SURVEILLANCE REPORT

Zoonotic influenza

Annual Epidemiological Report for 2022

Key facts

- Sporadic human infections with avian influenza virus A(H3N8), A(H5N1), A(H5N6), A(H9N2) and A(H10N3) were reported globally in 2022.
- Outbreaks and detections of highly pathogenic avian influenza viruses, mainly A(H5N1), affected poultry, wild and captive birds worldwide in 2022.
- In 2022, human infections with influenza virus A(H1N1)v and A(H1N2)v of swine origin were detected in two EU/EEA countries: Germany and the Netherlands, respectively.
- Outside of the EU/EEA, influenza virus A(H1N1)v, A(H1N2)v, and A(H3N2)v of swine origin caused sporadic human infections in Brazil, China, Taiwan, and the United States (US).

Introduction

Animal influenza viruses that usually circulate in animal species can, in rare occasions, transmit to humans and cause zoonotic influenza virus infections. Most zoonotic influenza virus infections in humans are caused by avian influenza or swine influenza viruses that circulate in wild birds and spill over to farmed poultry as well as pig populations, respectively. Infections are typically related to direct contact with sick or dead animals which are infected, or contaminated environments. Infections can result in asymptomatic, mild or severe disease, causing symptoms which range from fever, conjunctivitis and cough to severe pneumonia, but can also cause atypical symptoms like gastroenteritis.

Methods

This report is based on data for 2022, retrieved in March 2023 from different sources, such as the World Health Organization (WHO), the World Organisation for Animal Health (WOAH), the European Food Safety Authority (EFSA), and ECDC's epidemic intelligence activities.

This report includes events and data from 2022. It does not cover the entire winter-season pattern. The date of identification or onset of symptoms was used, and if not available, the date of reporting.

Since September 2017, ECDC, together with EFSA and the European Union Reference Laboratory for Avian Influenza (EURL), have been publishing quarterly updates on the avian influenza situation in the EU/EEA (see link) [1]. All the avian influenza detections in humans and birds for 2022 listed in the subsequent sections have been published in the avian influenza situation reports [2-6].

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Stockholm, May 2023

Epidemiology

Avian influenza in humans

Avian influenza virus A(H3N8)

In 2022, China reported two children infected with avian influenza virus A(H3N8) reassortant virus – both children were exposed to live poultry before the onset of symptoms [3,7]. These are the first two cases of human avian influenza A(H3N8) globally.

Avian influenza virus A(H5N1)

In 2022, six human cases with avian influenza virus A(H5N1) were reported globally. In Europe, Spain detected viral fragments of A(H5N1) in specimens taken from two asymptomatic poultry workers involved in culling and cleaning activities during an avian influenza outbreak at the same farm. However, productive infection was ruled out, and a contamination was considered [5,6,8]. Similarly, in the US, a low level of viral fragments was detected in a worker identified with mild symptoms (fatigue), who was involved in culling activities [3,6,7]. One lethal case of an individual exposed to backyard poultry was reported by China [5,6,8]. One human infection with avian influenza virus A(H5N1) was reported in Vietnam, in a five-year-old girl exposed to sick poultry [5,8,9]. For the first time, an avian influenza virus infection was reported in South America: a nine-year-old girl developed severe symptoms following exposure to sick and dead backyard poultry in Ecuador [6,10].

Avian influenza virus A(H5N6)

In 2022, 18 human cases of avian influenza virus A(H5N6) were reported from China, including three deaths. All the cases were exposed to infected poultry or virus-contaminated environments, such as live poultry markets. However, the source of exposure is unknown for one case [3-5,7,9,11-17].

Avian influenza virus A(H9N2)

In 2022, 16 human cases of avian influenza virus A(H9N2) were reported globally. Out of these, 15 were reported from China (one adult, and the remaining children). Among the cases with known exposure, all the infected individuals were exposed to poultry [3-5,8,9,12-15,17,18]. In addition, Cambodia reported one case of avian influenza virus A(H9N2) in a one-year-old female with exposure to backyard poultry [13].

Avian influenza virus A(H10N3)

One human case of avian influenza virus A (H10N3) was reported from China in 2022, following exposure to backyard poultry [4,16]. This was the second human case of avian influenza virus A (H10N3), after the first reported from China in 2021.

Swine influenza in humans

Swine influenza virus A(H1N1)v

In 2022, four human cases of swine influenza virus A(H1N1)v were reported globally – with individuals mostly experiencing mild respiratory symptoms, such as fever and cough. In Europe, Germany reported one case of infection with swine influenza virus A(H1N1)v in a 34-year-old female. Although the patient was not directly exposed to swine, she lived in a region with many swine farms and had contacts with swine farmers [7]. Two cases were reported in China, one in a six-year-old girl and another in a three-year old girl [16,18]. In addition, one case of human infection with swine influenza virus A(H1N1)v was reported in a 60-year-old female in Brazil, living with domestically raised pigs [8].

Swine influenza virus A(H1N2)v

In 2022, seven cases of human infection with swine influenza virus A(H1N2)v were reported globally. Infections caused mild respiratory disease in most cases. However, one individual was hospitalised. In Europe, the Netherlands reported one case of human infection with swine influenza virus A(H1N2)v in a young adult female working at a pig farm [8]. The US reported five cases of swine influenza virus A(H1N2)v; of these, the cases with known exposure attended agricultural events [15,16,19]. In addition, Taiwan reported its first case of human infection with swine influenza virus A(H1N2)v – the case was a seven-year-old girl whose family owned a pig barn [17].

