Christmas–New Year Influenza Lull: Not Too Late for Vaccination

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(See the major article by Ewing et al on pages 732–9.)

There has long been interest in predicting influenza season onset and timing and magnitude of peak activity to guide initiation of efforts to produce vaccine, encourage and provide vaccination, and enable the healthcare system to prepare for the possible onslaught of those needing care, particularly hospitalization. It is a certainty that the seasonal influenza epidemic in the United States will occur annually and that influenza activity will begin to build up during the early winter months, usually starting in December. However, predicting the rate of build-up, timing, and intensity of peak activity has been difficult.

Observing the rate of build-up, which influenza virus strains are circulating, and modeling based on past experience provide useful data and estimates, but these estimates, like weather predictions, are rarely reliable for very long to predict what will actually happen in the next weeks and months. Thus, any information that can add predictability to influenza season dynamics is of interest. In this vein, of high interest for pandemic influenza preparedness is understanding factors under human control that might predictably modify the dynamics and, thus, the trajectory of the seasonal influenza epidemic, delaying and lowering the magnitude of peak activity.

In this issue of The Journal of Infectious Diseases, Ewing et al present 2 studies that add to our understanding and predictability of early influenza season dynamics [1]. Each study examined the effect of the Christmas–New Year holiday period on influenza season dynamics. The first is an analysis of observational data: influenza-like illness (ILI) visits over time as recorded in a national medical claims database managed by IMS Health [2] for each of 8 influenza seasons (2001–2009). The second is a series of models of influenza transmission in a synthetic population to examine the possible mechanisms behind the observed holiday decrease in influenza occurrence.

For the first study, the authors found that the 2-week Christmas–New Year winter holiday period reduced visits for ILI and effectively delayed by at least 2 weeks the trajectory of what would be expected to happen had there been no holiday. The authors also noted a switch in relative ILI occurrence from children toward adults during the holiday period, a switch that gradually reversed after the holidays ended, and influenza occurrence began climbing again in all age groups.

The models, testing several hypotheses for why ILI visits might be reduced, found that, indeed, holidays during which schools were closed resulted in reduced transmission and a delay in the trajectory of the build-up to peak influenza occurrence, whereas simply introducing a lot of holiday travel did not have this impact. The authors concluded that the Christmas–New Year holiday delays seasonal influenza epidemic peaks as a result of changes in contact patterns. The key dynamic appears to be the reduction in opportunities for children to transmit to each other and others as a result of the up to 2-week concurrent school holiday.

These studies have some important strengths. The first used a national medical claims database (de-identified electronic CMS-1500 medical claim forms from full-time office-based active physicians throughout the United States) that captures almost 62% of outpatient visits in the United States, a database and influenza/ILI definition for which a high degree of correlation with US influenza activity independent of respiratory syncytial virus activity has been established [2]. Thus, it is specific for influenza. It examined 8 influenza seasons nationwide and demonstrated the same pattern of reduced medically attended ILI occurrence, after adjusting for reduced access to healthcare for all during the holiday period, with subsequent slow build-up after. Thus, the findings were consistent from year to year. The one exception was the 2003–2004 season that came early, peaked at the Christmas–New Year holiday, and rapidly declined without gradually “recovering” afterward. The models used were simple and clearly demonstrated the different impacts of school closure compared to travel on the build-up of influenza in the population, differences that made sense and, in the case of holiday school closures, were consistent with the observational findings.

The studies add to and support the results of 2 other large observational studies at a national level in Argentina and
France regarding the impact of school closures during winter holidays [3, 4], by demonstrating impact across the United States, covering 8 influenza seasons, providing a picture of what happens when schools are closed for holidays very early in an influenza season, and exploring the dynamics of what was observed using agent-based synthetic models. However, the observational study is also limited in that it could only provide a window into early season influenza dynamics.

There are some important implications from the findings in this study, both for seasonal and for pandemic influenza control. The main implication for seasonal influenza control is that the holiday season is a good time for additional public health efforts to encourage vaccination against influenza for those who did not get vaccinated earlier. Although vaccination is recommended during the entire influenza season, the main push for vaccination takes place during September through November when providers, workplaces and health departments take special efforts to make vaccine accessible to their clients, employees, and the community. Relatively little vaccination occurs after this time [5], despite the fact that the build-up to the annual influenza epidemic is usually slow before the Christmas–New Year holiday and stalls during that time. Although many health departments and provider offices may be closed for all but emergencies over the holidays, pharmacies are not. Their doors would be closed for all but emergencies over the holidays, pharmacies are not. Their doors would be closed for all but emergencies over the holidays, pharmacies are not. Their doors would be closed for all but emergencies over the holidays, pharmacies are not. Their doors would be closed for all but emergencies over the holidays, pharmacies are not. Their doors would be closed for all but emergencies over the holidays, pharmacies are not. Their doors would be closed for all but emergencies over the holidays, pharmacies are not. Their doors would be closed for all but emergencies over the holidays, pharmacies are not. Their doors would be closed for all but emergencies over the holidays, pharmacies are not. They would only need to achieve the level of relative “isolation” that happens during the winter holidays. A 2-week school closure early after recognition of a widespread pandemic that achieved what has been observed during the Christmas–New Year holiday would allow more time to study the severity of a pandemic strain, to determine the effectiveness of antiviral agents and to enable the healthcare system to prepare, even if it did not ultimately result in fewer people being infected.

There are several implications for future research. One notable shortcoming of the observational study is that the database used does not include visits for ILI from those without health insurance. It is possible that the holidays have a different effect on influenza occurrence among those without insurance, presumably mostly those who are poor. Influenza has been shown to more severely affect those living in poor neighborhoods, groups that are also less likely to be vaccinated against influenza [8]. In addition, it is unclear how likely those without health insurance would be to take advantage of the holidays to get vaccinated, especially if they had to pay for vaccine out-of-pocket. Nonetheless, there is an opportunity and a need to explore and evaluate systematic efforts to encourage influenza vaccination during the holiday period. The 2015–2016 influenza vaccination rates of 42% in adults and 59% in children [7] leave much room for improvement and are well short of the Healthy People 2020 targets of at least 70% for each group [9].

Notes

Disclaimer. The opinions expressed are solely those of the author and do not necessarily represent the official views of the Yale School of Public Health or the Centers for Disease Control and Prevention (CDC).

Potential conflicts of interest. Author certifies no potential conflicts of interest. The author has submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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