Large differences in mortality between urban and isolated rural areas

EurekAlert

In urban communities, less than 1 in 100 inhabitants died from Spanish flu in 1918, but in isolated communities up to 9 out of 10 died. An important explanation for the differences is due to different exposure to influenza in the decades before the Spanish flu came. Those living in urban communities probably had a higher degree of pre-existing immunity that protected against illness and death in 1918 than those living in very isolated rural areas. This is shown in a new study from the Norwegian Institute of Public Health.

Previous studies have suggested that an important reason for the large regional differences in mortality must be that people living in cities were more frequently exposed to similar viruses to the one that caused the Spanish flu earlier in life than those living in rural and extremely isolated areas.

"It is not inconceivable that there was a different geographical spread of the virus in the 1800s and early 1900s, at a time when intercontinental communication networks were less developed" said Svenn-Erik Mamelund, a senior adviser in the Division of Infectious Disease Control at the Norwegian Institute of Public Health.

"No one knows exactly which influenza viruses circulated before 1918. But a leading theory is that there were H1-like viruses circulating in the period before the last major pandemic, the Russian pandemic of 1889-90. Some viruses circulating prior to 1889 may therefore have been related to the virus that caused the Spanish flu in 1918, A (H1N1). This would mean that some people who were older than 28-30 years in 1918 may have had some protection against severe infection and death from Spanish flu because of previous exposure to similar viruses," he said.

First to confirm anecdotal information from 1918 with quantitative data

Analyses of age-specific mortality in urban and Western society in 1918, subtracted the expected mortality from seasonal influenza a few years before 1918, show that young adults had relatively high mortality, and those who were older than 65 years were largely spared. However, similar analyses for isolated communities, such as in Labrador, Canada, and Alaska, USA, showed that mortality for all adults over 30 years was very high, and up to 90-100 per cent.

"Data from church records for Okak, Hebron, and Brevig also supported the historical anecdotes about the high mortality in these isolated communities," said Mamelund.

The study also shows that it was mainly people belonging to indigenous populations who died in the worst affected areas. Findings suggest, that to a greater extent, the

geographically isolated indigenous groups had risk factors associated with influenza, such as co-morbidities e.g. pulmonary tuberculosis, cramped living conditions and poverty compared to Caucasian populations living in cities and countries with a high degree of urbanisation in the West. In addition, loss of caregivers due to high mortality was an indirect cause of many fatalities. Genetic explanations may also have played a role, says Mamelund.

The study is published in the latest issue of the *Epidemics* journal, and is based on quantitative data from archives and church records and ethnographic data from Scandinavia, North America and Oceania.

What conclusions can be drawn from this study?

"Firstly, the new research shows that it was only in cities and countries in the West that people older than 65 years had lower than expected mortality. In very isolated indigenous communities, mortality was very high for all adults over 30 years of age, and higher than during seasonal outbreaks of influenza in the years before 1918.

"Secondly, we conclude that without adequate immunological protection for large parts of the world's population, Spanish flu would probably have claimed many more lives than the most widely quoted estimate of 50-100 million dead.

"Mortality rates during the recent A (H1N1) pandemic in 2009 were lower than during normal seasonal influenza. This may be partly due to similar mechanisms that were at work in 1918 also being in operation in 2009. Those who are older than 65 years usually have the highest mortality associated with seasonal influenza, but because of pre-existing immunity, few elderly people became ill and died in 2009. Serological studies from Europe, Japan and the USA. have shown that pre-existing immunity was highest among those born before 1918, but also those born later had some protection. Those born after 1949 had little or no immunity against the A (H1N1) virus in 2009."

Do historical studies have relevance for future pandemic preparedness?

"Yes, both historical and contemporary studies of the immune status and mortality during influenza pandemics for different ages and countries are important. The studies show that models of morbidity and mortality for future pandemics should include the significance of pre-existing immunity," concluded Mamelund.

SOURCE [1]

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