

Influenza at the human-animal interface

Summary and assessment, 20 December to 16 January 2017

- **New infections¹:** Since the previous update, new human infections with influenza A(H7N2), A(H7N9) and A(H9N2) 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 are 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 influenza viruses. Information from these notifications is critical to inform risk assessments for influenza at the human-animal interface.

Avian Influenza Viruses

Avian influenza A(H5) viruses

Current situation:

Since the last update, no new laboratory-confirmed human cases of influenza A(H5) virus infection were reported to WHO. Influenza A(H5) subtype viruses have the potential to cause disease in humans and thus far, no human cases, other than those with influenza A(H5N1) and A(H5N6) viruses, have been reported to WHO. 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](#).

Avian influenza A(H7N9) viruses

Current situation:

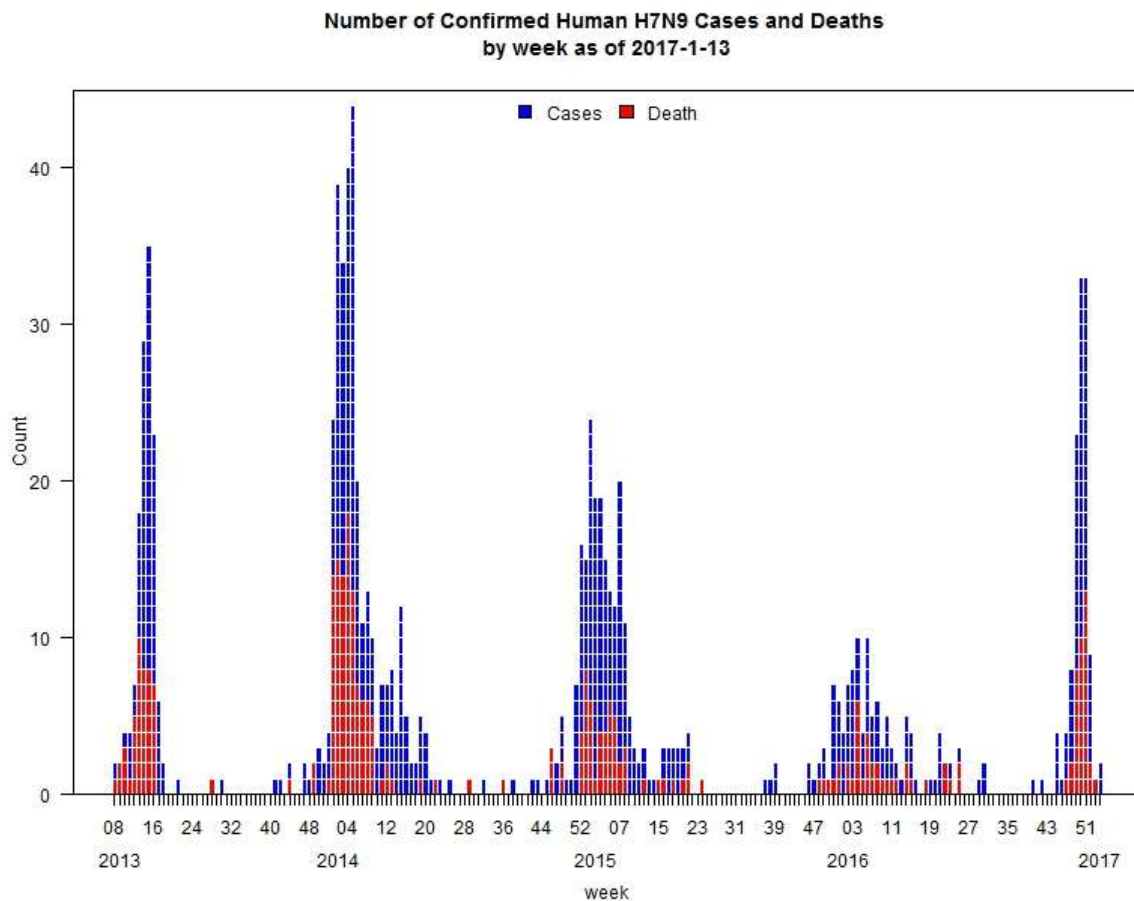
During this reporting period, China reported 110 laboratory-confirmed human cases of influenza A(H7N9) virus infection to WHO. 106 cases were reported in mainland China, three cases were reported in Hong Kong Special Administrative Region (SAR) and another case was reported in Macao SAR. Case details are presented in the table in the Annex of this document. For additional details on these cases and public health interventions, see the [Disease Outbreak News](#).

