Evaluation of Emergency Department Syndromic Surveillance Data by ICD-9 Code: Is There a Correlation Between Chief Complaint and Final Emergency Department Diagnosis for Early Detection of Influenza-Like Illness?

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Objective:
The purpose of this study is to characterize the relationship of emergency department chief complaint and final primary ICD-9 diagnosis assigned at the time of emergency department disposition for patients with symptoms and/or ICD-9 codes associated with influenza-like illness (ILI) using an electronic medical record.

Background: Syndromic surveillance aims to decrease the time to detection of an outbreak compared to traditional surveillance methods [(1)]. Emergency department (ED) syndromic surveillance systems vary in their methodology and complexity and are usually based on presenting chief complaints. Prior work in ED-based syndromic surveillance has shown conflicting results on agreement between chief complaint and discharge diagnosis, which may be syndrome-dependent [(2,3)]. The use of ED discharge diagnosis may improve surveillance validity if it can be done in a timely fashion [(3)].

Methods: The clinical criteria for influenza from the Centers for Disease Control and Prevention were used to select primary diagnoses and chief complaints for inclusion in our study. The George Washington University Emergency Department uses an electronic medical record (EMR) called IBEX Pulsecheck (Picis, Inc). All diagnoses are assigned at the time of patient disposition (discharge from the ED or admission to an inpatient unit), within hours of patient arrival. A retrospective search of IBEX data for a twelve-month period was conducted and data analyzed to ascertain the relationship between chief complaint and final diagnosis.

Results: 29 % of patients presenting to our ED had a different diagnosis at the time of disposition than their chief complaint as interpreted by the triage nurse. This percent was higher for gastrointestinal complaints (39%) than for respiratory or viral complaints (29 and 24%, respectively). Some chief complaints were more likely to change when it came time to the ED diagnosis.
In particular, weakness (15% "correct"), body aches (41% "correct"), upper respiratory infection (46% "correct"), and gastrointestinal complaints (55% "correct") were found not to correlate well to the discharge diagnosis.
Conversely, pneumonia symptoms (98% "correct") and sore throat (99% "correct") showed excellent correlation between chief complaint and ED diagnosis. The only diagnosis that or chief complaint that correlated well with monthly data for the influenza season (December through April) was the diagnosis of pneumonia, which tended to be greater during that period. There was a significant background of viral illness, which trended upward during the influenza season.

Conclusions: Because 29% of the patients studied had a different final ED diagnosis compared to chief complaint, for those categories in which there is significant variation, ED diagnosis is presumably more specific. The several hour delay may be worth the wait if one can accept the small delay in action for greater information.
The goal of syndromic surveillance is a sensitive system that minimizes costly false alarms [(4)]. The use of an EMR system may mitigate concerns regarding timeliness, as delays of only hours are expected between reporting of chief complaint and discharge diagnosis. Electronic systems that allow for immediate clinician assignment of diagnoses may enhance specificity. This type of information technology may facilitate earlier detection, communication between entities, and the use of database systems for epidemiologic intelligence [(1)].

References:
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