Using Emergency Department Disposition Data to Monitor Hospitalizations for Influenza-like Illness

Erin L. Murray, Ph.D., M.S.P.H.
New York City Department of Health and Mental Hygiene (DOHMH)

OBJECTIVE

To use Emergency Department (ED) syndromic surveillance data to monitor hospitalizations for influenza-like illness (ILI) and calculate excess hospitalizations attributable to influenza.

BACKGROUND

ED syndromic surveillance data for ILI have been found to provide timely and representative information about current influenza activity in NYC [1]. DOHMH monitors visits daily from 50 of 61 EDs, capturing about 94% of all ED visits in NYC. Since January 1, 2007, DOHMH has been receiving disposition data (e.g., hospitalized, discharged) from a subset of EDs. Currently, disposition data is received from 37 EDs (approximately 1/3 of all visits by the next day and >60% of all visits within 1 week).

More detailed hospitalization data, including date, demographics, and diagnosis on all NYC hospitalizations are routinely collected by the New York State Department of Health Statewide Planning and Research Cooperative System (SPARCS). SPARCS is subject to a 2-3 year reporting lag, thus limiting its timeliness and prospective use. However, SPARCS data from prior to January 1, 2007 can supplement the ED syndromic data to develop a model for ILI hospitalizations and calculate excess hospitalizations attributable to influenza that can be used in near real-time, particularly in the event of a pandemic.

METHODS

Preliminary analyses were limited to the 14 NYC EDs with disposition data available for >90% of all visits from January 1, 2007-May 17, 2008. Counts of weekly hospitalizations from EDs for ILI visits (i.e., complaints of fever and cough or sore throat, or mention of 'flu') were used. Additional baseline data were obtained from 2005-06 SPARCS data of ICD9-coded influenza-like ED hospitalizations. A cyclical regression model was fit to the combined 2005-06 SPARCS and 2007 syndromic surveillance data [2,3]. Excess hospitalizations from the ED attributable to influenza were calculated by subtracting the expected from the observed number of ILI hospitalizations. The number of ILI hospitalizations from EDs and (1) influenza isolates from WHO laboratories and (2) ED visits for ILI were compared using Pearson's correlation coefficients.

RESULTS

Among the 14 EDs used in this analysis, there were 314 excess hospitalizations from the ED attrib-utable to influenza during the 2007-2008 influenza season (See figure). ILI hospitalizations from the ED were strongly correlated with influenza isolates ($\rho=0.76$) and total ILI ED visits ($\rho=0.89$).

Admissions from the ED for Influenza-like Illnesses Obtained through Syndromic Surveillance and Influenza A and B Isolates, 2007-08, New York City
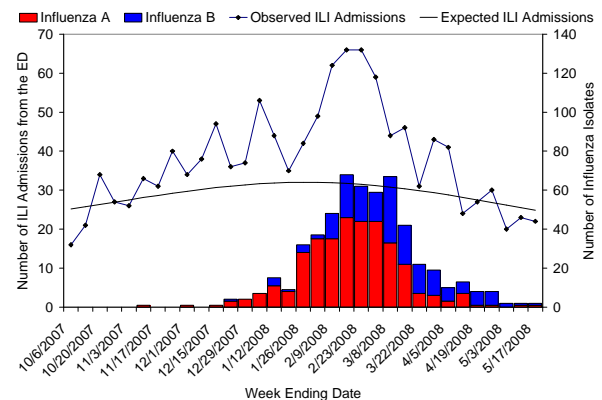
CONCLUSIONS

Preliminary analyses suggest that ED disposition data from syndromic surveillance is a viable data source for providing timely estimates of ILI hospitalizations. These analyses were limited by the small number of facilities and ILI hospitalizations from the ED, which decreased power and generalizability to the city. An additional limitation was the combination of two separate data sources, and thus different influenza-like definitions, to model expected levels of ILI hospitalizations from the ED. Future analyses should incorporate the SPARCS admissions data and the remaining 23 EDs providing disposition data through syndromic surveillance to provide city-wide estimates of hospitalizations for ILI and excess hospitalizations attributable to influenza, including by age group.

References:
[1] Olson DR, et al. Monitoring the impact of influenza by age: Emergency department fever and respiratory complaint surveillance in New York City. PLoS Medicine 2007; 4(8):1349-61.
[2] Serfling RE, et al. Excess pneumonia-influenza mortality by age and sex in three major influenza A2 epidemics, United States, 1957-58, 1960 and 1963. Am J Epidemiol 1967. 86: 433-41.
[3] Simonsen L, et al. The impact influenza epidemics on mortality: introducing a severity index. Am J Public Health 1997. 87: 1944-50.