Study of first wave of swine flu requires revised public health strategies

June 29 2009

There is no way to know how the newest strain of the H1N1 influenza virus will behave in the future. But scientists, notably those working at the intersections of epidemiology, mathematics, modeling and statistics, are monitoring it closely to identify anomalies on its pattern of spread while evaluating ways of mitigating its impact.

"Public health officials have the ability to track confirmed cases and hospitalizations in real-time with modern data collection approaches and the aid of modeling as well as the ability to quickly identify new strains and track their evolution," says mathematical epidemiologist Gerardo Chowell-Puente, an assistant professor at Arizona State University's School of Human Evolution and Social Change in the College of Liberal Arts and Sciences.

Chowell-Puente is co-author of a new study of the A(H1N1) influenza pandemic strain circulating around the world. The study's findings reveal an age shift in the proportion of cases toward a younger population when compared with historical patterns of seasonal influenza in Mexico. The findings are published June 29 online in the New England Journal of Medicine. Other authors of "Reported severe respiratory disease and deaths concurrent with atypical A(H1N1) influenza circulation of swine origin in Mexico, 2009" include Stefano Bertozzi and Arantxa Colchero, Mexico's National Institute of Public Health; Hugo Lopez-Gatell, Celia Alpuche and Mauricio Hernandez, Mexico Ministry of Health; and Mark A. Miller, National Institutes of Health Fogarty International Center,

"The data show that the vast majority of cases of severe pneumonia and deaths occurred among those ages between 5 and 59, which is atypical when compared with the age pattern supported by seasonal flu," says Chowell-Puente. "If resources or vaccine supplies are limited, focusing prevention efforts on these age classes must be considered."

Specifically, according to the findings, 87 percent of the deaths and 71 percent of the cases of severe pneumonia occurred in persons aged 5-59, compared to an average 17 percent and 32 percent, respectively, for influenza seasons from 2006 through 2008. "These findings suggest relative protection for those persons exposed to H1N1 influenza viruses during childhood prior to the 1957 pandemic," Chowell-Puente says.

Chowell-Puente and other mathematicians and biostaticians attending a swine flu workshop at Arizona State University June 25-28, note that vaccines and anti-viral medications are in limited supply.

"Because achieving high vaccination rates before the fall is not feasible with current technologies, effective distribution of a limited vaccine and antiviral stockpiles will be crucial to mitigate a potential second pandemic wave. The seasonal influenza vaccination strategy focuses on the very young and the very old - the most vulnerable populations. This is not necessarily the case for pandemics as we showed in our study."

According to Chowell-Puente, the key to containing pandemic flu is closely tied in to the ability to quickly produce a good stockpile of vaccines and following a reactive distribution plan that targets the appropriate age cohorts of the population. The first wave of the current strain has not been particularly deadly, but subsequent waves may be more virulent, though it is too early to tell, he notes.

"For the 1918 ("Spanish flu") influenza pandemic, this was the pattern - first a mild wave, and then a severe one with higher case fatality rates,"

notes Chowell-Puente.

The features of the A(H1N1) epidemic, according to the findings, are "somewhat similar to past influenza pandemics in that circulation of a new influenza virus is associated with an unseasonal wave of disease affecting a younger population."

It is the hope of Chowell-Puente that making this data available will help politicians make science-based decisions on how to optimize the use of limited resources to manage this and future epidemics.

In addition to this latest research, Chowell-Puente also was a co-author on a recent study of the flu in Japan. "Here we looked at the public health strategies they used that essentially stopped the spread of the disease in its tracks," he says.

The researchers found that in Japan, more than 90 percent of the cases were in school-aged children and teens. Quick action was taken to contain the disease through school closures and other social distancing measures, such as avoiding use of public transportation and the use of face masks. In addition, Japan employed active surveillance at airports, using recently developed sensors to detect passengers with fevers for additional screening. The disease was contained within two-to-three weeks, with only about 500 cases and no fatalities. Findings from this study appeared in the June 4 issue of *Eurosurveillance* in an article titled "Transmission potential of the new influenza A(H1N1) virus and its age-specificity in Japan."

Other authors on the Japanese study include: Hiroshi Nishiura, University of Utrecht, the Netherlands; Carlos Castillo-Chavez, Arizona State University; and Muntaser Safan, Mansoura University, Egypt.

Reducing the spread of the disease is key to preventing deaths, according

to Chowell-Puente. "As transmissibility grows, timely implementation of control measures is key to reduce epidemic impact on the population."

Source: Arizona State University (news : web)