

ABSTRACT

Syndromic surveillance of influenza-like illness using automated VA data preliminary results from the Idaho infectious disease reporting network

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Objective

The objective of this paper is to study whether syndromic surveillance using data from the Veterans Administration electronic medical record computerized patient record system (CPRS) correlates to officially reported influenza activity levels in the State of Idaho.

Introduction

Current influenza-like illness monitoring in Idaho is on the basis of syndromic surveillance using laboratory data, combined with periodic person-to-person reports collected by Idaho state workers. This system relies on voluntary reporting.

Electronic medical records with relational databases offer a method of obtaining data in an automated fashion. Clinical data entered in CPRS includes real-time visit information, vital signs, ICD-9, pharmacy, and labs. ICD-9 and vital signs have been used to predict influenza-like illness in automated systems.^{1,2} We sought to combine these with lab and pharmacy data as part of an automated syndromic surveillance system.

Methods

The Boise Veterans Affairs Medical Center provides care to over 20,000 veterans living in Idaho, with clinics in Boise and surrounding sites. Using data from the Veterans Integrated Service Network (VISN 20) data warehouse for influenza from 2009, we identified influenza-like illness cases from these clinics using ICD-9 codes collected as weekly counts. Additional counts of fever ($>100.5^{\circ}\text{F}$), hypoxia ($\text{O}_2 <92\%$), lab tests for influenza (A/B antigen, culture, novel flu), and prescriptions for antivirals (oseltamivir) were summed individually, and in an unweighted fashion, as total weekly counts. Spearman correlation, and multivariate logistic regression were used with predictors from the same week, and preceding week. This was correlated with weekly flu activity as reported

by the Center for Disease Control and Prevention; this reports geographic spread of influenza, as reported by state epidemiologists.³ The Veterans Administration Puget Sound Institutional Review Board (IRB) approved this study.

Results

Using comparisons with epidemiologist-reported flu activity level, all clinical data elements had statistically significant associations using Spearman correlation: sum of total counts of predictors $r=0.57$ ($P<0.0001$); lab tests $r=0.51$ (0.0001); ICD-9 codes $r=0.47$ ($P=0.0003$); prescription $r=0.38$ ($P=0.005$); fever $r=0.31$ ($P=0.02$); hypoxia $r=0.28$ ($P=0.04$). Total counts accounted for one-third ($r^2=0.3$) of variance. Similar results were found for preceding week counts. In logistic regression, both ICD-9, and lab counts were significant predictors (Wald $\chi^2=6.80$, $P=0.009$ and Wald $\chi^2=7.15$, $P=0.007$, respectively) (Figure 1).

Limitations

We sampled a small percent of the overall state population using Veterans Administration data; young people, women, and children are underrepresented.

Conclusions

Data obtained from electronic health records may be useful in predicting influenza-like illness on a regional basis. The combination of ICD-9 codes, vital signs, lab, and pharmacy data provided the best correlation with influenza. ICD-9 and lab counts both contribute independently to prediction, and should be considered to build a stronger model of prediction in our data.

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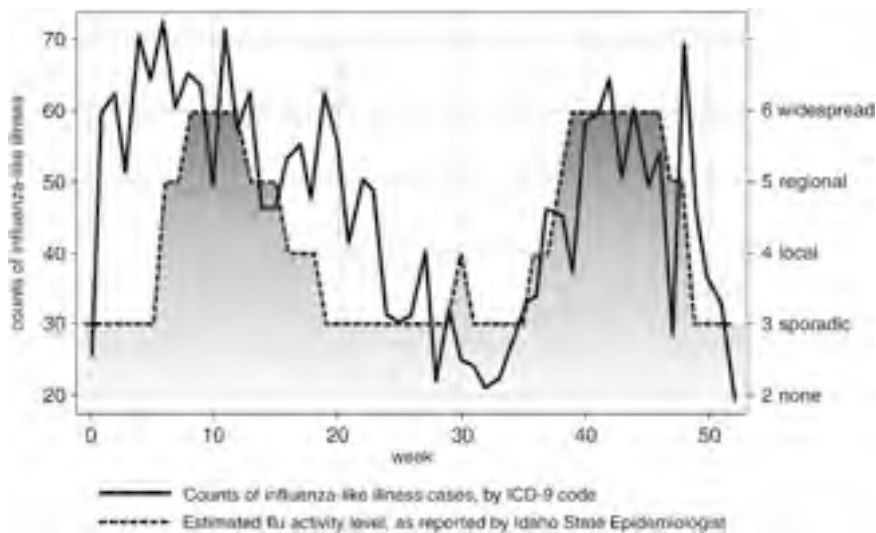


Figure 1 Veterans Administration influenza-like illness cases versus reported weekly influenza activity in the state of Idaho, 2009.

References

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