



HUMAN EMERGING RESPIRATORY PATHOGENS BULLETIN

MONTHLY SITUATIONAL ANALYSIS OF EMERGING RESPIRATORY DISEASES AFFECTING HUMANS

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IN THIS BULLETIN

1. Avian influenza updates
2. Swine-origin influenza updates
3. MERS-CoV update

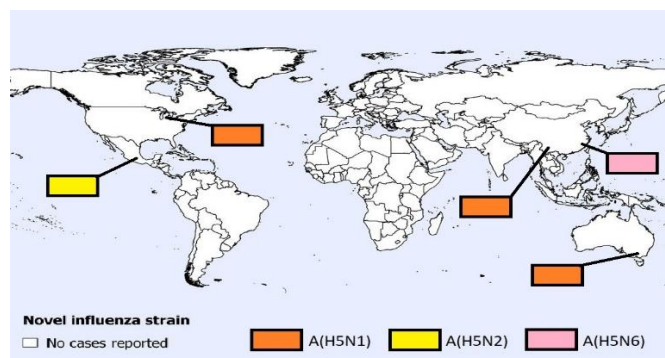
The Human Emerging Respiratory Pathogens (HERP) Bulletin is a monthly publication developed by the Public Health Agency of Canada (PHAC)'s Centre for Emerging and Respiratory Infections and Pandemic Preparedness (CERIPP). The HERP Bulletin serves as a mechanism for information sharing on summary surveillance 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 May 2024, the following human cases have been reported (Figure 1):

- Four new human cases of [A\(H5N1\)](#)
- One new human case of [A\(H5N2\)](#)
- One new human case of [A\(H5N6\)](#)
- Four new human cases of [MERS-CoV](#)

Figure 1. Spatial distribution of human cases of avian and swine influenza reported globally in May 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 May 31, 2024.



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UPDATE ON HUMAN EMERGING RESPIRATORY PATHOGEN PUBLIC HEALTH EVENTS (AS OF MAY 31, 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)	[911 (469), 52%]	May 2024
A(H5N2)	[1(1), 100%]	May 2024
A(H5N6)	[91 (36), 39%]	May 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)	[128 (2), 2%]	April 2024
A(H10N3)	[3 (0), 0%]	April 2024
A(H10N5)	[1 (1), 100%]	January 2024
Swine Influenza		
A(H1N1)v	[48 (1), 2%]	February 2024
A(H1N2)v	[52 (0), 0%]	March 2024
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	[2,613 (941), 36%]	May 2024
- Within Saudi Arabia ⁹	[2,204 (860), 39%]	May 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. A(H5N2): May 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).

Canada

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)

Four new human cases of avian influenza A(H5N1) were reported in May 2024 from China (1), Australia (1), and the United States (2).

One travel associated case was detected in China. The case was a 33-year-old female port cargo delivery worker who tested positive for A(H5N1) via random testing by the Chinese Department of Customs in Guangxi province on May 28, 2024. The case returned to Vietnam the same day, where she tested negative for H5N1, COVID-19, RSV and influenza A and B at a health clinic. The case lives in Vietnam and reported illness onset on March 26, 2024. Cough was the only sign of infection. Prior to illness onset, she purchased poultry from a local market in Vietnam, and cooked and consumed it with her family at their residence. Close contacts were monitored for 21 days and no additional cases were identified. There was no evidence of human-to-human transmission.

Considering the variation in test results, an investigation by the WHO is underway to confirm the result.

