

**National Capital Region ESSENCE Syndromic Surveillance Network.
Project Background and Proposed System Sustenance and Fortification Tasks
UASI FY10**

Background

Under DHS-UASI funding, the disease surveillance technology development team at APL, with the collaborative efforts of the local and state health departments in Maryland, Virginia, and the District of Columbia, implemented the National Capital Region (NCR) Syndromic Surveillance Network in April of 2004. The network has been fully operational since that time and consists of independent surveillance systems within the state health departments in Maryland, the District of Columbia, and Virginia. This system collects data, processes, and presents results to the regional public health agencies, and share data with a common “aggregate” node that covers the NCR. The following figure provides an illustration of this network.

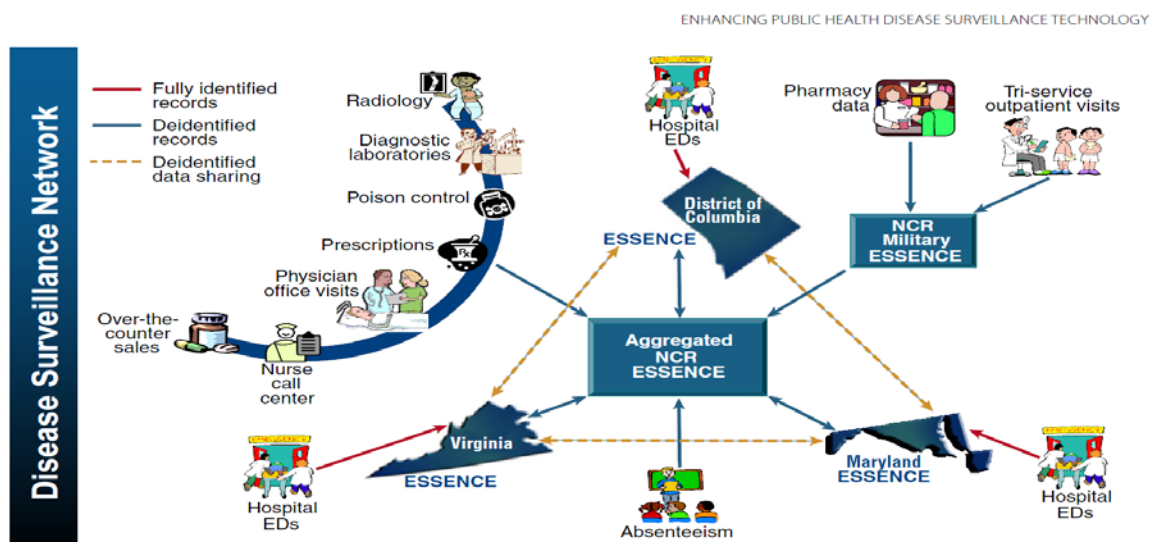


Figure 1. NCR Syndromic Surveillance Network.

Since inception, the system has remained fully operational and in active use. The Johns Hopkins University Applied Physics Laboratory software development team has made several system modifications and upgrades to enhance the its surveillance capabilities.

Development/Expansion under 2004-2006 UASI funding:

The project kicked off in the spring of 2004 with the establishment of the Enhance Surveillance Operating Group (a steering committee with representatives from NCR regional public health agencies) and the ratification of the tri-jurisdictional data sharing agreement. Also in the same year, the aggregate NCR (with data from the 3 jurisdictions) was deployed. The 2005 to 2006 period involved active system development and expansion including several simulation exercises. Enhancements included multiple version upgrades with capabilities that allowed: on-the-fly statistical algorithm-based alerting, stacked bar graphs, sortable data details tables, a custom chief complaints query tool, mapping features, an embedded secure event communications system, and summary state-based statistical alerting. Each one of these features was designed to provide public health practitioners the best tools to identify unusual proportions and patterns of patients with syndromic illness in the community using health indicator data. Also, four cross regional exercises were conducted where users actively participated in simulated outbreak scenarios and exercised the

functionality of the newly developed features. All enhancements during this period were based on NCR ESSENCE user-feedback.

Sustenance under UASI 2007 and 2008 Grants

During this period, the project moved from an active development and expansion phase to a primarily sustenance phase. Sustenance functions included, essential software development, upgrades/installment, and hardware/software upgrades. Additionally, enhancements made to the core system capabilities by ESSENCE systems used within other US regions were incorporated into the NCR ESSENCE with an upgrade to version 1.11.

Sustenance under UASI 2009 Grant - *funding to carry through September 2011*

In this period, per ongoing user feedback, modifications essential to maintaining optimal NCR ESSENCE functionality are being performed. The modifications will include 1) Converting to alternative open source mapping software (from existing ESRI ArcIMS) and 2) Making ESSENCE database independent so that sites could use a database other than Microsoft SQL Server 3) Modular Data Sets: allow site administrators the ability to custom configure datasource objects in ESSENCE 4) Update statistical detection system to do multi-threaded processing such as alerting by various time resolutions; work with new data such as environmental parameters (temperature, humidity, ect.).

Proposed Sustenance under UASI 2010 Grant – *funding to carry through November 2012*

In light of the recent H1N1 pandemic, recognizing the need for novel surveillance techniques, in addition to sustaining the current capabilities of ESSENCE, the need for more specific/tailored capabilities have been brought to light by NCR ESSENCE users. The following proposed features to be developed for NCR ESSENCE will aid public health practitioners and their partners perform more specific case-definition based disease surveillance functions as well as provide new opportunities for enhanced situational awareness.

1. Continue essential system maintenance operations to ensure existing functionality
2. Provide enhanced input and output functions to allow multi-jurisdictional aggregate data fused with local data to be shared across regional boundaries; resulting in NCR users being able to access surveillance information from systems around the country
3. Create a dashboard builder that allows users to display saved queries on a single page with visualization and mathematical options; allowing users to operate more efficiently
4. Provide a user-interface for system administrators to modify and develop new syndromes and sub-syndromes (such as “H1N1”); allowing individual users who have administration rights to control the definitions when the need arises, such with the emergence of epidemics from novel pathogens
5. Build a function to allow users to create reports that can be saved, automatically updated, and distributed; which would save time and effort and dramatically reduce copy/paste errors
6. Build subscription capability to the “My Alerts” feature; which would give users the ability to have the system email them if customized alerts have been generated
7. Modify the myAlerts feature to be able to disseminate new case definitions quickly and efficiently; enhancing the monitoring of new and emerging threats (40K)
8. Allow users to visualize the history of a myAlert definition on a time series; which would in turn boost users’ ability to recognize outbreaks
9. Develop a prescription drug module to support the possible addition of that new datasource; providing public health practitioners further insight into the severity of an outbreak.