

Influenza at the human-animal interface

Summary and assessment, 21 April to 16 May 2017

- **New infections¹:** Since the previous update, new human infections with influenza A(H5N1), A(H7N9), A(H9N2) and A(H3N2) variant 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:

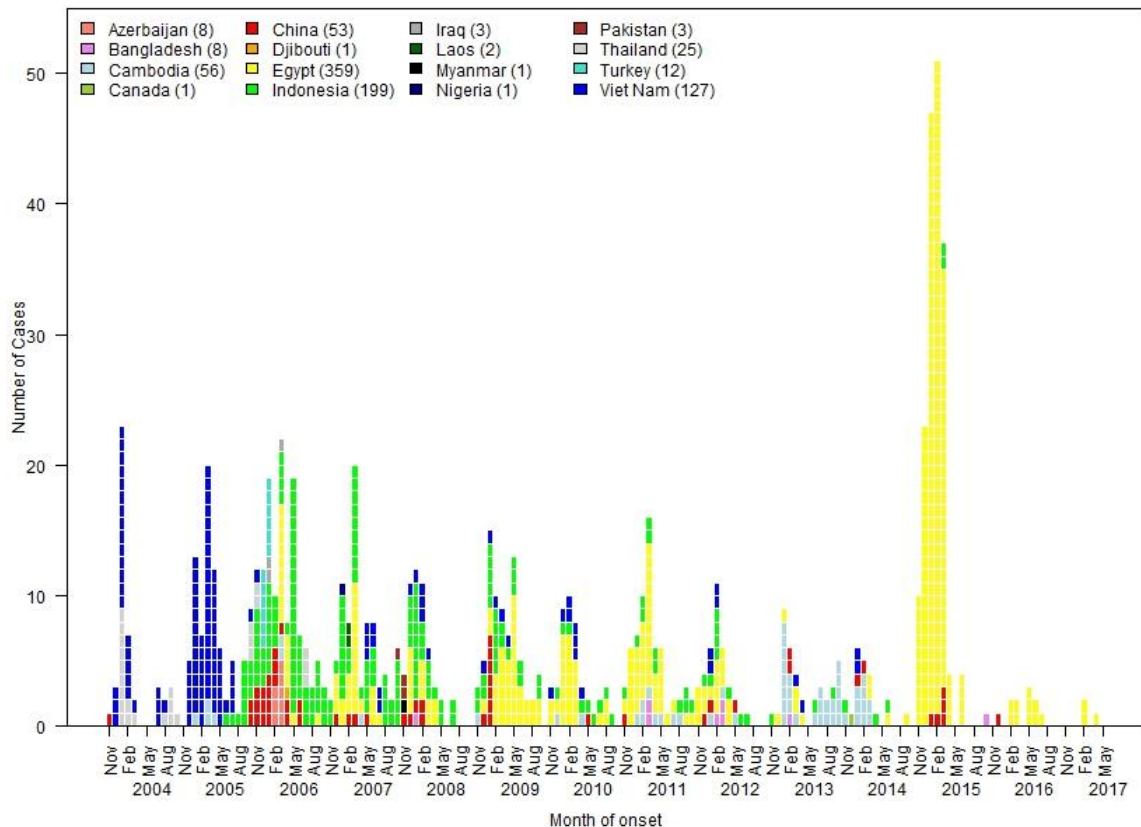
Since the last update, one new laboratory-confirmed human cases of influenza A(H5N1) virus infection was reported to WHO. A 35-year-old male resident of Cairo, Egypt, had onset of illness on 8 April 2017. He was initially treated as an outpatient (while traveling to Saudi Arabia) but was hospitalized on 16 April and treated with antivirals. A sample collected on 17 April tested positive for influenza A(H5N1). The patient recovered and was discharged on 23 April. A week prior to his illness, the case had visited a live poultry market in Egypt where he was in contact with poultry excreta. Follow-up of contacts of the case took place with no further cases reported. Avian influenza A(H5N1) viruses are enzootic in poultry in Egypt.

Since 2003, a total of 859 laboratory-confirmed cases of human infection with avian influenza A(H5N1) virus, including 453 deaths, have been reported to WHO from 16 countries (see Figure 1).

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

Figure 1: Epidemiological curve of lab-confirmed avian influenza A(H5N1) cases in humans by month of onset, 2003-2017



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 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?** 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.

