



Public Release Date: September 8, 2010

Contact: Steve Gibb

Steve.Gibb@noblis.org

703.610.2441

Society for Risk Analysis

Stanford Study Calls for Sheltering-in-Place in the Event of Nuclear Attack

Using Washington, D.C. as a Model, Study Urges Sheltering Option as Saving Tens of Thousands of Lives Versus Evacuation

Washington, D.C. – Stanford University experts have concluded that in the event of a nuclear detonation, people in large metropolitan areas are better off sheltering-in-place in basements for 12-24 hours than trying to evacuate immediately, unless a lengthy warning period is provided. The scientific and engineering analysts comprehensively modeled the impacts of a detonation in downtown Washington D.C. and calculated clogged exit roads would pose more significant risks by exposing evacuees to radiation than if people were to remain in place at the center of large buildings or in basements.

“The logistical challenge of an evacuation appears to be beyond current response capabilities,” said author Lawrence M. Wein of Stanford. He noted, “Sheltering in basements saves approximately twice as many lives as being aboveground” in the Washington, D.C. area. The authors recommend government encourage businesses and citizens to develop a basement shelter strategy, including the storage of food, water, blankets, and other necessities at facilities and homes located in or near large cities.

Funded by Stanford University, the analysis accounts for blast, thermal, and radiation effects and uses sophisticated mathematical models to investigate the impact of various response strategies. Although the researchers say they have more confidence in their sheltering recommendation than in their estimates of lives that would be lost, they argue there would be almost 80,000 fatalities in the immediate aftermath of detonation of a 10 kiloton improvised nuclear device on the Washington Mall. Of the estimated 360,000 survivors without access to a vehicle, they estimate 43,000 would die if they immediately tried to evacuate on foot. In contrast, sheltering in a basement (or near the middle of a large building) would save a third of them. A 10 kiloton device could be hidden in a van or similarly-sized vehicle. The explosive force of a single kiloton of nuclear material is equivalent to the blast from 1,000 tons of TNT.

“Among survivors of the prompt effects with access to a vehicle, the number of deaths depends on the fraction of people who shelter in a basement rather than self-evacuate in their vehicle: 23,100 people die (as opposed to 77,000) if 90 percent shelter in a basement, and 54,600 die if 10 percent shelter,” according to the study. “Details related to how to organize evacuation, search

and rescue, decontamination, and situational awareness (e.g. via phone or radio) reportedly have very little impact on the number of casualties.”

This new application of quantitative risk modeling is featured in the article “Analyzing Evacuation Versus Shelter-in-Place Strategies After a Terrorist Nuclear Detonation” in the September issue of the journal *Risk Analysis*, published by the Society for Risk Analysis. The article was authored by Lawrence M. Wein, Youngsoo Choi and Sylvie Denuit, all of Stanford University.

The study also notes sheltering “would save many more lives in New York city than in Washington for three reasons: New York city’s population density is much greater and so the population affected by the fallout would increase by nearly an order-of-magnitude; New York city has many more tall buildings, which would allow for greater protection for those who shelter; and New York city has few roadways that exit the city, which would greatly exacerbate both pedestrian and vehicle evacuation.”

The Stanford experts cite previous studies that have found first responders are unlikely to be able to establish evacuation stations until 12-48 hours after an attack, no significant federal response is likely for 24 hours, and a full federal response is not likely to be achieved for 72 hours. “Unlike a bioterror or chemical attack, it may not be possible for the government to provide timely advice to the populace after such an event.” The authors contend they have used conservative assumptions throughout the study, which they say adds strength to their conclusion that sheltering is the best option.

Risk Analysis: An International Journal is published by the nonprofit Society for Risk Analysis (SRA). SRA is a multidisciplinary, interdisciplinary, scholarly, international society that provides an open forum for all those who are interested in risk analysis. Risk analysis is broadly defined to include risk assessment, risk characterization, risk communication, risk management, and policy relating to risk, in the context of risks of concern to individuals, to public and private sector organizations, and to society at a local, regional, national, or global level. www.sra.org

Contact: Steve Gibb, 703.610.2441 Steve.Gibb@noblis.org or Lisa Pellegrin, 571.327.4868 or Lisa.Pellegrin@noblis.org to arrange an interview with the author(s). Note to editors: The complete study is available upon request from Lisa Pellegrin/Steve Gibb or here: <http://onlinelibrary.wiley.com/doi/10.1111/j.1539-6924.2010.01430.x/full>