Influenza at the human-animal interface
Summary and assessment, 4 October to 21 November 2016

- **New infections**: Since the previous update, new human infections with influenza A(H5N6), A(H7N9) and A(H1N1)v viruses were reported.

- **Risk assessment**: The overall public health risk from currently known influenza viruses at the human-animal interface has not changed. Further human infections with viruses of animal origin can be expected, but the likelihood of sustained human-to-human transmission remains low.

- **IHR compliance**: 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.

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**Avian Influenza Viruses**

**Avian influenza A(H5) viruses**

**Current situation:**
Since the last update, one new laboratory-confirmed human case of influenza A(H5N6) virus infection was reported to WHO on 21 November 2016.

A 47-year-old female resident of Hunan Province, China, developed symptoms on 18 November 2016. On the same day, she was admitted to hospital and was in critical condition at the time of reporting. No further cases were reported among the close contacts of this case, and the investigation of the source of exposure for the case is ongoing. Additional information on the virus from the case is anticipated.

A total of 15 laboratory-confirmed cases of human infection with influenza A(H5N6) virus, including six deaths, have been reported to WHO from China since 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.

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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/)
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.
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 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.  

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 two laboratory-confirmed human cases of influenza A(H7N9) virus infection to WHO on 10 November 2016. For more details on these cases, see Table 1 below and the Disease Outbreak News.

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7 [www.who.int/influenza/vaccines/virus/characteristics_virus_vaccines/en/](http://www.who.int/influenza/vaccines/virus/characteristics_virus_vaccines/en/)
Table 1: Human cases of influenza A(H7N9) reported from 4 October to 21 November 2016

<table>
<thead>
<tr>
<th>Province or region reporting (province of assumed exposure, if different from reporting 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 history</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zhejiang</td>
<td>77</td>
<td>F</td>
<td>2016/10/06</td>
<td>Severe</td>
<td>Visited a market and raised poultry at home</td>
</tr>
<tr>
<td>Jiangsu</td>
<td>89</td>
<td>M</td>
<td>2016/10/20</td>
<td>Severe</td>
<td>None</td>
</tr>
</tbody>
</table>

A total of 800 laboratory-confirmed cases of human infection with avian influenza A(H7N9) viruses, including at least 322 deaths, 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 China, 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, 2013-2016

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

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**Swine Influenza Viruses**

**Influenza A(H1N1)v viruses**

**Current situation:**
The Netherlands detected a human case of infection with an influenza A(H1N1)v virus in a child with onset of illness on 26 October 2016. The patient was admitted to a hospital with severe respiratory symptoms and received supportive treatment and oseltamivir. The patient has since recovered and been discharged from hospital. Close contacts of the patient were closely monitored for 10 days and no further cases were detected. The patient had visited a pig farm a few days prior to illness onset. A highly similar virus was detected upon sampling of the pigs from the farm. The influenza A virus detected from the patient was unsubtypeable with the routine human seasonal influenza diagnostics and therefore the haemagglutinin (HA) gene was sequenced.

All genes recovered from the virus detected in this case were similar to Eurasian lineage avian-like swine influenza A(H1N1) viruses circulating in pigs in the Netherlands in the past decennia. Other sporadic human cases of infection with swine influenza virus have been detected in Europe in the past, including in the Netherlands.\(^\text{10}\)

**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 swine A(H1N1) virus through contact with infected swine

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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 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.

4. **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 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

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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
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