

# Sneezes vs. Wheezes: Syndrome Definitions for Influenza-like Illness

Justin Pendarvis, MPH, Julia Gunn, RN, MPH, Amy Kirkwood Smith, MS,  
Michael Donovan, M. Anita Barry, MD, MPH

*Boston Public Health Commission, Communicable Disease Control Division*

## OBJECTIVE

To evaluate the impact of different syndrome definitions for influenza-like illness by comparing weekly trends with other data sources during the 2005-2006 influenza season in Boston.

## BACKGROUND

During influenza season, the Boston Public Health Commission (BPHC) uses syndromic surveillance to monitor Emergency Department (ED) visits for chief complaints indicative of influenza-like illness (ILI). We created three syndrome definitions for ILI to capture variable presentations of disease, and compared the trends with Boston pneumonia and influenza (P&I) mortality data, and onset dates for reported cases of influenza.

## METHODS

Three non-exclusive ILI syndrome definitions were used. ILI1 consisted of any flu-like symptom, ILI2 was defined as any flu-like symptom OR respiratory infection symptom, and ILI3 was defined by fever AND at least one flu-like symptom. Any chief complaint containing "flu" was included in all three syndrome groups.

**Figure 1. Syndrome Definitions**

	Fever	Cough	Cold	Sore Throat	Respiratory Infections
ILI1	✓	✓	✓	✓	
ILI2	✓	✓	✓	✓	✓
ILI3	x	✓	✓	✓	

✓ = At least one of these variables required

x = Required variable

From October 9, 2005 to May 6, 2006 the number of total visits for each ILI syndrome group was recorded daily and stratified into four age groups: 0-4 years (group 1), 5-24 years (group 2), 25-64 years (group 3), and ≥65 years (group 4). Trends in the number of weekly visits and percentage of all ED visits for each ILI syndrome definition were compared to the number of reported influenza cases with corresponding onset dates, and to weekly trends in the number of deaths attributable to P&I for the 122 Cities Surveillance Program. For reported cases of influenza, report date was used when the onset date was unknown (8.7% of cases). For cases in which both onset and report day were known, the average length of time between onset and report was 5.4 days. All comparisons were stratified by the four age groups.

## RESULTS

From October 9, 2005 to May 6, 2006, total ED visits ranged from 7,542 to 9,101 per week (average 8,405). During that time period ILI1 ranged from 9.4% of all ED visits to 16.0%; ILI2 from 10.0% to 16.9%; and ILI3 from 0.85% to 2.9%. ILI1 and ILI2 followed nearly identical trends, except in persons ≥65 years of age. All three syndrome definitions followed similar trending and all peaked the week of February 19-25. The percentage increase in ED visits for ILI was least pronounced for age group 1 (0-4) due to the common presentation of fever in young children, irregardless of season (46%-47% average by ILI1 and ILI2, 5.6% by ILI3). Age groups 2 and 3 showed the largest increases in ILI for all three syndrome groups. Onset of illness for the first reported case of influenza was the week of December 3, 2005; cases peaked the week of February 19-25, 2006. Overall P&I mortality ranged from 10.6% of all deaths to 12.6% for the two weeks beginning February 19. The proportion of deaths attributable to P&I was greatest among persons ≥65 (2.8%-18.2%, mean 11.8%) and peaked the week of March 4.

## CONCLUSIONS

ILI (all definitions), reported influenza cases, and P&I mortality all peaked between Feb 19 - Mar 4. The difference between ILI1 and ILI2 (i.e. the number of visits with respiratory infections) correlated with P&I mortality in the elderly (age group 4). The more specific ILI3 definition allowed for a comparison with national and statewide data for ILI sentinel surveillance that employ similarly standardized definitions for influenza. Variable syndrome definitions and age stratification allowed more accurate and descriptive characterization of the flu season, particularly as it pertains to issues of concern for public health officials.

