



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, including domestic, 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

EVENTS IN CANADA

No human cases of emerging respiratory infection have been detected in Canada since the last detection in July 2024 (see [HERP Bulletin no 91](#)).

INTERNATIONAL EVENTS

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

- One new human case of avian influenza [A\(H5N1\)](#)
- Two new human cases of avian influenza [A\(H9N2\)](#)
- Two new human cases of swine influenza [A\(H3N2\)v](#)
- One new human case of [MERS-CoV](#)

UPDATE ON HUMAN EMERGING RESPIRATORY PATHOGEN PUBLIC HEALTH EVENTS (AS OF SEPTEMBER 30, 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(H5NX) ⁶	[1 (0), 0%]	July 2024
A(H5N1)	[926 (470), 51%]	September 2024
A(H5N2)	[1(1), 100%]	May 2024
A(H5N6)	[93 (57), 61%]	July 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)	[133 (2), 2%]	September 2024
A(H10N3)	[3 (0), 0%]	April 2024
A(H10N5)	[1 (1), 100%]	January 2024
Swine Influenza		
A(H1N1)v	[50 (2), 4%]	August 2024
A(H1N2)v	[55 (0), 0%]	August 2024
A(H3NX)v ⁷	[1 (0), 0%]	August 2023
A(H3N2)v	[451 (1), <1%]	September 2024
A(H1NX)v ⁸	[1 (1), 100%]	November 2021
Eurasian avian-like A(H1N1)v	[11 (0), 0%]	September 2023
MERS-CoV¹		
Global Case Count ⁹	[2,614 (943), 36%]	September 2024
- Within Saudi Arabia ¹⁰	[2,205 (863), 39%]	September 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: 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. A(H5NX): July 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).



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(H5NX):** virus is a novel influenza A(H3) virus with pending, inconclusive, or undetermined neuraminidase results.

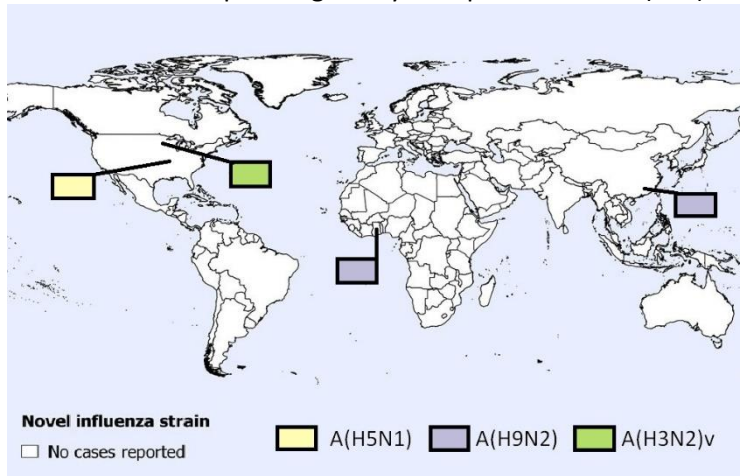
⁷**A(H3NX)v:** virus is a novel influenza A(H3) virus with pending, inconclusive, or undetermined neuraminidase results.

⁸**A(H1NX)v:** virus is a novel influenza A(H1) virus with pending, inconclusive, or undetermined neuraminidase results.

⁹**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).

¹⁰**Saudi Arabia:** cumulative case count and deaths due to MERS-CoV in Saudi Arabia reflect retrospective updates provided in the WHO DON.

Figure 1. Spatial distribution of human cases of avian and swine influenza reported globally in September 2024 (n=5).



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 September 30, 2024.

AVIAN INFLUENZA UPDATES

AVIAN INFLUENZA A(H5N1)

One new human case of avian influenza A(H5N1) was reported in September 2024 from the US in Missouri.

The case was >18 years old with significant underlying medical conditions and developed chest pain, nausea, vomiting, diarrhea and weakness on August 20, 2024. The case was hospitalized on August 22, 2024, was treated with influenza antiviral medications, subsequently discharged, and has recovered. The case was not admitted to the intensive care unit (ICU).

