

## Gossamer Health: a meaningful, open-source approach to shared surveillance software

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### Objective

The goal of this work is to make available to the public health community an open source system that makes available in a standards-based, modular fashion the basic tools required to conduct automated indicator-based population health surveillance. These tools may be deployed in a flexible fashion on health department servers, in the Amazon EC2 cloud, or in any combination, and are coupled through well-defined standards-based interfaces.

### Introduction

Cost-effective, flexible and innovative tools that integrate disparate data sets and allow sharing of information between geographically dispersed collaborators are needed to improve public health surveillance practice. Gossamer Health (Good Open Standards System for Aggregating, Monitoring and Electronic Reporting of Health), <http://gossamerhealth.org>, is an open source system, suitable for server or 'cloud' deployment, which is designed for the collection, analysis, interpretation and visualization of syndromic surveillance data and other indicators to monitor population health. The Gossamer Health system combines applied public health informatics research conducted at the University of Washington (UW) Center for Public Health Informatics and Washington State Department of Health, in collaboration with other state and local health jurisdictions, the International Society for Disease Surveillance and the Centers for Disease Control and Prevention.

### Methods

Gossamer combines work on (1) methods for automated surveillance based on summarized clinical data, such as the influenza and visit counts used in the Distribute project (1), (2) methods developed for the modularization of surveillance processes developed for the Shoki project (2), (3) methods developed for the automated processing of Health Information Exchange data (HIE) as part of the CDC HIE initiative (3) and (4) standard industry server virtualization and deployment techniques (4).

### Results

Gossamer uses code developed at UW and additional open source components. Most components are distributed under the '3-clause BSD license', permitting free use, modification and redistribution. Automated modules include (1) HL7 message receipt, processing and storage, (2) compilation of line listing data from HL7 Minimum Biosurveillance Data Set (MBDS) and Meaningful use (under development) messages, (3) classification of cases into syndromes and compilation of syndrome data into indicators, (4) receipt, storage, aggregation and management of indicator data, and (5) analysis, visualization and reporting (AVR) of indicator data. Modules may be

deployed locally or in the EC2 cloud and communicated using standard protocols to let deployment strategies be mixed across the system to support both sharing and shared use of components, as well as load balancing and optimization. This presentation will talk about the goals of the open source system and give underlying details of the technical implementation using virtual machines. As an example, we will discuss an application of the Gossamer system instance developed to let a state public health agency disseminate summarized laboratory test results for multiple (14) respiratory viruses (see Fig. 1).



Fig. 1. Gossamer Health Screenshot showing timeseries graph of positive test rates for multiple respiratory viruses.

### Conclusions

To support existing and emergent surveillance needs, the UW has worked with local and state health jurisdictions to identify features that allow for user-defined indicators of chronic and infectious disease surveillance. An important aspect of the Gossamer Health vision is its support for public health agencies to collaborate in cross-jurisdictional surveillance efforts through both on-demand and automated sharing of standards-based data feeds.

Gossamer is a work in progress, but it is a community work. All are welcome to participate in its development.

### Keywords

Surveillance; open source; architecture; cloud; software

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