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Media Advisory: To contact Rocco Casagrande, Ph.D., e-mail rocco@gryphonscientific.com or call 301-270-0671.

Model Suggests New Triage System for Aftermath of Possible Nuclear Detonation

CHICAGO -- With the assumption that medical personnel and material resources will be very limited, researchers have developed a new model for surgical triage following a nuclear detonation, according to a report posted online today by *Disaster Medicine and Public Health Preparedness*, a journal published by the American Medical Association. This article as well as all of the articles in the special issue, *Nuclear Preparedness*, is open access and can be viewed at *Disaster Medicine and Public Health Preparedness* journal's website http://www.dmphp.org.

Triage is an assessment and sorting process used to prioritize casualties and is historically based upon the medical needs and likelihood of survival of the victims," according to background information in the article. "The focus of triage in a mass casualty incident changes from the needs of an individual victim to the goal of saving the most lives possible. A mass casualty incident involving a nuclear explosion has the potential to produce catastrophic structural damage and injuries." The authors note that in the aftermath of a nuclear detonation, people with serious trauma may also have burn or radiation injury requiring complex care.

Rocco Casagrande, Ph.D., from Gryphon Scientific, Takoma Park, Md., and colleagues developed a model to test different hospital-based triage approaches following a nuclear detonation. The model, called MORTT (model of time and resource-based triage), was developed to guide the use of scarce medical resources, including hospital-based personnel, in the first 48 hours after the detonation of an improvised nuclear device. "MORTT is not intended to be used by the medical community in the aftermath of a disaster, but rather to be used as a tool to explore the effect of various prioritization decisions pre-event to support planning in an environment in which medical resources are scarce," the authors write. This model focuses primarily on the surgical needs of trauma victims.

"Using MORTT, we found that in poorly resourced settings, prioritizing victims with moderate life-threatening injuries over victims with severe life-threatening injuries saves more lives and reduces

demand for intensive care, which is likely to outstrip local and national capacity," the authors found. "Furthermore, more lives would be saved if victims with combined injury (i.e., trauma plus radiation more than 2 Gy [gray: dose of radiation]) are prioritized after nonirradiated victims with similar trauma." In addition, the authors add: "Second, as the victim loading increases relative to the resources available (up to 10-fold more patients or 10-fold fewer surgical teams as the baseline, called "10x" in Figure 1), mod-sev-mild saves more than 3-fold more victims than a sev-mod-mild system." This could translate into thousands of lives saved.

"Using MORTT we determined that a mod-sev-mild triage strategy saves more lives than treating severely injured victims first. This guidance holds for various assumptions of resource demand and scarcity, transport time to hospitals, and death rates." … "The results differ significantly from conventional triage schemes, in which the salvageable victim most likely to die next is prioritized, but these results are logical in the aftermath of a nuclear detonation for multiple reasons. First, severely injured people have a lower probability of survival even if treated. Second, severely injured people require more resources. Finally, medical resources may be unavailable to stabilize moderately injured victims while severely injured people are treated, and therefore people with moderate injuries will progress to a more severe category."

In conclusion, the authors write: "MORTT represents an initial effort to model a vastly complex event."

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