

# H1N1 FLU PANDEMIC! UNDER THE MICROSCOPIC LENS OF SCIENTISTS!

By DR IVY WONG NYET KUI

The recent outbreak of the H1N1 virus begs the question of how much do we know about the influenza pandemics. Some would also wonder why such a common illness could grip the world with fear. Whether you like it or not, the very mention of 'flu' these days could suggest much more than a simple case of sniffles.

It is as surprised as to some, flu pandemic is not a new subject under the microscopic lens of scientists. One of the most deadly flu pandemics in human history occurred in 1918 or so called Spanish Flu which killed an estimated 50 million people and infected another 500 million over a year time. The type of Spanish Flu virus was not identified until 2005, which the flu virus was reconstructed from pieces of genetic material retrieved from the lung of people who died 87 years ago, and the virus is known as H1N1.

Others are like the Asian Flu (1957) caused by H2N2 was first identified in China and the global death was estimated at 2 million; the Hong Kong Flu (1968-1969) caused by H3N2 had killed about 1 million of people worldwide, and in 1997, the new strain of avian flu (H5N1) emerged and infected 18 people in Hong Kong and caused 6 deaths. In 1977, the Russian Flu caused by H1N1 emerged, but due to its similarity to a virus prevalent between 1947 and 1957, most adults have substantial immunity to it. It is so true to say that the global outbreaks of influenza have occurred through the ages.

## So what is influenza virus?

Commonly, there are three main types of influenza viruses that can cause respiratory ailments: influenza A, B and C, of which only influenza type A and B caused major influenza epidemics. The different strains of influenza virus are normally represented by two surface glycoproteins: haemagglutinin (H) and neuraminidase (N). The rapid evolution of influenza viruses occurred through a combination of the accumulation of small mutations and abrupt reassortments that would provoke human immune responses. Haemagglutinin (H) enables the virus to bind to and enter into others cells resulted into replication, whilst the neuraminidase (N) allows the newly-replicated virus to leave and spread to other cells. Till now, there are 16 known H subtypes and 9 N subtypes found in wild aquatic birds, but only H 1, 2 and 3, and N 1 and 2 are commonly found in humans.

Virus as common as we know it is, undergoes an 'antigenic shift' or genetic alterations that enable a flu strains to jump from one animal species to another. Influenza A, for example, is actually an avian virus that has left its origin host (ducks) to infect first swine, and then through them, infect humans. Since the duck virus cannot infect humans directly, it is evident that some adaptation occurring in swine hosts was required for influenza virus to make its cross-species transfer to humans. On this cause, a new subtype can emerge due to recombination between human and animal strains.

