ABSTRACT

School absenteeism and emergency department ILI rates in King County, WA 2003–2009

C Rodriguez[1,2], A Baer[1,2], J Baseman[2], I Painter[2], D Yanez[2], T Koepsell[2], and JS Duchin[1,2]

[1]*Public Health—Seattle & King County (PHSKC), Seattle, WA, USA; and* [2]*University of Washington, Seattle, WA, USA*
E-mail: carla.rodriguez@kingcounty.gov

Objective
To describe the relationship between emergency department (ED) visits for influenza-like-illness (ILI) and absenteeism among school-aged children.

Background
Absenteeism is regarded as an expedient and responsive marker of illness activity. It has been used as a health outcome measure for a wide spectrum of exposures and as an early indicator of influenza outbreaks.[1] A handful of studies have described its validity compared with traditional 'gold-standards' for influenza and ILI.[2,3] We sought to further quantify the relationship between ED ILI and school absenteeism because absenteeism, as it relates to illness, and subsequent loss in productivity and wages for parents, school staff and children, is an important public health outcome.

Methods
Data were drawn from Public Health—Seattle & King County's syndromic surveillance system and included the weekly number absent by school and the weekly number of ILI visits in the county. Eighteen of nineteen public school districts and 18 of 19 hospitals contributed data for school-aged children from 2003–2009. An ecological study design and generalized estimating equations for Poisson models were used to measure the marginal association between county-wide (log) ED ILI rates and school absenteeism over time, using school enrollment as an offset. Models included adjustment by school level, influenza season, (log) average baseline absenteeism count, pre- and post-holiday weeks, time and confounding by diarrheal illness. The 2003–04 and 2008–09 school years were analyzed separately because of distinct patterns in respiratory virology during those years. Sensitivity analyses for the number of ED visits per school, simulated using a normal distribution for a range of means, were conducted to test the reliability of our results. Signals, representing excess events, in both ED and absenteeism data streams were generated using the cumulative sum (CUSUM) method and compared with virology data from the University of Washington Clinical Virology Laboratory. Virology data were also used to define the start and peak of viral epidemics, including influenza.

Results
During seasonal influenza periods from 2003–08, a 3-fold increase in county-wide ED ILI rate among children aged 5–9 years was associated with 18% (95 CI: 16,20%) higher absenteeism in elementary schools. Associations were similar among elementary and middle school-aged children, and greater than those observed in high schools. During the spring 2009 H1N1 pandemic, a 3-fold increase in ED ILI rate was associated with 38% (95 CI: 33,43%) higher absenteeism in elementary schools. We generally observed only weak associations between absenteeism and ILI during non-influenza periods from 2003–08 and outside the pandemic period of 2009. Predicted absenteeism rates were less variable than ILI rates, but still sensitive to the rise and peak of ED ILI and influenza epidemics. ED ILI signals were better correlated with virology data for the start and peak of influenza season than predicted absenteeism.

Conclusions
To our knowledge, this is the first study to quantify the degree to which absenteeism increases when ED ILI activity increases over several viral epidemics. We also observed improved temporal correlation of ED ILI signals with influenza data over predicted absenteeism, supporting the use of ED ILI as a predictor for school absenteeism. Because data on ED visits were only available at the county-level, we were unable to control for potential confounding by ED visits at the school level. However, our results were robust to sensitivity analyses. This is a first step towards understanding the validity of school absenteeism to describe ILI activity. Future studies that better control for the effect of school-level ED visits on absenteeism and test the predictive ability

of absenteeism for ILI are needed to verify and expand upon our results.

Acknowledgements

References

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