Comparing Telehealth and NACRS Influenza Activity to Fluwatch Surveillance Using EARS-X

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Objective

This paper will use CDC's EARS-X to examine Telehealth's potential as an early warning system specifically for influenza-like illness compared to NACRS, as well as qualitatively comparing the resultant EARS flags to peaks in influenza activity identified by the Public Health Agency of Canada's (PHAC) Federal Influenza surveillance system (Fluwatch).

Background

The SARS Report (1) stated that the failures in public health surge capacity could be potentially addressed by "hav[ing] a well-developed system for real-time data sharing and reporting, and for the rapid dissemination of surveillance information" (1). In particular, it mentioned the potential to "broaden the information collection capacity of Telehealth as a syndromic surveillance tool" (1).

The Ontario Telehealth Telephone Helpline was implemented in Ontario in 2001. It is administered by Clinidata, a private contractor ,and is available 24/7, including holidays, at no cost to the caller by registered nurses with clinical experience (2).

The National Ambulatory Care Reporting System (NACRS) has been collecting all ICD-10 physician coded ambulatory care visits in Ontario since 2000. For the purpose of this paper, only ED visit portion of the dataset was included in the analysis.

Data for PHAC's Fluwatch surveillance system relies primarily on sentinel and passive reporting (3).

Methods

Anonymized data from Telehealth (June 1, 2004-June 31, 2006) and NACRS (April 1, 2004-March 31, 2006) were secured for pilot work evaluating its capacity as a syndromic surveillance system.

The Telehealth and NACRS datasets were explored using CDC's Early Aberration Reporting System for Excel (EARS-X) to ascertain notable activity suggestive of outbreaks of influenza like illness. EARS-X includes three cumulative sum (CUSUM) detection methods which have different sensitivities and specificities on simulated data (4). These alerts were then evaluated by an epidemiologist to ascertain their validity as true alerts.

Results

The EARS analysis of the data resulted in 21 alerts being generated for NACRS data and 30 alerts being generated for Telehealth data. Of the 21 NACRS alerts, 19 of them were also flagged by Telehealth. Most notably, in 2004/05, EARS generated an alert for NACRS during week 7 (both a new maximum count and a C3 alert were generated). A C3 was also generated for weeks 9 and 10, but no new maximum counts were established. Concurrently, EARS generated an alert for Telehealth during week 5 (new maximum count and C3), and continued to generate alerts during weeks 6 (new maximum count, C1, C2 and C3), 7 (C2/C3) and 8 (new maximum count, C2 /C3). For 2005/06, the most important flags were, for NACRS, during weeks 2, 8 and 9 (C2/C3 for all) and, for Telehealth, weeks 8 (C3), and 9-11 (C2/C3). No new maximum counts were reached for 2005/2006.

Comparatively to Telehealth and NACRS, FluWatch in 2004/05 did not report a peak until week 9 -- 4 weeks after the initial Telehealth alert, and 2 weeks after the initial NACRS alert. The delay between Telehealth and, to a lesser extent, NACRS is less impressive during the 2005/06 season (EARS flagged a peak for both datasets during the same week as Fluwatch); however, this can be explained in large part by the fact that 2005/06 was a much less active year than 2004/05 (3).

Conclusions

More data are needed to better evaluate Telehealth's usefulness as an early warning system. However, the results seen for 2004/05 (a year of moderate influenza activity) are promising.

References

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