PROVEN PERFORMANCE SINCE 2004

SOME OF OUR SUCCESS CASES

Battelle began performing probabilistic risk analysis in the 1970's. Building on those fundamentals, in 2004 Battelle was contracted to develop risk analysis capabilities for the Department of Homeland Security to assess the risk of a bioterrorism attack in the U.S. and inform U.S. government decisions for biodefense investment. The gamut of possible attack scenarios needed to be considered, many mitigation options were possible, yet limited resources were available. What countermeasures should be developed and/or stockpiled? Should bioaerosol detectors be used? Which agents should be detected? And should efforts be focused on prevention or mitigation of an attack? DHS needed objective, risk-informed data upon which to make decision; Battelle has delivered and continues to develop, update and adapt DHS's risk tools and outcomes.

As the world's largest independent R&D organization, Battelle continues to solve bioterrorism challenges for the DHS. Subsequently, other clients responsible for preventing, preparing for and/or responding to adverse and potentially catastrophic CBRNE events have enlisted Battelle's Decision Support tools for a solution that:

• Uses scientifically sound models and data from multiple sources (e.g., SMEs, intelligence, and literature) to capture interactions
• Enumerates all scenarios of concern
• Prioritizes options by their risk
• Evaluates numerous mitigation options before selecting path forward
• Provides defensible and reviewable justifications for committing program funds
• Integrates the results of thousands/millions of scenarios to quantify and prioritize options by their risks

HOW IT WORKS

Battelle's Decision Support develops models and analyses that help our clients optimize their preparedness and response investments. These models capture the key data and phenomenology of the adverse events and the options available for prevention and response. The analyses are then used to inform resource allocations.

Battelle Decision Support initiates critical tasks that draw from its existing, modular foundation beginning with:

• What decisions need to be informed?
• What is a comprehensive set of scenarios to address the organization's decision process?
• What are options for preparedness and ensuing mitigation response?

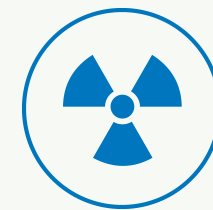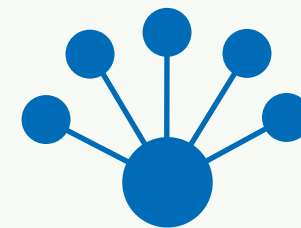Battelle Decision Support then applies its established methods to analyze the organization's risk:

• Defensible estimates are calculated of the likeliness of adverse events
• Sound scientific data and expert judgments are incorporated
• Vetted methods are used to estimate scenario consequences

Better decisions are made possible by using the analysis to objectively inform the organization's decisions:

• Better decision making: Get a more comprehensive and quantitative evaluation of options
• Trade-Off Analysis: Examine the benefits of different mitigation options (e.g., cost-benefit analysis)
• Ability to justify assumptions: Generate assumptions that are less subjective and more defensible, reassuring and analytical
• Identification of the most important data gaps: See how outcomes vary by situation
• Efficient allocation of resources: Determine the best way to allocate scarce resources and spend only on what is needed

Battelle risk analyses are conducted on systems appropriate for the scale of challenge, from utilities that are easy to access and use to high-performance, high-security computing environments.

• System requirements: Available on mobile, PC and cloud
• Analyst requirements: Client staff with minimal training
• Client deliverables: A decision support tool designed to address specific user challenges and perform quantitative analyses with a variety of tailored outputs

Placement & Evaluation of Detection Networks

Our client needed to determine intelligent, optimized placement of bioaerosol detectors for new or current locations to make the most out of limited detection resources. We developed a desktop tool to inform detector placement and network evaluation. We conducted a comprehensive assessment of detector network performance and defined a set of attack scenarios relevant to the locations to be protected. By using historical data and intelligence information to inform scenario probability, we were able to estimate consequences and detection for different placement options. The new tool allows the agency to plan defensible placement of detectors in the context of current and evolving environments by providing a data-driven quantitative assessment to decision makers with expertise.

