Accuracy versus Timeliness for Influenza Detection: A Comparison of Hospital Syndromic Surveillance Data with Discharge Data

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OBJECTIVE

Timely unplanned hospital admissions data in a general respiratory syndrome category and/or with a pneumonia or influenza admission diagnosis are compared with hospital discharge data to determine accuracy for prediction of influenza disease burden.

BACKGROUND

Hospital syndromic surveillance data may be a useful tool in detecting increases in influenza-like-illness (ILI) and for monitoring seasonal trends or pandemic activity on a local level. A previous comparison of hospital syndromic surveillance data with ILI surveillance data manually abstracted from emergency department notes revealed that the general respiratory category performed better than symptom-specific subcategories [1]. However, only about half of all patients hospitalized for influenza meet the ILI criteria defined as fever and either cough or sore throat [2]. Hospital discharge data are used retrospectively to determine disease burden [3], but is not of use for acute monitoring due to the substantial lag time. Knowing how accurately admission data reflect discharge data can assist with interpretation of real or near-real time data streams commonly used in syndromic surveillance systems.

METHODS

Data were used from one large tertiary-care hospital in Vermont participating in the Vermont Department of Health (VDH) hospital-based syndromic surveillance system. The general respiratory category is defined as one or more respiratory signs, symptoms, or diagnoses in the chief complaint, impression diagnosis or admission diagnosis; several exclusions apply. 53% of the records have a free text impression diagnosis. Admission data consist of admission diagnosis which is an ICD-9 code with text descriptor. Discharge data consist of five ICD-9 codes. Admission records and discharge records from 3/1/03 to 3/30/06 with an ICD-9 code of pneumonia (480-486) or influenza (487) were matched on a unique visit number.

RESULTS

The general respiratory syndrome category was 55.6% sensitive and 94.7% specific (PPV = 41%) compared with pneumonia and influenza diagnostic discharge codes. Inpatients with admission diagnoses for pneumonia or influenza predicted pneumonia or influenza discharge codes with a sensitivity and specificity of 40.1% and 98.9%, respectively, and a PPV of 71%.

Figure 1. Comparison of general respiratory category inpatients to discharge diagnosis codes.

Respiratory category	Discharge code*		Total
	yes	no	
yes	1,030	1,413	2,443
no	822	25,446	26,268
Total	1,852	26,859	28,711

*ICD-9 diagnostic code for pneumonia or influenza.

Figure 2. Comparison of admission and discharge diagnosis codes.

Admission code*	Discharge code*		Total
	yes	no	
yes	742	299	1,041
no	1,110	26,560	27,670
Total	1,852	26,859	28,711

*ICD-9 diagnostic code for pneumonia or influenza.

Sensitivity and PPV for the respiratory category were slightly better when analysis was limited to influenza season (Nov – Apr); other measures did not differ.

CONCLUSIONS

Using retrospective pneumonia and influenza discharge codes as a comparison, the general respiratory category performed moderately well. Limiting this category to only persons with admission diagnoses of pneumonia or influenza predicted discharge diagnosis less effectively. Existing syndromic surveillance systems may be a useful tool for seasonal and pandemic influenza surveillance.

REFERENCES

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