

Study details catastrophic impact of nuclear attack on US cities

March 20 2007

A new study by researchers at the Center for Mass Destruction Defense (CMADD) at the University of Georgia details the catastrophic impact a nuclear attack would have on American cities.

The study, which the authors said was the most advanced and detailed simulation published in open scientific literature, highlights the inability of the nation's current medical system to handle casualties from a nuclear attack. It also suggests what the authors said are much needed yet relatively simple interventions that could save tens of thousands of lives.

"The likelihood of a nuclear weapon attack in an American city is steadily increasing, and the consequences will be overwhelming" said Cham Dallas, CMADD director and professor in the UGA College of Pharmacy. "So we need to substantially increase our preparation."

Dallas and co-author William Bell, CMADD senior research scientist and faculty member of the UGA College of Public Health, examined four high-profile American cities – New York, Chicago, Washington, D.C. and Atlanta – and modeled the effects of a 20 kiloton nuclear detonation and a 550 kiloton detonation. (For comparison, the nuclear bombs dropped on Hiroshima and Nagasaki were in the 12 to 20 kiloton range). Bell explained that a 20 kiloton weapon could be manufactured by terrorists and fledgling nuclear countries such as North Korea and Iran, while a 550 kiloton device is commonly found in the arsenal of the former Soviet Union and therefore is the most likely to be stolen by terrorists.

The study, which took three years to complete and appears in the current issue of the International Journal of Health Geographics, combines data on the impact of the devices, prevailing weather patterns and block-level population data from the U.S. Census Bureau to provide a level of detail previously unavailable.

Among the study's findings:

-- A 20-kiloton detonation would leave debris tens of feet thick in downtown areas with buildings 10-stories or higher. Roughly half of the population in downtown areas would be killed, mainly from collapsing buildings. Most of those surviving the initial blast in downtown areas would be exposed to a fatal dose of radiation.

-- While the main effects from a 20-kiloton explosion would be from the blast and the radiation it releases, a 550-kiloton explosion would create additional and substantial casualties from burns. Such an explosion would superheat the blast zone, causing buildings to spontaneously combust. Mass fires would consume cities, reaching out nearly four miles (6.3 km) in all directions from the detonation site.

-- A 550 kiloton detonation in New York would result in a fallout plume extending the length of Long Island, resulting in more than 5 million deaths.

-- A 550 kiloton detonation in Washington, D.C. would destroy hospitals in the District, but its fallout plume would also incapacitate hospitals in Baltimore, nearly 40 miles away.

The researchers note that in all four cities studied, hospitals are concentrated in the area most likely to be destroyed. Another weak link is the inability of the nation's hospital system to treat the burn victims a 550-kiloton detonation would create. A 550-kiloton detonation in

Atlanta, the least densely populated of the four cities studied, would result in nearly 300,000 serious burn victims.

"The hospital system has about 1,500 burn beds in the whole country, and of these maybe 80 or 90 percent are full at any given time," Bell said. "There's no way of treating the burn victims from a nuclear attack with the existing medical system."

Dallas acknowledges that the consequences of a nuclear attack would be grim, but stresses that there are ways that tens of thousands lives could be saved.

"If a nuclear detonation were to occur in a downtown area, the picture would be bleak there," Dallas said. "But in urban areas farther from the detonation, there actually is quite a bit that we can do. In certain areas, it may be possible to turn the death rate from 90 percent in some burn populations to probably 20 or 30 percent – and those are very big differences – simply by being prepared well in advance."

One intervention is to mount a public awareness campaign to teach civilians what to do in the event of a nuclear attack. Since radioactive plumes move downwind, a person can look up at the trees to see which way the wind is blowing and then flee perpendicular to the wind. Because the plumes are significantly longer than they are wide, moving as little as one to five miles perpendicular to the plume can mean the difference between life and death. People in areas upwind of the detonation site, on the other hand, are safest staying where they are.

"There are certain areas where people should flee," Dallas said. "But in most areas, it would be much safer for people to stay put."

Dallas said today's hospital burn units provide exemplary but time consuming care to burn victims, who typically arrive sporadically and in

small numbers. A nuclear attack would bring a sudden surge of patients, but the medical system could dramatically minimize fatalities by training staff and equipping non-medical people to treat second-degree burn victims in much larger numbers. Dallas said the focus must be on cleaning the wounds to avoid fatal infections, administering painkillers and then moving on to the next patient. And all of this must occur in the field, since thousands of victims would not make it to a hospital.

"Under the current system and in these extraordinary conditions, they're going to be able to treat a hundred people well and not treat 99,900 people," Dallas said. "So we've got to change those gears."

On April 19, Dallas will address the United Nations for the second time in as many years. He will discuss options for repairing the crumbling sarcophagus surrounding the reactor that triggered the Chernobyl disaster in 1986. He also will discuss the consequences of a nuclear attack and what nations can do to prepare.

"We want to try to encourage people to pay attention to this, because it's not all the end of the world," Dallas said. "There are actually steps that one can take to save lives. But we're running out of time."

Source: University of Georgia

Citation: Study details catastrophic impact of nuclear attack on US cities (2007, March 20)
retrieved 9 April 2024 from

<https://phys.org/news/2007-03-catastrophic-impact-nuclear-cities.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--