



HUMAN EMERGING RESPIRATORY PATHOGENS BULLETIN

MONTHLY SITUATIONAL ANALYSIS OF EMERGING RESPIRATORY DISEASES AFFECTING HUMANS

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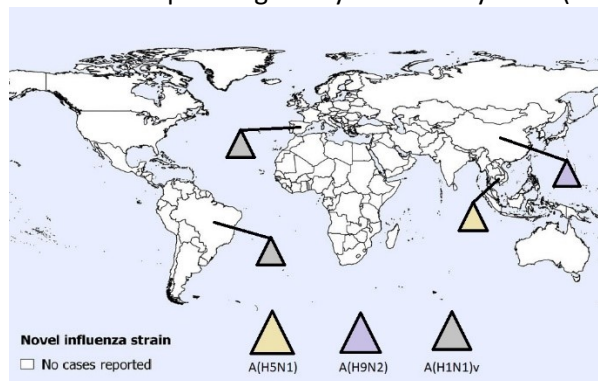
The Human Emerging Respiratory Pathogens (HERP) Bulletin is a monthly publication developed by the Public Health Agency of Canada (PHAC)'s Centre for Emerging and Respiratory Infections and Pandemic Preparedness (CERIPP). The HERP Bulletin serves as a mechanism for information sharing on summary surveillance 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), Middle East Respiratory Syndrome Coronavirus (MERS-CoV), and other ad-hoc emerging respiratory pathogens.

MONTHLY HIGHLIGHTS

During the month of February 2024, the following human cases have been reported (Figure 1):

- Three new human cases of avian influenza [A\(H5N1\)](#)
- One new human case of avian influenza [A\(H9N2\)](#)
- Two new human cases of swine origin influenza [A\(H1N1\)v](#)
- One new human case of MERS-CoV

Figure 1. Spatial distribution of human cases of avian and swine influenza reported globally in February 2024 (n=6).



Note: Map was prepared by CERIPP using data from the latest WHO Event Information Site (EIS) postings. This map reflects data available through these publications as of February 29, 2024.

UPDATE ON HUMAN EMERGING RESPIRATORY PATHOGEN PUBLIC HEALTH EVENTS (AS OF FEBRUARY 29, 2024)¹

NOVEL INFLUENZA ¹	[N CUMULATIVE CASES ² (DEATHS), CFR% ³]	DATE OF LAST REPORT ⁴
Avian Influenza		
A(H1N2) ⁵	[2 (0), 0%]	January 2019
A(H3N8)	[3 (1), 33%]	March 2023
A(H5N1)	[905 (468), 52%]	February 2024
A(H5N6)	[90 (35), 39%]	January 2024
A(H5N8)	[7 (0), 0%]	February 2021
A(H7N4)	[1 (0), 0%]	February 2018
A(H7N9)	[1,568 (615), 39%]	April 2019
A(H9N2)	[123 (2), 2%]	February 2024
A(H10N3)	[2 (0), 0%]	September 2022
A(H10N5)	[1 (1), 100%]	January 2024
Swine Influenza		
A(H1N1)v	[48 (1), 2%]	February 2024
A(H1N2)v	[51 (0), 0%]	November 2023
A(H3NX)v ⁶	[1 (0), 0%]	August 2023
A(H3N2)v	[446 (1), <1%]	November 2022
A(H1NX)v ⁷	[1 (1), 100%]	November 2021
Eurasian avian-like A(H1N1)v	[11 (0), 0%]	September 2023
MERS-CoV¹		
Global Case Count ⁸	[2,609 (939), 36%]	February 2024
- Within Saudi Arabia ⁹	[2,200 (858), 39%]	February 2024

¹**Date 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. A(H10N5): January 2024.

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



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³**Case 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.

⁴**Date of Last Report:** the month and year in which at least one human case of the corresponding pathogen was previously reported.

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

⁶**A(H3NX)v:** virus is a novel influenza A(H3) virus with pending, inconclusive, or undetermined neuraminidase results.

⁷**A(H1NX)v:** virus is a novel influenza A(H1) virus with pending, inconclusive, or undetermined neuraminidase results.

⁸**Global 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).

⁹**Saudi 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(H5N1)

Three new human cases of avian influenza A(H5N1) were reported in February 2024 from Cambodia.

