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Pandemic wave theory in doubt

Experts see weak evidence behind concerns over severe winter wave of influenza



Source: SXC/ilco

The 2009 pandemic could recede without resurging with a sweeping wave of severe influenza, write David Morens and Jeffery Taubenberger this week in *JAMA*. Health authorities in Europe and elsewhere have **warned** that worse may yet to come as more countries get into flu season, but the authors find few signs of distinct 'waves' of illness in large-scale outbreaks over the past two centuries.

"With little consistent evidence of wavelike behaviour in the major influenza epidemics and pandemics of the past, there is a general tendency of pandemics to quickly assume annual seasonality in temperate zones," say Morens and Taubenberger, of the US National Institutes of Health in Bethesda, Maryland.

It usually takes at least one recurrence before a new flu virus blends into more familiar patterns to circulate seasonally or annually, explain the authors in the commentary. This occurs as viruses change and more people build up immune defences against them. "The pandemics of 1957 and 1968 generally exhibited no more than 1 (mostly seasonal) recurrence, typically affecting populations not involved in the first pandemic appearance, and quickly became seasonal epidemics."

Even in the case of the 'Spanish Flu' of 1918–1919, when 20 million people are estimated to have died, there is no evidence to show which viruses were involved in spring-time outbreaks of mild influenza-like illness and a subsequent epidemic of more serious illness. The assumption that a more virulent virus appeared in the winter followed evidence of changes in mortality during the course of that pandemic, not changes in the virus, **infectious-disease experts have suggested**.

"The first documented wave of 1918, often confusingly referred to as the spring wave, was actually a summer surge of influenza fatalities concentrated in some but not all northern European countries between late June and August 1918," explain Morens and Taubenberger.

The impression that a spring pandemic wave preceded a later more serious epidemic in 1918 has drawn comparisons with the current situation, because most countries have seen mainly mild cases of illness associated with the novel swine-origin A/H1N1 strain of influenza. This has fuelled speculation that the pandemic might pick up speed later in the year, and that a more virulent virus might evolve.

The authors suggest that fears of a resurgence bringing more serious illness could also be off the mark. Past pandemics have varied in severity as well as where and when they appeared, they point out, adding that evidence of unchanged or lessening severity over time is "much greater" than the evidence of increased severity.

Experimental studies suggest that a flu virus could get weaker as it spreads through the population, says Heath Kelly, Head of the Epidemiology Unit at the Victorian Infectious Diseases Reference Laboratory and Associate Professor at the University of Melbourne, Australia. "It would be reasonable to expect an undrifting [unchanged] virus to become less virulent, rather than more virulent, over time, having passed through many hosts."

Kelly agrees that waves of illness may not be a significant feature of pandemics. In 1918, the ebb and flow of flu cases could have resulted from other factors, he explains, such as relaxed social-distancing measures, changes in age-specific attack rates, or a particular feature of the virus.

There are still many unknowns about the 2009 pandemic, notes Kelly. But the unanswered questions, including how many people are likely to die as flu season approaches in the northern hemisphere, are the same questions that vex health experts dealing with seasonal influenza, he says.

Although the "global industry" dedicated to keeping track of, controlling, and preventing influenza is important and impressive, it has been built on "surprisingly shaky foundations", adds Kelly.

Morens and Taubenberger see hopeful signs in the new H1N1 virus's modest ability to spread from person to person, its arrival during the summer, and the evidence of some pre-existing immunity in some vaccinated or older people. "Pandemic history suggests that changes neither in transmissibility nor in pathogenicity are inevitable," they write. "It will be critical to assess the effect of large-scale pandemic outbreaks in the Southern Hemisphere in the current and coming (winter) months."

Evidence from the ongoing pandemic in Australia, published this month in an [article](#) co-authored by Kelly, suggests that the 2009 pandemic strain predominated over seasonal strains over the course of 10 weeks, becoming responsible for 95% of all illness cases reported in the country. There was no evidence that people of any age were protected by having received seasonal flu vaccine.

Reference and link

1. Morens DM, Taubenberger JK. Understanding influenza backward. *JAMA* 2009, **302**:679–680. [Article](#)

[World Health Organization information](#) about pandemic (H1N1) 2009

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