

Can Telehealth Ontario Respiratory Call Volume be Used as a Proxy for Emergency Department Respiratory Visit Surveillance by Public Health?

Adam van Dijk MSc, Don McGuinness MA, Elizabeth Rolland MSc, Kieran M. Moore MD

Queen's University Emergency Syndromic Surveillance Team (QUESST), Kingston, Canada

Objective

This paper will examine the temporal relationship between Ontario's emergency department (ED) visits and telephone health line (Telehealth Ontario) call volume for respiratory illnesses, in an effort to test the feasibility of using Telehealth Ontario's system for real-time surveillance.

Background

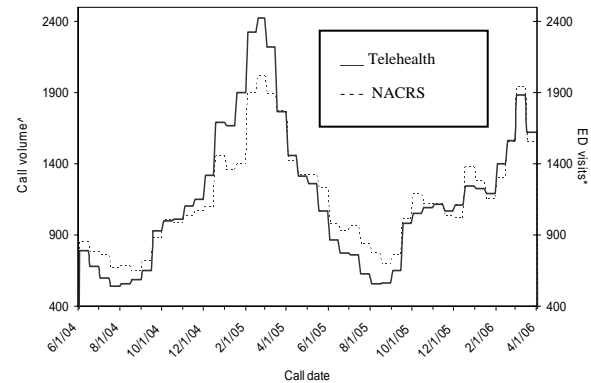
The prompt detection of disease outbreaks is a major concern to public health as it has the potential to reduce morbidity and mortality (1). Real-time syndromic surveillance uses existing non-traditional data for timely analysis and feedback to those responsible for investigations and follow-up of potential outbreaks (2). Recent studies have suggested that integrating multiple data sources can significantly improve detection accuracy of syndromic surveillance systems, but more work is needed to explore the most effective means of said integration and what types of data streams give the greatest benefit (3;4).

Methods

Retrospective data from the National Ambulatory Care Reporting System (NACRS), which uses ICD-10 coding for ED discharge diagnosis, and the Telehealth Ontario program were analyzed from June 1st, 2004 to March 31st, 2006. Telehealth Ontario data has the potential to be received in real-time while NACRS discharge data is many months delayed. The Telehealth Ontario and NACRS data sources were compared by fitting time-series models and estimating a cross-correlogram at different lags (semi-monthly).

Results

The Telehealth Ontario hotline had 216,105 calls for upper/lower respiratory complaints while 819,832 ICD-coded complaints from NACRS were identified with a comparable diagnosis of an infectious respiratory illness. Call volume was heavily weighted for the 0-4 age group (49%), while the NACRS visits were mainly from the 18-64 year olds (44%). Figure 1 displays the retrospective comparison of the two time-series'. The Spearman rank correlation coefficient was calculated to be 0.97, with the time-series analysis also resulting in significant correlations at lags (semi-monthly) 0 and 1, indicating that increases in call volume correlate with increases in NACRS discharge diagnosis data for respiratory illnesses.



*Call volume refers to Telehealth Ontario hotline (data series 4x original counts)

*ED visits refers to NACRS

Figure 1. Telehealth Ontario and the National Ambulatory Care Reporting System (NACRS) time series for respiratory illnesses, semi-monthly – Ontario, Canada, June 2004 – March 2006

Conclusions

The integration of Telehealth Ontario data into existing real-time syndromic surveillance systems may improve the ability of such systems to detect outbreaks of respiratory illness and assess the impact on emergency departments quicker than current methods. This would allow public health and emergency management officials a novel means of timely surveillance which could enable prompt preparation and action towards influenza-like illness outbreaks. Further research is needed on Telehealth Ontario and other non-traditional data sources in an on-going effort to improve disease detection and to provide evidence for their effectiveness as tools for surveillance. With ED discharge data not available in a timely manner, Telehealth Ontario is a viable surveillance alternative with its real-time potential and its parallels to ED discharge data.

References

- (1) Wagner MM, Tsui F-C, Espino JU, Dato VM, Sittig DF, Caruana RA, McGinnis LF, Deerfield DW, Druzdel MJ, Fridsma DB. The emergine science of very early detection of disease outbreaks. *Journal of Public Health Management and Practice* 2001;7(6):51-9.
- (2) Henning KJ. Overview of syndromic surveillance - what is syndromic surveillance. *Morbidity and Mortality Weekly Report* 2004;53(suppl.):5-11.
- (3) Fienberg SE, Shmueli G. Statistical issues and challenges associated with rapid detection of bio-terrorist attacks. *Statistics in Medicine* 2005;24:513-29.
- (4) Wang L, Ramoni MF, Mandl KD, Sebastiani P. Factors affecting automated syndromic surveillance. *Artificial Intelligence in Medicine* 2005;34(269):278.

FURTHER INFORMATION: Adam van Dijk, avandijk@healthunit.on.ca