Syndromic Surveillance for Influenza in Washington State: A Local and Regional Perspective

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OBJECTIVE

We explored the utility of tracking emergency department (ED) visits for febrile illness as a proxy for influenza surveillance, from both a local and a regional perspective.

BACKGROUND

In Washington State, near real-time analysis of ED data presents an opportunity to identify potential improvements to public health surveillance by monitoring disease trends and increasing the speed of case-finding. Syndromic surveillance data collected by Kitsap County Health District, Public Health – Seattle and King County, and Tacoma-Pierce County Health Department are shared with the Washington State Department of Health (WA DOH) to create a regional snapshot of disease activity.

METHODS

Three years of ED data (9/2004 – 4/2007) were examined from King (n=19 EDs) and Pierce (n=5 EDs) counties, and two years (9/2004 – 8/2006) of data were examined from Kitsap County (n= 1 ED). Records were selected if either the chief complaint or diagnosis contained one of the following key words or ICD codes in a common fever syndrome definition: FEV, HIGH TEMP, ELEVATED TEMP, HI TEMP, TEMP10, TEMP 10, SHIVER, FEELING HOT, FEEL HOT, FEELS HOT, NIGHT SWEAT, FEBR, PYREXIA, 780.6, 780.99. Fever syndrome records were counted by day, week, and month for each county and aggregated as a regional count. Total visits per day, week, and month were used to calculate proportions for King and Pierce counties and a regional aggregate of the two; census counts were not available for Kitsap County. To account for missing and incomplete historic data in the Pierce County repository, we replaced the census count and fever count with an average of the respective counts 2 days before and after when the census count was less than 65% of the 7-day moving average. Fever counts and proportions were also stratified by age group. Time-series data were plotted by time unit, county, and age group in line graphs and histograms. Trends were compared visually and by Pearson's correlation analysis. ED data were also compared to traditional data sources (number of schools reporting >10% absenteeism, positive influenza isolates, and pneumonia and influenza deaths) collected by the WA DOH as part of the annual sentinel influenza surveillance program.

RESULTS

There was a strong correlation between weekly ED fever visit counts and positive flu isolates, both for the region as a whole (r=.89) as well as by county (King, r=.88; Pierce, r=.83; Kitsap, r=.62). The correlation between positive flu isolates and weekly ED fever visit counts was highest among 18-44 year-olds (r=.87) and lowest among adults ages 65 and older (r=.51). In addition, Washington State school absenteeism trends correlated strongly with weekly fever visit counts among 5-17 year-olds (r = 0.83). The correlation was highest for King County (r=.85), followed by Pierce (r=.71) and Kitsap (r=.25) counties. There was a strong correlation between weekly ED visit counts at Pierce and King counties (r=.87). The volume of ED fever visit counts at Kitsap County was lowest compared with King and Pierce counties and did not correlate as strongly with data from these two counties (r=.61 and r=.53, respectively). The correlation between King and Pierce ED weekly fever visit counts was highest for the pediatric age groups (<2 years, r= .82; 2-4 years, r= .77; 5-17 years, r=.87), and declined with increasing age (18-44 years, r=.59; 45-64 years, r=.39; 65+ years, r=.13). When comparing King and Pierce counties, the correlations between the proportion of weekly ED fever visits was highest for the 5-17 year old age group (r=.84); the correlation for all other age groups was less than .65.

CONCLUSIONS

ED fever visits captured through syndromic surveillance correlate strongly across counties and with other specific and non-specific indicators of influenza activity, including laboratory influenza test results and all cause school absenteeism. ED fever visit trends for pediatric age groups, particularly school age children (5-17 years), may be good indicators of seasonal flu activity. Because other febrile illnesses, particularly respiratory syncytial virus, commonly co-circulate with influenza, the specificity of syndromic monitoring for fever symptoms needs to be further established. Additional work is also needed to evaluate the timeliness and alerting properties of the signals.

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