Swine influenza virus A(H3N2)v

In 2022, five cases of human infection with swine influenza virus A(H3N2)v were reported from the US. All the cases experienced mild respiratory illness and had contact with swine, most of which was at agricultural events [8,15,19].

Avian influenza detections in birds

Highly pathogenic avian influenza A(H5)

In 2022, highly pathogenic avian influenza A(H5) viruses without N-type determination were reported from Europe (Belgium, Bulgaria, Norway, and Russia), the Americas (Canada, Peru and the US), and Asia (Japan and Kazakhstan) [2-6,20].

Highly pathogenic avian influenza A(H5N1)

Highly pathogenic avian influenza A(H5N1) viruses continued to cause outbreaks in 2022, and affected poultry and wild bird populations in several countries in Europe (Austria, Belgium, Croatia, Cyprus, Czechia, Denmark, Estonia, Faroes, Finland, France, Germany, Greece, Greenland, Guernsey, Hungary, Iceland, Ireland, Isle of Man, Italy, Jersey, Latvia, Lithuania, Luxembourg, Moldova, Montenegro, the Netherlands, North Macedonia, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovakia, Slovenia, Spain, Svalbard and Jan Mayen, Sweden, Switzerland, and the United Kingdom), Africa (Algeria, Cameroon, Gabon, Ghana, Guinea, Mali, Namibia, Niger, Nigeria, Réunion, Senegal, South Africa, and Togo), the Americas (Canada, Chile, Colombia, Ecuador, Honduras, Mexico, Panama, Peru, the US, and Venezuela), and Asia (China, Hong Kong, India, Israel, Japan, Nepal, Pakistan, the Philippines, South Korea, Taiwan, Thailand, and Vietnam) [2-6,20].

Highly pathogenic avian influenza A(H5N2)

In 2022, avian influenza A(H5N2) viruses were detected in Europe (Germany and Poland), Africa (South Africa), and Asia (Japan and Taiwan) [2-6,20].

Highly pathogenic avian influenza A(H5N4)

In 2022, avian influenza A(H5N4) viruses were detected in the US [5,20].

Highly pathogenic avian influenza A(H5N5)

In 2022, avian influenza A(H5N5) viruses were detected in Norway, and Svalbard and Jan Mayen [2-6,20].

Highly pathogenic avian influenza A(H5N6)

In 2022, outbreaks related to highly pathogenic avian influenza A(H5N6) viruses were reported in Vietnam [20].

Highly pathogenic avian influenza A(H5N8)

In 2022, large outbreaks in wild birds and poultry caused by highly pathogenic avian influenza A(H5N8) viruses were mainly reported from Europe (Albania and Denmark), and Asia (China, Iraq, Israel, the Philippines, South Korea, and Vietnam) [2,3,20].

Highly pathogenic avian influenza A(H7N3)

In 2022, avian influenza A(H7N3) viruses were detected in Mexico [20].

Low pathogenic avian influenza viruses of subtype A(H5)

Low pathogenic avian influenza A(H5) viruses without N-type determination were reported from Belize [20].

Discussion

Following the onset of the largest epidemic of avian influenza in Europe in 2021, this disease continued to cause large outbreaks in poultry and affected captive and wild bird populations. This resulted in large-scale mass mortality events in 2022 which spread across an unprecedented geographical extent. Despite the large number of culling activities related to control measures, no productive and symptomatic infections have been observed in the EU/EEA. In Spain, two detections in cullers were considered as contaminations. However, mild, severe, and fatal human infections due to avian influenza viruses A(H5N1), A(H5N6), A(H9N2), and more uncommon subtypes such as, A(H3N8) and A(H10N3) were mostly reported from countries outside the EU/EEA (Cambodia, China, Ecuador, the US, and Vietnam). Exposure to sick or dead backyard poultry which are infected, or contaminated environments occurred before the onset of symptoms and were identified as risk factors.

Human infections with influenza viruses of swine origin were detected in the EU, with cases in Germany and the Netherlands due to A(H1N1)v and A(H1N2)v, respectively. Human infections with influenza viruses of swine origin were also reported from non-EU/EEA countries, with several cases occurring in Brazil, China, Taiwan, and the US due to A(H1N1)v, A(H1N2)v and A(H3N2)v. These infections largely caused mild respiratory illness, with only one case being hospitalised.

Public health implications

Zoonotic transmission of influenza viruses of animal origin remains a rare event. Influenza viruses in animals continue to reassort and evolve genetically. This underlines the need to continuously monitor the current situation and identify changes that could contribute to improved transmission and adaptation to mammals, including humans.

Zoonotic infections in humans are observed sporadically in the EU/EEA, and remain a concern for public health that needs to be tackled through an integrated One-Health approach. Rapid sharing of information about outbreaks as well as viral sequence data are key to understanding and assessing emerging situations. Transmission events of influenza viruses of animal origin to humans should be identified and reported as early as possible to investigate any human-to-human spread and so that requisite control measures can be implemented.

Candidate vaccine viruses for pandemic preparedness are developed, reviewed and updated twice a year [21].

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