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Validation of Los Angeles County Department of Public Health Respiratory Syndrome using Electronic Health Records

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Objective

To compare and validate syndromic surveillance categorization against electronic health records at one hospital emergency department (ED) in Los Angeles County (LAC).

Introduction

Effective and valid surveillance of syndromes can be extremely useful in the early detection of outbreaks and disease trends. However, medical chart checks without patient identifiers and lack of diagnoses in A08 data has made validation difficult. With the rising availability of electronic health records (EHRs) to local health departments, the ability to evaluate syndromic surveillance systems (SSS) has improved. In LAC, ED data are collected from hospitals and classified into categories based on chief complaints. The most reported syndrome in LAC is the respiratory classification, which is intended to broadly capture respiratory pathogen activity trends. To test the validity of the LAC Department of Public Health (DPH) respiratory syndrome classification, ED syndromic surveillance data were analyzed using corresponding EHRs from one hospital in LAC.

Methods

The ED selected was part of a not-for-profit community hospital in LAC. The hospital has over 200 licensed beds and about 48,000 ED visits annually.

Records were selected from those captured by the LAC DPH SSS and that were categorized as a respiratory syndrome. The study period was the week of January 13, 2013 through January 19, 2013, selected for the high frequency of respiratory records during that time period. Chief complaint data were extracted from the EHRs and analyzed by frequency. The ED chief complaint data were compared to discharge diagnoses with selected ICD-9-CM codes reflecting respiratory pathogen activity, as defined by the Centers for Disease Control and Prevention [1]. Frequencies of diagnoses were calculated. A kappa statistic for agreement between chief complaint and diagnoses was calculated. All analyses were conducted using SAS 9.3.

Results

During the study period, 191 deduplicated ED discharge records with respiratory syndrome were reviewed. Of the 191 records, 60 (31.4%) listed fever as a chief complaint, followed in frequency by cough (49, 25.7%), shortness of breath (24, 12.6%), and influenza (16, 8.4%).

Of the 191 records in the respiratory syndrome category, 142 records (74.3%) included an ICD-9 diagnosis code. Of the 142 records with non-missing ICD-9 diagnosis codes, 107 (75.3%) records were classified as CDC-defined respiratory pathogen activity. The kappa statistic for the agreement between the LAC DPH syndromic classification and the discharge diagnosis was 0.75 (95% CI: 0.68-0.83). The most common diagnoses were acute upper respiratory infections of unspecified site (38, 26.8%), acute bronchitis (32, 22.5%), and fever and other physiologic disturbances of temperature regulation (22, 15.5%). Influenza diagnoses accounted for 14.1% (20) of records with a listed diagnosis.

Conclusions

The agreement between SSS and discharge diagnosis for respiratory reports is substantial (k=0.75). This level of agreement is slightly higher than seen in other studies [2,3,4]. However, over 25% of discharge diagnosis data were missing from the EHR, limiting our comparative analysis. Further efforts to validate other syndromic categories and increase the power and agreement in the respiratory category are needed. With the growing use of EHRs, the ability to validate SSS is enhanced.

Keywords

Emergency department; Disease surveillance; Evaluation; Respiratory syndrome

References

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