Biological Warning and Incident Characterization

The Biological Warning and Incident Characterization (BWIC) system helps public health and emergency-management officials prepare for and respond to biological terrorist attacks and select public health threats. Developed by the Department of Homeland Security (DHS) in response to local and state requests, BWIC provides integrated decision support to facilitate timely warning, attack assessment, communications, and effective response in the event of a biological attack.

BWIC helps users interpret the significance of a confirmed biological event detected by BioWatch and other environmental-monitoring systems. Such events trigger the BWIC system, which can then be used to evaluate the threat to public health, the extent of the contamination, and the choices for response decisions.

Each locally controlled BWIC system combines community data from multiple sources; sophisticated, but user-friendly models; and visualization tools to aid local response to biological incidents. The BWIC system obtains environmental-monitoring data from BioWatch and U.S. Postal Service (USPS) detectors, alerts the user when a positive event occurs, and assembles information for BWIC-assisted response. In addition, the system can be used as a platform to support training, response planning, and response exercises.

By assembling data in the BWIC system, local agencies obtain a common view of an evolving event, thereby supporting decision making and coordination activities. In addition, BWIC is compatible with analysis tools and applications used at the jurisdictional level and interfaces with existing local information-technology systems.

The flexible design of the BWIC system enables local jurisdictions to configure each system so that it is consistent with local response plans and concepts of operations. Each jurisdiction decides the specific features to be included in its BWIC system. These components are then assembled within BWIC to provide situational awareness (Figure 1). Available BWIC components include the following:

- Locally provided geographic information system (GIS) maps
- BioWatch and USPS monitoring data
- Local meteorological information
- Atmospheric-dispersion models
- Day and night population information
- Disease progression information
- Subway and facility interior information
- Links to public health surveillance information
- Export using DMIS (Disaster Management Interoperability Services)

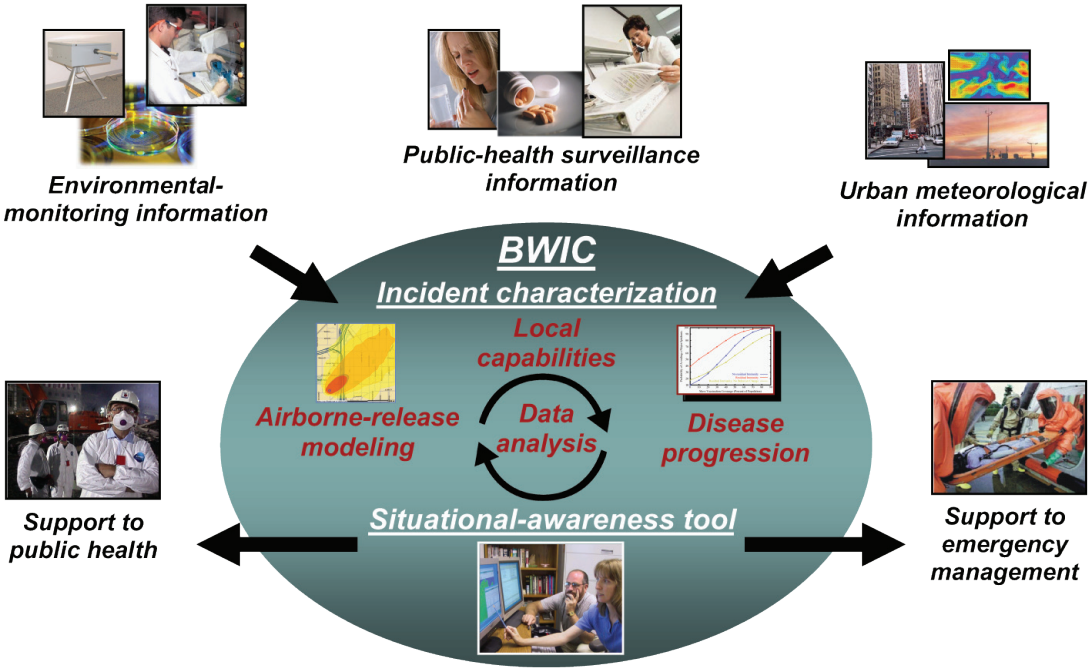

Figure 1. BWIC integrates key information to provide situational awareness.

