



## H7N9 situation update

28 February 2018, 16:00 hours; Rome

### Disclaimer

Information provided herein is current as of the date of issue. Information added or changed since the last H7N9 situation update appears in **red**. Human cases are depicted in the geographic location of their report. For some cases, exposure may have occurred in one geographic location but reported in another. For cases with unknown onset date, reporting date was used instead. FAO compiles information drawn from multiple national (Ministries of Agriculture or Livestock, Ministries of Health, Provincial Government websites; Centers for Disease Prevention and Control [CDC]) and international sources (World Health Organization [WHO], World Organisation for Animal Health [OIE]) as well as peer-reviewed scientific articles. FAO makes every effort to ensure, but does not guarantee, accuracy, completeness or authenticity of the information. The designation employed and the presentation of material on the map do not imply the expression of any opinion whatsoever on the part of FAO concerning the legal or constitutional status of any country, territory or sea area, or concerning the delimitation of frontiers.

### Overview

**Hazard:** Influenza A(H7N9) virus with pandemic potential.

**Country:** China; imported cases in Malaysia (1) and Canada (2).

**Number of human cases:** **1,625** confirmed; **621** deaths (since February 2013).

**New findings in birds / environment since last update (13 February 2018): 1**

**New human cases since last update (13 February 2018): 0**

**Map 1.** Human cases and positive findings in birds or the environment



*Note:* Human cases are depicted in the geographic location where they were reported; for some cases, exposure may have occurred in a different geographic location. Precise location of 63 human cases in Anhui (2), Beijing (2), Guangdong (1), Guangxi (1), Hebei (3), Hunan (1), Hubei (2), Jiangsu (2), Jiangxi (6), Sichuan (2), Zhejiang (3) and unknown (38) Provinces are currently not known, these cases are therefore not shown on the map.

**Provinces/municipalities affected:** Beijing, Chongqing, Shanghai and Tianjin Municipalities; Anhui, Fujian, Gansu, Guangdong, Guizhou, Hebei, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Liaoning, Qinghai, Shaanxi, Shanxi, Shandong, Sichuan, Taiwan, Yunnan and Zhejiang Provinces; Hong Kong SAR, Macao SAR; Guangxi, Inner Mongolia, Ningxia Hui, Tibet and Xinjiang Uyghur Autonomous Regions (China); Sabah (Malaysia); British Columbia (Canada).

**Highly pathogenic virus findings:** Since 10 January 2017, highly pathogenic avian influenza (HPAI) type H7N9 virus was detected in a total of 54 poultry or environmental samples (42 chickens, 2 duck and 10 environmental samples); H7N9 virus isolates from 32 human cases were found to be HPAI virus.

**Table.** Number of locations testing positive for H7N9 HPAI virus (n=38) in birds and/or the environment, by province and sampling site as of 28 February 2018.

Province	LBM*	Farm	Backyard	Airport	Total
Anhui	0	1	0	0	<b>1</b>
Fujian	1	0	0	0	<b>1</b>
Guangdong	22	0	0	0	<b>22</b>
Guangxi	0	1	0	0	<b>1</b>
Hebei	0	1	0	0	<b>1</b>
Heilongjiang	0	1	0	0	<b>1</b>
Henan	0	1	0	0	<b>1</b>
Hunan	3	1	1	0	<b>5</b>
Inner Mongolia	0	2	0	0	<b>2</b>
Shaanxi	0	1	0	0	<b>1</b>
Tianjin	0	1	0	0	<b>1</b>
Unknown	0	0	0	1	<b>1</b>
<b>TOTAL</b>	<b>26</b>	<b>10</b>	<b>1</b>	<b>1</b>	<b>38</b>

