

A/H1N1 Virus, AKA Swine Flu – Beware its mutant progeny... the worst is yet to come

You have four choices when it comes to self-defense.

1. Trust that virologists guess right and come up with a magic bullet flu vaccine in time.
2. Hope that Tamiflu and Relenza will be effective and available if you become infected.
3. Wear a mask and wash your hands.
4. Get the NASA technology, AiroCide installed to eliminate the airborne transmission of flu bugs altogether.
5. All of the above.

Influenza epidemics occur yearly during autumn and winter in temperate regions. Illnesses result in hospitalizations and deaths mainly among high-risk groups: the very young, elderly or chronically ill. Worldwide, these annual epidemics result in about three to five million cases of severe illness, and about 250,000 to 500,000 deaths.

Influenza viruses circulate in every part of the world. Among the many subtypes of influenza A viruses, currently influenza A/H1N1 and A/H3N2 subtypes are circulating among humans.

What is A/H1N1 Influenza Virus (Swine Flu)?

Swine flu is a respiratory disease found in pigs that is caused by influenza outbreaks within the porcine population. People do not normally get swine flu, but human infections can and do happen. Swine flu viruses have been reported to spread from person-to-person. In people, symptoms of swine flu are similar to the symptoms of regular human flu. These include fever, cough, sore throat, body aches, headache, chills, and fatigue. Some people have reported diarrhea and vomiting; others have experienced severe illness (for example, pneumonia) and death.¹

How does the virus spread?

At present, evidence suggests that the main route of human-to-human transmission of the new Influenza A/H1N1 virus is via respiratory droplets, which are expelled by speaking, sneezing or coughing. Any person who is in close contact (approximately 1 meter) with someone who has influenza-like symptoms (fever, sneezing, coughing, running nose, chills, muscle ache etc) is at risk of being exposed to these potentially infective respiratory droplets.²

Carriers can become infectious a day before they show symptoms of flu.³ Today, young children are believed to be a potent source of spread of influenza virus.

¹ N95 EUA Fact Sheet Authorized by FDA on May 1, 2009

² World Health Organization, Advice on the use of masks in the community setting in Influenza A/H1N1 outbreaks.

³ The Times of London, Mutant fears over 'mild flu' May 3, 2009

What Causes a Pandemic?

Like the ordinary flu virus, virologists believe the new bug may have an incubation period of about one to seven days. For a serious pandemic to occur, three conditions have to be met:

1. The virus has to cause high mortality.
2. It has to spread relatively quickly and easily among people.
3. And its incubation time in a host has to be sufficiently long.⁴

The fact that [this virus] has spread in a sustained way between people in both Mexico and the U.S. suggests that it transmits quite efficiently. Scientists are trying to assemble better data about transmission.⁵

What does the CDC say about protection?

When crowded settings or close contact with others cannot be avoided, the use of facemasks or respirators in areas where transmission of swine influenza A/H1N1 virus has been confirmed should be considered as follows:

1. Whenever possible, rather than relying on the use of facemasks or respirators, close contact with people who might be ill and being in crowded settings should be avoided.
2. Facemasks should be considered for use by individuals who enter crowded settings, both to protect their nose and mouth from other people's coughs and to reduce the wearers' likelihood of coughing on others; the time spent in crowded settings should be as short as possible.
3. Respirators should be considered for use by individuals for whom close contact with an infectious person is unavoidable. This can include selected individuals who must care for a sick person (e.g., family member with a respiratory infection) at home.

In addition, frequent washing of hands and avoidance of contact with the eyes, nose and mouth should be observed.⁶

What is the biggest worry?

Inside CDC the real worry now is what happens next fall/winter when the true flu season begins. Will this H1N1 strain come back with resistant protection and become a real pandemic?

Margaret Chan, WHO's director-general, says that the end of the flu season in the northern hemisphere means an initial outbreak could be milder but then a second wave more lethal, as happened in 1918.⁷

Albert Osterhaus, a virologist at Erasmus University in the Netherlands is currently testing the A/H1N1 virus to determine whether it shares any pathogenic markers with older deadly bugs. Dr. Osterhaus's lab is comparing the markers on the current A/H1N1 bug to other viruses that were deadly in people, such as the 1918 strain. Said Dr. Osterhaus, "I wouldn't be too comfortable that this swine-flu virus isn't hot yet. It can adapt."⁸

In 1918, after the initial outbreak of influenza [swine flu – A/H1N1] at Fort Riley, Kansas in April, widespread outbreaks of influenza did not occur until late summer.⁹ When [it]

⁴ The Wall Street Journal, Transmission of Virus a Puzzle for Scientists, May 4, 2009

⁵ Ibid.

