OJPHI

ISDS 2015 Conference Abstracts

ISDS INTERNATIONAL SOCIETY FOR DISEASE SURVEILLANCE

Evaluating Syndromic Surveillance Systems

Iain Lake[1], Felipe J. Colón-González*[1], Roger Morbey[2], Alex J. Elliot[2], Gillian E. Smith[2] and Richard Pebody[3]

[1]School of Environmental Sciences, University of East Anglia, Norwich, United Kingdom; [2]Public Health England, Birmingham, United Kingdom; [3]Public Health England, London, United Kingdom

Objective

To devise a methodology for evaluating the effectiveness of syndromic surveillance systems

Introduction

While results from syndromic surveillance systems are commonly presented in the literature, few systems appear to have been thoroughly evaluated to examine which events can and cannot be detected, the time to detection and the efficacy of different syndromic surveillance data streams. Such an evaluation framework is presented.

Methods

A number of possible public health scenarios were identified (e.g. outbreak of pandemic influenza, *Cryptosporidium* outbreak and deliberate anthrax release) and deterministic compartmental models were used to simulate the number of disease cases generated for a range of severities. Data were used from four national syndromic surveillance systems (a non-emergency medical number, emergency department records, and information from family doctor in and out of hours consultations) coordinated by Public Health England. For each of these four surveillance systems, simulation data were estimated based upon transmission models. Such simulation data were superimposed onto baseline syndromic surveillance data to create a test dataset. Random noise was added to these test data to represent expected variability. Existing statistical detection algorithms currently used for near-real time syndromic surveillance were used to evaluate these simulations. For each scenario, timeliness was assessed as the number of days between the start of the simulation and extra activity being detected by syndromic surveillance. Timeliness was assessed for a range of disease severities. The efficacy of different syndromic data streams and reported syndromes was assessed.

Results

An evaluation methodology was developed enabling the thorough evaluation of syndromic surveillance systems. Using the system developed for England this indicated that for an outbreak of pandemic influenza (AH1N1) a national family doctor-based syndromic system would be the first to detect such an event. Specific times to detection will be reported as well as results from *Cryptosporidium* outbreaks and anthrax events. The outputs are sensitive to changes in parametrization of the compartmental model and the proportion of people reporting to each data stream.

Conclusions

We have developed an effective methodology for the systematic evaluation of syndromic surveillance systems in terms of their ability to detect events and their timeliness to detection. We argue that this methodology can be widely adopted to provide more empirical analysis of the effectiveness of syndromic surveillance systems worldwide.

Keywords

Syndromic Surveillance; Evaluation; Detection

Acknowledgments

We acknowledge support from Royal College of Emergency Medicine, EDs participating in the emergency department system (EDSSS), Ascribe Ltd and L2S2 Ltd; OOH providers submitting data to the GPOOHSS and Advanced Heath & Care; TPP and participating SystmOne practices and University of Nottingham, ClinRisk, EMIS and EMIS practices submitting data to the QSurveillance database; and NHS 111 and HSCIC for assistance and support in providing anonymised call data the underpin the Remote Health Advice Syndromic Surveillance System. We thank the PHE Real-time Syndromic Surveillance Team for technical expertise. The authors received support from the National Institute for Health Research Health Protection Research Unit in Emergency Preparedness and Response. The views expressed in this abstract are those of the authors and not necessarily those of the NHS, the NIHR, the Department of Health or Public Health England

***Felipe J. Colón-González**
E-mail: f.colon@uea.ac.uk