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

As of 16 January 2017, a total of 918 laboratory-confirmed cases of human infection with avian influenza A(H7N9) viruses, including at least 359 deaths³, 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 China⁴, positives among virological samples continue to be detected mainly from live bird markets, vendors and some commercial or breeding farms.

Figure 2: Epidemiological curve of avian influenza A(H7N9) cases in humans by week of onset, 2013-2017



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

⁴ Food and Agriculture Organization. H7N9 situation update.

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

- 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(H7N2) viruses

Current situation:

During this reporting period, the United States of America (USA) reported one laboratory-confirmed human case of influenza A(H7N2) virus infection to WHO. The likely source of infection in the human was through close contact with ill cats infected with an A(H7N2) virus. The infection resulted in mild illness and the individual has recovered. No human-to-human transmission of the virus has been detected thus far. Cats are not the typical host of avian influenza viruses; however, cats have been infected in the past with such viruses (e.g., different avian influenza viruses, as well as human seasonal influenza viruses). More information on influenza in cats, influenza A(H7N2), and the human infection with A(H7N2) can be found [here](#).

Risk Assessment:

- 1. What is the likelihood that additional human cases of infection with avian influenza A(H7N2) viruses will occur?** If the virus continues to circulate and infect cats, and humans are in close contact with infected cats, further human cases would be expected but unusual. The hygiene measures put in place following the detection of this human case have likely had an impact on the transmission of the virus from infected cats to humans.
- 2. What is the likelihood of human-to-human transmission of avian influenza A(H7N2) viruses?** Current evidence suggests that the likelihood is low. Thus far, there has been no evidence of human-to-human transmission of this virus from this human case. There have been two previous human cases of infection with A(H7N2) virus reported in the USA^{5,6}, and no human-to-human transmission was detected in these events. There were several presumed human cases of infection with influenza A(H7N2) in the United Kingdom in 2007 and there was no sustained human-to-human transmission detected in that event.⁷
- 3. What is the risk of international spread of avian influenza A(H7N2) 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:

⁵ https://wwwnc.cdc.gov/eid/article/18/7/11-1913_article

⁶ <https://www.cdc.gov/flu/avianflu/outbreaks.htm>

⁷ <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=3206>

One new laboratory-confirmed human case of A(H9N2) virus infection was reported to WHO from China in a seven-month-old girl from Guangdong province. The case developed mild illness on 11 December 2016, was not hospitalized and has recovered. She had exposure to a live poultry market prior to illness onset. No abnormalities were observed among close contacts of the case at the time of reporting. Avian influenza A(H9N2) viruses are enzootic in poultry in China.

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.

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).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

⁸ 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

⁹ 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/

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/

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>

Annex:

Table 1: Laboratory-confirmed human cases of avian influenza A(H7N9) virus infection (reported from 20 December 2016 to 16 January 2017)

