Influenza at the human-animal interface
Summary and assessment, 5 April to 9 May 2016

- **New infections**: Since the previous update, new human infections with A(H5N6), A(H7N9) and A(H9N2) 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). 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:**
Three new human A(H5N6) virus infections were notified to WHO in this reporting period (Table 1). These are the first human cases of A(H5N6) virus infection reported from Anhui and Hubei provinces. All three cases had exposure to live poultry or live poultry markets. A total of 14 laboratory-confirmed cases of human infection with avian influenza A(H5N6) virus, including six deaths, have been detected in China since 2014. In the past four months, twice as many cases have been reported since the first case was detected in 2014.

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

Recent publications indicate ongoing evolution of avian influenza A(H5N6) viruses through reassortment with other avian influenza viruses resulting in viruses with different internal genes. To date, no changes in transmissibility in humans have been detected as a result of these reassortant

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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/](http://www.who.int/wer/en/)
viruses. Surveillance is continuing in both human and animal populations to monitor for further virus evolution. All recent avian influenza A(H5N6) viruses that have been tested remain susceptible to the neuraminidase inhibitor class of antiviral drugs.

Table 1: Human cases of avian influenza A(H5N6) reported from 4 April to 9 May 2016

<table>
<thead>
<tr>
<th>Country</th>
<th>Province</th>
<th>Age</th>
<th>Sex</th>
<th>Date of onset (yyyy/mm/dd)</th>
<th>Case condition at time of reporting</th>
<th>Exposure to</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>Hubei</td>
<td>35</td>
<td>M</td>
<td>2016/04/09</td>
<td>Critical</td>
<td>Live poultry market</td>
</tr>
<tr>
<td>China</td>
<td>Hunan</td>
<td>11</td>
<td>F</td>
<td>2016/04/11</td>
<td>Stable</td>
<td>Live poultry</td>
</tr>
<tr>
<td>China</td>
<td>Anhui</td>
<td>65</td>
<td>F</td>
<td>2016/04/24</td>
<td>Critical</td>
<td>Live poultry</td>
</tr>
</tbody>
</table>

No new laboratory-confirmed human cases of avian influenza A(H5N1) virus infection were reported. Since 2003, a total of 850 laboratory-confirmed cases of human infection with avian influenza A(H5N1) virus, including 449 deaths, have been reported to WHO from 16 countries. 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.

**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:
Since the last update, China reported 17 new laboratory-confirmed human cases of avian influenza A(H7N9) virus infection to WHO, including five deaths. For more details on these cases, see Table 2 below and the Disease Outbreak News.

One additional case in a cluster was reported. The cluster included an 85-year-old female from Zhejiang Province. She had onset of symptoms on 1 March and passed away on 8 March. She had been admitted to the same hospital and shared the ward with a confirmed case between 22 and 23 February. She was not exposed to live poultry or live poultry market, according to her relatives. The confirmed case admitted to the same ward was a 29-year-old male from Zhejiang Province who developed symptoms on 15 February. He had exposure to a live poultry market and a household contact that was also a confirmed case. The household contact (from Fujian Province) developed symptoms on 4 February and had exposure to a live poultry market.

Human to human transmission between the 29-year-old male and the 85-year-old female is likely considering the virological information obtained thus far. For more details on the cluster, see the Disease Outbreak News.

Additionally, one laboratory-confirmed case of avian influenza A(H7N9) virus infection was reported to WHO from Hong Kong Special Administrative Region (SAR) (Table 2). Details on this case were reported in the Disease Outbreak News.

A total of 770 laboratory-confirmed cases of human infection with avian influenza A(H7N9) viruses, including at least 306 deaths, have been reported to WHO (Figure 1). According to reports received by the Food and Agriculture Organization (FAO) on surveillance activities for avian influenza A(H7N9) viruses in China, positives among virological samples continue to be detected mainly from live bird markets, vendors and some commercial or breeding 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.
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.