The first case was a 9-year-old boy from Kapo 1 Village, Or Russey Commune, Kratie City, Kratie Province, Cambodia. The case had developed symptoms of fever, shortness of breath, cough and fainting on January 31, 2024, was hospitalized on February 5, 2024, and died on February 8, 2024.

The second case was a 16-year-old male, identified on February 11, 2024 as a close contact of the 9-year-old boy, the first case. The case was asymptomatic however, he was admitted to hospital for monitoring and treatment and was in isolation at home at the time of last report.

The first (9-year-old boy) and second (16-year-old boy) cases are siblings; dead poultry was brought from the household of the first case to the household of the second case, and both siblings were exposed. The chicken was cooked and consumed by both siblings. Based on available information, human-to-human transmission cannot be excluded; however, no further suspected cases or evidence of sustained human-to-human transmission was found.

The third case was a 17-year-old female residing in Kampot province, Cambodia. The case developed fever, cough, tiredness, and difficulty breathing on an unknown date. At

the time of report, the case was in intensive care. There was reported exposure to 7 dead chickens approximately 5 days prior to illness onset.

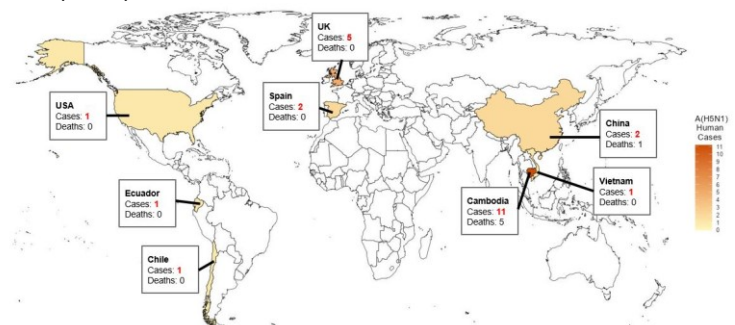
In 2024, 5 human cases of avian influenza A(H5N1) have been detected worldwide, all from Cambodia. Since 2022, 24 human cases of A(H5N1) have been reported worldwide (2022: n=6, 2023: n=13, 2024: n=5) in Cambodia (11), Chile (1), China (2), Ecuador (1), Spain (2), United Kingdom (5), United States (1), Vietnam (1) (Figure 2). Of these cases, 13 (including 1 death) belonged to clade 2.3.4.4b, 9 cases (including 5 deaths) all from Cambodia belonged to clade 2.3.2.1c and 2 are pending.

The A(H5N1) clade 2.3.2.1c detected in Cambodia is different from the clade A(H5N1) 2.3.4.4b that is predominantly circulating worldwide including in Canada.

Since the emergence of A(H5N1) in humans in 1997, 905 human cases of A(H5N1) have been reported globally, with a CFR of 52% (Figure 3).

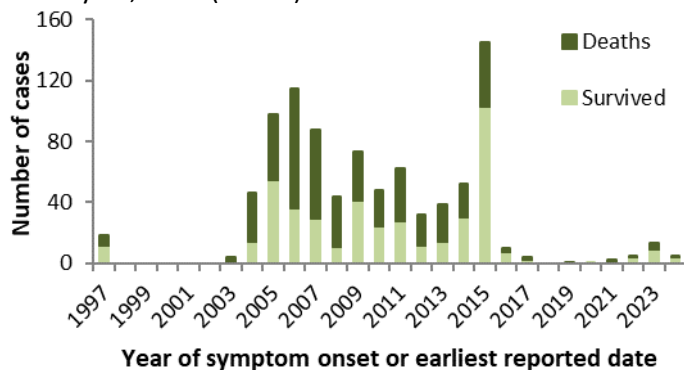
In Canada, A(H5N1) detections associated with the current 2021-2024 A(H5N1) clade 2.3.4.4b epizootic have been reported in domestic, backyard, and wild bird populations, as well as other animal species. No domestically acquired human A(H5N1) infections have been reported in Canada. In 2014, Canada (Alberta) reported a single fatal case of A(H5N1) in a resident returning from travel in China.