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The BWIC system can display BioWatch, USPS, and additional biological-environmental data on a number of GIS platforms. Users can also view historical information via BWIC. In addition, users can enter important facts directly on the maps, overlaid with GIS data as appropriate. This allows users to include data that was not anticipated—for example, information from law enforcement or federal investigators—as well as anecdotal information from responders witnessing suspicious activity or unusual events, such as distressed or dead animals.

Augmenting public health monitoring results with BWIC data and predictions can help determine the public health significance of a biological event. BWIC is designed to run in parallel and exchange data with a public health syndromic surveillance system, such as ESSENCE. In addition, users can input data into BWIC as desired. For example, users can enter public health monitoring metrics, such as the number of reported hospital cases or the number of people reporting symptoms in a given locality.

The BWIC modeling tools incorporate data feeds from local meteorological stations to visualize and feed airflow information. BWIC displays the meteorological data along with wind fields created from the data. The meteorological information is also used for BWIC's air-dispersion models, which include outdoor-plume models and indoor and subway models where applicable.

BWIC can help users perform release reconstruction by modeling potential upwind-release areas consistent with the meteorological and environmental-monitoring data. BWIC can also send environmental-monitoring information to the Interagency Modeling and Atmospheric Assessment Center (IMAAC) and incorporate modeling results from IMAAC back into the BWIC system.

The BWIC population-modeling tool maps the exposed population within geographic-area contours. The exposed population can be manually selected by users or can be determined from plume-modeling results. Both nighttime and daytime population maps (using census tracts) are included in BWIC, enabling users to identify the number of people within a selected region and visualize the diurnal movement of that population.

BWIC can be used for training, response planning, and exercises. After each BWIC system is installed, local personnel are trained to use the system and its models. Additional information about the system's capabilities is provided in a user's manual and is embedded within the software for the user's reference. Moreover, data feeds that simulate biological events are provided for a number of local scenarios to support user training and the development of local emergency-response plans.

In support of user-defined scenarios, planning, and response, BWIC includes a capability to model the progression of infectious and noninfectious diseases. By using existing epidemic models, this tool can simulate the movement of exposed populations and then provide the number of cases for each census tract.

Finally, the BWIC system includes a link to Centers for Disease Control (CDC) Web-based information and contains an internal bioagent reference tool. The bioagent reference tool provides answers to key questions about CDC Category A and B agents, as well as selected Category C agents. Agent summaries with references are provided to help users diagnose, mitigate, and prevent these diseases.

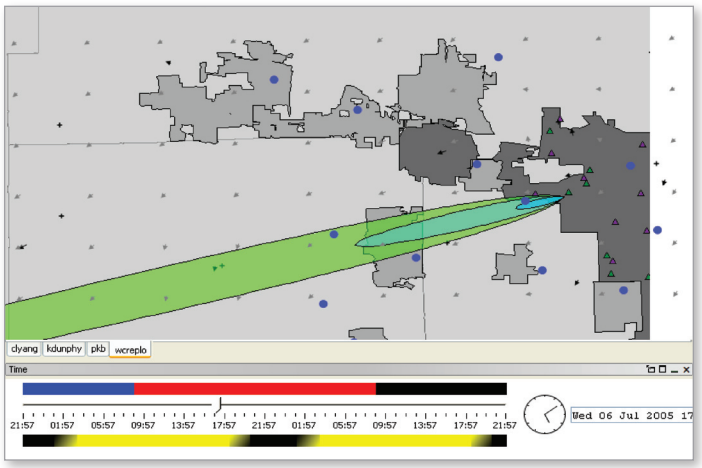

Figure 2. A BWIC-generated dispersion model for an urban area.

For more information about BWIC, please contact

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