

SAGES Update: Electronic Disease Surveillance in Resource-Limited Settings

Lewis L. Sheri, Timothy C. Campbell, Jacqueline S. Coberly, Richard A. Wojcik, Shraddha V. Patel and Brian Feighner*

Johns Hopkins University Applied Physics Laboratory, Laurel, MD, USA

Objective

The Suite for Automated Global Electronic bioSurveillance (SAGES) is a collection of modular, flexible, open-source software tools for electronic disease surveillance in resource-limited settings. This demonstration will illustrate several new innovations and update attendees on new users in Africa and Asia.

Introduction

The new 2005 International Health Regulations (IHR), a legally binding instrument for all 194 WHO member countries, significantly expanded the scope of reportable conditions and are intended to help prevent and respond to global public health threats. SAGES aims to improve local public health surveillance and IHR compliance with particular emphasis on resource-limited settings. More than a decade ago, in collaboration with the US Department of Defense (DoD), the Johns Hopkins University Applied Physics Laboratory (JHU/APL) developed the Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE). ESSENCE collects, processes, and analyzes non-traditional data sources (i.e. chief complaints from hospital emergency departments, school absentee data, poison control center calls, over-the-counter pharmaceutical sales, etc.) to identify anomalous disease activity in a community. The data can be queried, analyzed, and visualized both temporally and spatially by the end user. The current SAGES initiative leverages the experience gained in the development of ESSENCE, and the analysis and visualization components of SAGES are built with the same features in mind.

Methods

SAGES tools are organized into four categories: 1) data collection, 2) analysis & visualization, 3) communications, and 4) modeling / simulation / evaluation. Within each category, SAGES offers a variety of tools compatible with surveillance needs and different types or levels of information technology infrastructure. SAGES tools are

built in a modular nature, which allows for the user to select one or more tools to enhance an existing surveillance system or use the tools *en masse* for an end-to-end electronic disease surveillance capability. Thus, each locality can select tools from SAGES based upon their needs, capabilities, and existing systems to create a customized electronic disease surveillance system. New OpenESSENCE developments include improved data query ability, improved mapping functionality, and enhanced training materials. New cellular phone developments include the ability to concatenate single SMS messages sent by simple or Smart Android cell phones. This 'multiple-SMS' message ability allows use of SMS technology to send and receive health information exceeding normal SMS message length in a manner transparent to the users.

Conclusions

The SAGES project is intended to enhance electronic disease surveillance capacity in resource-limited settings around the world. We have combined electronic disease surveillance tools developed at JHU/APL with other freely-available, interoperable software tools to create SAGES. We believe this suite of tools will facilitate local and regional electronic disease surveillance, regional public health collaborations, and international disease reporting. SAGES development, funded by the US Armed Forces Health Surveillance Center, continues as we add new international collaborators. SAGES tools are currently deployed in locations in Africa, Asia and South America, and are offered to other interested countries around the world.

Keywords

software; surveillance; electronic; open-source

*Brian Feighner

E-mail: brian.feighner@jhuapl.edu

