

## The evolution of ESSENCE

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### Objective

This talk will describe the history and events that influenced the design and architecture decisions of the Electronic Surveillance System for Community-based Epidemics (ESSENCE) (1). Additionally, it will discuss the current functionality and capabilities of ESSENCE and the future goals and planned enhancements of the system.

### Introduction

In development for over 14 years, ESSENCE is a disease surveillance system utilized by public health stakeholders at city, county, state, regional, national and global levels. The system was developed by a team from the Johns Hopkins University Applied Physics Laboratory (JHU/APL) with substantial collaborations with the U.S. Department of Defense Global Emerging Infections Surveillance and Response System (DoD GEIS), U.S. Department of Veterans Affairs (VA) and numerous public health departments. This team encompassed a broad range of individuals with backgrounds in epidemiology, mathematics, computer science, statistics, engineering and medicine with significant and constant influence from many public health collaborators.

### Methods

We created a timeline of events, such as a particular partner's need (Florida Department of Health's desire to detect outbreaks based on patient time of arrival) or a public health outbreak (SARS) and correlated each one with design and architecture decisions that influenced ESSENCE. We used these events to describe the epidemiology, technology, analytical, administrative, political, legal and monetary factors that were considered at each point. Looking historically and critically at each decision point, we analyzed the benefits and costs of each decision. These benefits and costs were described from many different points of view, including those of the developer, user, administrator and others.

After walking through the historical timeline, we described the current architecture and feature set of ESSENCE. We also were able to point out the unique features between different instances of ESSENCE.

Based on user feedback, understanding outside influences and internal research, the ESSENCE team is always looking to

improve the system. Part of this presentation will be to describe the future plans for the ESSENCE system from both architecture and feature stand points.

### Results

Public health user needs and preferences have strongly influenced and prioritized the growth of ESSENCE, sometimes in unforeseen directions. Conversely, the evolving domain of syndromic and disease surveillance has broadened the situational awareness, perspectives and sometimes the responsibilities of public health monitors. The ESSENCE system has provided those monitors with the tools to help detect and investigate public health situations in their communities.

### Conclusions

The utility of the ESSENCE system can be traced back directly to the influence of public health users and to the design decisions of the ESSENCE team. Understanding the history of disease surveillance in this context can help clarify current situations faced by today's public health practitioners as well as prepare them for tomorrow.

### Keywords

ESSENCE, disease surveillance, system architecture

### Acknowledgments

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### References

1. Lombardo J, Burkom H, Elbert E, Magruder S, Lewis SH, Loschen W, et al. A systems overview of the Electronic Surveillance System for the Early Notification of Community-Based Epidemics (ESSENCE II). *J Urban Health* 80. 2003;80(2 Suppl 1):i32-42.

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