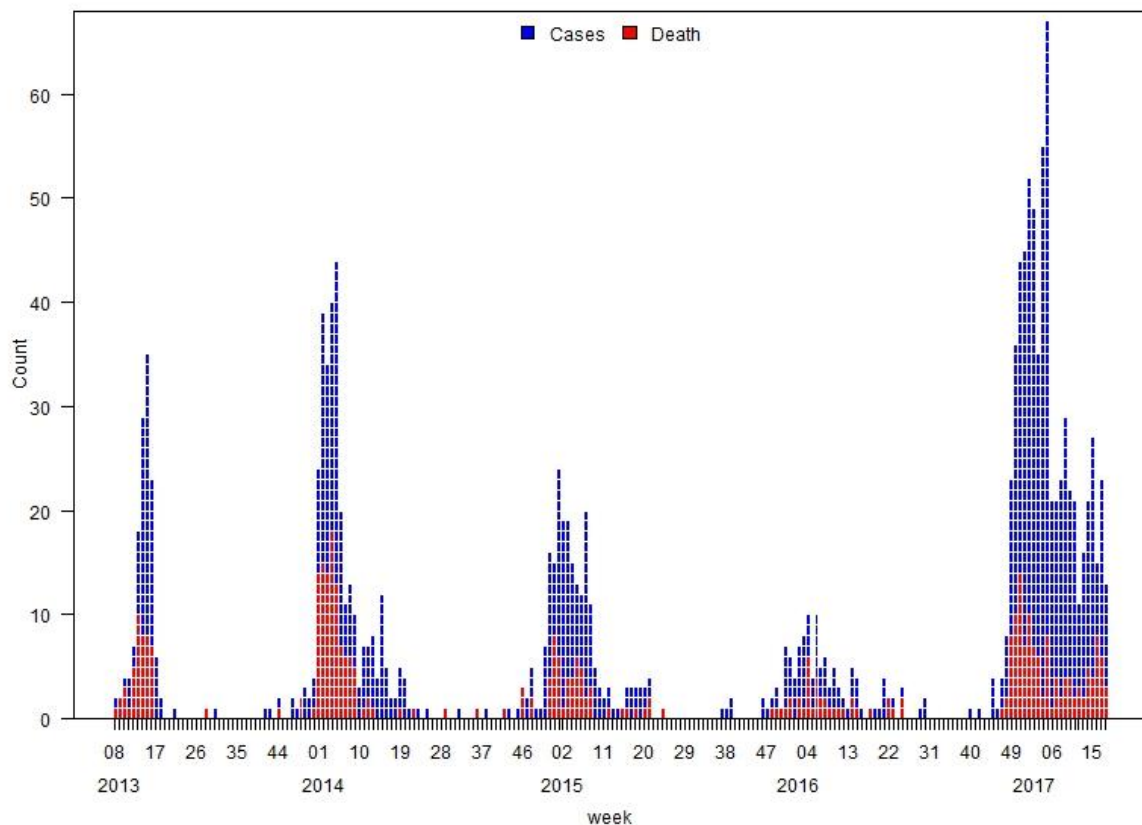
Avian influenza A(H7N9) viruses

Current situation:

During this reporting period, 93 laboratory-confirmed human cases of influenza A(H7N9) virus infection were reported to WHO from China. Among these cases, two clusters of cases were reported. Cases were reported from Shaanxi province for the first time. Case and cluster details are presented in the table in the Annex of this document. For additional details on these cases, public health interventions, and the recently detected highly pathogenic avian influenza (HPAI) A(H7N9) viruses, see the [Disease Outbreak News](#).

As of 16 May 2017, a total of 1486 laboratory-confirmed cases of human infection with avian influenza A(H7N9) viruses, including at least 571 deaths³, have been reported to WHO (Figure 2). The number of human infections with avian influenza A(H7N9) viruses and the geographical distribution of human cases in the fifth epidemic wave (i.e. onset since 1 October 2016) is greater than in any earlier wave. This suggests that the virus is spreading, and emphasizes that further intensive surveillance and control measures in both the human and animal health sectors are crucial.

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



³ Total number of fatal cases is published on a monthly basis by China National Health and Family Planning Commission.

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 in poultry from live bird markets, commercial and backyard farms.