The second case was a 2-year-old female from Victoria, Australia, who acquired the infection while travelling to India from February 12 to February 29, 2024. The case developed lower respiratory symptoms, loss of appetite, irritability, and fever when she was still in India on February 25, 2024. Upon return to Australia on March 1, 2024, the case was hospitalized and admitted to the intensive care unit (ICU), where she was intubated for one week. The case was discharged from the hospital after 2.5 weeks and has since fully recovered. The case did not have known exposure to sick persons or animals while in India. No secondary cases were

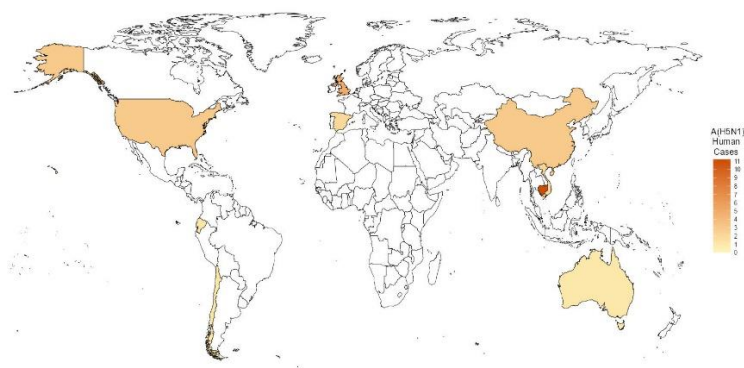
identified. This case was infected with an A(H5N1) virus from clade 2.3.2.1a, which has been previously detected in both humans and poultry in India. This clade is different from the clade circulating worldwide including in Canada (clade 2.3.4.4b), and from the clade detected in Cambodia (2.3.2.1c) since the start of this recent outbreak in December 2021.

Two human cases of avian influenza A(H5N1) were reported from Michigan on May 22 and May 31, 2024 respectively. Both cases were >18 years of age and were workers on two different commercial dairy farms. The cases were not related to each other. The first case was male, and the sex of the second case is unknown. The first case developed conjunctivitis as their only symptom of infection. The second case reported respiratory symptoms, sore throat, fatigue, and eye symptoms. These cases were not hospitalized and received antivirals. The first case has since recovered and the second case was recovering as of the time of last report. For the first case, only the conjunctival specimen tested positive for A(H5N1). While for the second case, only the nasopharyngeal specimen tested positive. The viruses from the two cases belong to the clade 2.3.4.4.b. No secondary cases or symptomatic individuals associated with these two cases have been identified. No human-to-human transmission has been detected. Neither case was wearing full personal protective equipment while working directly with infected dairy cows. These are the second and third human cases with probable cow-to-human transmission associated with the ongoing multistate outbreak of HPAI A(H5N1) in dairy cows in the US. The first reported case was from Texas in April 2024 (see [HERP Bulletin no 88](#)).

In 2024, 11 human cases of avian influenza A(H5N1) have been detected worldwide, from Cambodia (5), the United States (3), Vietnam (1), China (1), and Australia (1). Since 2022, 30 human cases of A(H5N1) have been reported worldwide (2022: n=6, 2023: n=13, 2024: n=11) in Australia (1), Cambodia (11), Chile (1), China (3), Ecuador (1), Spain (2), United Kingdom (5), United States (4), and Vietnam (2) (Figure 2). Of these cases, 15 of the viruses belong to the same strain of A(H5N1) that is associated with the current global outbreak in animals (clade 2.3.4.4b), 1 is tentatively from this same strain, 10 cases were infected with viruses that belonged to a different strain of A(H5N1) (clade 2.3.2.1c), and 1 is from clade 2.3.2.1a. The clade details of two cases from Cambodia and the travel-related case from China are unknown.

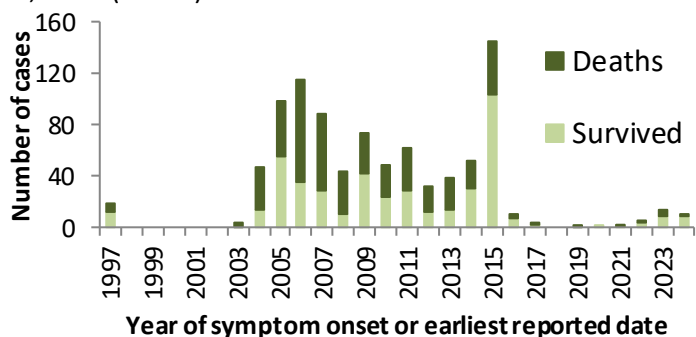
Since the emergence of A(H5N1) in humans in 1997, 911 human cases of A(H5N1) have been reported globally, with a CFR of 52% (Figure 3). In Canada, A(H5N1) detections associated with the current 2021-2024 A(H5N1) clade 2.3.4.4b epizootic have been reported in domestic, backyard, and wild bird populations, as well as other animal species. HPAI A(H5N1) has not been detected in dairy cattle or other livestock in Canada. 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.

