

Enhancing Public Health Surveillance by Using Multiple Data Sources for Syndromic Surveillance: The Alberta Real Time Syndromic Surveillance Net

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Objective

The Alberta Real Time Syndromic Surveillance Net (ARTSSN) is a pilot public health surveillance project developed for the Capital Health region of Alberta, Canada and funded by Alberta Health and Wellness. This paper describes the advantages of using ARTSSN and comparing information derived from multiple electronic data sources simultaneously for real time syndromic surveillance.

Background

Capital Health is a regional health care organization, which provides services for over one million inhabitants in the Edmonton area of Alberta, Canada. Traditionally, disease surveillance under its jurisdiction has been paper-based and records maintained by different departments in several locations. Before ARTSSN, there was no centralized database or unified approach to surveillance and automated reporting despite rich electronic health data in the region. The existing labor-intensive manual surveillance process is inefficient and inherently susceptible to human error. Its effectiveness is sub-optimal in detecting outbreaks of emerging infectious diseases, and clusters of injuries or toxic exposures. The ultimate objective of ARTSSN is to enhance public health surveillance through earlier and more sensitive detection of clusters and trends, with subsequent tracking and response through an integrated, automated surveillance and reporting system.

Methods

In the first phase of development of ARTSSN, four electronic databases were abstracted into a common repository: (1) calls to the regional telephone health advice service (Health Link, HL); (2) emergency department visits (EDIS); (3) Provincial Laboratory for Public Health reports (ProvLab); (4) public school absenteeism (School). The repository refreshes itself in minutes (HL, EDIS, and ProvLab) or in a maximum of 24 hours (School) to capture real time data as they enter into their respective system.

Users of ARTSSN conduct surveillance through a web-based dashboard according to specified variables of interest (e.g. age, gender, time, geographic location, syndrome, disease) selected from either single or multiple data sources. Notifiable disease alerts that are

triggered by pre-defined thresholds are also sent to designated users through automated notification mechanisms.

ARTSSN surveillance results can be displayed as maps, graphs, or tables, depending on user preference. Results can also be exported for use in other areas of public health practice.

Results

The simultaneous use of multiple electronic data sources enhances real time syndromic surveillance. Using gastrointestinal (GI) and influenza-like-illness (ILI) syndromes as examples, there is a clear positive correlation between HL and EDIS information, whether the data are examined by daily volume, by age group, or by geographic locations. The HL data reflects concerns of interest in the community, and serves as a leading indicator of what may subsequently be recorded in EDIS.

Similarly, increased calls to HL for ILI syndrome precede laboratory confirmed cases of influenza illness in the community and in care facilities. Calls to HL are also indicative of infectious disease outbreaks in the community, as evidenced by a recent syphilis outbreak in the region. Collectively, the multiple data sources in ARTSSN provide timely detection of disease burden in the community for public health actions.

Conclusions

The advantage of ARTSSN is its capability to enhance surveillance through the use of multiple data sources for real time syndromic surveillance. ARTSSN has enabled the development of new capabilities for following health conditions, detecting their changes earlier, determining the populations affected, and responding to the needs of users for new surveillance products. If fully utilized, ARTSSN will improve real time syndromic surveillance for public health decision-making and practice in the region.

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