This A(H5N1) case was the first in the US to be identified through the country's national seasonal flu surveillance system and not via H5-specific outbreak surveillance. Seven symptomatic close contacts were identified, one household contact and six health care workers contacts while the case was hospitalized. The household contact had onset of cough and tiredness on August 20, 2024, and recovered without seeking medical care. According to the US CDC, the household contact was ill at the same time as the case, which suggests a common exposure rather than human-to-human transmission. He was not tested by PCR but was offered serology testing. The second close contact was a health care worker with an unknown illness onset date. This close contact developed mild symptoms and tested negative for influenza by PCR. The third close contact was also a healthcare worker and developed mild respiratory symptoms. This third contact was not tested for influenza as the illness resolved before the investigation began. Serologic testing was offered for this contact.

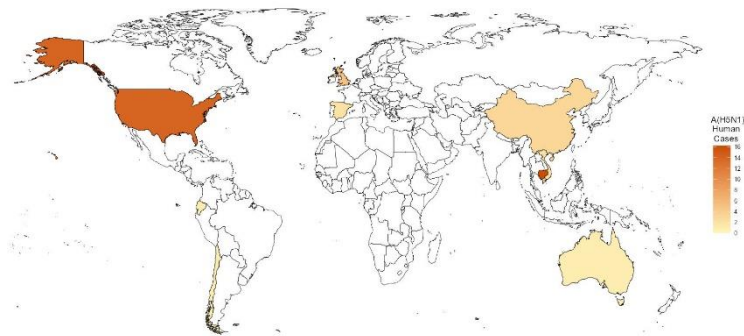
On September 27, 2024, four additional health care worker contacts who developed mild respiratory symptoms were identified. They were not tested by PCR but their serology test results are pending. No additional human cases have been identified. There is no immediate known animal exposure. There is currently no evidence of human-to-human transmission.

In 2024, 26 human cases of avian influenza A(H5N1) have been detected worldwide, from Australia (1), Cambodia (10), China (1), the United States (13), and Vietnam (1). This case count does not include one A(H5NX) human case in the US (1) that the US CDC was not able to determine the neuraminidase (NA) subtype of. Since the start of the ongoing A(H5N1) worldwide outbreak in poultry and other animals in December 2021, 45 human cases of A(H5N1) have been reported worldwide (2022: n=6, 2023: n=13, 2024: n=26) in Australia (1), Cambodia (16), Chile (1), China (3), Ecuador (1), Spain (2), United Kingdom (5), United States (14), and Vietnam (2) (Figure 2). Of these cases, 21 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, 12 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 five cases from Cambodia,

the travel-related case from China, and four cases from the US are unknown.

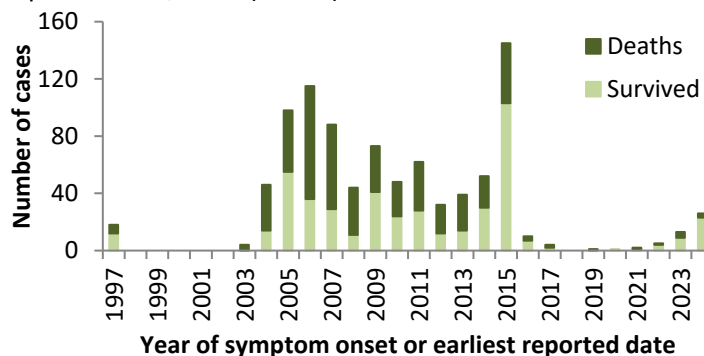
Since the emergence of A(H5N1) in humans in 1997, 926 human cases of A(H5N1) have been reported globally, with a CFR of 51% (Figure 3). In Canada, A(H5N1) detections associated with the current 2021-2024 A(H5N1) clade 2.3.4.4b epizootic have been reported in domestic, backyard, and wild bird populations, as well as other animal species. HPAI A(H5N1) has not been detected in dairy cattle, other livestock in Canada, or in raw milk. 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 September 30, 2024 (n=45).



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 September 30, 2024.

Figure 3. Temporal distribution of human cases of A(H5N1) influenza reported globally, by year, January 1, 1997, to September 30, 2024 (n=926).



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 September 30, 2024.

