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WorldClinic Executive Summary: Understanding and preparing for H1N1 (“swine flu”)

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Origins of H1N1

H1N1 is a highly contagious influenza virus that reproduces by invading healthy cells and inserting its genes into the host cells' genome, essentially reprogramming the cells to do what it needs. H1N1—also known as “swine flu”—is a rather unique virus, being composed of genetic material from birds, swine and humans, a situation that occur when a human is working around infected pigs.

Mutation and the challenge to human immune systems: “genetic re-assortment”

Last spring, there was an outbreak of the H1N1 virus in Mexico. It moved very quickly because it was quite contagious and it had to transmit itself from human to human in order to survive. Fortunately, this swine flu epidemic was mild as the predominant genetic material in the virus was of human and swine origin. Because humans and pigs share common mammalian descendants, our immune systems are closely related and most people are able to fend off such a virus.

Now, here's the problem: birds do not share that kind of common pathway with humans. Birds are descended from dinosaurs and they have an entirely different immune system. If someone who has swine flu is exposed to a bird population that has a strong strain of avian flu, and if inside his or her body those two viruses meet, they will undergo a process called “genetic re-assortment” where the avian flu will share a good portion of its RNA with the H1N1 swine flu virus, and that mutation is a potential catastrophe.

Human immune systems know very well how to deal with viruses that infect mammals. They are less successful at figuring out how to deal with avian RNA, which is essentially a descendant of reptilian RNA. Once we're infected with the mixed RNA, our immune system will not know exactly what to do. It cannot kill this virus accurately and on target. What happens then is our immune system overreacts and that's what makes us so ill.

“Sentinel” pandemics foreshadow greater problems

In the last 120 years, there have been four world-wide flu pandemics: in 1889-90, 1918-19, 1957, and 1968. A great concern is that each of these pandemics had a “sentinel” pandemic which occurred the previous spring. This was followed by a relatively dormant period in the summer, which gave way to a very serious pandemic the following fall and winter that affected hundreds of millions of people worldwide.

This is certainly what happened in the influenza epidemic of 1918. It was preceded by a mild pandemic in the Spring of 1918. But by the end of 1918 and going into the opening

months of 1919, it was a full-blown, highly lethal, very contagious illness that went worldwide very, very quickly and killed more than 50 million people—an estimated 675,000 in the United States alone.

The pattern from the previous four pandemics seems to be repeating itself now, with one obvious difference: people are able to travel from one place to another much more quickly. In 1918, intercontinental travel required traveling by ship. To get to Europe, it took two weeks. Now, it's a four-hour plane ride. It's the distance in time between two meals. Lunch in Paris; dinner in New York—and the virus has moved three thousand miles. This could portend a serious problem this fall and winter.

Avoiding H1N1

There are steps you can take to improve your chances of avoiding H1N1. Remember that the virus enters the body through the mouth and nose, often by the hands, and can survive for short periods on any surface that has moisture. Therefore,

- Wash your hands regularly, if possible using alcohol-based sanitizer liquids like Purel and Germex. Keep your face clean, as well;
- Wear a mask if you are working with someone who has the flu or if you are traveling in crowded public spaces such as airports and train stations in places that have known swine flu outbreaks;
- Keep your workspace well ventilated; open a window, if possible;
- Wipe down spaces and objects that are used in common: bathrooms and kitchens, the copier controls, doorknobs, telephones, even pens at a cash register.

The incubation period of the virus is about 4-7 days. Be particularly attentive to how you are feeling, especially if you have been recently exposed to a friend, family member, or co-worker who has come down with swine flu. If you are not feeling well, it is better to err on the side of caution and not go to work.

Know the symptoms and begin treatment within 48 hours

Headache, cough, and a high fever are the hallmarks of the flu. Often, the patient will also have a sore throat and diffuse aches and pains. It's like having a cold, but the symptoms are twice as bad, and they last twice as long. And it happens fairly quickly: the patient feels well on Tuesday, is kind of sick on Wednesday morning, feels worse by the end of the day, and by Thursday morning, has the flu full force. Everything hurts: they have a ripping headache, a fever north of 101.4, and they feel awful.

Treatment should begin as soon as possible and certainly within 48 hours of onset. Discuss the symptoms with your primary care physician, who may prescribe Tamiflu or Relenza. (oseltamivir or zanamivir).

Finally, two caveats: avoid antibiotics and the ER

Unless otherwise directed by a physician, avoid antibiotics. They are focused on bacterial infections which tend to live in just one place, such as the sinuses, the strep of the throat, or the urinary tract. When a patient feels that bad across so many different body parts, that's the flu—and antibiotics don't help.

Also, in general, avoid going to the emergency room because you may infect others. Of course, last spring, everybody went to the emergency room. The daily volume of most urban ERs was up 50 percent in many cases. The problem is they brought the virus to the health care facility, so they infected the doctors and nurses who were in the best

position to protect them. And they infected sick people who were already at the ER with other serious illnesses.

It was a reasonable response to the situation: when you have swine flu, you feel awful and afraid. However, the best approach is to stay put and contact your primary care physician by phone to review symptoms and determine a course of action.