7 Total number of fatal cases is published on a monthly basis by China National Health and Family Planning Commission.
Table 2: Human cases of avian influenza A(H7N9) reported from 4 April to 9 May 2016

<table>
<thead>
<tr>
<th>Country</th>
<th>Province or region</th>
<th>Age</th>
<th>Sex</th>
<th>Date of onset (yyyy/mm/dd)</th>
<th>Case condition at time of reporting</th>
<th>Exposure to live poultry</th>
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</thead>
<tbody>
<tr>
<td>China</td>
<td>Anhui</td>
<td>64</td>
<td>M</td>
<td>2016/02/21</td>
<td>Died</td>
<td>Yes</td>
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<td>China</td>
<td>Fujian</td>
<td>86</td>
<td>M</td>
<td>2016/02/24</td>
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<td>Yes</td>
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<td>China</td>
<td>Jiangsu</td>
<td>60</td>
<td>F</td>
<td>2016/02/25</td>
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<td>Yes</td>
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<td>China</td>
<td>Anhui</td>
<td>84</td>
<td>M</td>
<td>2016/03/01</td>
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<td>Yes</td>
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<td>China</td>
<td>Guangdong</td>
<td>36</td>
<td>M</td>
<td>2016/02/26</td>
<td>Severe</td>
<td>Yes</td>
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<td>China</td>
<td>Zhejiang</td>
<td>85</td>
<td>F</td>
<td>2016/03/01</td>
<td>Died</td>
<td>No. Shared the same hospital ward with a confirmed case.</td>
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<tr>
<td>China</td>
<td>Anhui</td>
<td>79</td>
<td>F</td>
<td>2016/02/24</td>
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<td>Yes</td>
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<td>China</td>
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<td>56</td>
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<td>2016/03/06</td>
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<td>Yes</td>
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<td>67</td>
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<td>2016/03/10</td>
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<tr>
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<td>43</td>
<td>F</td>
<td>2016/03/01</td>
<td>Severe</td>
<td>No</td>
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<tr>
<td>China</td>
<td>Guangdong</td>
<td>39</td>
<td>F</td>
<td>2016/02/26</td>
<td>Severe</td>
<td>Yes</td>
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<tr>
<td>China</td>
<td>Fujian</td>
<td>58</td>
<td>F</td>
<td>2016/03/09</td>
<td>Severe</td>
<td>Yes</td>
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<td>Jiangsu</td>
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<td>M</td>
<td>2016/03/18</td>
<td>Severe</td>
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<tr>
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<td>2016/03/19</td>
<td>Severe</td>
<td>Yes</td>
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<tr>
<td>China</td>
<td>Hong Kong SAR</td>
<td>80</td>
<td>M</td>
<td>2016/04/06</td>
<td>Stable</td>
<td>Yes</td>
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</tbody>
</table>
Avian influenza A(H9) viruses

Current situation:
One human infection with avian influenza A(H9) virus was reported from Egypt. The case is a 18-month-old male from Cairo Governorate who developed influenza-like illness on 10 April 2016. On 20 April 2016, a sample from this patient tested positive for an influenza A(H9) virus. The patient is reportedly in good condition and the epidemiological investigation revealed the case had exposure to live poultry at a market in the two weeks prior to onset of illness. While infection with influenza A(H9N2) is likely in this case, laboratory confirmation of the neuraminidase type is anticipated.

A total of 28 laboratory-confirmed, non-fatal cases of human infection with avian influenza A(H9N2) viruses have been detected globally in the past. 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.

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). 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 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.

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Links:
WHO Human-Animal Interface web page

Cumulative Number of Confirmed Human Cases of Avian Influenza A(H5N1) Reported to WHO

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: Web portal on Avian Influenza

Food and Agriculture Organization of the UN (FAO) webpage: Avian Influenza

OFFLU
http://www.offlu.net/index.html