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, currently available 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 new laboratory-confirmed human case of A(H9N2) virus infection was reported to WHO from China. A 32-year-old man from Beijing developed mild illness on 28 April 2017 and was not hospitalized. He reported no clear exposure to live poultry prior to illness onset. 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. Currently available 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

⁴ Food and Agriculture Organization. H7N9 situation update.
www.fao.org/ag/againfo/programmes/en/empres/H7N9/situation_update.html

spread is considered unlikely as this virus has not acquired the ability to transmit easily among humans.

Influenza A(H3N2) variant viruses

On 2 May 2017, the United States (US) IHR National Focal Point (NFP) reported the first case of human infection with an influenza A(H3N2)v virus in 2017 in a child from the state of Texas. The child developed an upper respiratory illness on 23 February 2017 and a sample from the patient was confirmed positive for influenza A(H3N2)v virus in late April. The patient did not require hospitalization and swine contact at an agricultural fair was reported in the week preceding illness onset. Further characterization of the virus is underway.

Since reporting of novel influenza A viruses became nationally notifiable in 2005, 402 human infections with influenza A(H3N2)v viruses, including this latest case, have been reported to the US Centers for Disease Control and Prevention (CDC).⁵

Risk Assessment:

- 1. What is the likelihood that additional human cases of infection with swine influenza viruses will occur?** Influenza 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 swine influenza viruses 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 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.
- 3. 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 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.

⁵ <http://www.cdc.gov/flu/swineflu/variant-cases-us.htm>

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 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>

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/

Annex:

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

Province or region reporting (province of assumed exposure, if different from reporting province or region)	Age	Sex	Case condition at time of reporting	Date of onset (dd/mm/yyyy)	Exposure history (at time of reporting)
Beijing (Shandong)	56	M	Severe	31/03/2017	No known exposure
Hunan	65	M	Severe	08/04/2017	Poultry from street vendors
Hebei	67	M	Fatal	09/04/2017	Live poultry market
Hunan	55	F	Fatal	22/03/2017	Live poultry market
Anhui (Tianjin)	50	M	Fatal	07/04/2017	Domestic poultry
Shandong	44	M	Fatal	08/04/2017	Live poultry market
Beijing	34	M	NR	10/04/2017	Live poultry market
Beijing (Hebei)	41	F	Severe	07/04/2017	No known exposure
Jiangxi (Fujian)	53	F	Fatal	31/03/2017	No known exposure
Hebei	70	M	Fatal	10/04/2017	Domestic and street vendor poultry
Hebei	50	F	Severe	09/04/2017	Domestic and street vendor poultry
Hunan	44	F	NR	12/04/2017	To be investigated
Beijing (Hebei)	36	F	Severe	08/04/2017	Live poultry market
Hunan	47	F	Severe	07/04/2017	Poultry from market
Zhejiang	72	M	NR	11/04/2017	Live poultry market
Shandong	46	M	NR	14/04/2017	Poultry from market
Zhejiang	63	M	Severe	10/04/2017	Live poultry market
Hebei	58	F	Fatal	05/04/2017	Domestic poultry
Gansu	43	F	Mild	13/04/2017	Live poultry slaughtering
Beijing	72	M	Fatal	13/04/2017	Domestic poultry
Hunan	79	M	NR	15/04/2017	Poultry from street vendors
Sichuan	60	M	Severe	08/04/2017	Poultry from market
Sichuan	54	M	Severe	13/04/2017	Domestic poultry
Beijing	55	F	Severe	08/04/2017	Live poultry market
Guangxi	70	M	Mild	15/04/2017	Live poultry farmer
Beijing	64	M	Severe	05/04/2017	Live poultry market
Liaoning	61	F	Severe	07/04/2017	To be investigated
Sichuan	53	M	Severe	15/04/2017	To be investigated
Hunan	41	M	Fatal	08/04/2017	No known exposure
Jilin	34	M	Fatal	14/04/2017	Occupational exposure
Jiangsu	66	M	Severe	06/04/2017	Domestic poultry
Sichuan	66	M	NR	18/04/2017	Domestic poultry
Sichuan	74	M	NR	14/04/2017	Poultry from street vendors
Sichuan	71	M	Severe	15/04/2017	Poultry from street vendors
Gansu	47	F	NR	11/04/2017	Live poultry market
Shandong	59	M	Severe	11/04/2017	Occupational exposure
Beijing	56	M	Severe	08/04/2017	Poultry from street vendors
Beijing (Hebei)	61	F	Severe	15/04/2017	Poultry from street vendors
Shandong	50	F	Severe	21/04/2017	Occupational exposure
Chongqing	51	M	NR	20/04/2017	Occupational exposure
Henan	66	M	Severe	13/04/2017	Domestic poultry environment
Fujian	4	F	Mild	18/04/2017	Freshly-killed poultry
Guangdong	69	F	Severe	14/04/2017	Live poultry market
Guangdong	51	F	Severe	23/04/2017	Freshly-killed poultry
Sichuan	57	F	Severe	15/04/2017	Live poultry market
Sichuan	70	F	Fatal	21/04/2017	Live poultry market
Sichuan	82	M	Fatal	19/04/2017	Poultry from market
Hubei	68	F	Fatal	21/04/2017	Live poultry market
Jiangsu	58	F	Fatal	18/04/2017	No known exposure
Gansu	60	M	Severe	17/04/2017	To be investigated
Beijing	44	F	Severe	14/04/2017	Poultry from street vendors
Hebei	62	F	Fatal	16/04/2017	Domestic poultry
Hebei	26	F	NR	24/04/2017	No known exposure
Sichuan	64	M	Fatal	20/04/2017	Poultry from street vendors
Sichuan	51	M	Fatal	23/04/2017	Live poultry market
Hebei	35	M	Fatal	25/04/2017	Occupational exposure to live poultry
Hebei	63	M	Severe	26/04/2017	Backyard poultry
Sichuan	56	M	Fatal	20/04/2017	Live poultry market

