

Knowledge Based Decision Support for Biosurveillance

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Abstract:

Most biosurveillance systems are currently working towards utilizing knowledge based approach for anomaly detection and alerting of public health officials. This project concentrates on the phase after an aberration has been flagged by the system and decision-making become crucial. At this point, public health officials must make decisions in four areas – interpretation, investigation, response (control) and communications [1]. A public health user may investigate a suspected event, determine the significance of the suspicion and notify appropriate health officials if warranted.

CDC is developing a decision support platform that will aid biosurveillance personnel in acquiring relevant knowledge required to handle an event, by filtering through existing knowledge sources. It will incorporate an intelligent algorithm to search through available knowledge sources that can be categorized as static, secure or dynamic resources such as recommendations found in the electronic journals such as MMWR, websites, secure discussion forums and RSS news feeds for information related to an alert/event and present it to aid rapid decision making.

CDC Decision Support Services to Support Biosurveillance:

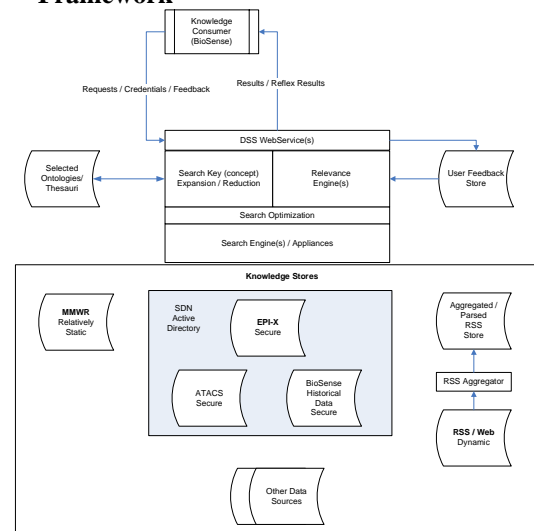
CDC is committed to strengthening the capacity of the public health system to respond to emergent health threats, catastrophic events and routine investigations to validate or refute an event. To achieve this imperative, CDC must continue to prepare the broader public health infrastructure at home and abroad to respond to a wide range of public health emergencies. [2] BioSense, is a state-of-the-art, multi-jurisdictional data sharing initiative that is geared to improve the nation's capabilities for near real-time disease detection and surveillance by using data from existing health databases.[3,4] The proposed knowledge based decision support services will support BioSense users.

The primary aim is to support human decision makers by providing contextually relevant knowledge from outside biosurveillance data while making sound decisions about the data being reviewed.

Emphasis will be to deliver the most useful search results without omitting important ones. Advanced search capabilities will include parametric searching to find single or groups of documents with specific attributes, federated search to return results from many sources in a single query, and category drill-down to let users browse through categories and subcategories

A web service interface will be developed for the required Knowledge Service, allowing for flexibility as the system changes over time and will also potentially allow for other systems to consume the new service (Figure 1).

Figure 1. Decision Support Architectural Framework



Knowledge-based decision support services will help a consumer construct a knowledge search definition based on current or anticipated user/application context or based on a specific set of search criteria. Initial phase of the project will include knowledge sources like MMWR, Epi-X forum and RSS News feeds.[5]

This project will leverage the work of others working in the area of biosurveillance and decision support using unstructured content. This presentation will focus on the framework for delivering knowledge-based decision support services.

Reference:

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3. Bradley CA, Rolka H, Walker D, Loonsk J. BioSense: implementation of a National Early Event Detection and Situational Awareness System. *MMWR Morb Mortal Wkly Rep*. 2005 Aug 26;54 Suppl:11-9
4. Loonsk JW; Centers for Disease Control and Prevention (CDC). BioSense--a national initiative for early detection and quantification of public health emergencies. *MMWR Morb Mortal Wkly Rep*. 2004 Sep 24;53 Suppl:53-5.
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