⁶ CDC H1N1 Flu General Information

⁷ Financial Times, May 3, 2009 Chan hits back at WHO critics

⁸ op. cit. WSJ

⁹ Schoenbaum SC, McNeil BJ, Kavut J. The swine-influenza decision. *New England Journal of Medicine*. 1976; 295:759–65.

started in 1918 it was a relatively wimpy virus. Then it heated up and killed some 40 million people.¹⁰

Virologists say pigs' biology makes them perfect "mixing vessels" in which new flu strains are formed, making them important animals to study in order to monitor future viruses with potential to infect humans.¹¹

In the Canadian province of Alberta, officials quarantined about 220 pigs that became infected from a worker who had recently returned from Mexico. It was the first documented case of the H1N1 virus being passed from a human to another species.¹²

The cross back to pigs raises some concern because it could create a fresh opportunity for the virus to evolve in new and potentially unpleasant ways. Crossing species again could make it more deadly. The never-before-seen virus was created when genes from pig, bird and human viruses mixed together inside a pig. Experts fear the virus that has gone from humans back into pigs in at least one case could mutate further before crossing back into humans again.¹³

The potential for viral mutation.

The biggest worry would be if a person or a pig became infected with both swine flu and H5N1 avian flu at the same time. When any animal becomes infected with two different influenza strains at the same time, these can swap genes to create an entirely new virus with unpredictable qualities. As the former is highly transmissible but does not appear to be particularly lethal, while the latter is highly virulent but does not spread easily, a reassortment between the two could generate a very dangerous strain.¹⁴

This process, reassortment or antigenic shift, gave rise to the new swine flu strain, and a sustained spread to pigs could increase the chances of another such mutation arising. This sort of evolution, however, could also occur in a human host infected with, for example, both swine flu and a seasonal flu strain.

The speed and ease with which the initial A/H1N1 virus has spread both geographically and now ping-ponging between species is cause for further concern. Mutating progeny and their ever changing RNA structure and various strains "intermarry" has the capacity to produce an evolved strain that is highly transmittable and resistant to intervention.

There is already evidence to suggest this is already happening.

Virologists say this new virus is a bit of a "mutt," containing bits of a virus that appears to have mixed with another hybrid virus that contained swine, bird and human genes. Researchers from the Center for Computational Biology and Bioinformatics at Columbia University and elsewhere announced this week they've found that six segments of the virus are related to swine viruses from North America.

With the virus now positioned around the world in both human and porcine populations the opportunity for transmutation has grown exponentially. And while it is possible to produce an anti-virus that can inoculate against the current strain, it is what it may

¹⁰ Interview with Dr. Osterhaus – WSJ

¹¹ Financial Times, May 1, 2009 Experts call for broad flu watch

¹² Associated Press, May 3, 2009

¹³ Associated Press, Swine flu goes person-to-pig; could it jump back? May 3, 2009

¹⁴ The Times of London, Alberta incident raises prospect of swine flu mutation, May 3, 2009

combine with over the intervening period that is the unknown that medicine cannot be depended upon to protect mankind from. Virologists are hard at work but all admit they just don't know what will happen next.

What can you do?

The CDC and WHO advise us to stay at home if we are sick. To wash our hands frequently and keep them away from our mouths, eyes and noses. If you are in a crowded area, wear a mask for some level of protection and if you are acting as a caregiver for a sick family member to wear a respirator.

The mask is as much protection for those around you as for yourself. But if not properly fitted to the face it is ineffective. Respirators are available in the US from the CDC with an authorization and can be sourced on their website.

The other option – from NASA.

According to an article published under the category NASA Commercial Space Spin Offs, one NASA Spinoff technology is being eyed to combat Swine Flu. The article points out that NASA as part of its extended space flight research developed the technology. Today, marketed under the brand name AiroCide uses a little known but highly effective pathogen-killing technique, Photocatalytic oxidation (PCO) to destroy harmful airborne microbes.¹⁵

Studies at the University of Wisconsin as well as at Texas A&M and other internationally recognized scientific institutions have determined that the technology eliminates 99.9997% of all organic matter that comes in contact with its Photocatalytic Chamber.

Because the primary means of viral transmission is airborne, and the highest risk occurs in closed environments where individuals are within close proximity to each other such as in a public place. An office setting, a hotel, public transit, a hospital, and other such places where a single sneeze or cough will aerosolize the virus and leave it lingering in the air even after the carrier has departed.

An AiroCide unit will help eliminate the airborne biohazard.

The best course of action is:

1. Trust that virologists guess right and come up with a magic bullet flu vaccine in time.
2. Hope that Tamiflu and Relenza will be effective and available if you become infected.
3. Wear a mask and wash your hands.

And

Get the NASA technology AiroCide installed to eliminate the airborne bugs altogether.

¹⁵ Space Coalition Blog, NASA Commercial Space Spin Offs.