Figure 2. Spatial distribution of human cases of A(H5N1) influenza reported globally from January 1, 2022, to February 29, 2024 (n=24).



Note: Map was prepared by CERIPP using data from the WHO EIS postings, the US CDC's Health Alert Network (HAN), and WHO cumulative case counts. This map reflects data available as of February 29, 2024.

Figure 3. Temporal distribution of human cases of A(H5N1) influenza reported globally, by year, January 1, 1997, to February 29, 2024 (n=905).



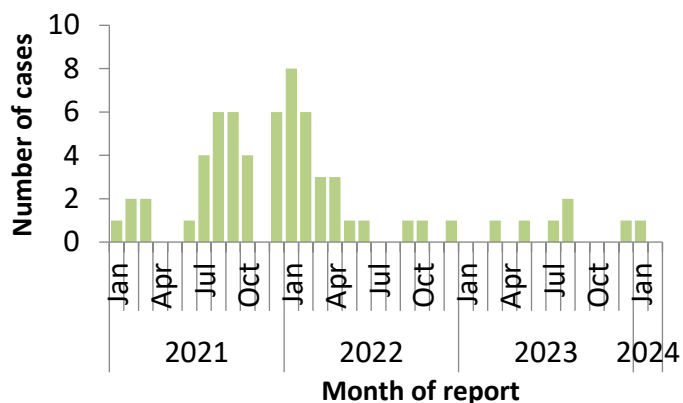
Note: Graph was prepared by CERIPP using data from the WHO EIS postings, the US CDC’s Health Alert Network (HAN), and WHO cumulative case counts. This graph reflects data available as of February 29, 2024.

AVIAN INFLUENZA A(H5N6)

The most recent human case of avian influenza A(H5N6) was reported in January 2024 from China.

In 2024, 1 human case of avian influenza A(H5N6) was detected worldwide. In 2023, 6 human cases of avian influenza A(H5N6) were detected, all in China. Since January 2021, 64 cases of avian influenza A(H5N6) have been reported globally (2021: n=32, 2022: n=25, 2023: n=5, 2024: n=1) (Figure 4); the majority of cases (63) were reported from China and one case was reported from Lao PDR (Figure 4). Since the emergence of this virus in 2014, a total of 90 laboratory-confirmed human cases of avian influenza A(H5N6), including at least 35 deaths, have been reported globally (CFR: 39%). No cases have been reported in Canada.

Figure 4. Temporal distribution of human cases of A(H5N6) influenza reported globally, by month, January 1, 2021, to February 29, 2024 (n=64).



Note: Graph was prepared by CERIPP 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 February 29, 2024.

AVIAN INFLUENZA A(H9N2)

One new human case of avian influenza A(H9N2) was reported in February 2024 from China.

The case was a 22 month-old girl who developed symptoms of fever and cough with sputum on February 15, 2024 and visited a medical facility the next day with no required hospitalization. Infection with A(H9N2) was confirmed on February 23, 2024 and the virus was found to be sensitive to the antiviral Tamiflu. The case has since recovered. The case visited Zhongshan, Guangdong Province during the incubation period. She had no reported direct contact with poultry recently, had not consumed undercooked poultry, nor had any contact with patients. One household contact developed a sore throat on February 17, 2024, although this symptom subsided after taking medication and tested negative for Influenza A. The case's other household contacts are asymptomatic.

This case marks the first reported human case of avian influenza A(H9N2) in 2024. In 2023, a total of 15 human cases of avian influenza A(H9N2) were reported globally, all in China. Since the emergence of avian influenza A(H9N2) in the human population in 1998, 123 cases have been reported worldwide, with a CFR of 2%. No cases have been reported in Canada.

SWINE INFLUENZA UPDATES

SWINE ORIGIN INFLUENZA A(H1N1)v

Two new human cases of swine origin influenza A(H1N1)v were reported in February 2024 from Brazil and Spain.

