OVERSEAS EMERGING RESPIRATORY VIRUS INTELLIGENCE

Highly Pathogenic Avian Influenza A(H5NX)

Clade 2.3.4.4b

Avian influenza A(H5N1) clade 2.3.4.4b has spread throughout poultry and wild birds across Africa, Asia, Europe and the Americas, and was detected on Antarctica's mainland in February 2024.[1, 2] It has never been detected in New Zealand, Australia or the Pacific Region. Since January 2022, 26 human cases of avian influenza H5N1 clade 2.3.4.4b have been reported in Europe (7 cases), Asia (2 cases) and the Americas (17 cases). All but one case had direct or indirect exposure to sick poultry/birds (21 cases) or dairy cattle (4 cases) before illness onset, while one case has no immediately known animal exposure. There is no evidence of sustained human-to-human transmission.[1, 3]

The US Centers for Disease Control and Prevention (CDC) are investigating a cluster of illness associated with a confirmed case of influenza A(H5N1) reported in Missouri on 6 September 2024.[4] The case was identified through the seasonal influenza surveillance system and has recovered following hospitalisation associated with underlying conditions.[5] A household contact reported onset of respiratory symptoms on the same day but was not tested and has since recovered. The timing of symptoms suggests a possible common source exposure, which remains unknown. Six healthcare workers who had close contact with the confirmed case also experienced mild respiratory symptoms. One tested negative for influenza, while the others were not tested as they recovered before the investigation began.[6] Serology results for the confirmed case,their household contact and healthcare workers who had high-risk exposures are pending. The virus from the Missouri case was identified as clade 2.3.4.4b, genomically related to ongoing US cattle outbreak, including sequences from cows, poultry, birds, other farm animals and raw milk. There were no mutations associated with enhanced infectivity or capacity for human-to-human transmission. H5 avian influenza outbreaks have been detected in poultry in Missouri in 2024 and in wild birds there in the past. No A(H5N1) dairy cattle outbreaks have been reported in the state to date. This is the 14^{h} human case of infection with influenza A(H5) reported in the United States in 2024 and the first without a known exposure. There are no indications of unusual human influenza activity through the US influenza surveillance system. Based on currently available information, the CDC continues to assess the immediate risk to the general public from H5N1 as low.[4]

On 14 August 2024, the joint FAO/WHO/WOAH assessment on the recent influenza A(H5N1) virus situation in animals and people was updated.[1] The global public health risk of influenza A(H5N1) is assessed as low, and the risk for occupationally exposed persons as low to moderate, depending on risk mitigation measures in place. Additional human infections in those exposed to infected animals or contaminated environments are likely to occur, however the public health impact of these infections is minor at the global level.

As of 1 October 2024, the number of human cases of influenza A(H5N1) clade 2.3.4.4b infection associated with the multi-state dairy cattle outbreak remains at four, as reported by the CDC.[3] All cases were dairy farm workers exposed to infected livestock, and all reported mild symptoms and recovered. Studies have demonstrated that seroprevalence to HPAI A(H5N1), even among workers with known exposures, is low reflecting generally poor ability of this virus to transmit to humans.[7]

Influenza A(H5N1) has been detected in 244 dairy herds in 14 states. In the past 30 days, there have been detections in 44 herds in 2 states.[8] Other farm animals in multiple states, including mice, domestic cats, and alpacas have also been reported.[9] There has also been evidence of transmission of A(H5N1) from dairy to poultry farms. Epidemiological findings from Michigan suggest that the majority of transmission between farms is through shared movement of people, vehicles and equipment between premises.[10]

As of 1 October 2024, the CDC has also reported nine confirmed cases of A(H5) in poultry farm workers involved in depopulating A(H5N1) infected poultry at two farms in the same Colorado county.[11] Genomic analysis of virus isolated from three of the workers showed they are closely related to the dairy cattle clade 2.3.4.4b outbreak.[12] Two states have reported outbreaks in commercial or backyard poultry flocks in the past 30 days (as of 26 September).[13]

On 9 August 2024, the CDC published their assessment of potential pandemic risk posed by currently circulating influenza A(H5N1) viruses, based on virus isolated from the first human case of infection following exposure to infected dairy herds. The current overall individual and population health risk to the general public from this virus remains low, and the future pandemic risk is assessed as moderate, which is similar to previous assessments of earlier influenza A(H5N1) viruses.[14]

Clade 2.3.2.1.c

On 2 September 2024, the WHO published a risk assessment for avian influenza A(H5N1) in Cambodia following the notification of a confirmed case due to clade 2.3.2.1c in a 15 year old child.[15] Cambodia has reported 10 human cases of infection due to influenza A(H5N1) in 2024, most of whom had known exposure to dead or sick poultry prior to illness onset. Available evidence suggests that the virus has not acquired the capacity for sustained human-to-human transmission. Further cases are expected as the virus continues to circulate among poultry in Cambodia. The overall public health risk posed by this virus was assessed as low.