Figure 2. Spatial distribution of human cases of A(H5N1) influenza reported globally from January 1, 2022, to May 31, 2024 (n=30).



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 May 31, 2024.

Figure 3. Temporal distribution of human cases of A(H5N1) influenza reported globally, by year, January 1, 1997, to May 31, 2024 (n=911).



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 May 31, 2024.

AVIAN INFLUENZA A(H5N2)

One new human case of avian influenza A(H5N2) was reported in May 2024 from Mexico.

The case was a 59-year-old male residing in Mexico who worked as a trader in fixed and mobile markets. He developed fever, dyspnea, diarrhea, nausea, general malaise, and abdominal and lumbar pain on April 17, 2024. The case reported multiple chronic comorbidities and had been bedridden for 3 weeks prior to symptom onset. The case was hospitalized on April 24, 2024 and died on the same day. The source of exposure is currently unknown and is still under investigation. No household contacts of the case reported symptoms of illness; however, no samples were collected during contact follow-up. The 16 contacts at the hospital where the case died remained asymptomatic. Twelve additional close contacts were identified (7 symptomatic and 5 asymptomatic), and all tested negative for SARS-CoV-2, influenza A and influenza B. No secondary cases have been identified.

This is the first human case of avian influenza A(H5N2) reported worldwide. Since only one human case has been reported to date, the full spectrum of disease is unknown.

AVIAN INFLUENZA A(H5N6)

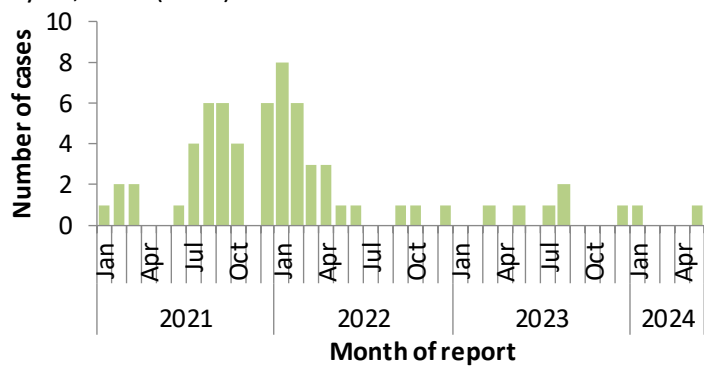
One new human case of avian influenza A(H5N6) was reported in May 2024 from China.

The case was a 52-year-old female labor worker from Fujian province who developed symptoms of fever and shortness of breath on April 13, 2024. She had no underlying medical conditions. She was admitted to the ICU on April 22, 2024, with severe pneumonia and received antiviral treatment. The case died on April 30, 2024.

In 2024, two human cases of avian influenza A(H5N6) were detected in China. In 2023, six human cases of avian influenza A(H5N6) were detected, all in China. Since January 2021, 65 cases of avian influenza A(H5N6) have been reported globally (2021: n=32, 2022: n=25, 2023: n=5, 2024: n=2) (Figure 4); the majority of cases (64) 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 91

laboratory-confirmed human cases of avian influenza A(H5N6), including at least 36 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 May 31, 2024 (n=65).



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 May 31, 2024.

AVIAN INFLUENZA A(H9N2)

The most recent human case of avian influenza A(H9N2) was reported in April 2024 from Vietnam.

