

Inpatient data: a new frontier in Veterans Affairs biosurveillance and public health monitoring from the electronic health record

Cynthia Lucero*, Patricia Schirmer, Gina Oda and Mark Holodniy

Department of Veterans Affairs, VHA Office of Public Health, Palo Alto, CA, USA

Objective

To describe the utility of inpatient data in the Veterans Affairs (VA) ESSENCE biosurveillance system.

Introduction

VA ESSENCE analyzes ICD-9 diagnosis codes and demographic data from outpatient and emergency department (ED) visits using complex aberrancy-detection algorithms (1). In 2010, a new instance was stood up (VA Inpatient ESSENCE), which receives weekly feeds of inpatient data from all VA acute care hospitals starting October 1, 2009. Data include demographics, admission/discharge data (including ICD-9 diagnosis codes), diagnosis-related group (DRG), bedsection, procedure and surgery data.

Methods

For this demonstration, we selected one disease for which we currently perform routine outpatient/ED ESSENCE surveillance (influenza) and one HAI of interest [*C. difficile* infection (CDI)]. First, we queried VA Inpatient ESSENCE for hospitalizations with an influenza diagnosis code (ICD-9: 487, 488). These data were compared to CDC's AHDRA hospitalizations, a voluntarily reporting system for laboratory-confirmed influenza-associated hospitalizations. Second, we queried VA Inpatient ESSENCE for hospitalizations with the CDI diagnosis code (ICD-9: 008.45) as well as total monthly discharges. Monthly rates for CDI were then calculated per 1000 total discharges. CDI rate per 100,000 population for FY 2010 was calculated using the total enrollees in VA Health Care in FY 2010 (8.343 million) as the denominator. Previous analysis from a non-VA hospital demonstrated good correlation between the CDI code and positive toxin assay (2).

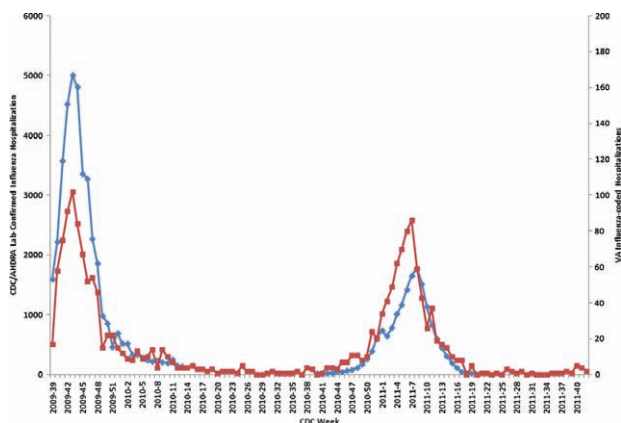


Fig. 1. VA Inpatient ESSENCE influenza-coded hospitalizations and CDC/AHDRA Laboratory-confirmed influenza hospitalizations, by CDC Week.

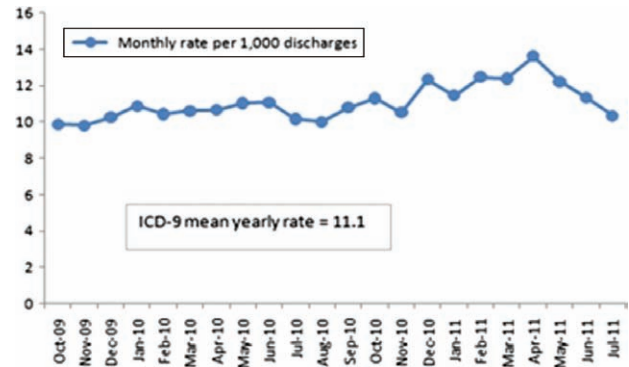


Fig. 2. VA Inpatient ESSENCE monthly rates of *Clostridium difficile* Infection by ICD-9 diagnosis code, October 2009–July 2011.

Results

Alerts for influenza were observed on multiple consecutive days during the fall wave of the H1N1 pandemic as well as during the peak of the 2010–2011 influenza season. Peaks in weekly influenza hospitalizations appeared to correlate well temporally between the VA and CDC's AHDRA data (Fig. 1). From October 1, 2009 to July 31, 2011 more than 12,500 CDI codes were identified among nearly 1.13 million hospitalizations with a calculated mean CDI rate of 11.1 per 1000 discharges (Fig. 2). The CDI rate for FY10 was 78/100,000 population.

Conclusions

Inpatient data provide robust and valuable information for VA beyond what was previously available in outpatient ESSENCE data or through manual methods. Inpatient data can be monitored year-round, which provides more complete situational awareness for planning and response. Future plans include (1) developing inpatient-specific alerting algorithms, (2) establishing a single VA ESSENCE application that combines both outpatient and inpatient data and (3) improving timeliness of inpatient data receipt and adding additional data elements to improve system specificity.

Keywords

Inpatient surveillance; influenza; healthcare-associated infections; *Clostridium difficile* infection; electronic health record

References

- Lombardo J, Burkom H, Elbert E, 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.
- Dubberke ER, Reske KA, McDonald LC, Fraser VJ. ICD-9 codes and surveillance for *Clostridium difficile*-associated disease. *Emerg Infect Dis*. 2006;12:1576–9.

*Cynthia Lucero

E-mail: cynthia.lucero@va.gov