



HUMAN EMERGING RESPIRATORY PATHOGENS BULLETIN

MONTHLY SITUATIONAL ANALYSIS OF EMERGING RESPIRATORY DISEASES AFFECTING HUMANS

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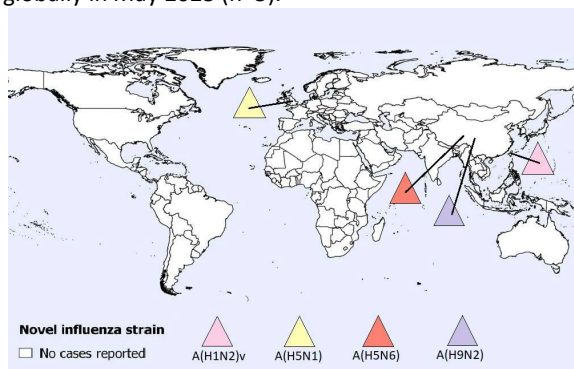
The Human Emerging Respiratory Pathogens (HERP) Bulletin is a monthly publication developed by the Public Health Agency of Canada (PHAC)'s Centre for Immunization and Respiratory Infectious Diseases (CIRID). The HERP Bulletin serves as a mechanism for information sharing on summary surveillance indicators of global public health events affecting humans in the field of emerging respiratory pathogens. This includes pathogens such as novel influenzas (both avian and swine-origin), MERS-CoV, and other ad-hoc emerging respiratory pathogens.

MONTHLY HIGHLIGHTS

During the month of May 2023, the following human cases have been reported:

- Two new human cases of avian influenza A(H5N1)
- One new human case of avian influenza A(H5N6)
- One new human case of avian influenza A(H9N2)
- One new human case of swine-origin influenza A(H1N2)v

Figure 1. Spatial distribution of human cases of avian and swine influenza reported globally in May 2023 (n=5).



Note: Map was prepared by the Centre for Immunization and Respiratory Infectious Diseases (CIRID) using data from the latest WHO Event Information Site (EIS) postings. This map reflects data available through these publications as of May 31, 2023.

UPDATE ON HUMAN EMERGING RESPIRATORY PATHOGEN PUBLIC HEALTH EVENTS (AS OF MAY 31, 2023)¹

NOVEL INFLUENZA ¹	[N CUMULATIVE CASES ² (DEATHS), CFR% ³]
Avian Influenza	
A(H1N2) ⁴	[2 (0), 0%]
A(H3N8)	[3 (1), 33%]
A(H5N1)	[894 (464), 52%]
A(H5N6)	[85 (33), 39%]
A(H5N8)	[7 (0), 0%]
A(H7N4)	[1 (0), 0%]
A(H7N9)	[1,568 (615), 39%]
A(H9N2)	[116 (2), 2%]
A(H10N3)	[2 (0), 0%]
Swine Influenza	
A(H1N1)v	[44 (0), 0%]
A(H1N2)v	[48 (0), 0%]
A(H3N2)v	[446 (1), <1%]
A(H1NX)v ⁵	[1 (1), 100%]
Eurasian avian-like A(H1N1)v	[10 (0), 0%]
MERS-CoV¹	
Global Case Count ⁶	[2,604 (936), 36%]
Saudi Arabia ⁷	[2,196 (855), 39%]

¹Date of 1st Reported Case of Human Infection: MERS-CoV: February 2013 (retrospective case finding September 2012). A(H7N9): March 2013. A(H5N1): 1997. A(H9N2): 1998. A(H5N6): 2014. A(H5N8): December 2020. A(H7N4): February 2018. A(H1N2): March 2018. A(H10N3): May 2021. A(H3N8): April 2022. A(H3N2)v with M gene from pH1N1: 2011. A(H1N2)v: 2005. A(H1N1)v: 2005. EA A(H1N1): 1986, but the above table counts cases from January 2021.

²Cumulative Case Counts: updated using data reported by the World Health Organization, and the United States Centers for Disease Control and Prevention (US CDC).