AVIAN INFLUENZA A(H5N2)

The most recent human case of avian influenza A(H5N2) was reported in May 2024 from Mexico.

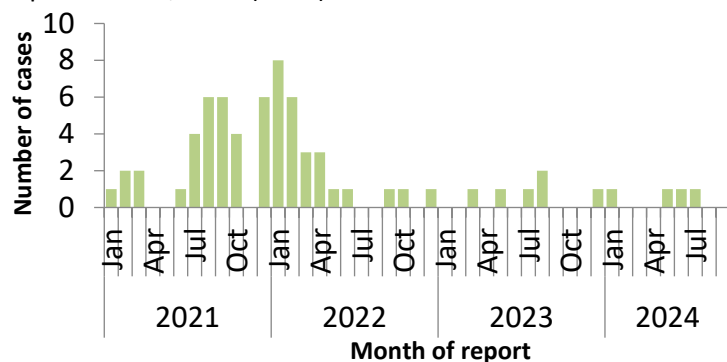
This was the first ever detected human case of A(H5N2). Since only one human case of A(H5N2) has been reported to date and the availability of clinical information is limited, the full spectrum of disease is unknown.

AVIAN INFLUENZA A(H5N6)

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

Since January 2021, 67 cases of avian influenza A(H5N6) have been reported globally (2021: n=32, 2022: n=25, 2023: n=5, 2024: n=4) (Figure 4); all but one case (2021, Lao PDR) were reported in China. Since the emergence of this virus in 2014, a total of 93 laboratory-confirmed human cases of avian influenza A(H5N6), including at least 57 deaths, have been reported globally (CFR: 61%). 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 September 30, 2024 (n=67).



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 September 30, 2024.

AVIAN INFLUENZA A(H9N2)

Two new human cases avian influenza A(H9N2) were reported in September 2024 from China (1) and Ghana (1).

The first case was a 3-year-old female from Guangdong province, China. Her illness onset date was August 12, 2024. On August 19, 2024, the case visited a hospital for treatment for bronchitis with cough but no fever. The case's condition was mild, she was not hospitalized, and recovered. There was no immediate known exposure to live poultry prior to illness onset and the case had no travel history. Twenty-seven close contacts were identified. No additional human cases were detected. Environmental samples from the case's home tested negative for influenza A.

The second case was a child under five years old residing in the Upper East Region of Ghana bordering Burkina Faso. The case developed a sore throat, fever, and cough on May 5, 2024. On May 7, 2024, the case was seen at a local hospital, received a diagnosis of influenza-like illness, and was treated with antipyretics, antihistamines, and antibiotics. The case had no known history of exposure to poultry or any sick person with similar symptoms prior to illness onset. On May 7, 2024, respiratory samples tested positive for seasonal influenza A(H3N2) via PCR. On July 9, genomic sequence analysis indicated an avian influenza A(H9) virus. Subsequently, an aliquot of the sample was sent to the US CDC for additional testing and validation. On August 6, the US CDC confirmed the samples as positive for influenza A(H9N2) virus. Respiratory

samples from close contacts tested negative for influenza. No additional human cases of A(H9N2) have been identified in the community. Illness among poultry has been reported in the Upper East Region, but the cause of the disease in poultry had not been confirmed as of the time of reporting. This is the first human infection with a zoonotic influenza virus reported from Ghana to the WHO.

In 2024, 11 human cases of avian influenza A(H9N2) have been reported worldwide, from China (8), India (1), Vietnam (1), and Ghana (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, 133 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 August 2024 from the US (1) and Vietnam (1).

In 2024, four human cases of swine origin influenza A(H1N1)v have been 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 50 human cases of A(H1N1)v have been reported globally since 2005, with a 4% 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 August 2024 from the US.

In 2024, three human cases of swine origin influenza A(H1N2)v were detected worldwide, all in the United States. 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 55 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

Two new human cases of swine origin influenza A(H3N2)v were reported in September 2024 from the US.

