

'Natural experiment' documents the population benefit of vaccinating preschoolers against the flu

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Recent policies calling for vaccinating preschool-aged children against the flu led to a 34 percent decline in influenza cases in this age group, according to researchers at Children's Hospital Boston and McGill University. The findings, which revealed smaller declines in other age groups as well, arose from a study that used real time surveillance data from pediatric emergency departments (EDs) in the United States and Canada to evaluate the relationship between national flu vaccination policies and rates of flu-like illness.

The research team, led by Anne Gatewood Hoen and John Brownstein of the Children's Hospital Informatics Program (CHIP), reported their findings September 19 in the [Canadian Medical Association Journal](#).

Preschoolers – specifically children aged two to four – play a significant role in community transmission of the flu with each new season. The Advisory Committee on Immunization Practices – the national body that sets vaccination policies in the U.S. – updated its [influenza](#) vaccine recommendations in 2006 to include vaccination of this age group. The corresponding Canadian body, the National Advisory Committee on Immunization, did not include these children in its recommendations until 2010.

"The differences in the U.S. and Canadian policies created conditions for a natural experiment for evaluating the effects of U.S. policy change

in the target age group," said Brownstein, director of CHIP's Computational Epidemiology Group. "They also gave us an opportunity to test whether we could use hospital-based real time [surveillance data](#) to assess the effects of policy changes, and do so more quickly than traditional epidemiologic studies, which are more focused on vaccine uptake than on outcomes."

To conduct this evaluation, Brownstein, Hoen, and their collaborators at McGill compared data on 114,657 ED visits for influenza-like illness (out of 1,043,989 total visits) at Children's Hospital Boston and Montreal Children's Hospital in Montreal, Quebec, from 2000 to 2009, ending with the onset of the 2009 H1N1 pandemic. This period included years when the U.S. and Canadian flu vaccination policies for two- to four-year olds were aligned and the years when they differed.

"Montreal and Boston are similar demographically and have similar epidemiological dynamics with regard to seasonal influenza," according to Hoen, a research fellow in CHIP who, like Brownstein, holds a joint appointment at McGill. "We also examined data on the virus strains circulating in each city for each season to account for any viral differences and ensure that we were making valid comparisons."

While the data from both EDs showed strong similar seasonal variations in reports of influenza cases across the whole time period studied, the rate of visits by two- to four-year olds to the Children's Hospital Boston ED for flu-like illness declined by 34 percent compared to Montreal Children's following the 2006 U.S. policy change.

The research team also found that ED visit rates for flu-like illness also declined between 11 and 18 percent for other childhood [age groups](#) in Boston compared to Montreal.

"There are a few explanations for the findings in other age groups,"

Hoen said. "It could be that vaccinating preschoolers reduced the spread of the virus in the home and the community, kind of a 'herd immunity' effect. It is also possible that the policy change had the side effect of improving vaccine uptake overall by promoting general awareness of the benefits of vaccinating children overall, or by increasing the likelihood that parents would get the siblings of preschoolers vaccinated."

"This approach has provided evidence of the population benefit of changing flu vaccination policies to include preschoolers," Brownstein added. "And it has gotten to that answer in a way that standard epidemiologic systems could not have."

Hoen and Brownstein think their methods have the potential for more generalized application beyond [flu vaccination](#). "There almost certainly other scenarios in which it would be possible to look at health status differences between populations based on policies, behaviors, etc., using this kind of analysis," said Brownstein. "And we don't have to limit ourselves to infectious diseases, but can look at chronic diseases or medication safety issues. More real time data is coming out, and we just have to think carefully about it, understand it, and find the proper context in which to make comparisons."

Provided by Children's Hospital Boston

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