³Case Fatality Rate (CFR): the proportion of cases that resulted in death. Note that this rate is dependent on accurately reported deaths. For events with active cases, this value may be updated retrospectively as final disposition of the cases is known.

⁴A(H1N2): virus is a seasonal reassortant of the A(H1N1)pdm09 and A(H3N2) seasonal strains.

⁵A(H1NX)v: virus is a novel influenza A(H1) virus with pending, inconclusive, or undetermined neuraminidase results.

⁶Global Case Count: cumulative case count and deaths due to MERS-CoV reflect retrospective updates provided in the World Health Organization (WHO) Disease Outbreak News (DON).

⁷Saudi Arabia: cumulative case count and deaths due to MERS-CoV in Saudi Arabia reflect retrospective updates provided in the WHO DON.

AVIAN INFLUENZA UPDATES

AVIAN INFLUENZA A(H3N8)

The most recent human case of avian influenza A(H3N8) was reported in March 2023 from China.

There have been three human cases, including one fatality, worldwide since the first detection in 2022. The previous two cases were reported from Henan and Hunan provinces in China in April and May 2022 respectively and recovered. The case fatality rate (CFR) for A(H3N8) is 33%; however, with only three human cases to date, the full spectrum of disease is highly uncertain.

AVIAN INFLUENZA A(H5N1)

Two new human cases of avian influenza A(H5N1) were detected in May 2023 from the United Kingdom.

The United Kingdom Health Security Agency (UKHSA) detected influenza A(H5) virus in two asymptomatic poultry workers, following the introduction of an asymptomatic testing programme for people who have been in contact with infected birds.

The first case tested positive for influenza A(H5), with no detection of human seasonal subtypes A(H1) or A(H3), on May 1, 2023. This worker wore no personal protective equipment (PPE). The case tested negative on May 3 & 4, 2023. The participant has remained asymptomatic throughout.

The second case from the same farm tested positive for influenza A(H5) on May 5 & 6, 2023. This case was a poultry culler exposed to infected birds at the same farm and wore PPE with no reported breaches. The individual had negative samples at baseline (May 1, 2023) and day 2 after enrollment, but positive samples on days 4 and 5. In routine subtyping assays, A(H1) and A(H3) were negative in both samples, and A(H5) was positive in one and negative in the other. The case has been clinically assessed and remained asymptomatic. The case was treated with oseltamivir and was negative on respiratory sampling taken on May 14, 2023, the last day of isolation.

Both cases were later confirmed to be A(H5N1) clade 2.3.4.4b.

All other study participants remain well and tested negative for influenza A. Follow-up of contacts has been completed.

Based on the timing exposures and test results, the first individual is likely to have had contamination of the nose and/or throat from material inhaled on the farm, while the second individual seems to be true infection.

A significant number of A(H5N1) detections associated with the current 2021-2023 A(H5N1) clade 2.3.4.4b epizootic have been reported in domestic, backyard, and wild bird populations, as well as other animal species across Canada.

Since 2022, thirteen human cases of A(H5N1) have been reported worldwide (2022 n=5, 2023 n=8) in Cambodia (2), Chile (1), China (2), Ecuador (1), Spain (2), United Kingdom (3), United States (1), Vietnam (1; tentative). Of these cases, 11 belonged to clade 2.3.4.4b and two belonged to clade 2.3.2.1c (both from Cambodia).

Since the emergence of A(H5N1) in humans in 1997, 892 human cases of A(H5N1) have been reported globally, with a CFR of 52%. No domestically acquired human A(H5N1) infections have ever been reported in Canada; however, in 2014, Canada (Alberta) reported a single fatal case of A(H5N1) in a resident returning from travel in China.

AVIAN INFLUENZA A(H5N6)

One new human case of A(H5N6) was reported in May 2023 in Guangdong Province, China.

The case was detected on May 19, 2023. The case was a 54-year-old female farmer from the city of Nanchong, in Sichuan Province, China who had an illness onset date of May 19, 2023, and was hospitalized on the same date in severe condition. The case had exposure to backyard poultry. No family members had developed symptoms at the time of reporting.

