

BUSINESS SCENARIOS FOR BIOSURVEILLANCE –

The following scenarios illustrate, by example of hypothetical public health events, the biosurveillance capabilities should support.

1.1 IDENTIFY AN EVENT

Potential event is identified using data mining or other methods.

1.2 CONFIRM EXISTENCE OF EVENT

The use of real-time clinical data to assist in confirming or refuting the existence of a health event is described in the following scenarios.

1.2.1 Environmental Signal

A positive environmental signal indicates that a biological agent may have been released into the environment of a major metropolitan area. Based upon that signal, public health monitors are alerted to look for early clinical cases that present in a manner consistent with this particular biological agent. The real-time clinical data can be accessed based on clinical symptoms and diagnoses consistent with the agent released, and include emergency room diagnoses, lab orders and results, and other clinically descriptive data of public health relevance. The data are monitored and analyzed during the period of time during which people infected with the agent would start to show symptoms, to determine whether or not the signal was truly positive, or a false alarm.

1.2.2 Suspect Illnesses

Health indicators, a number of cases of unexplained illness in an area, have raised the level of concern of public health officials. Public health monitors analyze the real time clinical care data to determine if there are more ill people with similar symptoms, how quickly the number of cases is increasing, and the clinical attributes of the illness, to help establish whether or not this is an existing or potentially new disease threat.

Example: E coli Exposure to children at a state fair where people come from all over the state to one location and then get sick after getting home.

An individual is diagnosed with an infectious disease that can be traced to a particular health risk. Public health officials determine that a risk of transmission exists to certain populations. Information about this case(s) is shared with local and regional practitioners, requesting increased surveillance and reporting of additional cases to public health officials. In addition, public health authorities issue a press release advising the relevant population of the potential risk.

Example: Hepatitis A is diagnosed in a person handling food in a restaurant or a store selling fresh produce. The case is reported by the clinician consulted by the patient. Investigation by public health officials determines that there is a risk of transmission of hepatitis A in persons who consumed food items handled by the patient. A press release is issued to inform the public, defining precisely who was at risk and who may benefit from immunoprophylaxis, consisting in this case of an injection of immune globulin, and providing details about ad hoc immunization clinics. Information on this case is also shared with local and regional practitioners, requesting increased surveillance and reporting of additional cases to public health officials.

1.2.3 Intelligence Warning

Intelligence exists about a possible attack on several large metropolitan cities, which could be an attack on the water supply, at a large public gathering, or against a chemical or nuclear facility. Public health monitors begin to analyze the real time data stream for the clinical symptoms consistent with illness resulting from a successful attack. Localization of cases could also help associate particular aspects of the attack location that may have been affected.

1.3 MONITOR AN ONGOING EVENT

The use of real-time clinical data to provide situational awareness of an ongoing event is described in the following scenarios. Having the clinical care data from emergency rooms available in real-time provides public health officials with more timely data than would be available otherwise to deploy emergency response resources in the most effective manner.

1.3.1 Ascertain Size of Event

A health event, following a successful attack, has been confirmed to be in progress in a specific jurisdiction. The investigators, response personnel, and health officials need to know how many people are affected at what locations within the jurisdiction, and how quickly that number is increasing (at the onset of the event) or decreasing (as the event progresses to its end). Both geospatial mapping and temporal charting are available to visualize this information.

Public health may have information about a developing event that is unknown to clinicians on site. As a result, public health monitors have a broader view of the event, and can analyze it for symptoms and related diagnoses so that the full magnitude of the event, both in number of cases and geographical location, can be known.

1.3.2 Ascertain Rate of Spread of Event

A health event, the release of a biological agent, has been confirmed to be in progress in multiple jurisdictions. The investigators, response personnel, and health officials need to

know the locations both within and across jurisdictions to which the event is spreading and how rapidly it is spreading to determine the response necessary to manage and contain the event. Graphical views are available to authorized individuals to show the rate of spread and changes in the pattern of spread both within and across jurisdictions.

1.4 RESPOND TO KNOWN EVENT

Responding to a known, confirmed event includes tracking the efficacy of response activities and monitoring for adverse events as well as providing data to support outbreak management and countermeasure/response activities. The following scenarios describe how real-time clinical data helps support the various response activities.

1.4.1 Support Outbreak Management and Countermeasure/Response Activities

Integrated data from all biosurveillance data sources can be transmitted across jurisdictions, as appropriate, to support outbreak management and countermeasure/response teams. The jurisdictional use of that data includes identification of potentially exposed individuals for follow-up, exposure contact tracing, prophylaxis, treatment, and isolation and quarantine.

1.4.2 Track Efficacy of Response Actions

As the response to the event continues, the public health can track the increase or decrease in the size and spread of event to determine if the containment and preventative measures are effective.

1.4.3 Monitor for Adverse Events

As the population affected by the event is treated or prophylaxed, the real-time clinical care data can be monitored for the occurrence of adverse events.