\*LBM: live bird market

## Situation update

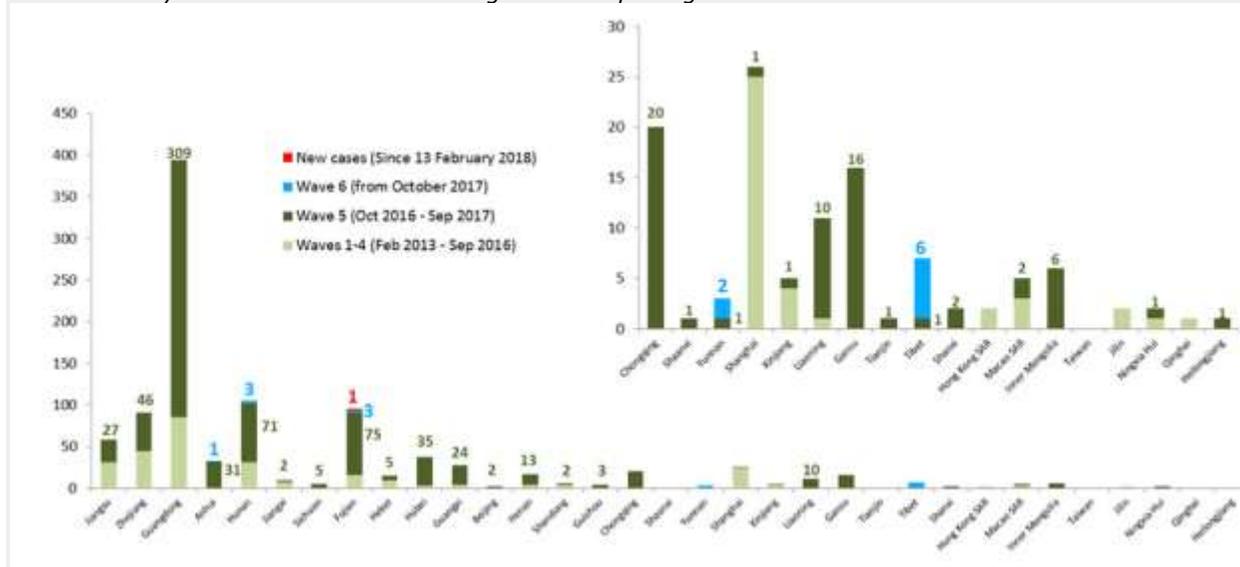
### Animals

- 28 February 2018, Ministry of Agriculture, China published the results of the national animal H7N9 surveillance and post-vaccination monitoring for the month of January 2018. The overall post-vaccination monitoring result\* from 28 provinces was 87.30%\*\*. Out of the 43,466 virology samples collected from 25 provinces, one duck sample in a live bird market tested positive for H7N9 in Nanan City, **Fujian** Province [[reference](#)].  
\*antibody titre  $\geq 24$  as required by the MoA regulation. \*\*ratio of poultry samples which achieved required immunity level.
- 24 February 2018: The Ministry of Agriculture, China has released Guiding principles on Prevention and Control of H7N9 Flu in Poultry in China (2018-2020) to further improve the prevention and control of influenza H7N9 in poultry and effectively maintain poultry production and public health safety. The "[National poultry H7N9 influenza elimination plan](#)", which was in force since 2014, has been abolished. The new guiding principles prevail in case of inconsistencies with previous regulations [[reference](#)]. Among others, the new guiding principles contain the following requirements:
  - to achieve that less than 0.1% of the bird population (i.e. one out of 1000 birds) will be affected by H7N9 during 12 consecutive months;
  - to achieve that there will be no outbreak in large-scale farm ( $\geq 20,000$  birds for layers or  $\geq 50,000$  birds for broilers) – with or without vaccination – during 12 consecutive days;
  - to maintain herd immunity above 70%;
  - for any cross provincial border poultry movement: within 21 days before leaving the farm, a minimum of 30 poultry samples shall be collected and tested within 48 hours; or an immunization certificate needs to be submitted for meat chickens or meat ducks that are less than 50 days old.
  - promote and strengthen the implementation of 1110\* system at markets.

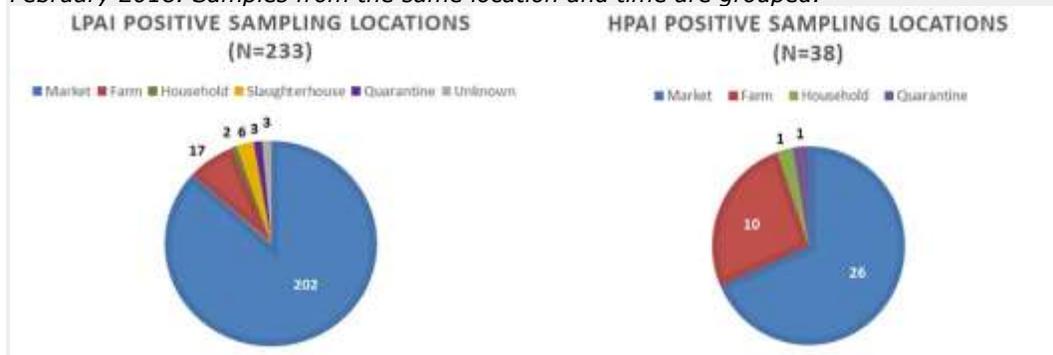
Note: \*cleaning once a day, thorough disinfection once a week, closing-day once a month, zero live poultry remaining in the cage over night or while closing.

