

ESSENCE Version 2.0: The Department of Defense's Worldwide Syndromic Surveillance System Receives Several Enhancements

David C. Pattie, Ph.D., M.S.¹, Martin J. Atherton, DrPH, MPH¹, David J. Savory, M.S.¹, Gale E. Savage, MD, MPH¹, Kenneth L. Cox, MD, MPH²

¹Epidemiological Surveillance Methods and Development Project, PSI, ²Global Health Surveillance, Force Health Protection and Readiness Programs, TRICARE Management Activity, Office of the Assistant Secretary of Defense

OBJECTIVE

As an evolving syndromic surveillance system, ESSENCE has recently undergone some significant improvements and new additional capabilities. We present three of these impactful enhancements and evaluate their added value to military public health and preventive medicine providers and system users. Specific Version 2.0 enhancements include: (1) laboratory orders (2) radiology orders and (3) the ability for users to create their own syndrome groups for outbreak classification and detection.

BACKGROUND

ESSENCE receives and analyzes data for the Military Health System's (MHS) 9 million beneficiaries resulting in approximately 90,000 daily outpatient and emergency department visits worldwide [1]. In May 2008, MHS released ESSENCE Version 2.0, a system-wide upgrade which includes the following enhancements: improved system security, additional reporting and display capabilities, laboratory orders, radiology orders, and the ability for users to define their own syndrome groups.

METHODS

Evaluating data sources for use in a syndromic surveillance system should involve several considerations such as the availability, cost, time latency, and diagnostic precision of the data. Data sources for ESSENCE Version 1.0 were limited to ICD-9CM diagnosis codes and medication therapeutic class (GC3) codes for syndrome classification. As part of the Version 2.0 release, new data sources for laboratory and radiology orders were realized by incorporating the MHS' Ancillary Standard Ambulatory Data Record (A-SADR) extracts into ESSENCE's data ingest architecture. The A-SADR files provide laboratory and radiology records from the Composite Health Care Systems (CHCS) and include data elements that capture Current Procedure Terminology 4th Edition codes (CPT-4) for laboratory and radiology orders. The CPT codes for laboratory and radiology test orders were then mapped to each ESSENCE syndrome group for classification purposes.

Electronic disease surveillance systems need to be flexible in terms of having the ability to quickly adapt classification methods to detect emerging and poorly understood diseases. To address this concern, ESSENCE Version 2.0 allows users to define and create their own syndrome groups by specifying codes available in the ESSENCE system (ICD-9, GC3 and CPT-4). After creating a user defined syndrome group, the system stores the grouping under the users profile and runs the ESSENCE temporal algorithm for outbreak detection.

RESULTS

Information generated from laboratory and radiology orders are providing ESSENCE system users with an important early warning and pre-confirmatory data source to detect potential infectious disease outbreaks. User defined syndromes are providing users with the flexibility to adapt classification groups to emerging diseases or to more relevant specific outbreaks. Table 1 demonstrates a user defined syndrome for salmonella utilizing the laboratory orders data source provided by CPT codes.

Table 1. Screen Shot of ESSENCE Data Details Table.

Data Details								
Order Date	PIN	Age	FMP	CPT	CPT Description	Syndrome	Clinic Type	MEPRS
11/Jun/2008	15DF0CAC93	24	20	86768-32	immunossay for Salmonella	Salmonella_G1	Primary Care	BHA
11/Jun/2008	088A4F0BC8	0	05	87045-00	stool culture for Salmonella and Shigella	Salmonella_G1	Primary Care	BDA
11/Jun/2008	2169F5F97	50	20	87045-00	stool culture for Salmonella and Shigella	Salmonella_G1	Other	BAG
11/Jun/2008	045C954587	2	01	87045-00	stool culture for Salmonella and Shigella	Salmonella_G1	Primary Care	BGA
11/Jun/2008	01DE37D137	1	03	87045-00	stool culture for Salmonella and Shigella	Salmonella_G1	Primary Care	BGA
11/Jun/2008	0EC1BC94C5	1	02	87045-00	stool culture for Salmonella and Shigella	Salmonella_G1	Primary Care	BDA

CONCLUSIONS

ESSENCE continues to advance its capabilities by adding additional pre-diagnostic data sources and the ability for system users to quickly modify syndromes through the user-defined syndrome function. Future enhancements scheduled for ESSENCE Version 3.0 include: laboratory results, disposition codes, reason for visit/chief complaints, vital sign data, and additional disease and injury categories.

REFERENCES

[1] Health Affairs, 2008. Armed Forces Health Longitudinal Technological Application [Online]. Available: <http://www.ha.osd.mil/ahla/>. Accessed on February 14, 2008.