The first case was a 49-year old male with underlying conditions from Toledo, Paraná, Brazil. The case developed symptoms of fever, headache, cough, adynamia, odynophagia, dyspnea and asthenia on December 12, 2023, was hospitalized on December 16, 2023 and was discharged after fully recovering on December 18, 2023. The case did not receive antiviral treatment nor the seasonal influenza vaccine in 2023 and has no history of exposure to pigs. No close contacts of the case were identified. On January 15, 2024, the results confirmed infection with A(H1N1)v. According to the sequencing results, reported by the WHO “the virus shares 99% similarity with the A/Paraná/ virus 20675/2022 (A/H1N1 pdm09) previously detected in the city of Toledo-Paraná in October 2022. The segments PB2, PB1, PA, NA, and MP corresponded to the virus A/Paraná/10835/2021 (A/H1N1 pdm09) also reported in the city of Toledo and the NP and NS segments corresponded to the virus A/Paraná/44706/2022 (A/H3N2v) reported in the city of Santa Helena, also in the state of Paraná. A second HA result, however, showed 95% similarity to viruses collected from Brazil's swine in March of 2015 (A/swine/Brazil/EMBRAPA-35152/2015)” ([WHO](#)).

The second case was a 33-year old male pig farm worker with no underlying conditions from Catalonia, Lleida, Spain. The case developed symptoms of cough with muco-purulent expectoration, fever, malaise, and myalgia on November 25, 2023 and was diagnosed with bronchitis. The case was treated with bronchodilators and oral corticosteroids but did not receive antiviral treatment. On December 14, 2023, the results confirmed infection with A(H1N1)v catalogued as A/Catalonia/NSAV198289092/2023 (GISAID accession: EPI_ISL_18782577). A sample was sent for confirmation to the National Institute of Microbiology and the virus isolate will be shared with the WHO Collaborating Centre, results are not yet available. The case has since recovered. To date, no new cases have been detected among close contacts or co-workers on the farm through the epidemiological investigation.

In 2024, 2 human cases of swine origin influenza A(H1N1)v has been detected worldwide. There have been 5 human A(H1N1)v cases reported worldwide in 2023 in Brazil (1),

China (2), Spain (1) and Switzerland (1). A total of 48 human cases of A(H1N1)v have been reported globally since 2005, with a 2% CFR. Two A(H1N1)v detections have been reported in Canadian residents since reporting began in 2005, with the first case reported in Ontario in September 2012 and the second case reported in Manitoba in April 2021 (see [HERP Bulletin no 52](#)).

SWINE ORIGIN INFLUENZA A(H1N2)v

The most recent human case of swine origin influenza A(H1N2)v was reported in November 2023 from the United Kingdom (UK).

To date, no human cases of swine origin influenza A(H1N2)v have been reported in 2024. In 2023, 4 human swine origin influenza A(H1N2)v cases were reported worldwide in Taiwan (1), the UK (1), and the United States (2). A total of 50 human cases of swine origin influenza A(H1N2)v have been reported globally since 2005, with a 0% CFR. Three swine origin influenza A(H1N2)v detections have been reported in Canadian residents since reporting began in 2005. The first case was reported in Alberta in October 2020 (see [HERP Bulletin no 46](#)), the second case was reported in Manitoba in April 2021 (see [HERP Bulletin no 52](#)) and the latest case in Canada was reported in November 2021 in Manitoba (see [HERP Bulletin no 59](#)).

SWINE ORIGIN INFLUENZA A(H3N2/H3NX)v

The most recent human case of swine origin influenza A(H3N2)v was reported in November 2022 from the United States. The most recent human case of swine origin influenza A(H3NX)v was reported in August 2023 from the United States.

To date, no human cases of swine origin influenza A(H3N2)v have been reported worldwide in 2024. Excluding the reported case of A(H3NX)v in the United States (1), no cases of swine origin influenza A(H3N2)v were detected in 2023. Globally, 446 swine origin influenza A(H3N2)v cases have been reported since 2005, with <1% CFR. Two swine origin influenza A(H3N2)v detections have been reported in Canadian residents since reporting began in 2005, with the latest case reported in June 2021 (see [HERP Bulletin no 54](#)).

MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS (MERS-COV) UPDATE

One new human case and details on three previously reported cases of MERS-CoV were reported in February 2024 from Saudi Arabia.