**Animal/environmental findings:** Since 4 April 2013 around 2500 virological samples from the environment, chickens, pigeons, ducks and a tree sparrow tested positive; positives mainly from live bird markets, vendors and some commercial or breeding farms.

**Figure 1.** Number of positive virological samples from birds or the environment, by province and origin as of 28 February 2018. Data include both high and low pathogenic H7N9 viruses.

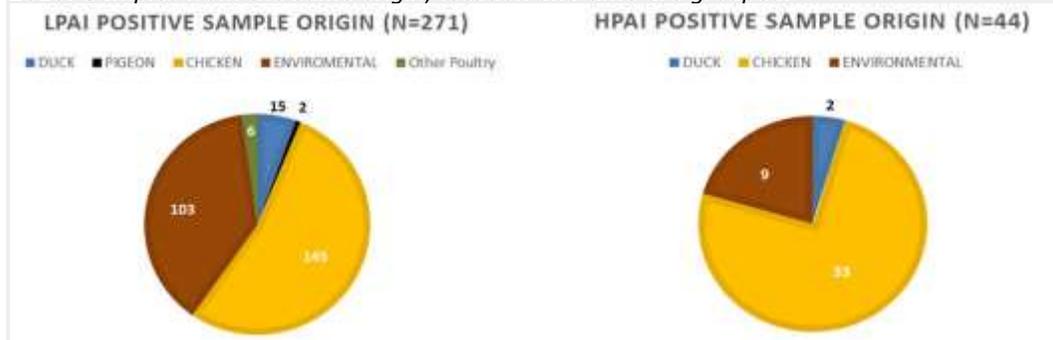


**Figure 2.** Distributions of low\* and highly pathogenic H7N9 virologically positive samples ( $n^{LPAI}=233$ ;  $n^{HPAI}=38$ ) collected from birds or the environment, by sampling location, between October 2016 and 28 February 2018. Samples from the same location and time are grouped.



\*may contain unconfirmed HPAI at the time of publishing

**Figure 3.** Distributions of low\* and highly pathogenic H7N9 virologically positive samples ( $n^{LPAI}=271$ ;  $n^{HPAI}=44$ ) collected from birds or the environment, by sample origin between October 2016 and 28 February 2018. Samples from the same origin, location and time are grouped.

