

Monitoring Febrile Syndromes from Chief Complaints: Is the Information There?

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INTRODUCTION

There exists no standard set of syndromes for syndromic surveillance, and available syndromic case definitions demonstrate substantial heterogeneity of findings constituting the definition [1]. Many syndromic case definitions require the presence of a syndromic finding (e.g., cough or diarrhea) and a fever.

OBJECTIVE

Automated syndromic surveillance systems often use chief complaints as input. Our objective was to determine whether chief complaints accurately represent whether a patient has any of the following febrile syndromes: Febrile respiratory, febrile gastrointestinal, febrile rash, febrile neurological, or febrile hemorrhagic.

METHODS

We used ICD-9 primary discharge diagnoses to generate a superset of 1,557 patients with findings potentially consistent with any of seven syndromes: respiratory, gastrointestinal, rash, neurological, botulinic, constitutional, and hemorrhagic [2]. Two physicians (and a third, if disagreements existed) read Emergency Department (ED) reports for the 1,557 patients, classified them into syndromic categories based on case definitions we developed (available at <http://web.cbmi.pitt.edu/~chapman>), and determined whether the patients had a fever.

From majority vote of physician classifications, we generated a criterion standard set for five of seven febrile syndromes (we excluded febrile botulinic and febrile constitutional, because botulism is typically afebrile and fever is an element of the constitutional definition). Author JND manually classified the patients' chief complaints into febrile syndromic categories using the same definitions physicians used to classify patients based on their ED reports. For every syndrome and for every febrile syndrome, we calculated sensitivity and specificity by comparing the manual classifications of chief complaints against physician criterion standard classifications based on ED reports.

RESULTS

The table below shows sensitivity and specificity for manual classification of chief complaints when compared to criterion standard classification for five febrile and non-febrile syndromes.

CONCLUSIONS

Chief complaints showed high specificity for febrile and non-febrile case definitions. Whereas chief complaints had modest sensitivity in predicting the syndromes correctly, they had poor sensitivity in predicting febrile syndromes. Respiratory, gastrointestinal, rash, neurological, and hemorrhagic syndromic case definitions for surveillance systems using chief complaints as input should not include fever. Chief complaints do not contain enough information to identify both a syndromic presentation and a fever.

REFERENCES

- Graham J, Buckeridge D, Choy M, Musen M. Conceptual heterogeneity complicates automated syndromic surveillance for bioterrorism. Proc AMIA Annu Fall Symp 2002:1030.
- Chapman WW, Dowling JN, Wagner MW. Generating a reliable reference standard set for syndromic case classification. J Am Med Inform Assoc 2005:(in press).

Table: Predictive Performance of Manually Encoded Chief Complaints on Non-febrile and Febrile Syndromes

	Respiratory	Gastrointestinal	Rash	Hemorrhagic	Neurological
Num Cases	607	633	138	328	571
Num TP	231	215	53	134	222
Num FP	18	20	17	14	24
Num FN	376	418	85	194	349
Sensitivity	38.1%	34.0%	38.4%	40.9%	38.9%
Specificity	98.1%	97.8%	98.8%	98.9%	97.6%
	Febrile Respiratory	Febrile Gastrointestinal	Febrile Rash	Febrile Hemorrhagic	Febrile Neurological
Num Cases	196	181	34	52	147
Num TP	4	12	4	0	5
Num FP	1	0	0	0	1
Num FN	192	169	30	52	142
Sensitivity	2.0%	6.6%	11.8%	0%	3.4%
Specificity	99.9%	100%	100%	100%	99.9%

Num cases is the number of positive cases by criterion standard. TP is true positive; TN is true negative; FN is false negative.