



H7N9

The H7N9 situation is very fluid with new information being shared daily. The information on this page is appropriate to the date published –November 21, 2013. For the latest information see resources listed at the end.

INTRODUCTION

H7N9 is an avian Influenza. Avian Influenza is a disease of wild birds and domestic poultry caused by many different subtypes of Type A influenza virus. The natural reservoir for Type A influenza viruses is wild water birds such as ducks and geese. New influenza A subtypes are continually emerging in the waterfowl population due to the constant mutation of the virus.

While avian influenza is caused by Type A viruses, seasonal influenza outbreaks in people, which occur almost every winter, are caused by either Type A and Type B influenza viruses. Influenza Type C viruses cause a mild respiratory illness in humans, but are not usually responsible for outbreaks of the flu. Type A viruses are found in both people and animals, whereas Type B viruses are normally only found in humans.

Avian influenza viruses are classified in two ways, one is by the host's immune response and the other severity of infection. Influenza subtypes are named for two antigens present on the surface of the virus. These are:

- H (hemagglutinin)
- N (neuraminidase)

There are 16 possible H antigens and 9 possible N antigens. Virus subtypes are named H9N2, H5N1, etc, depending on their combination of antigens. The other classification of avian influenzas is by the severity of the disease they cause in domestic poultry, and the designations are:

- Low pathogenicity avian influenza (LPAI)
- High pathogenicity avian influenza (HPAI)

Why the concern about H7N9?

This influenza A (H7N9) virus is one subtype among the large group of H7 viruses. Although some H7 viruses (H7N2, H7N3 and H7N7) have occasionally been found to infect humans, this is the first time H7N9 infections have been reported in humans. As such, H7N9 has the potential to spark a pandemic due to the lack of immunity to this virus in the



human population.

Wednesday May 1, 2013 Chinese researchers reported H7N9 appears to have evolved as wild birds mingled with each other and then with domestic flocks. (Lancet). The H gene might have originated from avian influenza viruses of duck origin, and the N gene might have transferred from migratory birds infected with avian influenza viruses as they traveled the East Asian flyway. The research indicated the six internal genes of this virus likely originated from two different groups of H9N2 avian influenza viruses. These viruses have been isolated from chickens. Further analyses suggest ducks and chickens were the likely the intermediate hosts for the virus leading to the new H7N9, however experts caution other intermediate hosts may exist.

A study published May 29, 2013 indicates H7N9 is showing resistance to Tamiflu, which has implications for treatment in the event of a widespread outbreak or pandemic. This is the first of its kind study.

For the most recent confirmed human cases of H7N9 and deaths attributed to the virus please see the World Health Organization (WHO) [Disease Outbreak News](#).

US Declares H7N9 Emergency

The [US government](#) has declared that H7N9 bird flu "poses a significant potential for a public health emergency", and has given emergency authorization for use of diagnostic kits for the virus. This declaration allows for the use of test kits prior to the extensive testing required for FDA approval. The kits test for the presence of genes specific for H7N9. States have also been alerted to dust off their pandemic plans.

Sustained human-to-human transmission of H7N9 **has not been found** to date. Researchers caution the virus is easier to catch than H5N1 and may only need a few mutations to go



pandemic. There is **no way** to predict the future course of this virus.

Labs are now making "seed" viruses for manufacturers to create H7N9 vaccine similar to the process used in 2009 with H1N1.

Scientists reported last week at a Summit in Brussels that H7N9 appears to trigger a poor immune response. Their preliminary research indicates 13x more virus is needed to achieve a typical immune response. This has serious implications for the development/production of an adequate supply vaccine.

Has there been human-to-human transmission of H7N9?

A family cluster of infection is suspected in the family of an 87-year-old man one of the first revealed detections of H7N9 in humans (March 31, 2013). At the time it was reported his two sons were ill and in the hospital with similar symptoms, but local Chinese officials indicated neither had the virus. April 17, 2013 a news report confirmed the older son who recovered did have H7N9. The younger son died, with no test results available. This report was contradicted by a report from Xinhua indicating both sons tested positive for the virus. CDC is not aware of exposure source. If confirmed, these infections would be the second instance of family contact infections of H7N9. A 52-year-old woman died and the virus was detected in her husband.

April 30, 2013 with the report of an infection of a 4-year old, the son of a man previously reported infected officials are investigating this cluster infection. However they stress they expect to see these types of infections where people have close contact in family living quarters.

As of May 6, 2013 Chinese officials have reported two more family "clusters" where two to three people in a family have become infected. The data are unclear as to whether they became infected from the same source or each other due to variable incubation times. Officials cannot rule out limited human-to-human transmission.

May 23, 2013 Chinese, US, and Canadian researchers reported limited aerosol transmission of the virus in ferrets. Ferrets are used for this research as they mimic humans with respect to contracting the virus. This is good news with respect to human-to-human transmission of the virus at this time. The researchers also found H7N9 virus shedding occurred before most clinical signs developed, a pattern seen with pandemic and seasonal flu."

The also cautioned should H7N9 becomes endemic in China's poultry, the likely source of the of the virus, the risk of the virus evolving to become more transmissible among humans or spreading to pigs would increase.

How can infection with H7N9 virus be prevented?

Though at this time, it is not known for certain the source or mode of transmission, as with any influenza virus, following basic hygiene practices and food safety measures are recommended to reduce the risk of infection.

Hand hygiene:

- Wash your hands before, during, and after you prepare food; before you eat; after you use the toilet; after handling animals or animal waste; when your hands are dirty; and when providing care when someone in your home is sick. If possible use a disposable towel to open public doors, push shopping carts, etc.
- Wash your hands with soap and running water when visibly dirty; if not visibly dirty, wash your hands with soap and water or use an alcohol-based hand cleanser.

Respiratory hygiene:

- Cover your mouth and nose with a medical mask, tissue, or a sleeve or flexed elbow when coughing or sneezing; throw the used tissue into a closed bin immediately after use; perform hand hygiene after contact with respiratory secretions.

Is it safe to consume poultry and eggs?

These food safety rules will protect consumers from H7N9 and other food-borne pathogens such as Salmonella:

Separate raw meat from cooked foods.

Do not use the same chopping block or utensils for raw meat and other foods.

Do not put cooked meat back on the raw meat platter. Wash your hands with soap and hot water after handling raw meat.

Cook food at or above 165 degrees Fahrenheit (i.e. no pink meat).

Fully cook eggs (i.e. no runny yolks).

Remember:

Fully cooked or pasteurized eggs / egg products are safe to eat.

H7N9 is killed by cooking food at or above 165 degrees Fahrenheit (i.e. no pink meat).

Is it safe to travel to China?

At this time, WHO does not advise the application of any travel measures with respect to visitors to China nor to persons leaving China. April 24, Taiwan reported an infection in a man who had been to China. He is currently in critical condition. [CDC travel recommendations](#) for visiting China.

Resources:

[World Health Organization](#)

[Centers for Disease Control](#)

[Center for Infectious Disease Research and Policy](#)