Sichuan	52	M	Severe	24/04/2017	Live poultry sale
Hebei	46	F	NR	27/04/2017	To be investigated
Chongqing	25	F	Severe	25/04/2017	Occupational exposure to live poultry
Anhui	73	F	Severe	20/04/2017	Domestic poultry
Sichuan	76	F	Severe	26/04/2017	Live poultry market
Hebei	62	M	NR	25/04/2017	Poultry from street vendors
Hunan	31	M	Severe	27/04/2017	Live poultry market
Guangxi	57	M	Severe	29/04/2017	Live poultry market
Hebei	33	M	Severe	25/04/2017	Domestic poultry
Henan	50	M	NR	24/04/2017	To be investigated
Shaanxi	62	M	Fatal	18/04/2017	Poultry from market
Chongqing	43	M	Severe	24/04/2017	Freshly-killed poultry from market
Tianjin	35	M	Fatal	26/04/2017	Live poultry market
Henan	58	M	Severe	15/04/2017	Live poultry market
Zhejiang	69	M	NR	25/04/2017	Live poultry market
Shaanxi	63	M	Mild	29/04/2017	Visited H7N9 case in hospital
Sichuan	79	F	Fatal	29/04/2017	Poultry from street vendors
Jiangsu	57	F	Severe	27/04/2017	No known exposure
Gansu	72	M	Severe	11/04/2017	Live poultry farm
Shaanxi	31	M	Fatal	29/04/2017	Freshly-killed poultry from market
Hebei	38	M	Fatal	03/05/2017	Live poultry market
Shaanxi	52	F	Severe	26/04/2017	Live poultry market
Hebei	83	M	Fatal	25/04/2017	Domestic poultry environment
Fujian	35	F	Severe	01/05/2017	Domestic and freshly- killed poultry
Hebei	50	F	Severe	01/05/2017	Domestic poultry
Sichuan	54	F	NR	30/04/2017	Domestic poultry
Sichuan	62	F	NR	30/04/2017	Live poultry market
Beijing (Hebei)	37	F	NR	02/05/2017	Domestic poultry and a confirmed case
Jiangsu	77	M	Fatal	03/05/2017	Live poultry market
Hebei	47	M	NR	01/05/2017	Live poultry farm
Hebei	65	M	Severe	02/05/2017	Domestic poultry
Beijing	60	F	Fatal	02/05/2017	Live poultry farm
Henan	58	M	Severe	03/05/2017	Domestic poultry
Henan	60	F	Severe	04/05/2017	Occupational exposure
Hubei	63	M	Severe	06/05/2017	No known exposure

NR: not reported