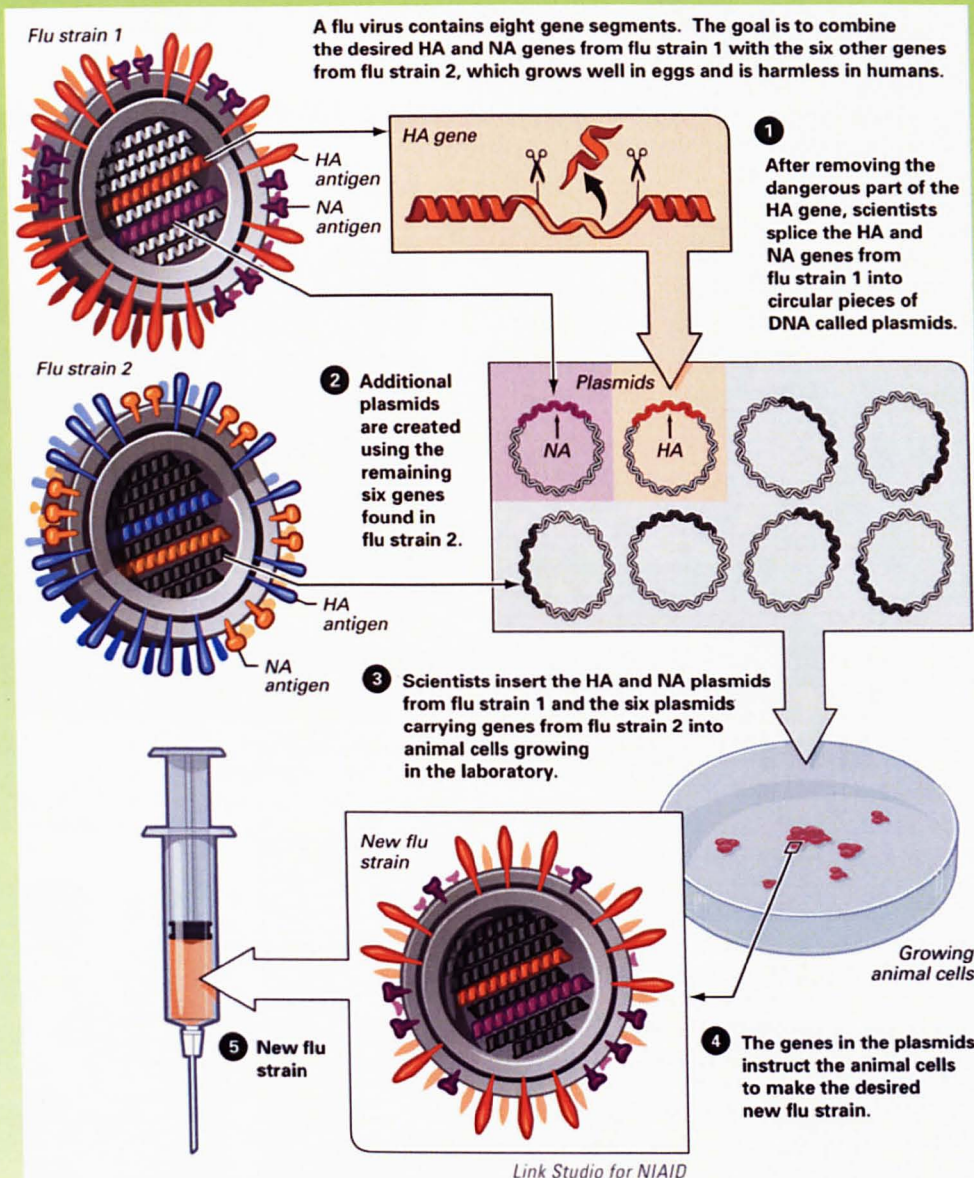
The 2009 Flu Pandemics was first identified in March-April 2009. A novel swine origin influenza A(H1N1) virus, now referred to as influenza A(H1N1)v, is the cause of flu outbreaks in the US, Canada, Mexico and elsewhere. This new strain has a unique genetic composition that has not been seen before, which is thought to be a reassortment of four known strains of influenza A virus: one endemic in

(normally infecting) humans, one endemic in birds, and two endemic in pigs (swine). Consequently, this novel H1N1 virus now threatens populations in all countries as no one will have developed previous immunity to it (Novel Swine Origin Influenza A (H1N1) Virus Investigation Team, 2009). Transmission of the new strain is human-to-human, with cooked pork products safe to eat as the virus cannot be transmitted by eating foods.

## What are the symptoms?

The symptoms of novel H1N1 flu virus in people are similar to the symptoms of seasonal flu and include fever, cough, sore throat, runny or stuffy nose, body aches, headache, chills and fatigue. A significant number of people who have been infected with novel H1N1 flu virus also have reported diarrhea and vomiting. The high risk groups for novel H1N1 flu are not known at this time, but it is possible that they may be the same as for seasonal influenza. People at higher risk of serious complications from seasonal flu include people age 65 years and older, children younger than 5 years old, pregnant women, people of any age with chronic medical conditions (such as asthma, diabetes, or heart disease), and people who are immunosuppressed (e.g., taking immunosuppressive medications, infected with HIV) (Centre for disease control and prevention).





Avian flu vaccine development by genetics techniques (from: National Institute of Allergy and Infectious Diseases)

## Is there vaccine available?

There are two influenza antiviral medications that are recommended for use against novel H1N1 flu. The drugs that are used for treating novel H1N1 flu are called oseltamivir (trade name Tamiflu<sup>®</sup>) and zanamivir (Relenza<sup>®</sup>). As the novel H1N1 flu spreads, these antiviral drugs may become in short supply. Therefore, the drugs may be given first to those people who have been hospitalized or are at high risk of severe illness from flu. The drugs work best if given within 2 days of becoming ill, but may be given later if illness is severe or for those at a high risk for complications (Centre for disease control and prevention).

## Conclusions

Influenza virus is unpredictable. Though human race is proud of their personal achievement in science and technology, conquering human mind, galaxy, and dominating the economy trend, the invasion of a tiny virus can still make the whole world shockingly panic. As Keiji Fukuda, a top World Health Organization official as ever said, "There's no standard picture for how this novel virus would develop, we can prepare, but in the end, we're at the mercy of a virus."