Clade 2.3.2.1a

On 22 May 2024, the Victorian Department of Health (Australia) reported the retrospective identification of a human case of infection with influenza A(H5N1) clade 2.3.2.1a. The case was a child who acquired infection in India in March before returning to Australia and recovered following severe infection. There was no evidence of onwards human transmission. This clade has previously been detected among birds in India.[16]

ESR public health risk assessment

Given the potentially high impact of the disease, very low likelihood of sustained human-to human transmission and very low likelihood of importation of a human case of influenza A(H5N1), the overall public health risk of avian influenza A(H5N1) to Aotearoa New Zealand is low. However, due to the pandemic potential of avian influenza viruses should there be a change in viral transmissibility, national preparedness activities led by the Ministry for Primary Industries, Health New Zealand and the Public Health Agency are ongoing.

Other human cases of avian and swine influenza

On 20 September 2024, the US CDC reported two human cases of infection with influenza A(H3N2) variant virus.[17] Both cases were aged less than 18 years, were hospitalised and have since recovered. Both cases

attended the same agricultural fair, although were not contacts, and one child had direct contact with swine. All household members of one case developed symptoms the day after attending the agricultural fair, with one testing positive for SARS-CoV-2, and all recovered. The child subsequently developed new symptoms and tested positive for A(H3N2)v. The household members likely experienced an unrelated illness and no human-to-human transmission of A(H3N2)v was identified. The US CDC have reported nine human cases of infection with variant influenza viruses during the 2023-2024 influenza season.

On 20 September 2024, the WHO published a risk assessment on Ghana's first human case of infection with avian influenza A(H9N2) which was notified on 26 August.[18] Epidemiological investigations did not identify any exposure to sick poultry or people with similar symptoms prior to the child's illness onset. No secondary cases were identified. Influenza A(H9N2) has been reported in poultry in Ghana since late 2017. Based on currently available information, the WHO assess the risk to the general population based by this virus as low.

On 4 September 2024, the WHO published a risk assessment on Vietnam's first human case of infection with influenza A(H1N1) variant virus. The case had underlying medical conditions and has died. No secondary cases have been identified. The source of infection remains unknown. Based on currently available information, WHO assesses the current risk to the general population posed by this virus as low.[19]

From 8 June to 19 July 2024, two human cases of infection with influenza A(H5N6) in China, one human case of infection with influenza A(H9N2) in China, and two human cases of infection with influenza A(H1N2) variant virus in the US were reported. All cases had exposure to poultry or swine prior to illness onset.[20]

Australia is responding to outbreaks of HPAI H7 viruses in 16 commercial and domestic poultry flocks; eight in Victoria, six in New South Wales and two in the ACT.[21] No new outbreaks have been reported since late July. There has been no associated human illness.

WHO risk assessment for influenza at the human-animal interface

As at 19 July 2024, the WHO advises that the overall public health risk from currently known influenza viruses at the human-animal interface has not changed, and the sustained human-to-human transmission of these viruses is currently considered unlikely. Human infections with viruses of animal origin are not unexpected at the human-animal interface wherever these viruses circulate in animals.[20]

Middle East respiratory syndrome coronavirus (MERS-CoV)

On 5 September 2024, the WHO was notified of a human case of MERS-CoV in Saudi Arabia.[22] The case had underlying conditions, did not have a history of contact with camels and was not a healthcare worker. Prior to this case, four MERS-CoV cases, all fatal, had been reported in 2024.[23] All cases were from Saudi Arabia, with the most recent reported in April. The WHO's risk assessment remains moderate at the global and regional levels.[22] The WHO expects additional cases of MERS-CoV to be reported from the Middle East and/or other countries where MERS-CoV is circulating in dromedaries.

References

1. FAO/WHO/WOAH. Updated joint FAO/WHO/WOAH assessment of recent influenza A(H5N1) virus events in animals and people. 12 August 2024. Available from: *https://www.who.int/publications/m/item/updated-joint-fao-who-woah-assessment-of-recent-influenza-a(h5n1)-virus-events-in-animals-and-people*. [Accessed 15 08 2024]

2. World Organization for Animal Health. Wildlife under threat as avian influenza reaches Antarctica. 13 March 2024 [Available from: *https://www.woah.org/en/wildlife-under-threat-as-avian-influenza-reaches-antarctica/*. [Accessed 17 04 2024]

3. US Centers for Disease Control and Prevention. H5 Bird Flu: Current Situation. 25 September 2024 [Available from: *https://www.cdc.gov/bird-flu/situation-summary/index.html*. [Accessed 26 09 2024]