Province or region reporting (province of assumed exposure, if different from reporting province or region)	Age	Sex	Date of onset (yyyy/mm/dd)	Case condition at time of reporting	Exposure history
Hong Kong Special Administrative Region (SAR)	70	M	12/26/2016	Severe	Live poultry market
Hong Kong SAR	62	M	01/01/2017	Fatal	No known exposure
Jiangsu	41	F	22/11/2016	Severe	Live poultry market
Jiangsu	66	M	25/11/2016	Fatal	Live poultry market
Zhejiang	46	F	30/11/2016	Severe	Occupational exposure
Jiangsu	46	M	01/12/2016	Severe	Live poultry market
Anhui	54	M	29/11/2016	Severe	Live poultry market
Jiangsu	63	M	28/11/2016	Fatal	Live poultry market and domestic poultry
Jiangsu	32	F	01/12/2016	Severe	No apparent exposure to live poultry
Zhejiang	64	M	07/12/2016	Severe	Domestic poultry
Zhejiang	56	F	08/12/2016	Severe	Live poultry market
Jiangsu	51	M	06/12/2016	Fatal	Live poultry market
Guangdong	49	M	07/12/2016	Fatal	Live poultry market
Jiangsu	39	M	05/12/2016	NR	Live poultry market
Jiangsu	39	F	08/12/2016	Severe	Probable to person-to-person contact
Guangdong	50	M	04/12/2016	Fatal	Live poultry market and domestic poultry
Jiangsu	48	M	06/12/2016	Fatal	Live poultry market
Jiangsu	68	M	01/12/2016	Fatal	Exposure to poultry-related environment
Jiangsu	45	F	07/12/2016	Fatal	Live poultry market
Jiangsu	68	M	08/12/2016	Severe	Occupational exposure, live poultry market and domestic poultry
Jiangsu	48	M	08/12/2016	Fatal	No apparent exposure to live poultry
Jiangsu	39	M	08/12/2016	NR	Under investigation
Jiangsu	73	F	15/12/2016	Fatal	Live poultry market
Zhejiang	68	M	09/12/2016	NR	Live poultry market
Anhui	49	M	05/12/2016	Fatal	Live poultry market
Jiangsu	48	M	12/12/2016	Fatal	Under investigation

Jiangsu	75	M	13/12/2016	Severe	Live poultry market
Fujian	44	M	09/12/2016	Severe	Live poultry market
Anhui	66	M	16/12/2016	Fatal	Live poultry market
Anhui	37	F	12/12/2016	Severe	Live poultry market and poultry-related environment
Zhejiang	54	F	12/12/2016	Severe	Live poultry market
Jiangsu	83	M	12/12/2016	Fatal	Live poultry market and domestic poultry
Zhejiang	33	M	16/12/2016	Severe	Live poultry market and domestic poultry
Jiangsu	46	F	15/12/2016	Fatal	Live poultry market
Jiangsu	73	M	14/12/2016	NR	Live poultry market
Zhejiang	41	M	15/12/2016	Severe	Live poultry market
Jiangsu	23	M	12/12/2016	Severe	Occupational exposure
Jiangsu	45	M	08/12/2016	Severe	Live poultry market and domestic poultry
Jiangsu	84	F	10/12/2016	Severe	Live poultry market
Zhejiang	51	F	09/12/2016	Severe	Live poultry market and domestic poultry
Jiangsu	57	M	05/12/2016	Severe	No apparent exposure to live poultry
Guangdong	53	M	13/12/2016	Fatal	Live poultry market
Jiangsu	45	F	16/12/2016	NR	Under investigation
Jiangsu	76	M	15/12/2016	Fatal	Under investigation
Anhui	59	M	13/12/2016	Severe	Occupational exposure
Anhui	73	M	13/12/2016	Severe	Live poultry market
Zhejiang	71	M	07/12/2016	Severe	Live poultry market
Guangdong	41	F	15/12/2016	Fatal	Domestic poultry
Jiangsu	52	M	02/12/2016	Severe	Live poultry market
Zhejiang	70	F	17/12/2016	Fatal	Live poultry market
Anhui	62	M	22/12/2016	NR	Probable to person-to-person contact
Guangdong	45	F	17/12/2016	Fatal	Live poultry market and domestic poultry
Anhui	64	M	15/12/2016	Severe	Live poultry market
Jiangsu	68	M	11/12/2016	Severe	Live poultry market
Anhui	53	M	18/12/2016	Fatal	No apparent exposure to live poultry
Jiangsu	64	M	13/12/2016	Severe	Live poultry market
Jiangsu	74	M	02/12/2016	Severe	Live poultry market