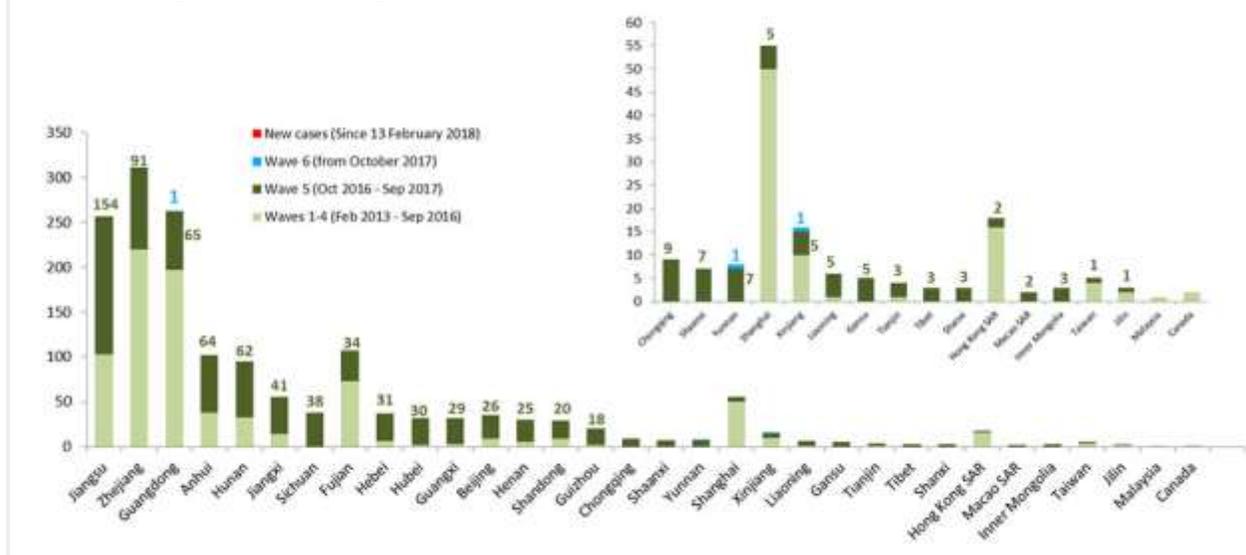


\*may contain unconfirmed HPAI at the time of publishing

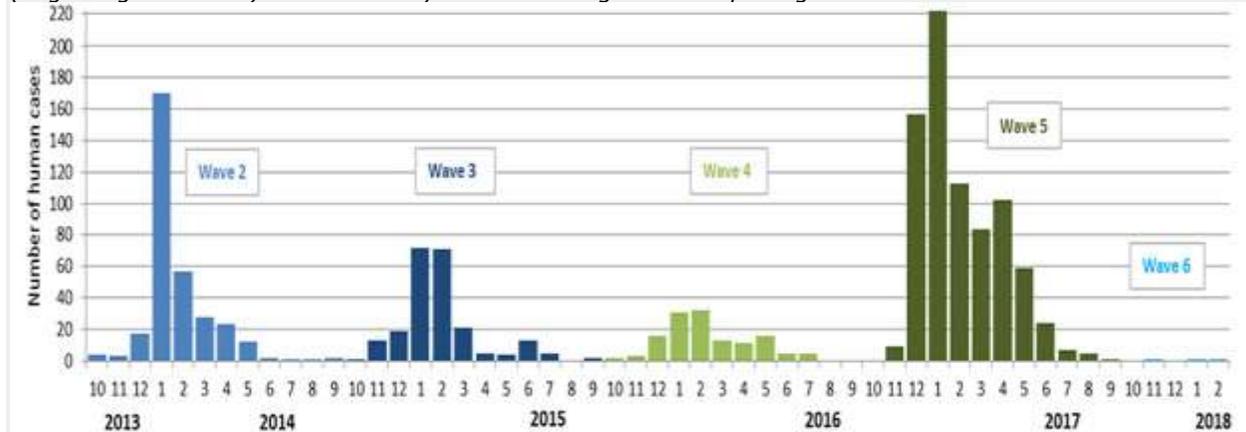
## Humans

- Since the last update (13 February 2018), no new human case was reported.
- For detailed information on human cases, please refer to WHO's [Disease Outbreak News](#)

**Figure 4.** Number of officially reported human cases since February 2013 as of 28 February 2018. Data include both high and low pathogenic H7N9 viruses



**Figure 5.** Incidence of officially reported human cases by month, based on onset date from October 2013 (Beginning of wave 2) to 28 February 2018. Both high and low pathogenic H7N9 viruses are included.



Note: For cases with unknown onset dates from wave 2 (n=2), wave 3 (n=146), wave 4 (n=27) and wave 5 (n=55), reporting dates were used instead.

## Publications

- Roche X., Sims L., von Dobschuetz S., Kamata A., Qi Y., Jia B., Fusheng G., Tago D., Brioudes A., Kalpravidh W., Pinto J., Raizman E., Lubroth J., Cheng J. **Chinese-Origin H7N9 Highly Pathogenic Avian Influenza: Spread in poultry and human exposure – a Qualitative Risk Assessment Update.** FAO Animal Health Risk Analysis – Assessment, Issue No. 4 February 2018. Rome, FAO. [\[reference\]](#). For the period assessed (January to May 2018), which is characterized by increased influenza virus activity and major festivals in the region, risk of H7N9 spread in poultry and human exposure was found to be reduced when compared to the same period in previous years (see [Qualitative Risk Assessment Update Issue No. 3](#)). Nevertheless, there is still moderate likelihood for new avian and human exposures to occur during this period and for virus to be introduced to neighbouring countries (in particular, Viet Nam, Lao PDR and Myanmar). Vigilance in monitoring for viral incursions needs to be maintained in the region.

