



HUMAN EMERGING RESPIRATORY PATHOGENS BULLETIN

MONTHLY SITUATIONAL ANALYSIS OF EMERGING RESPIRATORY DISEASES AFFECTING HUMANS

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UPDATE ON HUMAN EMERGING RESPIRATORY PATHOGEN PUBLIC HEALTH EVENTS (AS OF DECEMBER 31, 2022)¹

COVID-19 UPDATE

On December 31, 2019, cases of a pneumonia of unknown etiology were reported in Wuhan, China. These cases were determined to be due to a novel coronavirus called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes coronavirus disease 2019 (COVID-19). On January 30, 2020, the World Health Organization (WHO) first declared the outbreak a Public Health Emergency of International Concern (PHEIC). On March 11, 2020, the WHO characterized the outbreak as a global pandemic. The WHO Director-General convened the International Health Regulations (IHR) Emergency Committee (EC) on COVID-19 thirteen (13) times through 2020 to 2022, continually assessing that COVID-19 constitutes a PHEIC.

The Public Health Agency of Canada is monitoring the situation closely. For the most up-to-date information, please visit: <https://www.canada.ca/en/public-health/services/diseases/2019-novel-coronavirus-infection.html>

AVIAN INFLUENZA UPDATES

AVIAN INFLUENZA A(H9N2)

Three (3) new human cases of A(H9N2) were reported in December 2022 from China. The cases were reported from three different provinces in China: Hunan, Gansu, and Anhui. The cases were 3, 5, and 58-years-old, respectively. Most (2/3) of the cases were male. The 3-year-old male and 5-year-old female experienced mild symptoms of illness and were not hospitalized, while the 58-year-old male experienced severe symptoms and was hospitalized. Both the 3-year-old and the 58-year-old cases reported a history of exposure to live poultry markets. The source of exposure for the 5-year-old case is unknown as of the time of reporting. No additional cases have been detected among family members of any of the three (3) cases. These cases are not known to be epidemiologically linked.

To date, 21 human cases of avian influenza A(H9N2) were reported

NOVEL INFLUENZA ¹	[N CUMULATIVE CASES ² (DEATHS), CFR% ³]
A(H7N9)	[1,568 (615), 39%]
A(H5NX) ⁴	[1(0), 0%]
A(H5N1)	[886 (463), 52%]
A(H9N2)	[107 (2), 2%]
A(H5N6)	[83 (33), 40%]
A(H5N8)	[7 (0), 0%]
A(H7N4)	[1 (0), 0%]
A(H1N2) ⁵	[2 (0), 0%]
A(H10N3)	[2 (0), 0%]
A(H3N8)	[2 (0), 0%]
A(H3N2)v	[446 (1), <1%]
A(H1N2)v	[47 (0), 0%]
A(H1N1)v	[41 (0), 0%]
A(H1NX)v ⁶	[1 (1), 100%]
Eurasian avian-like A(H1N1)	[10 (0), 0%]

MERS-CoV¹

Global Case Count ⁷	[2,601 (935), 36%]
Saudi Arabia ⁸	[2,194 (854), 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(H2N2)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 (avian and swine influenza, MERS CoV), and the United States Centers for Disease Control and Prevention (US CDC) (swine influenza).

³Case Fatality Rate (CFR): the proportion of cases that resulted in death. For events with active cases, may be updated retrospectively as final disposition is known.

⁴A(H5NX): virus is an A(H5) virus with pending neuraminidase results.

⁵A(H1N2): virus is a seasonal reassortant of the A(H1N1)pdm09 and A(H3N2) seasonal strains.

⁶A(H1NX)v: virus is a novel influenza A(H1) virus with pending neuraminidase results.

⁷Global Case Counts: cumulative case count and deaths due to MERS-CoV reflect retrospective updates provided in the World Health Organization (WHO) Disease Outbreak News (DON).

⁸Saudi Arabia: cumulative case count and deaths due to MERS-CoV in Saudi Arabia reflect retrospective updates provided in the WHO DON.

worldwide in 2022. Since the emergence of this virus in the human population in 1998, 107 cases have been reported worldwide, with a case fatality rate (*CFR) of 2%. No cases have been reported in Canada.

*CFR: case fatality rate. 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.

AVIAN INFLUENZA A(H5N6)

One (1) new human case of avian influenza A(H5N6) was reported in December 2022 from China. The case was a 54-year-old male from Hunan province, China. He was hospitalized and in critical condition as of the time of reporting. No source of exposure has been identified; however, the case worked in a restaurant preparing food, which may provide the potential for occupational exposure to sick and/or infected poultry. No close contacts of the case reported symptoms at the time of last report.

A total of 83 laboratory-confirmed human cases of avian influenza A(H5N6), including at least 33 deaths (CFR: 40%) have been reported globally since 2014. Since January 2021, 57 cases of avian influenza A(H5N6) have been reported globally (Figure 2); 56 A(H5N6) cases were reported from China and one (1) case was reported from Lao PDR (Figure 3). So far, 25 A(H5N6) human cases have been reported worldwide in 2022. No cases have been reported in Canadian residents.

