The Performance of Sub-Syndrome Chief Complaint Classifiers for the GI and RESP Syndromes

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Objectives: To determine the prevalence of the sub syndromes based on the ICD9 classifiers, and to determine the sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of chief complaint (CC) classifiers for the sub syndromes associated with the respiratory (RESP) and gastrointestinal (GI) syndromes using the ICD9 classifier as the criterion standard.

Background: The Centers for Disease Control and Prevention (CDC) BioSense has developed CC and ICD9 sub syndrome classifiers for the major syndromes for early event detection and situational awareness. The prevalence of these sub-syndromes in the emergency department (ED) population and the performance of these CC classifiers have been little studied. Chart reviews have been used in the past to study this type of question but because of the large number of cases to review, the labor involved would be prohibitive. Therefore, we used an ICD9 code classifier for a syndrome as a surrogate by chart reviews to estimate the performance of a CC classifier.

Methods: A retrospective study of ED visits at four New York State hospitals from May 1, 2005 to April 30, 2007 was performed. These hospitals have annual volumes of ED visits from 24,000 to 33,000 and have electronic medical records. Patients were included if their CC and ICD9 codes were available in their electronic medical records. We determined the prevalence of the sub-syndrome using the CDC ICD9 classifiers. In order to optimize performance of the New York CC classifier, we modified the CDC CC classifier list of words and abbreviations and added some terms from NY CC classifiers. We determined the sensitivities, specificities, PPV and NPV of the chief complaint classifiers using the ICD9 classifiers as the criterion standard.

Results: 235,102 of the 238,547 (98.6%) charts had both CC and ICD9 codes. Tables 1 and 2 summarize the results for the RESP and GI sub-syndromes. The sensitivities of the sub-syndromes varied greatly, with a trend toward higher sensitivities in sub- syndromes with greater prevalence. Specificities and NPVs were greater than 0.97 and 0.93 respectively.

Conclusion: The sensitivities, PPVs and prevalences varied greatly by syndrome. The low sensitivities of some of the sub-syndromes may limit their usefulness. Further evaluation is being conducted by reviewing medical charts to refine the CC sub-syndrome classifiers and identify reasons for CC-ICD9 discrepancies.

Table 1 – Respiratory Sub-syndromes

	Prev	Sens	Spec	PPV	NPV
Chest Pain	6.71%	0.56	0.99	0.77	0.97
Dyspnea	6.70%	0.48	0.98	0.62	0.96
Asthma	2.22%	0.45	0.99	0.67	0.99
Hemoptysis	0.18%	0.44	1.00	0.35	1.00
Otitis Media	1.81%	0.42	0.99	0.50	0.99
Cough	5.83%	0.35	0.99	0.68	0.96
URI	6.15%	0.32	0.99	0.68	0.96
Influenza	0.06%	0.13	1.00	0.05	1.00
Pneu&Lung abscess	1.79%	0.07	1.00	0.46	0.98
RSV	0.03%	0.06	1.00	0.20	1.00
Bronchitis/ Bronchiolitis	1.68%	0.02	1.00	0.55	0.98
Cyanosis Hypoxemia	0.24%	0.02	1.00	0.19	1.00
Pleurisy	0.22%	0.02	1.00	0.22	1.00
Resp Failure	0.26%	0.00	1.00	0.08	1.00

Table 2 – Gastrointestinal Sub-syndromes

GI	Prev	Sens	Spec	PPV	NPV
Abdominal Pain	10.79%	0.51	0.99	0.83	0.94
Nausea & Vomiting	8.67%	0.38	0.98	0.65	0.94
Diarrhea	2.44%	0.37	0.99	0.64	0.98
Intestinal Infection	0.01%	0.05	1.00	0.01	1.00
Food Poisoning	0.01%	0.03	1.00	0.02	1.00