In 2023, two cases of A(H5N6) have been detected. A total of 85 laboratory-confirmed human cases of avian influenza A(H5N6), including at least 33 deaths (CFR: 39%) have been reported globally since 2014. Since January 2021, 59 cases of avian influenza A(H5N6) have been reported globally; 32 cases in 2021, 25 cases in 2022 and 2 cases in 2023 (Figure 2); the majority of cases (58) were reported from China and one case was reported from Lao PDR (Figure 3). No cases have been reported in Canadian residents.

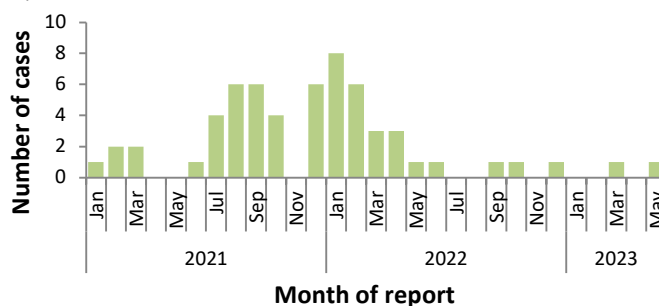
AVIAN INFLUENZA A(H9N2)

One new human infection of A(H9N2) was reported in May 2023 from China.

The case was a 7-month-old male from Jiangxi Province with an illness onset date of May 1, 2023. The case was detected through influenza-like-illness (ILI) surveillance and had mild symptoms. The case had suspected exposure to backyard poultry. No symptoms in the rest of the family have been reported.

In 2023, nine cases of A(H9N2) have been detected. Since the emergence of this virus in the human population in 1998, 116 cases have been reported worldwide, with a CFR of 2%. No cases have been reported in Canada.

Figure 2. Temporal distribution of human cases of A(H5N6) influenza reported globally, by month, January 1, 2021, to May 31, 2023 (n=59).



Note: Graph was prepared by the Centre for Immunization and Respiratory Infectious Diseases (CIRID) using data from the WHO EIS postings and the Hong Kong Centre for Health Protection (CHP) press releases. This graph reflects data available as of May 31, 2023.

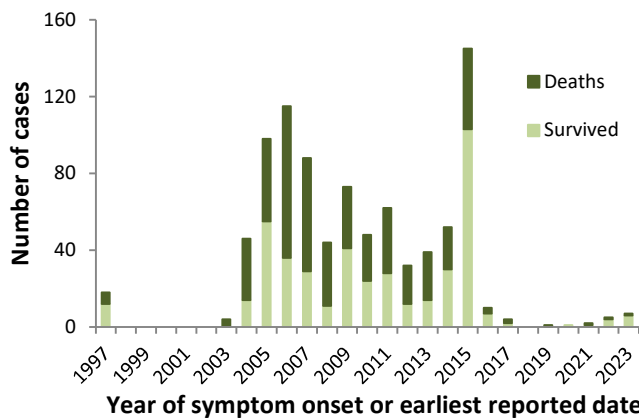
Figure 3. Spatial distribution of human cases of A(H5N6) influenza reported in China and Lao PDR from January 1, 2021, to May 31, 2023 (n=59).



A(H5N6) Human Cases ■ January 1, 2021 - May 31, 2023

Note: Map was prepared by the Centre for Immunization and Respiratory Infectious Diseases (CIRID) using data from the WHO EIS postings and the Hong Kong Centre for Health Protection (CHP) press releases. This map reflects data available through these publications as of May 31, 2023.

Figure 4. Temporal distribution of human cases of A(H5N1) influenza reported globally, by year, January 1, 1997, to May 31, 2023 (n=894).



Note: Graph was prepared by the Centre for Immunization and Respiratory Infectious Diseases (CIRID) using data from the WHO EIS postings, the US CDC's Health Alert Network (HAN), and WHO cumulative case counts. This graph reflects data available as of May 31, 2023.

SWINE INFLUENZA UPDATES

SWINE ORIGIN INFLUENZA A(H1N1)v

The most recent human case of swine origin influenza A(H1N1)v was reported in March 2023 from China.