AVIAN INFLUENZA A(H5N1)

The most recent human case of avian influenza A(H5N1) was reported in November 2022 from China. In December 2022, the WHO linked the human case of a avian influenza A(H5N1) in China from November 2022 and the human case of A(H5NX) in Vietnam from October 2022 to the clade 2.3.4.4b.

There have been 886 human cases of A(H5N1) reported globally since 1997, with a CFR of 52% (Figure 4). Five (5) human infections with A(H5N1) and one (1) case of A(H5NX) have been reported worldwide in 2022, all linked to the highly pathogenic avian influenza (HPAI) outbreak in domestic poultry, wild birds, and some mammals that continues to evolve in Europe and the Americas. The four (4) human cases from Europe, the UK and North America were mild/asymptomatic and the two (2) human cases from Asia were fatal/severe. These two (2) recent detections from Asia provide additional information regarding the spectrum of disease caused by A(H5N1) viruses belonging to the clade 2.3.4.4b such that severe and fatal outcomes can be expected. According to the WHO, the risk of infection for humans remains low and no sustained human-to-human transmission has been reported.

No domestically acquired A(H5N1) infections have ever been reported in Canada, although a significant number of A(H5N1) detections associated with the current 2021-2022 epizootic have been reported in domestic, backyard, wild bird populations, and other wild animal species across Canada. In 2014, Canada (Alberta) reported one single fatal case of A(H5N1) in a resident returning from travel in China.

SWINE INFLUENZA UPDATES

SWINE ORIGIN INFLUENZA A(H1N2)v

One (1) new human case of a avian influenza A(H1N2)v was reported in December 2022 from Taiwan. The case was a 7-year-old female who was living in Changhua County, Taiwan. She experienced influenza-like symptoms and was treated with antivirals. The case was not hospitalized and has since recovered from illness. The case lived with her family who own a pig barn in Changhua; however, the case had no direct exposure to pigs prior to illness onset. Six (6) close contacts were identified, two (2) of whom reported influenza-like illness; however, all close contacts tested negative for A(H1N2)v.

A total of 47 A(H1N2)v cases have been reported globally since 2005, with a 0% CFR. Eight (8) A(H1N2)v cases have been reported worldwide in 2022. Three (3) 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 avian influenza A(H3N2)v was reported in November 2022 from China.

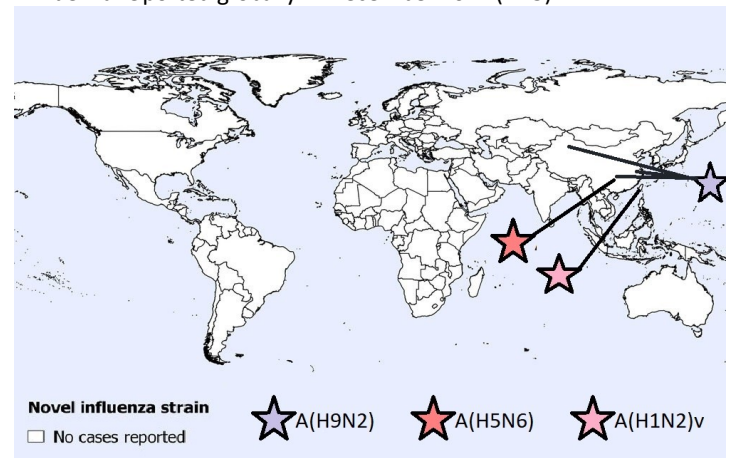
Globally, 446 A(H3N2)v cases have been reported since 2005, with <1% CFR. Five (5) A(H3N2)v cases have been reported worldwide in 2022. Two (2) A(H3N2)v detections have been reported in Canadian residents since reporting began in 2005, with the latest case reported in June 2021.

SWINE ORIGIN INFLUENZA A(H1N1)v

The most recent human case of swine origin influenza A(H1N1)v was reported in October 2022 from Brazil.

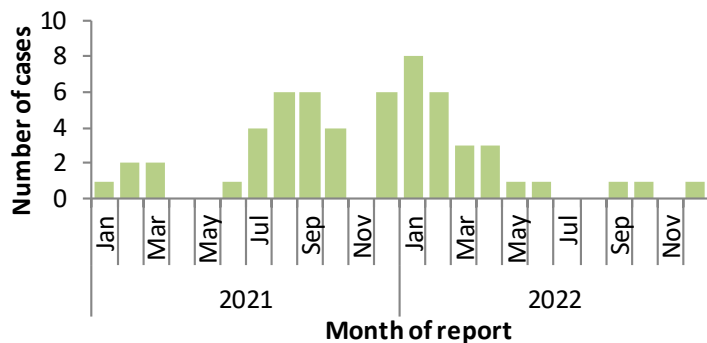
Globally, 41 human cases of A(H1N1)v have been reported since 2005, with no associated fatalities. Four (4) A(H1N1)v cases have been reported worldwide in 2022. Two (2) A(H1N1)v detections have been reported in Canadian residents since reporting began in 2005, with the latest case reported in April 2021.