Both cases are <18 years of age and their infections were detected in Minnesota. The two cases sought healthcare during the week ending September 7, 2024. They were not hospitalized and have both recovered from their illness. Both cases (who are not close contacts of one another) attended the same agricultural fair prior to illness onset. The first child had indirect swine contact and the second had direct swine contact. For the first case, a separate, likely unrelated illness was identified in the household. The day after attending the agricultural fair, all household members developed symptoms. One household member was tested but tested positive for SARS-CoV-2. All household members recovered. For the second case, no illness was identified among contacts. No human-to-human transmission of A(H3N2)v associated with either case was identified.

To date, five human cases of swine origin influenza A(H3N2)v have been reported worldwide in 2024, from Canada (1) and the United States (4). 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, 451 swine origin influenza A(H3N2)v cases have been reported since 2005, with <1% CFR. Four human cases of swine origin influenza A(H3N2)v have been reported in Canada since 2005. The first case of A(H3N2)v in Canada was reported in Ontario in 2005. This was

followed by a second case in Ontario in 2016, a third case in Manitoba in June 2021 (see [HERP Bulletin no 54](#)), and a fourth case in Saskatchewan in July 2024 (see [HERP Bulletin no 91](#)).

MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS (MERS-COV) UPDATE

One new human case of MERS-CoV was reported in September 2024 from the Kingdom of Saudi Arabia (KSA).

The case was a 54-year-old male Pakistani national, a non-healthcare worker residing in KSA. The patient had comorbidities including type-II diabetes, hypertension, ischemic heart disease, ischemic cardiomyopathy, and atrial fibrillation. He developed a fever, cough, shortness of breath, and palpitations on August 28, 2024. He was hospitalized on August 31, 2024, as a cardiac case due to ischemic findings on his ECG. On September 1, 2024, he was transferred to a different hospital and diagnosed with pneumonia. A nasopharyngeal swab collected on September 1 was tested for influenza, SARS-CoV-2 and respiratory syncytial virus (RSV). When the specimen result came back negative for all three viruses, the sample was sent for additional MERS-CoV testing. The patient was discharged at his request against medical advice on September 1 before being informed of the lab results with MERS-CoV confirmation. He travelled to Pakistan on September 2, 2024. MERS-CoV positivity was confirmed on September 4. On September 7, 2024, Pakistan health authorities transferred the case to a public hospital for strict isolation and management of his comorbidities. The case was discharged on September 13 after testing negative for MERS CoV with instructions to continue oral medication and return for a follow-up after 5 days. The follow-up was completed on September 19 with the declaration of full recovery.

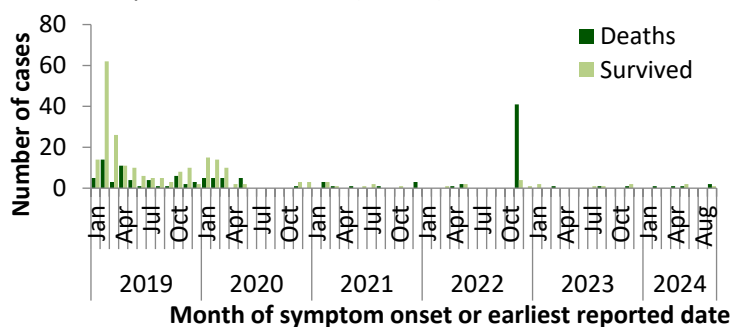
Following a field investigation, there was no evidence of interaction with camels. Follow-up of one household member and 23 healthcare workers from the hospitals and two patients were completed in Saudi Arabia. In Pakistan, close contacts, including family members, travel contacts during transit from Saudi Arabia to Pakistan, and healthcare workers at the public hospital were quarantined for 14 days. No secondary cases have been identified.

On September 5, 2024, the Food and Agriculture Organization of the United Nations reported two new human deaths related to Middle East Respiratory Syndrome Coronavirus (MERS-CoV) in Saudi Arabia. These deaths are

the outcomes of two previously reported cases; however, it is not known which previously reported cases these two fatalities are attributed to. These two new deaths, as well as one additional death to the Saudi Arabia numbers but not the global numbers with no explanation, are reflected in the most recent WHO MERS-CoV numbers.

To date, six 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, 2,614 laboratory-confirmed cases of MERS-CoV, including 943 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 September 30, 2024 (n=335).



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 September 30, 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](#).