

Comparison of Syndromic Surveillance Systems in the Military

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OBJECTIVE

This paper describes and compares electronic systems used by the Department of Defense (DoD) for syndromic surveillance in-garrison and in a deployed environment in Southwest Asia.

BACKGROUND

The Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) was developed by the Department of Defense Global Emerging Infections Surveillance and Response System in 1999 as a need for detection of bioterrorist attacks in the Washington D.C. area.¹ After 11 September 2001, ESSENCE was expanded to include all DoD medical treatment facilities (MTF) in-garrison.¹ The current version of ESSENCE (EIDS ESSENCE) is derived from systems created by The Johns Hopkins University Applied Physics Laboratory for incorporation of civilian data (ESSENCE II and ESSENCE IV).^{2,3}

Following the Gulf War, the DoD determined a need for health surveillance of deployed troops. A DoD Directive released in 1997⁴ and Presidential Review Directive/NSTC-5 released in 1998⁵ outlined the general requirements for surveillance in deployed troops and subsequently led to further guidance detailing specifics for Disease Non-Battle Injury (DNBI) surveillance. DNBI surveillance is a complex process involving a variety of systems, ultimately combined for joint analysis.

METHODS

ESSENCE data are collected through an automated process in which ICD-9-CM ambulatory data from all DoD MTF are streamed into a central database, where it is filtered into syndromic surveillance categories for display in an interactive website.

DNBI data are collected from all services through patient encounter software at established locations (using ICD-9-CM codes) and by-hand tally in remote locations. Data are sent by personnel either directly to AFIOH from deployed sites or entered into a collection database for processing. AFIOH consolidates all data into appropriate syndromic surveillance categories and conducts analysis.

RESULTS

ESSENCE and DNBI both compile data into syndromic surveillance categories, eight and eighteen respectively. Graphs are created using a basic modeling algorithm. (Figure 1 and Figure 2). Data can be grouped according to individual base/unit, geographic location, or service. In both systems, alerts are generated through comparison to a baseline

based on a previous number of weeks. A key difference is that ESSENCE monitors counts, while DNBI monitors rates. Some concerns with ESSENCE include: "noise" from small increases in rare events, unrecognized denominator changes, and access variations/coding practices that may trigger an alert. Some concerns with DNBI include: data entry/case definition errors, inaccurate population data, lack of reporting, and technical difficulties.

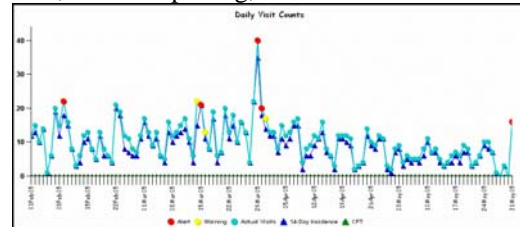


Figure 1. Example of Time Series graph used in ESSENCE.

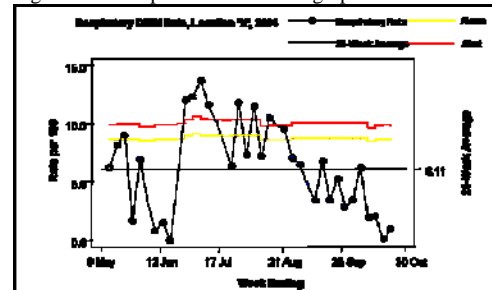


Figure 2. Example of Time Series graph used in DNBI.

CONCLUSIONS

Although ESSENCE and DNBI utilize similar analyses, the definitions of the syndromic surveillance categories and data presentation differ. Both programs are useful in presenting syndromic surveillance data; however the full capabilities and utility of the systems are not currently successful.

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