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Highly Pathogenic Avian Influenza

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Feb 03, 2023 Highly Pathogenic Avian Influenza

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The world is tired of pandemics and the associated restrictions that new and emerging diseases have placed on our lives. But some disease threats are too severe to be ignored.

Context

In 2006, Lantern Books published "*Bird Flu: A Virus of our Own Hatching*," by Dr. Michael Greger, about a virus that keeps public health authorities awake at night – the avian influenza virus. This virus caused the Spanish Flu outbreak in 1918 (in Spain, it was called the French Flu!). According to the World Health Organization, the "1918 influenza epidemic killed more people in less time than any other disease before or since." Some estimate that the 1918 influenza killed 50-100 million people worldwide (approximately 1 in 20 persons then alive). Seasonal flu mortality is concentrated among the elderly and infirm, whereas the 1918 influenza virus killed those in the prime of life. Around half the world became infected with the virus, and in Alaska, 50% of the population perished. Because so many young people died, life expectancy in America fell precipitously to just 37 years!

The Spanish flu, also known as the Purple Death, was not an "easy" disease. People

turned deep blue because their lungs could not absorb enough oxygen to turn their blood from blue to red, the standard color of arterial blood. Infected people “drowned” in the bloody secretions filling their lungs.

It is still not clear why the 1918 flu was so deadly. Disease agents that rapidly kill those they infect tend to peter out because infected people are so ill they do not move around and are, therefore, less likely to infect others. It has been suggested that the virus developed very high virulence because of the First World War and its trench warfare. The trenches were so crowded and cramped that the conditions favored the evolution of a virulent virus because victims did not have to move far to infect others. Similar crowded conditions are now widespread in animal agricultural facilities where millions of animals, especially birds, and pigs, are crammed together in Concentrated Animal Feeding Operations (CAFOs).

Current events

Earlier this year, health journalists were urged to pay attention to the emergence of the highly pathogenic avian influenza (HPAI) virus. This virus has been killing wild birds in large numbers and is now causing millions of farmed poultry to be “depopulated” – the euphemism used to kill large numbers of farm animals. The US Department of Agriculture’s recommended method for depopulating birds and pigs in CAFOs is VSD+ or Ventilation Shut Down Plus. In VSD+, the ventilating fans in agricultural buildings containing thousands or tens of thousands of creatures are turned off. Heat, carbon dioxide, or a combination is pumped into the building to kill the animals as quickly as possible. Deaths are due to heat stroke and lack of oxygen. Infected animals shed large quantities of the flu virus; the longer they live, the more virus is produced. Sterilizing the CAFO buildings and dealing safely with the dead birds and their infectious waste materials is a significant public health challenge.

The current strain of the highly pathogenic influenza virus emerged in commercial geese in Asia in 1996. In 2014, a new strain of the virus emerged and started infecting wild birds without always killing them. The evolution of the new strain created opportunities for the virus to spread to North America via wild bird migrations. In 2015, North America’s H5N1 bird flu outbreak resulted in the culling of more than 50 million farmed poultry. The 2022/23 outbreak has already exceeded that number and continues to increase. In total, 316 million farmed poultry have been “depopulated” worldwide between 2005 and 2021 because of H5N1 virus infections. The current

depopulation of egg layers is one reason for the rapid rise in egg prices in grocery stores.

Reasons for Concern

The news that the virus recently infected mink on a farm in Spain and, most importantly, spread from mink to mink (mammal to mammal) is cause for more significant concern. The bird flu virus had not previously been reported to spread from one mammal to another. If it starts to do so, then it will become more of a pandemic threat to humans. So far, nobody has detected human-to-human transmission. Professor Devi Sridhar, Global Public Health Chair, University of Edinburgh, notes the current virus ". . . it's a major economic, animal welfare and farming problem now." But Professor Sridhar also warns the avian flu virus "is just a mutation away" from becoming a more significant threat.

Vaccines are available to protect poultry flocks and reduce the opportunities for viral evolution into new (and more dangerous) strains. However, vaccines are not often used because of the difficulty of discriminating between birds that have been infected and are possibly infectious versus birds that are protected by vaccination and not infectious. The export of poultry is big business, but countries will not import vaccinated birds if they cannot differentiate between infectious and protected birds. The continuing threat of H5N1 and other avian flu viruses is changing the debate on the suitability of vaccinating farmed poultry.

Final Comments

Although concern among scientists, governments, and other stakeholders is rising and media coverage is increasing, the threat of another pandemic looms.

Greater efforts and funding are needed to understand the following:

1. What mutations in the avian flu virus lead to a pandemic pathogen, and
2. What conditions increase the risk of such a mutation developing? For example, does housing pigs and poultry (specifically ducks) close together in intensive animal housing heighten the risk of the evolution of a pandemic virus?

With greater understanding, developing policies to manage and mitigate the risk of a pandemic virus should be possible.

As most of us know, changes in policy, business operations, and stakeholders' expectations take time. International organizations monitor the threat, and the World Organization on Animal Health is tracking avian influenza outbreaks. The world is also engaged in discussions on the current global food system. Perhaps those discussions should include attention to how CAFOs are managed, where they are located, and whether there are alternatives to CAFOs that would better address world food needs. In the meantime, we should cross our fingers (tightly!) and hope that the avian flu virus does not acquire a mutation allowing it to pass easily from one human to another!