4. US Centers for Disease Control and Prevention. CDC A(H5N1) Bird Flu Response Update September 27, 2024. 27 September 2024 [Available from: *https://www.cdc.gov/bird-flu/spotlights/h5n1-response-09272024.html*. [Accessed 03 10 2024]

5. US Centers for Disease Control and Prevention. CDC A(H5N1) Bird Flu Response Update September 13, 2024. 13 September 2024 [Available from: *https://www.cdc.gov/bird-flu/spotlights/h5n1-response-09132024.html*. [Accessed 19 09 2024]

6. US Centers for Disease Control and Prevention. CDC A(H5N1) Bird Flu Response Update September 20, 2024. 20 September 2024 [Available from: *https://www.cdc.gov/bird-flu/spotlights/h5n1-response-09202024.html*. [Accessed 26 09 2024]

7. US Centers for Disease Control and Prevention. Summary of H5N1 Seroprevalence Studies. 05 June 2024 [Available from: *https://www.cdc.gov/ncird/whats-new/H5N1-seroprevalence-studies.html*. [Accessed 25 07 2024]

8. U.S Department of Agriculture. HPAI Confirmed Cases in Livestock. 02 October 2024 [Available from: *https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/hpai-confirmed-cases-livestock*. [Accessed 03 10 2024]

9. U.S Department of Agriculture. Detections of Highly Pathogenic Avian Influenza in Mammals. 10 September 2024 [Available from: *https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/mammals*. [Accessed 05 09 2024]

10. U.S Department of Agriculture. 2024 Highly Pathogenic Avian Influenza (H5N1) - Michigan Dairy Herd and Poultry Flock. 09 June 2024. Available from: *https://www.aphis.usda.gov/sites/default/files/hpai-h5n1-dairy-cattle-mi-epi-invest.pdf*. [Accessed 20 06 2024]

11. Colorado Department of Public Health and Environment. State health officials closely monitor farms responding to avian flu spread in poultry and cows. 20 July 2024 [Available from: *https://cdphe.colorado.gov/press-release/state-health-officials-closely-monitor-farms-responding-to-avian-flu-spread-in*. [Accessed 25 07 2024]

12. US Centers for Disease Control and Prevention. A(H5N1) Bird Flu Response Update, July 19, 2024. 19 July 2024 [Available from: *https://www.cdc.gov/bird-flu/spotlights/h5n1-response-07192024.html*. [Accessed 25 07 2024]

13. U.S Department of Agriculture. Confirmations of Highly Pathogenic Avian Influenza in Commercial and Backyard Flocks. 25 September 2024 [Available from: *https://www.aphis.usda.gov/livestock-poultry-disease/avian/avian-influenza/hpai-detections/commercial-backyard-flocks*. [Accessed 26 09 2024]

14. US Centers for Disease Control and Prevention. Results of Influenza Risk Assessment Tool. 09 August 2024 [Available from: *https://www.cdc.gov/pandemic-flu/php/monitoring/irat-virus-summaries.html*. [Accessed 15 08 2024]

15. World Health Organization. Avian Influenza A(H5N1) - Cambodia. 2 September 2024 [Available from: *https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON533*. [Accessed 05 09 2024]

16. World Health Organization. Avian Influenza A (H5N1) - Australia. 07 June 2024 [Available from: *https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON519*. [Accessed 12 09 2024]

17. US Centers for Disease Control and Prevention. Weekly US Influenza Surveillance Report: Key Updates for Week 37, ending September 14, 2024. 20 September 2024 [Available from: *https://www.cdc.gov/fluview/surveillance/2024-week-37.html*. [Accessed 26 09 2024]

18. World Health Organization. Avian Influenza A(H9N2) - Ghana. 20 September 2024 [Available from: *https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON534*. [Accessed 26 09 2024]

19. World Health Organization. Influenza A(H1N1) variant virus - Viet Nam. 4 September 2024 [Available from: *https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON532*. [Accessed 12 09 2024]

20. World Health Organization. Influenza at the human-animal interface summary and risk assessment. 19 July 2024. Available from: *https://www.who.int/publications/m/item/influenza-at-the-human-animal-interface-summary-and-assessment-19-july-2024*. [Accessed 01 08 2024]

21. Australian Government. H7 high pathogenicity avian influenza. 26 July 2024 [Available from: *https://www.outbreak.gov.au/current-outbreaks/avian-influenza*. [Accessed 03 10 2024]

22. World Health Organization. Middle East respiratory syndrome coronavirus - Kingdom of Saudi Arabia. 2 October 2024 [Available from: *https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON536*. [Accessed 03 10 2024]

23. European Centre for Disease Prevention and Control. Communicable disease threats report, 24-30 August 2024, week 35. 30 August 2024. Available from: *https://www.ecdc.europa.eu/en/publications-data/communicable-disease-threats-report-24-30-august-2024-week-35*. [Accessed 05 09 2024]