Figure 1. Spatial distribution of human cases of avian and swine influenza reported globally in December 2022 (n=5).



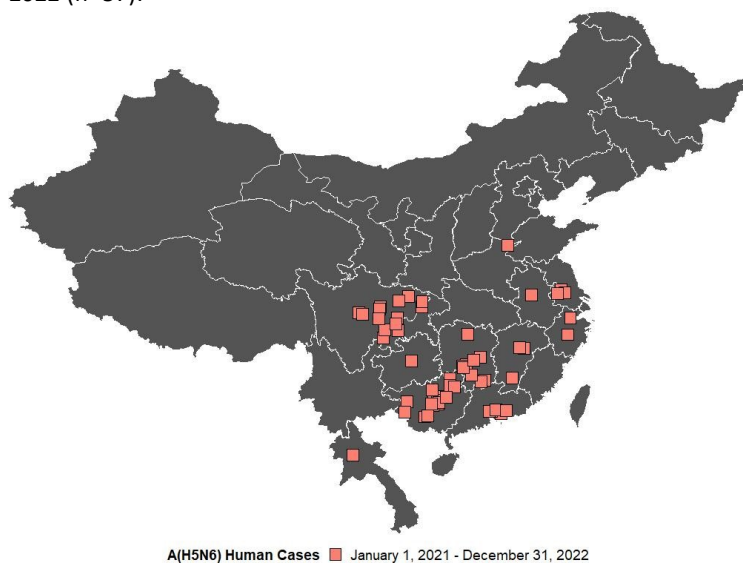
Note: Map was prepared by the Centre for Immunization and Respiratory Infectious Diseases (CIRID) using data from the latest WHO Event Information Site (EIS) postings. This map reflects data available through these publications as of December 31, 2022.

Figure 2. Temporal distribution of human cases of A(H5N6) influenza reported globally, by month, January 1, 2021 to December 31, 2022 (n=57).



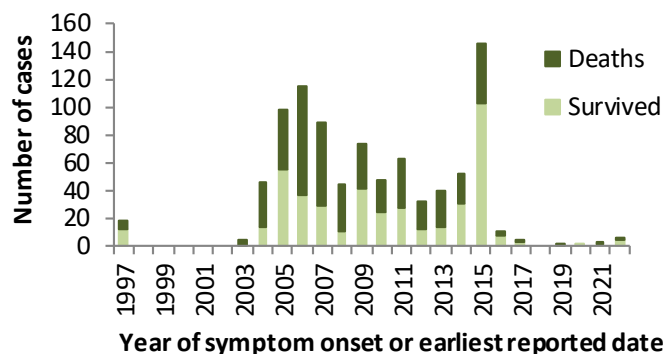
Note: Graph was prepared by the Centre for Immunization and Respiratory Infectious Diseases (CIRID) using data from the WHO EIS postings and the Hong Kong Centre for Health Protection (CHP) press releases. This graph reflects data available as of December 31, 2022.

Figure 3. Spatial distribution of human cases of A(H5N6) influenza reported in China and Lao PDR from January 1, 2021, to December 31, 2022 (n=57).



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 December 31, 2022.

Figure 4. Temporal distribution of human cases of A(H5N1) influenza reported globally, by year, January 1, 1997 to December 31, 2022 (n=886).



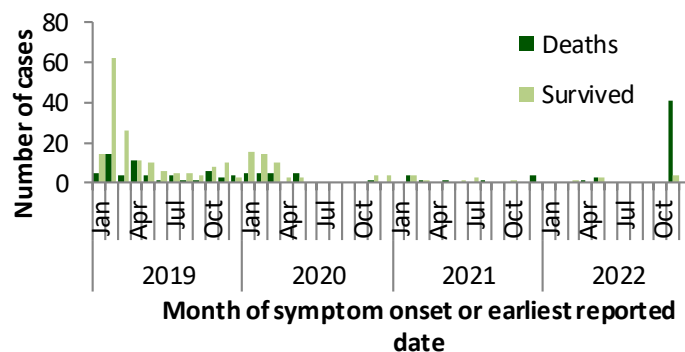
Note: Graph was prepared by the Centre for Immunization and Respiratory Infectious Diseases (CIRID) using data from the WHO EIS postings, the US CDC's Health Alert Network (HAN), and WHO cumulative case counts. This graph reflects data available as of December 31, 2022.

MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS (MERS-COV) UPDATE

One (1) new human case of MERS-CoV was reported in December 2022 from Saudi Arabia. No additional case details were reported.

According to the WHO, 2,601 laboratory-confirmed cases of MERS-CoV, including 935 deaths, have been reported globally since reporting began in 2012 (CFR: 36%). Seven (7) MERS-CoV cases have been reported worldwide to the WHO in 2022. 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 December 31, 2022 (n=319).



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 December 31, 2022. 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.