

CONCURRENT SESSION 1 – DECISION SUPPORT

The Wide Area Decontamination Tool

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There are many types of emergencies and disasters that threaten the stability of society. Among the most serious are biological incidents, for which government agencies have a specific interest in developing mitigation strategies. A methodology was developed to simulate the cost and time associated with the decontamination of wide-area indoor, outdoor, and underground biological incidents. This methodology has flexible definition of scenarios, configurable settings for various key parameters in the response such as decontamination efficacy and considers a wide range of potential decontamination strategies that could be employed. The methodology was incorporated into a software application, the Wide Area Decontamination Tool (WADT), allowing users to construct simulations and view results.

The WADT methodology is driven by a series of equations developed to characterize the cost and time associated with each step of the decontamination process, including: 1) the preliminary sampling of surfaces to define initial contaminant levels, 2) removal of waste from the site area to decrease the cost of decontamination, 3) the treatment of surfaces to remove contaminant, 4) the subsequent sampling of surfaces to determine the effectiveness of treatment, and 5) the sampling of waste materials to determine proper disposal procedures. The decontamination portion of the WADT methodology includes a series of equations and distributions developed to estimate the effectiveness of a decontamination treatment on a specific surface type, known as the Efficacy Model. The Efficacy Model was informed by an in-depth evaluation of decontamination treatment data compiled following an extensive literature search on the effectiveness of a number of decontamination treatment methods on various surface types. This evaluation consisted of two rigorous statistical analyses resulting in multiple distributions from which an efficacy value can be estimated based on the specific decontamination method and surface type combination chosen. This model allows the tool to simulate decontamination in a more realistic way by enabling surfaces that may require multiple treatments to be fully decontaminated.

The WADT allows users to define parameters driving the methodology in terms of uncertainty. Using these uncertainty inputs, the tool provides users the ability to quickly simulate thousands of potential scenarios and identify the distribution of possible cost and time outcomes from the defined uncertainty in the scenario. The application provides the capability to analyze highly uncertain scenarios and determine the most effective mitigation and operationalization strategies in response to wide area biological contamination events.
