

Swine Flu in New Pattern: Will It Turn Deadly?

by Laurence Hecht

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June 18—Something halfway between living and dead, and so small that 500 million of them could fit on the head of a pin, may be about to change world history, forever. (And, no, we don't mean the brains of the present Congress and Administration.)

In separate announcements over the past two weeks, two of the world's leading authorities on pandemic influenza noted that the H1N1 virus (swine flu) is no longer following a seasonal pattern. Human cases of the virus, which should have been disappearing from the Northern Hemisphere as Summer rolled in, were, instead, increasing. The persistence or increase of cases in Minnesota, New York, and New England was noted by Dr. Michael T. Osterholm, a world-renowned infectious disease specialist, and former special advisor on bioterrorism to the U.S. Department of Health and Human Services, in an interview published in the *New York Times* June 12.

Such persistence is one of the warning signs that a virus, a constantly changing entity, may be becoming more deadly. A similar pattern was also seen in previous pandemics, such as 1957, and the 1918 flu, which may have killed as many as 100 million worldwide, in less than a year. There is no question now that we are in the midst of an influenza pandemic, as the World Health Organization declaration of June 11 made official. The big question is whether and when this new strain of virus may mutate, or re-assort into a

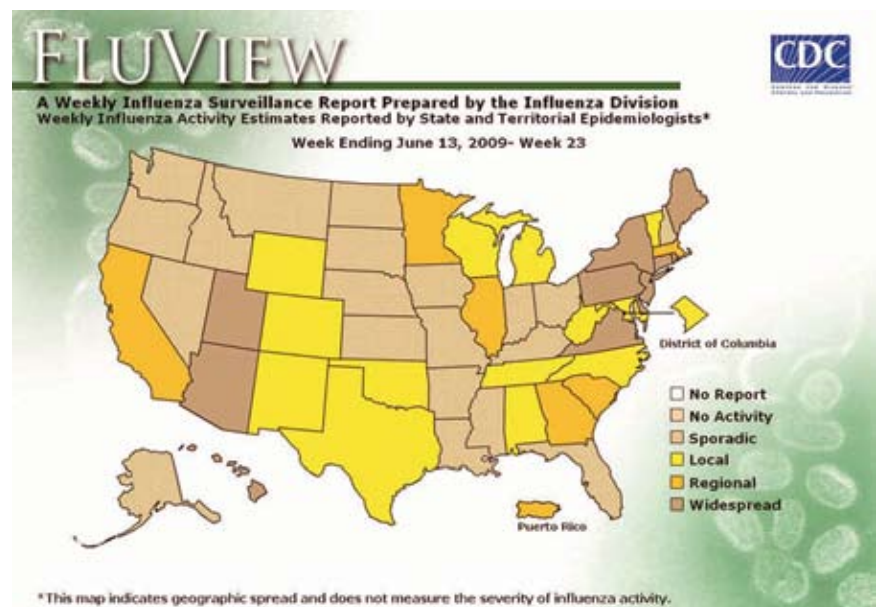
deadly new version, that could wreak havoc on unprotected populations.

A Warning from the Pasteur Institute

A week before the Osterholm warning, Dr. Sylvie van der Werf, director of a research unit at France's Pasteur Institute, described the non-seasonal behavior of the new H1N1 virus as a serious threat, and called for universal vaccination. (France is already preparing to vaccinate its entire population.) Usually, influenza spreads in Autumn and Winter, Dr. van der Werf noted, but the current virus is spreading in the United States and Canada while these countries are in Spring and early Summer. We're not in normal conditions of virus transmission, she said, in an interview with the French daily *Le Figaro*.

Another anomaly van der Werf noted: Normally, a

FIGURE 1



U.S. Centers for Disease Control

new influenza virus substitutes itself for the virus of the seasonal flu. This is not taking place now. We're in an entirely new situation. We don't know if there will be one or two viruses next Autumn in France. Everything indicates that the virus will spread massively in the Northern Hemisphere. When? End of June? End of August? End of September? One cannot exclude that the virus will start circulating at an unusual time period. Therefore, vaccination of everyone has to be undertaken, in the North as well as in the South, in the rich as well in the developing countries. And in her opinion—in light of the current evolution of the disease—the sooner the better.

New outbreaks of the H1N1 flu virus this week, in seven Mexican states, added emphasis to her warning. Authorities reactivated the health alert status, and closed some elementary schools in the states of Chiapas and San Luis Potosi. These are regions of sub-tropical climate. National Health Minister José Ángel Córdova noted the discrepancy, pointing out that, normally, the flu would not be expected to stage a resurgence until the Winter. Mexico had declared a flu emergency April 23 after numerous cases of the new flu began appearing in various parts of the country. Mexico City went back to a normal "green" status on May 21, after no new infections had appeared for a week.