In 2024, six human cases of avian influenza A(H9N2) have been reported worldwide, from China (5) and Vietnam (1). 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, 128 cases have been reported worldwide, with a CFR of 2%. No cases have been reported in Canada.

AVIAN INFLUENZA A(H10N3)

The most recent human case of avian influenza A(H10N3) was reported in April 2024 from China.

In 2024, one human case of avian influenza A(H10N3) has been reported worldwide. Since the emergence of avian influenza A(H10N3) in humans in 2021, three human cases have been reported, all from China, with a CFR of 0%. However, with only three human cases reported to date, the full spectrum of disease is highly uncertain. No cases have been reported in Canada.

SWINE INFLUENZA UPDATES

SWINE ORIGIN INFLUENZA A(H1N1)v

The most recent human cases of swine origin influenza A(H1N1)v were reported in February 2024 from Brazil (1) and Spain (1).

In 2024, two human cases of swine origin influenza A(H1N1)v were detected worldwide. There have been five 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 March 2024 from the United States.

In 2024, one human case of swine origin influenza was detected worldwide. In 2023, four 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 52 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

A cluster of three new human cases of MERS-CoV and one unrelated fatal case were reported in May 2024 from Saudi Arabia.

The cases associated with the hospital cluster were between 56-60 years old. All the cases were male, non-healthcare workers, and all resided in Riyadh, Saudi Arabia. All three cases reported multiple chronic comorbidities. The first (index) case experienced symptoms of illness on March 29, 2024, and was hospitalized on April 4, 2024. He had no clear exposure to known risk factors. This case was admitted to the ICU and died on April 7, 2024. Two secondary cases were identified after contact tracing.

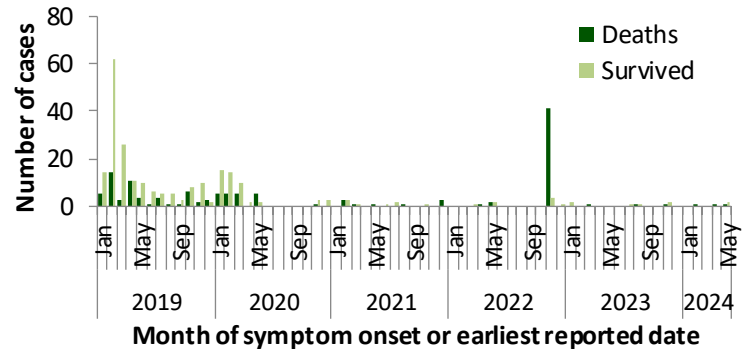
The second case was hospitalized on March 8, 2024, prior to exposure to the index case. He was exposed to the index case on April 4, 2024 in the hospital ward and developed a fever on April 6, 2024. The second case was subsequently admitted to the ICU and intubated on April 9, 2024. The third case was exposed to the index case in the hospital emergency room on April 4, 2024. The third case developed shortness of breath on April 15, 2024. He was subsequently admitted to the ICU and intubated on April 18, 2024. The second and third cases had no history of exposure to camels, and are believed to be secondary healthcare-associated infection cases. As of April 21, 2024, the second and third cases were still in the ICU. No onward human transmission was identified.

One additional fatal human case was also reported in May 2024. This case is not epidemiologically linked to the MERS-CoV hospital cluster. The case was a 32-year-old male with comorbidities from Taif, Saudi Arabia, who had an illness onset date of January 21, 2024. The case died on February 17, 2024. He reported direct exposure to camels prior to illness onset.

To date, five new human cases of MERS-CoV have been reported in 2024, all from Saudi Arabia. In 2023, ten cases of MERS-CoV were reported in Oman (1), Saudi Arabia (8), and the United Arab Emirates (1). According to the WHO, 2,613

laboratory-confirmed cases of MERS-CoV, including 941 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 May 31, 2024 (n=334).



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 May 31, 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](#). In May 2024, the WHO published a DON article with case information for one single, fatal case of MERS-CoV. This fatal case was already reflected in the case totals published in [HERP Bulletin no 88](#).