Accelerating Situational Awareness for Biosurveillance

Methods

Data fusion components are responsible to index, tag, analyze structured and unstructured data and link similar information together. This is particularly important as it provides a holistic view into the data platform and gives the user an opportunity to review and consume a variety of data points. The platform demonstrates linkages to data sources and shows how a public health official could interact with the information provided by data sources and other surveillance information in order to maintain situation awareness, monitor an event and enhance public health and medical response.

Situation awareness is used to describe a variety of techniques used to address situations where there is a lot of data and very little knowledge of what it represents. Situation awareness often relies heavily on visualization strategies to convey multiple streams of information into a single, highly intuitive, operational picture. The situation awareness components provide the platform with the ability to detect anomalies, clusters of potential events, predict the rate and spread of a disease outbreak, and provide the analysts and decision makers with tools, methodologies and processes to investigate the event.

Typical approaches define key indicators that help to characterize changes in the data space. The non-spatial situation awareness visualizations are dashboard, data visualizations and time series visualizations and geospatial situation awareness visualizations are risk visualization, asset status and readiness and modeling and simulation. Combined both visualizations provide the platform with the ability to visualize data points in various formats.

Assets status and readiness and modeling and simulation are shown here. Asset status and readiness can combine spatial and nonspatial representation. Potential elements for display included facility utilization, excess capacity for beds, respirators, immunizations among responders. Successfully managing an outbreak means ensuring that these resources are used as efficiently as possible. Visualization can be used to show the relationship between supply and demand and identify imbalances. Situational awareness benefits from the ability to visualize project situations and what-if scenarios. Outbreak modeling and simulation can project the infection rates and location to further support capacity planning as well as to approximate the effect of interventions such as closing of airports, schools and quarantine.

GDSP™ incorporates compatible public health communications and surveillance systems and uses industry standards as a framework to operate as an integrated network for accelerating situational awareness for biosurveillance.

Results

The platform addresses early event detection, analysis and interpretation, and public health response. The architecture of the platform operationalizes existing public health infrastructure at the local, national, and global levels and focuses on how all the components are integrated together into the product solution. An approach was developed that shortens an important portion of the outbreak response timeline. We also documented technical and policy-related challenges in developing a global disease surveillance platform.