The first case was a 59-year-old female Saudi national, non-healthcare worker (housewife), in Eastern Region. She developed a fever, cough, sore throat, and shortness of breath on September 30, 2023. She was admitted to hospital on October 5, 2023, and was diagnosed with pneumonia. The case was discharged on November 12, 2023. She had multiple comorbidities: diabetes mellitus, asthma, and leukemia. There was no clear history of exposure to known risk factors. Follow-up for 16 household contacts and 29 healthcare workers was completed, and no secondary cases were identified.

The second case was a 93-year-old female Saudi national, non-healthcare worker, living in Qassim Region. She developed a fever, sore throat, confusion, and decreased consciousness on September 15, 2023. The case was admitted to hospital in Qaseem on September 23, 2023, and referred to a hospital in Riyadh on September 25, 2023, for treatment of her chronic conditions and was diagnosed with pneumonia. She was admitted to the intensive care unit (ICU) in critical condition on September 25, 2023. The case died on October 19, 2023. She had a history of diabetes mellitus and liver disease. There was no clear history of exposure to known risk factors. Follow-up for 5 household contacts and 43 healthcare workers was completed, with no secondary cases identified.

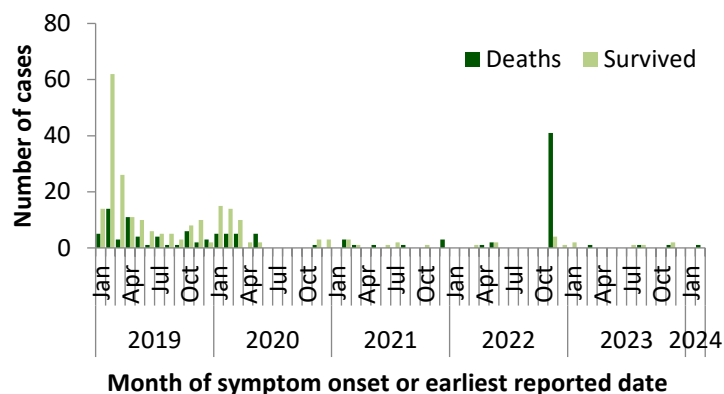
The third case was a 79-year-old male, Saudi national, non-healthcare worker living in Riyadh Region. He developed a fever, cough, and shortness of breath on September 27, 2023. He was hospitalized and admitted to the ICU on September 29, 2023, and was diagnosed with pneumonia. The case was discharged from hospital on November 12, 2023. Comorbidities included diabetes mellitus and chronic obstructive pulmonary disease. The case had no direct contact with camels, but he did have contact with his brother, who is a camel owner. The case's brother was asymptomatic and tested negative for MERS-CoV (however, this test was performed more than 10 days after the positive case confirmation). In total, 5 household contacts and 14 healthcare workers completed follow-up, with no secondary

cases identified. The camels owned by the case's brother were asymptomatic and no laboratory results were shared.

The fourth case was a 66-year-old male Saudi national, non-healthcare worker living in Riyadh Region. He developed a fever, cough, and shortness of breath on October 26, 2023. The case was admitted to the ICU in Riyadh on November 8, 2023, and was diagnosed with pneumonia. He died on December 24, 2023. The case had asthma as a comorbidity. He had a history of direct contact with camels as he was a camel owner. In total, a follow-up of 16 household contacts and 34 healthcare workers was completed, with no secondary cases identified. The camels were asymptomatic, and no laboratory results were shared.

To date, one new human case of MERS-CoV and one new fatality has been reported in 2024. In 2023, 10 cases of MERS-CoV were reported in Oman (1), Saudi Arabia (8), and the United Arab Emirates (1). According to the WHO, 2,609 laboratory-confirmed cases of MERS-CoV, including 939 deaths, have been reported globally since reporting began in 2012 (CFR: 36%) (Figure 5). 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 February 29, 2024 (n=330).



Note: Graph was prepared by CERIPP using data from the WHO Disease Outbreak News (DON) and Saudi Arabia’s Ministry of Health. This graph reflects data available as of February 29, 2024. The data integrates CERIPP real-time reporting with WHO DON retrospective reporting of MERS-CoV cases and deaths. In November 2022, the WHO published a 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. In August 2023, the WHO published a DON article with case information for three retrospective MERS-CoV cases and two deaths. These three cases and one death were already reflected in the cumulative case count of the DON article published in July 2023, as well as the case totals published in [HERP Bulletin no 79](#).