

Evaluation of Triage Note Negation Processing for Syndromic Surveillance

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OBJECTIVE

Effective use of clinical notes for syndromic surveillance (SS) is limited by the inherent variability in textual data such as misspellings, abbreviations and negated terms which can cause false signals. The objective of this study was to compare the sensitivity, specificity, and positive and negative predictive value of an emergency department-based syndrome classifier after preprocessing the triage note with a negation tool. We pre-processed 3059 ED records with the negation tool prior to syndromic classification and found improvements in specificity and positive predictive value.

BACKGROUND

NC DETECT is a statewide, near real-time public health surveillance system used for early event detection and as situational awareness. Several data sources, including emergency department (ED) visits, are received, processed, analyzed and monitored daily. The NC DETECT syndrome classifier searches for keywords in chief complaint (CC) and triage note (TN) fields in the ED data and assigns records to zero, one or more syndromes, e.g. Severe Gastrointestinal Illness (GI-S), Fever Rash Illness (FRI), and Respiratory Illness (Resp). To address the negation present in TN more robustly, we developed a negation processing system using existing tools. The system combines a freely available negation tool called NegEx, and select modules from a chief complaint pre-processor, Emergency Medical Text Processor (EMT-P). The system was implemented in March 2008 and is applied to the TN field prior to syndromic classification of ED visits in NC DETECT.

METHODS

For this study we used a gold standard dataset of ED visit records that was created in a previous biosurveillance project.¹ We included only those visits with triage notes, so the final sample included 3059 visits. The syndrome classifier was run twice against each record, once on the raw triage notes and again after pre-processing with the select EMT-P modules followed by the NC DETECT-modified version of NegEx for Resp, GI-S and FRI. Data analyses including sensitivity, specificity and predictive values were performed using SAS version 9.1.3 (SAS Institute, Cary, NC).

RESULTS

Specificity and positive predictive value improved with the NegEx pre-processing while sensitivity and negative predictive value remained relatively unchanged (Table 1).

Table 1: Statistical Analysis Before & After Pre-Processing with EMT-P + NegEx

	Se (95% CI)	Sp (95% CI)	PPV (95% CI)	NPV (95% CI)
Respiratory Before	47% (39-54)	88% (85-90)	46% (39-54)	88% (85-90)
Respiratory After	46% (39-54)	92% (90-94)	58% (49-66)	88% (86-90)
Severe GI Before	52% (31-73)	96.63% (95-98)	25% (14-40)	99% (98-99)
Severe GI After	52% (31-73)	97.09% (96-98)	28% (16-44)	99% (98-99)
Fever Rash Before	99.6% (97-99.9)	53% (49-56)	40% (36-44)	99.8% (98-99.9)
Fever Rash After	99.6% (97-99.9)	64% (60-67)	46.28% (42-51)	99.8% (99-99.9)

Se= sensitivity, Sp= Specificity, PPV= positive predictive value, NPV= negative predictive value, CI= confidence interval

CONCLUSION

Other studies have shown improvements to syndrome classification when using the entire clinical note compared to triage note and chief complaint², but privacy considerations may prevent the use of the entire note on a broad scale by public health authorities for SS. Triage notes, however, do not include individually identifiable health information and, as a result, may be more accessible in the near term. This study has shown that EMT-P and NegEx in combination applied to TN produces statistically significant improvements in syndrome classification.

REFERENCES

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