	Live poultry market and domestic poultry
China	Zhejiang	81	M	2016/1/10	Critical	Raw poultry meat
China	Jiangsu	42	M	2016/1/10	Critical	Raw poultry meat and domestic poultry
China	Zhejiang	58	F	2016/1/21	Critical	Live poultry market and domestic poultry
China	Zhejiang	66	F	2016/1/22	Critical	Domestic poultry
China	Zhejiang	71	M	2016/1/22	Severe	Environment with domestic poultry
China	Hunan	32	M	2016/1/22	Critical	Live poultry market and domestic poultry
China	Guangdong	74	M	2016/1/19	Critical	Raw poultry meat
China	Zhejiang	54	M	2016/1/25	Critical	Raw poultry meat and domestic poultry
China	Jiangsu	91	M	2016/1/19	Critical	Unknown
China	Hong Kong SAR	60	M	2016/2/8	Stable	Live poultry market

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.
- 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 previously 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.

Avian influenza A(H9N2) viruses

Current situation:

One human infection with avian influenza A(H9N2) virus was reported from China. The case was a 57-year-old female from Sichuan Province. Date of illness onset is unknown as the patient was hospitalized on 9 February 2016 with a history of recurrent productive cough with fatigue and shortness of breath during the past year. The patient has chronic underlying conditions. On 16

February 2016, a sample from this patient tested positive for A(H9N2) virus. The patient remains hospitalized and epidemiological investigations including contact monitoring are ongoing.

A total of 28 laboratory-confirmed cases of human infection with avian influenza A(H9N2) viruses, none fatal, have been detected globally. In most human cases, the associated disease symptoms have been mild and there has been no evidence of human-to-human transmission. Influenza A(H9N2) viruses are enzootic in poultry populations in parts of Africa, Asia and the Middle East. The majority of viruses that have been sequenced belong to the A/quail/Hong Kong/G1/97 (G1), A/chicken/Beijing/1/94 (Y280/G9), or Eurasian clades.

Risk Assessment:

- 1. What is the likelihood that additional human cases of infection with avian influenza A(H9N2) viruses will occur?** Most human cases are exposed to the A(H9N2) virus through contact with infected poultry or contaminated environments. Human infection tends to result in mild clinical illness. 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 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(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 this virus has not acquired the ability to transmit easily among humans.

Swine Influenza Viruses

Influenza A(H1N1)v viruses

Current situation:

Three human infections with A(H1N1)v virus were notified from China in this reporting period.

A 2.5-year-old male from Hunan Province with illness onset on 30 June 2015 was detected through sentinel Severe Acute Respiratory Infection (SARI) surveillance. The patient was hospitalized with pneumonia and later recovered. He had no underlying medical conditions. The case investigation found that the case was exposed to pigs in his village. The second and third cases were a 5-year-old female and a 4-year-old female from different cities in Yunnan Province with illness onset on 17 November and 22 November 2015 respectively. The cases were detected through sentinel Influenza-like Illness (ILI) surveillance and both had mild symptoms. Exposure history for both cases is not known.

To date, a total of seven laboratory-confirmed cases of human infection with this Asian sub-lineage A(H1N1)v virus have been detected in China. The haemagglutinin (HA) gene recovered from viruses detected in the most recent three cases grouped with swine influenza A(H1N1) viruses circulating in China.

Risk Assessment:

- 1. What is the likelihood that additional human cases of infection with influenza A(H1N1)v viruses will occur?** Influenza A(H1N1) 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 A(H1N1) virus through contact with infected swine or contaminated environments. Human infection tends to result in mild clinical illness. 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 influenza A(H1N1)v 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.
- 3. What is the risk of international spread of influenza A(H1N1)v 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 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 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).⁶ State Parties to the IHR (2005) are required to immediately notify WHO of any laboratory-confirmed⁷ 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

⁶ 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

⁷ 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/

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/

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>