In 2023, two cases of A(H1N1)v have been detected. Globally, 44 human cases of A(H1N1)v have been reported since 2005, with no associated fatalities. Two A(H1N1)v detections have been reported in Canadian residents since reporting began in 2005, with the latest case reported in April 2021.

SWINE ORIGIN INFLUENZA A(H1N2)v

One new human case of A(H1N2)v was reported in May 2023 in Taiwan.

The case was in a 16-year-old female who lived in central China with a symptom onset date of March 13, 2023. She was prescribed oseltamivir and symptoms subsided on March 16, 2023. The case had a history of masked contact with farm poultry and pigs which all tested negative for

influenza. One close contact had flu-like symptoms but tested negative for influenza and COVID-19.

Based on sequence analysis, this isolate (A/Taiwan/1/2023 [H1N2]v), is a novel reassortant virus containing HA and NA gene segments derived from swine influenza A(H1N2) viruses, which may have been circulating locally for decades. The other six internal genes (PB2, PB2, PA, NP, M, and NS) are from human A(H1N1)pdm09 viruses. The HA (H1) belongs to influenza clade 1A, Eurasian Avian-like, and shares a similarity of 94% to A/Taiwan/2021 (H1N2)v. No amino acid mutations in the NA protein that are associated with resistance to neuraminidase inhibitors were found, indicating that the virus is still susceptible to neuraminidase inhibitors, like oseltamivir.

This is the first case of A(H1N2)v detected in 2023. A total of 48 A(H1N2)v cases have been reported globally since 2005, with a 0% CFR. Three A(H1N2)v detections have been reported in Canadian residents since reporting began in 2005, and the latest case in Canada was reported in November 2021 from Manitoba.

SWINE ORIGIN INFLUENZA A(H3N2)v

The most recent human case of swine origin influenza A(H3N2)v was reported in November 2022 from the United States.

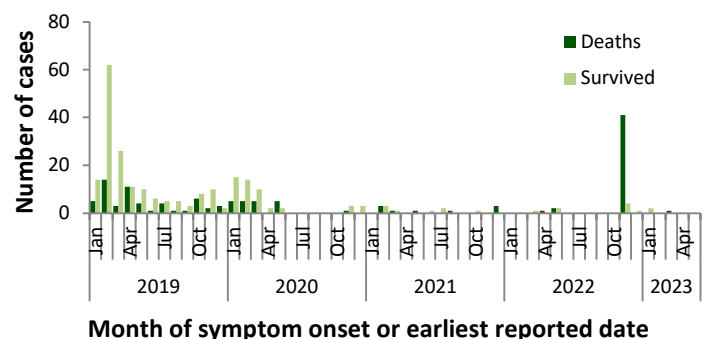
No cases of A(H3N2)v have been detected in 2023. Globally, 446 A(H3N2)v cases have been reported since 2005, with <1% CFR. Two A(H3N2)v detections have been reported in Canadian residents since reporting began in 2005, with the latest case reported in June 2021.

MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS (MERS-COV) UPDATE

The most recent human case of MERS-CoV was reported in March 2023 from Saudi Arabia.

In 2023, three cases of MERS-CoV were detected. According to the WHO, 2,604 laboratory-confirmed cases of MERS-CoV, including 936 deaths, have been reported globally since reporting began in 2012 (CFR: 36%). No cases have ever been reported in Canada.

Figure 5. Temporal distribution of human cases of MERS-CoV reported to the WHO, globally, by month and year, January 1, 2019, to May 31, 2023 (n=322).



Note: Graph was prepared by the Centre for Immunization and Respiratory Infectious Diseases (CIRID) using data from the WHO Disease Outbreak News (DON) and Saudi Arabia's Ministry of Health. This graph reflects data available as of May 31, 2023. The data integrates CIRID real-time reporting with WHO DON retrospective reporting of MERS-CoV cases and deaths. In November 2022, the WHO published a Disease Outbreak News (DON) article that updated their counts with retrospective cases and deaths, which resulted in an increase of an additional 5 cases and 41 deaths compared to their previous MERS-CoV-related DON.