

## **Possible link between the severe respiratory illness outbreak in Mexico and swine influenza in southwestern United States?**

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### **Abstract**

Reminiscent of the Severe Acquired Respiratory Syndrome (SARS) outbreak during the spring and fall of 2003, an outbreak of Severe Respiratory Illness (SRI) in Mexico has world health officials in a state of concern. The concern centers on the fact that as of April 24, 2009 over 134 cases have been reported in Mexico with an accompanying high mortality rate in healthy young adults. With new information surfacing from public health investigations of recent cases of swine influenza in the United States, here we discuss putative links between the outbreak of SRI in Mexico and the emergence of a novel swine influenza A (H1N1) strain in several southwestern U.S. states.

**Key Words:** swine influenza, emerging infectious disease, severe respiratory illness.

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Eerily reminiscent of the Severe Acquired Respiratory Syndrome (SARS) outbreak during the spring and fall of 2003, an outbreak of Severe Respiratory Illness (SRI) in Mexico has world health officials in a state of “Heightened Concern”. The concern centers around the fact that as of April 24, 2009 over 134 cases (see Figure 1) have been reported with an associated 20 deaths ([http://www.health.gov.on.ca/english/providers/program/emu/health\\_notices/ihn\\_042\\_309.pdf](http://www.health.gov.on.ca/english/providers/program/emu/health_notices/ihn_042_309.pdf)), although some estimates place mortality figures at around 60 deaths. Case fatality rates range from 11 to 29% in central and southern Mexico. What is most alarming is that the deaths have occurred in healthy young adults.

Seasonal influenza, which usually subsides by late spring in North America and Mexico, does not seriously affect healthy young adults but can cause serious illness in the very young and the very old. In contrast, the 1918 influenza pandemic caused severe illness in healthy young adults. The symptoms observed in afflicted patients from the recent outbreak in Mexico have similarities to symptoms of the 1918 pandemic. Infected people first display influenza-like symptoms, including fever, cough, sore throat, muscle joint pain,

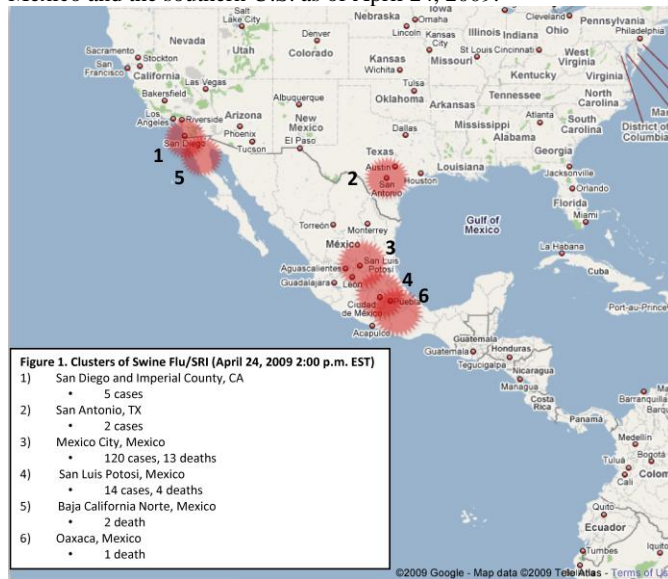
and possible shortness of breath. The illness progresses to SRI within five days.

Health officials in Mexico have reported SRI cases in the central and northern regions of the country. Several of the recent SRI deaths have been reported in Mexican states that border the U.S. states of Texas and California, where the Centers for Disease Control and Prevention (CDC) has recently been investigating an outbreak of swine influenza. As of this writing, the CDC report 7 human cases of swine influenza in Texas and southern California (<http://www.cdc.gov/flu/swine/investigation.htm>). Interestingly, the first two confirmed cases of swine influenza had no direct contact with pigs.

The link between cases in Mexico and the United States appears to be swine influenza A (H1N1) as Mexican Health Minister Jose Angel Cordova told the Televisa network. Indeed, Mexican officials now state that some of the samples taken from ill patients have been confirmed by laboratories at the Public Health Agency of Canada and the CDC as positive for the virus.

The swine influenza A (H1N1) viruses isolated by

**Figure 1.** Clusters of human cases of swine influenza and SRI in Mexico and the southern U.S. as of April 24, 2009.



the CDC from the two individuals who were ill in late March and early April in southern California were found to be closely related and not previously seen [1]. Even though the majority of the novel swine influenza A virus's genes were similar to swine influenza viruses circulating in the United States since 1999, two of the genes (the neuraminidase and the matrix proteins) were found to be similar to genes from viruses of swine flu Eurasian lineage [2]. This finding suggests that the swine influenza virus causing illnesses in the United States, and possibly Mexico, is a new virus recombined from different strains.

Although H1N1 is not a new subtype of influenza A in humans, the new swine virus isolated from these cases is substantially different from existing human H1N1 viruses. Therefore, a large proportion of the population may be susceptible to infection with this new form of H1N1 influenza. The more alarming aspect of the Mexican SRI is that it appears to be contagious and easily transmitted outside of an intermediary swine host. If this is the case, then person-to-person contact may spread the illness. In an attempt to limit person-to-person transmission, Mexico City has cancelled classes at all levels of schools, including Universities. Furthermore, they have recommended that people take personal precautions and not gather in large groups.

Since travel is extensive throughout Mexico and the United States, North American public health officials are on alert for additional outbreaks. Anyone seeking medical attention for having influenza-like symptoms, plus travel to Mexico, should be observed for onset of

severe respiratory illness and possible infection with swine influenza. Additionally, healthcare professionals in North, Central, and South America should be on the lookout for patients presenting with influenza-like illness who have had recent contact with swine. This outbreak highlights the need for closer collaborations between investigators (in both human and animal pathogens), front-line health care professionals in developing countries, and their counterparts in other countries in order to coordinate resources and expertise in zoonotic emerging infectious diseases. This will aid in the design of rapid responses to emerging respiratory infections in humans, a gaining of a better understanding of the epidemiological and host factors of the disease, and the development of potential intervention strategies.

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