

## Explainer: What is H7N9 bird flu?

February 10 2014, by Charles Watson

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Around 20,000 chickens were culled in Hong Kong last week after the virus was detected in birds imported from mainland China. Credit: Alex Hofford/AAP Image

Australia's federal Department of Health has [advised general practitioners](#) to be on the lookout for potential cases of the H7N9 strain of influenza A, or bird flu, following a spate of deaths in China.

Chinese authorities at the [Centre for Health Protection](#) are taking the threat very seriously: control points have been set up to detect infected people with thermal imaging and all suspected cases will be referred to

hospital for assessment.

The threat has been particularly serious over the past week, as hundreds of millions of Chinese returned to their home villages to celebrate the Lunar New Year holiday.

Poultry trading has also been [halted in Shanghai](#) for the next three months. This follows the [culling of 20,000 chickens](#) in Hong Kong after the virus was detected in birds imported from mainland China.

## Influenza strains

Influenza A strains are classified according to the occurrence of different numbered types of [haemagglutinin](#) (H), a protein responsible for binding the virus to cells, and [neuraminidase](#) (N), enzymes that help the virus spread. The H proteins are numbered 1 to 17, and the N proteins are numbered 1 to 11. However, this doesn't correspond with severity.

The [influenza](#) A group contains most of the dangerous [influenza viruses](#). New strains of influenza A virus are regularly found in poultry in China, but bird [influenza strains](#) do not usually infect humans.

The most devastating influenza epidemic in history, the Spanish flu, occurred after World War One and killed more than 50 million people around the world. The Spanish flu was [caused by](#) the A(H1N1) strain that is transmitted directly from person to person.

## H7N9

The H7N9 strain began to infect humans in Zhejiang province in 2013 where more than 250 cases of human illness have been recorded,

including [more than 50 deaths](#). Cases have been reported in many different areas in China, with most cases occurring in Zhejiang, Shanghai, Jiangsu, and Guangdong. The illness is [most common](#) in males around the age of 60.

The good news is that all the cases so far [seem to have been caused](#) by contact with birds, and no cases of human-to-human transmission have been reported. In addition, the incidence rate of new cases is less now than was reported early in the epidemic in 2013.

The last significant [bird flu](#) epidemic was in 2007, when the H5N1 strain killed many birds and [infected](#) more than 500 people with a 60% death rate.

The human death rate in H7N9 is [lower](#) (20-25%) and the strain does not kill infected birds. However, the fact that the birds do not die is a negative feature in terms of control because it makes virus spread harder to track.

## Symptoms

Like most influenza viruses, H7N9 causes fever and cough, which progresses to pneumonia.

Some bird flu strains have the capacity to spread in the blood stream and can cause a massive overload of the immune system, with sudden collapse of many major organs. Fortunately, this has not occurred in the current epidemic.

## Treatment and prevention

Antiviral drugs such as Tamiflu and Relenza [seem to be effective](#), but Chinese doctors have reported the rapid appearance of [drug resistance](#) in

some cases. Australia maintains emergency stocks of antiviral drugs for treatment of influenza in an epidemic.

It is technically possible to develop a vaccine, but the manufacture process takes from five to seven months and only a handful of centres around the world are equipped for influenza vaccine production. It has [been reported](#) that centres in the United States, the United Kingdom and Japan have recently commenced the process of H7N9 vaccine manufacture, but there is a risk that full-scale production might limit the production of seasonal influenza vaccines around the world.

## Implications for Australia

For the time being, the H7N9 virus is not being transmitted from person to person, so the risk to humans is related only to contact with infected chickens, ducks, or pigeons in markets in China. A potential risk to watch out for is transmission of the virus to other animals, such as pigs, which may indicate further mutations in the virus.

Research on H5N1 bird flu virus revealed that five genetic mutations would be needed to allow human-to-human transmission to occur, and the H7N9 strain has only two of these crucial mutations. However, influenza viruses have a remarkable capacity for mutation, and the situation will have to be closely watched.

The World Health Organization has a large international team, which is actively monitoring developments; so far the WHO has not recommended that travel to China be restricted.

**More information:** University of Queensland Associate Professor Ian Mackay's website is a good source of technical information on influenza viruses such as H7N9 bird flu:

[www.uq.edu.au/vdu/VDUInfluenza\\_H7N9.htm](http://www.uq.edu.au/vdu/VDUInfluenza_H7N9.htm)

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