In data we trust? An evaluation of the quality of influenza hospital admissions data gathered by automated versus manual reporting

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Objective

We sought to evaluate the quality of influenza hospitalizations data gathered by our biosurveillance system.

Introduction

The Washington Comprehensive Hospital Abstract Reporting System (CHARS) has collected discharge data from billing systems for every inpatient admitted to every hospital in the state since 1987 (1). The purpose of the system is to provide data for making informed decisions on health care. The system collects age, sex, zip code and billed charges of the patient, as well as hospital names and discharge diagnoses and procedure codes. The data have potential value for monitoring the severity of outbreaks such as influenza but not for prospective surveillance: Reporting to CHARS is manual, not real-time, and there is roughly a 9-month lag in release of information by the state. In 2005, Public Health—Seattle & King County (PHSKC) requested that hospitals report pneumonia and influenza admissions (based on both admission and discharge codes) directly to the PHSKC biosurveillance system; data elements included hospital name, date/time of admission, age, sex, home zip code, chief complaint, disposition and diagnoses. In 2008, reporting was revised to collect separate admission and discharge diagnoses, whether the patient was intubated or was in the ICU and a patient/visit key. Hospitals transmit data daily for visits that occurred up to 1 month earlier. Previously, we identified a strong concordance between the volume of influenza diagnoses recorded across the PHSKC and CHARS systems over time (2). However, discrepancies were observed, particularly when stratified by hospital. We undertook an evaluation to identify the causes of these discrepancies.

Methods

We included patients with a diagnosis of influenza (ICD9 codes 487.0, 487.1, 487.8, 488.0 or a textual variant of 'influenza', excluding 'H. influenza'). We also focused on 2008 data exclusively, since at the time of the analysis, more recent CHARS data were unavailable. Of the 20 hospitals in King County, 10 provided admissions data in 2008, but data from only 9 hospitals were available in CHARS for comparison. For each of the 180 influenza hospitalizations identified by the PHSKC system, we manually attempted to find a matching record in CHARS according to hospital name, discharge month/year, age, sex and zip code. We flagged all influenza admissions in the PHSKC system that did not have a matching record in CHARS. Next, we asked hospitals with unmatched records to reverse-identify patients and retrieve their medical charts for PHSKC review.

Results

In 2008, the PHSKC system (which searches through admission and discharge diagnoses) identified 180 patients hospitalized with influenza, compared with 161 patients identified by CHARS (which is based on discharge diagnoses exclusively). Thus far, PHSKC has reviewed 46 charts from 8 hospitals to validate system accuracy; review of data from the remaining hospital is pending. We identified 3 hospitals that were transmitting incorrect data to PHSKC and requested correction and resubmission of historical data from these hospitals. Preliminary analysis revealed that 35 of the 180 influenza hospitalizations captured by the PHSKC system (19%) were missed by CHARS; however, 15 of these patients (43%) were admitted with presumptive diagnoses of influenza but were determined not to have influenza by the time of discharge. Also, 28 of 161 influenza hospitalizations (17%) captured by CHARS were missed by the PHSKC system; however, we had no means of reverse-identifying CHARS records and, therefore, could not evaluate the validity of these data by chart review.

Conclusions

This evaluation identified several problems with data quality, which were substantial though not universal across hospitals. We plan to continue the analysis using 2009 data, to ensure that data quality issues have been resolved. A key limitation of this analysis is that CHARS is an imperfect gold standard for identifying King County influenza admissions; we could not independently identify admissions based on laboratory data to determine which system performed better.

Keywords

Data quality; influenza; hospitalizations

References

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