The different **types of flu** explained – **seasonal influenza, swine flu** and **avian flu**

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Winter is upon us and with it comes influenza season. The influenza viruses have the ability to undergo changes resulting in circulation of many different influenza viruses with differences in disease features such as incubation period, contagiousness, severity of symptoms and clinical outcome. This article discusses the influenza virus and the differences between seasonal flu, swine flu and bird flu.

The influenza virus

There are four types of influenza virus, types A, B, C and D.

- Influenza A can infect humans and many different types of animals. The emergence of a new type A influenza, with the ability to infect humans and spread easily from human to human, can result in severe disease that spreads globally as nobody will have immunity to this new influenza. Influenza A has the potential to change and cause this global spread of a new virus which is then called pandemic influenza.
- Influenza B circulates among humans and causes seasonal epidemics. An epidemic occurs when the influenza spreads quickly within a population or area.
- Influenza C can infect both humans and pigs, but the disease is usually mild and rarely reported.
- Influenza D occurs mainly in cattle and is not known to cause illness in humans.

The influenza virus contains proteins on its surface. These are haemagglutinin (or HA proteins) and neuraminidase (or NA proteins). Currently there are 18 known HA subtypes and 11 known NA subtypes. These can occur in different combinations on the surface of the virus.

Seasonal flu

Influenza, also known as flu, is a viral infection that affects the respiratory system including the nose, throat and lungs and can result in symptoms that may include fever, headache, runny or stuffy nose, muscle aches, fatigue, cough, sore throat and stomach problems such as nausea, vomiting and diarrhoea. Seasonal influenza is estimated to result in about three to five million cases of severe illness, and about 290 000 to 650 000 respiratory deaths worldwide each year.

Small changes in the influenza virus result in seasonal influenza, but most people have some immunity. Because the changes are small, it is possible to predict these changes and formulate vaccines that can help control seasonal influenza. However, when the influenza virus undergoes significant changes that cannot be predicted, we see a pandemic such as the pandemic H1N1 that occurred in 2009.

Swine flu

Influenza viruses that infect their natural animal host, are named for the animal host, therefore swine flu refers to influenza viruses infecting and circulating in swine (pigs). Animal influenza type A viruses are distinct from human influenza and do not easily transmit among humans. However, sporadic human infections have occurred, and humans can be infected with swine influenza subtypes A(H1N1), A(H1N2) or A(H3N2). Humans are primarily infected through direct contact with infected animals or contaminated environments such as visiting locations where pigs are exhibited.

In 2009, a new, unique subtype A(H1N1) influenza virus started circulating in the United States of America, Mexico and Canada. The virus differed enough so that many people, especially younger people, did not have much resistance. This was also a very contagious virus and it soon spread across the globe to cause a pandemic. Initially, the virus was referred to as a swine-origin influenza virus as it resembled two different swine-lineage (H1N1) influenza viruses, and the pandemic

virus became known as "swine flu". It later became evident that there was no exposure to pigs with the initial case and this virus was not circulating in pigs, thus the virus was called pandemic H1N1 influenza. Research has shown that this pandemic strain contains genes from four different flu viruses including two swine strains, one human strain and one avian (bird) strain.

The pandemic H1N1 influenza presented with symptoms similar to seasonal influenza. However, patients were more likely to also develop diarrhoea and vomiting with severe chest discomfort, fever and headaches. Unlike seasonal influenza, patients with pandemic H1N1 were less likely to present with a stuffy nose, sneezing and a sore throat. Pandemic H1N1 is still occurring every year and is now circulating as another seasonal influenza strain. This strain has also been included in the seasonal flu vaccine since 2010 in South Africa.

Avian flu (bird flu)

As with swine flu, avian flu also refers to influenza circulating in birds, especially aquatic birds such as ducks, but also chickens and turkeys. Humans can be infected with avian influenza virus subtypes A(H5N1), A (H7N9) and A(H9N2). The majority of cases reported in humans are influenza A(H5N1) and A(H7N9) and have been associated with direct or indirect contact with infected live or dead poultry, especially when slaughtering, de-feathering and preparation of poultry for human consumption in household settings. There is however no indication that the virus can be contracted through ingestion of properly prepared and cooked poultry and eggs.

The avian H5N1 virus first jumped from birds to humans in Hong Kong in 1997, infecting 18 people and causing six deaths. Since 2003, this avian virus has spread from Asia to Europe and Africa, becoming endemic in poultry populations in several countries. This has caused millions of poultry infections and has severely impacted livelihoods, international trade and the economy. Outbreaks also resulted in infection of more than 800 people with 440 deaths. The World Health Organization reported in March 2019 that death occurred in 56% of patients who contracted avian H5N1. Human infections with the avian H7N9 were reported in 2013 for the first time in China, spread across the country, and resulted in over 1500 reported human cases, many resulting in death.

The incubation period (time from infection until start of symptoms) for avian influenza in humans is longer (two to five or eight days and up to 17 days) when compared to seasonal flu (one to four days). Avian influenza in humans is also more likely to present with diarrhoea, and this often appears up to a week before any respiratory symptoms. Lower respiratory symptoms such as shortness of breath appear early on during infection whilst upper respiratory symptoms such as runny nose are less common.

Only rare cases of human to human transmission have been reported to healthcare workers, and it seems as though family clusters of disease may be caused by common exposure rather than person-to-person transmission. Although there has not been any sustained human-to-human transmission to date, the concern is that the virus may mutate and become highly contagious and that could result in severe disease and death in more than half of the people infected. However, no one can predict if or when this will happen.

Conclusion

The influenza virus exists as many subtypes that can infect different species of animals and humans. In general influenza strains seen in animals do not easily infect humans, but on rare occasions this can happen. This is the case with avian influenza that has resulted in the death of more than half of people infected. At the moment this virus does not spread from human to human, but concerns exist that the virus can mutate to become more contagious and cause a pandemic such as the pandemic influenza H1N1 that occurred in 2009. At the moment there is no way to predict or prevent pandemic influenza. However, because of the small changes seen in seasonal influenza viruses, vaccines are available and should be offered to all patients in order to prevent disease.

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