Jiangsu	62	F	15/12/2016	Severe	Live poultry market
Jiangsu	48	F	10/12/2016	Severe	No apparent exposure to live poultry
Zhejiang	34	F	18/12/2016	Severe	Live poultry market
Zhejiang	60	F	16/12/2016	Severe	Live poultry market
Jiangsu	33	F	21/12/2016	Severe	Live poultry market
Jiangsu	58	M	09/12/2016	NR	No apparent exposure to live poultry
Jiangsu	57	M	25/11/2016	Severe	Live poultry market
Jiangsu	66	M	15/12/2016	Severe	Live poultry market
Jiangsu	83	M	15/12/2016	Severe	Live poultry market
Zhejiang	53	M	23/12/2016	NR	Live poultry market and domestic poultry
Jiangsu	45	M	17/12/2016	Severe	Live poultry market
Jiangsu	52	M	17/12/2016	Severe	Domestic poultry
Anhui	66	F	21/12/2016	Fatal	Live poultry market and domestic poultry
Zhejiang	51	M	15/12/2016	Severe	Live poultry market
Zhejiang	41	M	23/12/2016	Severe	Live poultry market
Anhui	55	F	19/12/2016	Fatal	Live poultry market
Jiangsu	60	M	21/12/2016	Severe	Live poultry market
Fujian	41	M	21/12/2016	Severe	Domestic poultry
Jiangsu	45	M	19/12/2016	NR	Live poultry market
Jiangsu	39	M	16/12/2016	Severe	Live poultry market
Zhejiang	81	F	23/12/2016	Fatal	Live poultry market
Zhejiang	36	F	18/12/2016	NR	Live poultry market and domestic poultry
Jiangsu	54	F	21/12/2016	NR	Under investigation
Jiangsu	63	F	18/12/2016	NR	Under investigation
Guangdong	50	F	21/12/2016	Fatal	Live poultry market and domestic poultry
Zhejiang	61	F	21/12/2016	Severe	Live poultry market
Guangdong	80	M	23/12/2016	Fatal	Live poultry market
Hunan	53	F	23/12/2016	Severe	Live poultry market
Zhejiang	79	M	17/12/2016	Severe	Domestic poultry
Jiangsu	76	M	19/12/2016	Fatal	Under investigation
Shanghai	34	M	26/12/2016	NR	Under investigation
Jiangsu	34	F	23/12/2016	Fatal	Under investigation

Anhui	75	F	22/12/2016	Fatal	Domestic poultry
Jiangsu	47	M	29/12/2016	NR	Under investigation
Jiangsu	46	M	20/12/2016	Fatal	Under investigation
Zhejiang	53	F	26/12/2016	NR	Under investigation
Anhui	44	M	21/12/2016	NR	Occupational exposure
Zhejiang	63	M	22/12/2016	Severe	Live poultry market and domestic poultry
Guangdong	50	M	22/12/2016	Severe	Live poultry market
Guangdong	57	M	23/12/2016	Severe	Live poultry market
Jiangsu	59	F	18/12/2016	Fatal	Under investigation
Jiangsu	73	M	25/12/2016	Fatal	Under investigation
Jiangsu	49	M	23/12/2016	Fatal	Under investigation
Jiangsu	52	F	20/12/2016	NR	Under investigation
Jiangsu	70	M	27/12/2016	Severe	Live poultry market
Guangdong	53	M	24/12/2016	NR	Under investigation
Anhui	91	M	26/12/2016	Fatal	Live poultry market
Guangdong	73	F	24/12/2016	Severe	Live poultry market
Guangdong	58	F	26/12/2016	Severe	Live poultry market
Guangdong	56	M	27/12/2016	Severe	Domestic poultry
Guangdong	82	M	21/12/2016	Fatal	Live poultry market
Hong Kong SAR	10	M	2017/01/08	Recovered	Live poultry exposure
Macau SAR	72	F	2017/01/08	Stable	Market and domestic poultry

NR: not reported