BEAR for Radiological Risk Decisions

Commanders facing radiological risks may be required to choose a course of action that weighs mission objectives against the risks of potential radiological exposure. How does one pick a course of action to ensure mission success while minimizing health risks for military personnel? The Battelle Best Estimate/Assessment Risk (BEAR) provides the commander and staff with an understandable metric for aiding in making military decisions in the face of a nuclear accident, terrorist attack or operations in contaminated territory. BEAR allows for direct comparison of all of the health and operational risks and benefits of each course of action. It analyzes both health risks (combat, DNBI, and short- and long-term radiological health risk) and post-mission combat effectiveness to provide clear, unambiguous answers to the critical questions that commanders will face in the field: do the benefits of an action outweigh the total (operational and radiation) risks? Are total personnel risks minimized? The customized user interface allows easy user inputs, with built-in logic to verify reasonableness. An easy-to-understand reporting template targets outputs on exactly what is needed to assist effective decision making.

Integrated CBRN Terrorism Risk Assessment

The Department of Homeland Security needed to develop a strategic, integrated all-CBRN risk assessment that integrates the findings of the intelligence and law enforcement communities with input from the scientific, medical and public health communities. We developed an algorithm which synthesizes multiple risk analyses into a single overall assessment of CBRN terrorism risk. The project required development of individual threat (i.e., chemical, biological, radiological, nuclear) terrorism risk assessment and definition of a comprehensive attack scenario set including different terrorists, hazards, targets and attack modalities. The Integrated CBRN Terrorism Risk Analysis and Decision Support Tool allows risk analysts to identify which attacks are likely, consequential and risky, and conducts risk buy-down analysis for mitigation options across the threat landscape.

Probabilistic Risk-Informed Analysis for Food Safety

Food contamination can cause significant financial damage to food producers, including loss of food product, cleanup costs for impacted facilities, and lost sales due to erosion of brand value. We developed a risk-informed analysis program to help producers identify and mitigate food contamination risks. First, we created a comprehensive set of contamination scenarios specific to the food product and integrated facility-specific food processing instrument readings and scientific data regarding known food contaminants. We then developed a comprehensive, manufacturer-specific contamination estimation tool including production, distribution, retail, home preparation, consumption and human health impacts. The web-accessible decision support tool allows manufacturers to conduct base risk analysis and what-if scenario analysis to select the right mitigation strategy.

For support with your most complex CBRN decisions, contact us today.

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Every day, the people of Battelle apply science and technology to solving what matters most. At major technology centers and national laboratories around the world, Battelle conducts research and development, designs and manufactures products, and delivers critical services for government and commercial customers. Headquartered in Columbus, Ohio since its founding in 1929, Battelle serves the national security, health and life sciences, and energy and environmental industries. For more information, visit www.battelle.org.

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It can be done

RISK-INFORMED DECISION SUPPORT FOR CBRN

PROBABILISTIC RISK ASSESSMENT, PREPAREDNESS AND OPERATIONAL DECISION-INTELLIGENCE SUPPORT FOR COMPLEX CBRN SCENARIOS

The best course of action in a complex, multi-varied scenario is rarely clear. Decisions are required and the outcomes will be revealed in hindsight. Tabletop exercises and expert judgment are useful in trend identification, but are subjective, limited and not quantitative.

Battelle's risk-informed Decision Support provides a proven, systematic and comprehensive methodology to project and evaluate the multi-variable factors of complex rare event scenarios and quantify their risk and consequences. It was specifically designed to provide risk-informed support to the unique challenges of CBRN scenarios where:

• Number of possibilities (i.e., scenarios) to plan for is large

• Number of options for addressing negative impacts are numerous

• Addressing all risks is too expensive

• Interactions among options are difficult to assess by simple review

• Quantitative, risk-informed rationale is designed to support decision makers.

What can you do with Battelle's risk-informed Decision Support?

Evaluate Options

• Use the comprehensive risk assessment to evaluate many risk mitigation options

• Estimate change in risk and cost for each mitigation option

• Obtain options for buying down risk

• Evaluate the options to identify those that are the most acceptable

Work Toward the Optimal

• Identify current position and long-term optimal position

• If cost is more than can be funded in a single effort, identify incremental steps to the optimal position

• Make rational investment decisions toward that end

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