

# **Improving Response to the Aftermath of Radiological and Nuclear Terrorism**

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In support of the Department of Homeland Security's Science and Technology Directorate and Office of Health Affairs, Lawrence Livermore National Laboratory and Battelle has undertaken detailed consequence modeling of a nuclear detonation in several modern U.S. cities that obtain insight into the nature and distribution of injuries and support community preparedness activities. Atmospheric dispersion and prompt effects models are important tools for planning an initial response to a nuclear detonation; however current operational predictions used by federal agencies make some overly simplified assumptions. The analysis used for this study provided more realistic methods of estimating exposure by accounting for the presence of different building types, which can provide shielding and sheltering of the population, and also provide more realistic estimations of the number and type of casualties from nuclear-detonation prompt effects (prompt radiation, thermal and blast overpressure) that account for how these structures both protect people and cause injury due to building collapse and glass breakage. Results indicate that although high levels of casualties and extensive destruction may be unavoidable, both casualties and secondary effects can be significantly reduced with proper planning, equipment, training, and medical countermeasure development.