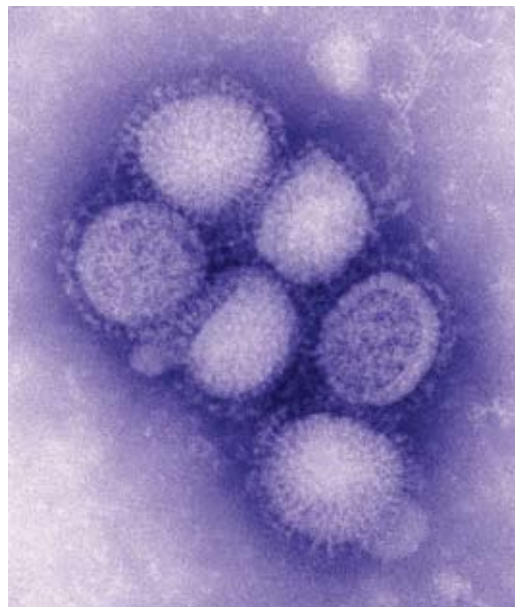
CDC Confirms It

Then, on June 18, the U.S. Centers for Disease Control (CDC) announced that the flu season, which should have ended by now, is continuing in the United States. "We're anticipating that we will see the novel H1N1 continue with activity probably all the way into our flu season in the Fall and Winter," CDC epidemiologist Dan Jernigan said in a press conference. One of the present areas of concern is children's Summer camps.

CDC testing now shows that 89% of the influenza virus still circulating in the United States is the new

strain, now officially known as Novel H1N1. Jernigan said the flu appears to infect about 7% of the population in the hardest hit areas of the Northeast.

"Clearly, there are hundreds of thousands of cases that have occurred in the U.S.," he said. The number of officially confirmed cases is much lower, because confirmation requires acquisition and testing of specimens. As of June 12, the CDC reported 17,855 confirmed and probable cases and 45 deaths in the U.S.A. Worldwide, experts estimate that millions have probably been infected. But, the number of confirmed deaths attributable to the virus is under 200.



U.S. Centers for Disease Control

Electron microscope images of the H1N1 influenza virus, taken in the Centers for Disease Control Influenza Laboratory. The spike-like structures on the outside are the protein coat.

A Cause for Worry

The cause for concern was summarized in a number of new papers appearing in the *New England Journal of Medicine* over recent weeks. The argument is based on the observation of the development of previous influenza epidemics, the most serious of the past century being the deadly 1918 and the 1957 outbreaks.

An influenza virus is a continuously changing organism. One type of change is a mutation within the genome which causes

changes in the proteins produced by the virus. This could cause, for example, a change in the outer shell which might make it more difficult for the human or animal immune system to detect or defeat the virus. In another type of change, known as re-assortment, elements of other viruses can unite with the existing virus, creating a new entity.

The largest natural reservoir for viruses that end up infecting humans is the bird population. Livestock, especially pigs, provide another important reservoir. Interaction among migratory birds, livestock, and humans appears to be the usual route for development of new viruses. Several strains of such so-called triple reassortant viruses have been recently identified, using advanced genomic techniques not previously widely available.

Analysis of the strain of H1N1 virus responsible for

the present pandemic, indicates that it is made up of components of avian, swine, and human viruses that can be traced back to 1990. These combined, in about the year 2000, with two North American swine flu strains. A Eurasian swine flu strain is probably also involved.

The ability of a virus to incorporate so many variants from different animal and human populations from around the world is the real cause for worry. In a sense, the virus is a marker of the state of the human condition, and carries within it, the legacy of all previous states of the human condition. When sanitation and preventive health measures are maintained, and human and animal immunity levels are high, the likelihood of deadly pandemics, viral or bacterial, is lower. In periods of economic and social collapse, the probability of a deadly pandemic event is greatly increased.

One such time was in the aftermath of World War I, when the 1918 influenza pandemic unleashed its wrath upon the world. Another such time is now. The sudden reversal of fortunes of large, concentrated populations in Eurasia and the Southern Hemisphere, already living on the borderline of malnutrition and compromised immune states, provides just the sort of breeding ground that viruses and bacterial infection thrive on. (The UN Food and Agriculture Organization announced this week that the number of hungry people around the world, due to the global financial meltdown, now exceeds 1 billion.) The reduced access to health care in developed nations, unemployment, and declining living standards, add fuel to the fire. Migrations of populations made desperate by economic conditions, globalized agriculture, with its added opportunities for easy transmission of animal diseases across borders, the natural movement of bird populations carrying new infections, all provide paths for spread of infection.

Disease is the true marker of the state of the global physical economy. The virus or bacterium has little interest in market values. The real state of the worldwide wealth-producing capacity, and the resultant condition of its human participants, is its only interest. Within the viral genome, the history of the economic successes, and failures, of globally extended human population is written.

To a sane U.S. Presidency, such serious considerations, and the ominous warnings of leading world experts, would be cause for concern.

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