- Wei J., Zhou J., Cheng K., Wu J., Zhong Z., Song Y., [...], Li Y. **Assessing the risk of downwind spread of avian influenza virus via airborne particles from an urban wholesale poultry market.** Building and Environment. 2018 Jan;127:120-126. doi: 10.1016/j.buildenv.2017.10.037. [\[reference\]](#). *The risk of AIV downwind spread via airborne particles from a representative wholesale market in Guangzhou was assessed. Air samples were collected at different locations inside a wholesale market. Viral RNA was readily detected from 19 out of 21 air sampling events and the concentration of viral RNA detected at the poultry holding area was as high as 100 m downwind. A high concentration of avian 18S RNA detected at the poultry holding area was used for assessing the potential spread of avian influenza virus during outbreak situations. The model indicated the combined effect of wind direction and surrounding buildings on the spread of virus and a slow decay rate of the virus in the air in the downwind direction.*
- Chen E., Wang M.H., He F., Sun R., Cheng W., Zee B.C.Y., [...], Chong K.C. **An increasing trend of rural infections of human influenza A (H7N9) from 2013 to 2017: A retrospective analysis of patient exposure histories in Zhejiang province, China.** PLoS One. 2018 Feb 15;13(2):e0193052. doi: 10.1371/journal.pone.0193052. [\[reference\]](#). *This study aimed to compare the proportional changes between urban and rural infections in the Zhejiang province from 2013 to 2017 by analyzing the exposure histories of human cases. From 2013 to 2017, a statistically significant trend in rural infections was observed. Each year, significant increases in the proportion of live poultry transactions in LPMS and poultry processing plants were detected in conjunction with an increased proportion of urban and rural infections.*
- Xiang D., Shen X., Pu Z., Irwin D.M., Liao M., Shen Y. **Convergent Evolution of Human-Isolated H7N9 Avian Influenza A Viruses.** The Journal of Infectious Diseases 2018 Feb 9. doi: 10.1093/infdis/jiy082. [\[reference\]](#). *This study investigated whether adaptive evolution had occurred in human-isolated H7N9 viruses. All available genomes of H7N9 AIVs were evaluated and maximum likelihood trees were separately reconstructed for all eight genes. Signals of positive selection and convergent evolution were detected on branches that lead to changes in host tropism (from avian to human). Three genes had significant signals of positive selection. In addition, 34 sites having significant signals for parallel evolution in eight genes were detected, including seven well-known sites that play a role in crossing species barriers for AIVs.*
- Ma M.J., Liu C., Wu M.N., Zhao T., Wang G.L., Yang Y., [...], Cheng L.L. **Influenza A(H7N9) Virus Antibody Responses in Survivors 1 Year after Infection, China, 2017.** Emerging Infectious Diseases. 2018 Apr 17;24(4). doi: 10.3201/eid2404.171995. [\[reference\]](#). *The study investigated dynamic changes of antibody response to H7N9 virus over 1 year post-infection in 25 laboratory-confirmed infections in Suzhou City, Jiangsu Province during the fifth wave. Most survivors had relatively robust antibody responses that decreased but remained detectable at 1 year. Several survivors had low or undetectable antibody titers. Hemagglutination inhibition titer was >1:40 for <40% of the survivors. Measured in vitro in infected mice, hemagglutination inhibition titer predicted serum protective ability.*
- Liu D., Zhang Z., He L., Gao Z., Li J., Gu M., [...], Liu X. **Characteristics of the emerging chicken-origin highly pathogenic H7N9 viruses: A new threat to public health and poultry industry.** Journal of Infection. 2018 Feb;76(2):217-220. doi: 10.1016/j.jinf.2017.09.005. [\[reference\]](#). *Two H7N9 chicken isolates from live bird markets in southern China showed amino acid insertions and mutation at the cleavage site of the hemagglutinin similar to those from reported human cases. Phylogenetically, they formed a separate cluster. Laboratory animal infection confirmed their high pathogenicity in chickens and varied virulence in mice.*

## FAO actions:

- **FAO published a risk assessment update entitled, "Chinese-Origin H7N9 Highly Pathogenic Avian Influenza: Spread in poultry and human exposure"** [\[reference\]](#)
- FAO guidance and risk assessments are available on a dedicated website [\[link\]](#)
- Liaise with China and partners, monitor situation, monitor virus evolution, conduct market chain analysis, risk assessment, surveillance guidance and communication.

## FAO's support to countries

- FAO continues supporting at-risk countries with surveillance and preparedness for H7N9 incursion
- [FAO is providing surveillance and sampling guidance for South and Southeast Asia](#)
- Funding to date: US\$ 8.1 million mobilized (US\$ 6.7 million USAID, US\$ 1.9 million TCPs)