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ABSTRACT

Surveillance for nationally notifiable infectious conditions using ICD-9-CM diagnosis codes in the VA ESSENCE biosurveillance system

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Objective
To determine the utility of ICD-9-CM diagnosis codes in the Veterans Affairs (VA) Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) for detection and public health surveillance of nationally notifiable infectious conditions in veteran patients.

Introduction
ESSENCE obtains electronic data from 153 VA Medical Centers plus outpatient clinics in all 50 states, American Samoa, Guam, Philippines, Puerto Rico, and U.S. Virgin Islands. Currently, there is no centralized VA reporting requirement for nationally notifiable infectious conditions detected in VA facilities. Surveillance and reporting of cases to local public health authorities are performed manually by VA Infection Preventionists (IP) and other clinicians. In this analysis, we examined positive predictive value (PPV) of ICD-9-CM diagnosis codes in VA ESSENCE to determine the utility of this system in electronic detection of reportable conditions in VA.

Methods
VA ESSENCE analyzes ICD-9-CM diagnosis codes and demographic data from outpatient and emergency department visits at all VA facilities.[1] For this review, visits with an ICD-9-CM code(s) for a reportable communicable disease during 2009 were selected. For diseases in which 10 or fewer potential cases were identified, we expanded the date range and selected all potential cases from July 2005 to May 2010. For diseases in which more than 100 potential cases were identified, a minimum of 20% of records were selected for review. Laboratory and clinical data from electronic medical records were reviewed by a VA epidemiologist for concordance and case classification based on the most recent CDC/CSTE case definitions.[2] PPV for each disease was calculated as number of patients who met case definition criteria divided by total number assigned an ICD-9-CM diagnosis code for the disease. For some diseases, numerators included both confirmed and probable/ suspected cases based on CDC definitions.

Results
Disease-specific PPV proportions ranged from 0 to 72% with the overall proportion 25.7% (224/871). Of the 30 reportable diseases reviewed thus far, 13 diseases had PPVs of 0%. Of the 30 diseases, 15 had PPVs above 10% and 4 diseases (cryptosporidiosis, listeriosis, spotted fever rickettsiosis, and salmonellosis) had PPVs greater than 50%. Reasons that visits did not meet CDC case definitions included: (1) Patient had a history of the disease but was not acutely infected; (2) Miscoding for vaccine administration or vaccine reaction; (3) Miscoding of similar sounding disease; (4) Patient was initially diagnosed or treated at another facility, so testing results not available in VA records; (5) Diagnosis was in the differential or a clinical diagnosis only with no confirmatory testing performed; (6) Miscoding for prophylaxis given or exposure to a disease but patient was not acutely ill; (7) Miscoding for antibody titer evaluations.

Conclusions
PPVs for the majority of reportable communicable diseases captured by current VA ESSENCE were low, and therefore ESSENCE is of limited value in detecting new cases. Our results are consistent with a similar analysis performed in North Carolina.[3] For a few diseases, ESSENCE had relatively high PPVs (greater than 50%). For these diseases, VA ESSENCE may be an added tool for more timely and possibly for additional case detection beyond what is currently captured through manual surveillance. Future work will evaluate system sensitivity by comparing reportable diseases captured by VA ESSENCE with those identified by IP manual surveillance as a gold standard. Efforts to enhance PPV by combining ICD-9-CM codes with additional data elements (for example, laboratory results) are also underway. Accurate, automated, electronic reporting of reportable diseases to VA Office of Public Health will be

important in understanding disease trends within Veteran populations, ensuring timely reporting and facilitating information sharing with local, state, and federal public health partners.

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References

1 Lombardo J, Burkom H, Elbert E, Magruder S, Lewis SH, Loschen W, *et al.* A systems overview of the Electronic Surveillance System for the Early Notification of Community-Based Epidemics. *J Urban Health* 2003;**80** (2 Suppl 1): i32–42.
2 CDC. Nationally Notifiable Infectious Conditions, United States 2010. Available at: http://www.cdc.gov/ncphi/disss/nndss/phs/infdis2010.htm.
3 Sickbert-Bennett EE, Bischoff T, Cleve W, Long R. Utility of ICD-9-CM Diagnosis Codes for Public Health Surveillance. *Advances in Disease Surveillance* 2008;**5**:62.