

Improving the Realism of Radiological-Nuclear Training Exercises: Results of a New Study

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Introduction: Disasters and emergencies involving radiation can produce numerous social and behavioral impacts, including shadow evacuations, seeking of medical attention by large numbers of people fearful of potential contamination, and stigmatizing of individuals, products and communities perceived to be associated with the incident. Indeed, these, and related impacts, can constitute some of the most important and challenging public health effects of a radiological-nuclear incident. At the present time, it is unclear whether or how such issues are being addressed in preparedness training exercises.

Methods: With support from the Radiation Studies Branch, Centers for Disease Control and Prevention (CDC), a study (2006–2008) was performed by researchers at the University of Alabama at Birmingham. The aim was to determine how social and behavioral issues are addressed in radiological-nuclear exercises. Radiological-nuclear exercise reports, guidance materials, and related items were gathered, and a systematic review and analysis of the documents was conducted.

Results: Initial findings from the study suggest that only about half of radiological-nuclear exercises deal with key social and behavioral issues. Where such issues are included, they tend to receive relatively little attention, components are typically small in scope, and the most difficult challenges often are “assumed away.”

Conclusions: Even though social-behavioral issues are central in radiological-nuclear incidents, opportunities to practice coping with them in training exercises are quite limited. If preparedness training is to be realistic and useful, this problem urgently needs to be addressed. The present study provides a series of recommendations toward this end.

Keywords: behavioral; nuclear; preparedness; radiological; social; training

Prehosp Disast Med 2009;24(2):s156

Designing a Medical Preparedness Model for Responding to Radiological Emergencies

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Introduction: The medical system has an important role in response to a radiological emergency. Although the Radiation Emergency Medical Preparedness and Assistance Network (REMPAN) exists, every country must provide elements of preparedness of a national medical system for managing radiological emergencies.

Methods: A research group consisting of experts reviewed the literature and related plans; International Atomic Energy Agency (IAEA) standards also were considered.

Based on a three-level approach, preparedness elements of the national medical system were determined.

Results: An emergency medical services (EMS) team for each district is to be trained. The competence of the team members, requisite equipment, procedures for rapidly preparing an ambulance, triage, and decontamination procedures were compiled. For each province, a prepared general hospital and its teams should develop: (1) radiological assessment capability; (2) triage; and (3) decontamination preparedness intervention. A radiation emergency receiving area, equipment list, personal protective equipment, and cooperation with specialized centers were considered. Each country must have a specialized hospital for medical management, training, and connection with REMPAN. All specialized departments, unique instruments, specific drugs, and necessary procedures were defined. Also, the development of a mobile medical support team that could be accessed from the region.

Discussion: Although radiological emergencies are rare, a national medical system must provide a comprehensive emergency management plan and be prepared for incidents.

Keywords: chemical, biological, radiological, nuclear, or explosive; emergency; model; preparedness; radiological emergency

Prehosp Disast Med 2009;24(2):s156

Chemical, Biological, Radiological, and Nuclear Preparedness Training for Prehospital Providers

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Introduction: This study assessed the self-reported theoretical and practical preparedness training of Canadian prehospital providers in chemical, biological, radiological, or nuclear events (CBRN).

Methods: A survey was designed to address the theoretical and practical CBRN training level of prehospital providers. emergency medical services (EMS) staff in British Columbia and Ontario were invited to complete the on-line survey.

Question	Yes n (%)	Total Responses
Practice performing procedures in PPE	463(58)	803
Mask fit-tested (other than N-95)	411(51)	801
Ever used gas mask with live agent	152(19)	800
Use PPE in exercise involving communication	263(33)	800
Use PPE in exercise with radio or telephone communication	201(25)	801
Called to provide care at contaminated scene	319(40)	797

Results: There were 1,028 respondents to the survey. The respondents primarily were male, frontline personnel with >15 years of experience. Only 63% of respondents indicated they had received either theoretical or practical training to work in a contaminated environment. Of those that had received any training, 61% indicated they had received “hands on” or practical training. In regards to identifying a possibly contaminated scene, 82% indicated they had received some training. Only 42% had received training on symptoms of nerve agent exposure, 37% on symptoms of blister agent exposure, and 46% on symptoms of asphyxiants. In regard to treating victims of chemical agents, 32% had received training regarding nerve agents, and 30% regarding blister agents. Only 31% of all respondents had received training regarding the detection of radiation.

Conclusions: Chemical, biological, radiological, and nuclear events have unique hazards and require specific education and training. As assessed with this survey, Canadian prehospital providers do not uniformly receive the training to identify and work in contaminated environments.

Keywords: chemical, biological, radiological, and nuclear; preparedness; education; prehospital; preparedness; training
Prehosp Disast Med 2009;24(2):s156–s157

Medical Care within the Hot Zone: An Innovative Concept in Vienna during the EURO08

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Introduction: The response to hazardous materials or chemical, biological, radiological, nuclear (CBRN) incidents typically consists of: (1) cordons regulating access into and egress from designated zones; and (2) use of appropriate personal protective equipment. In most systems emergency medical services (EMS) will stay outside of the “hot zone”. The patient will be rescued by the fire service and, after some gross decontamination, handed over. As mass gatherings are regarded as high-risk events, this system was used in Vienna during the Euro08 and augmented by: (1) casualty decontamination units (seven parallel lines for stretcher decontamination, located before triage); (2) a rapid intervention group for medical care in the hot zone (25 medical personnel), responsible for triage, life support (airway, breathing, bleeding), and antidote therapy; and (3) a joint CBRN incident command for close cooperation with detection units.

Methods: After a review of the available open-source literature, a risk analysis was performed and the tactical concept described above was developed with cooperation of all involved services. Special training was performed for all members of the aforementioned units.

Results: As the concept was not tested by an actual emergency, the following observations can be made: (1) readiness of the units could be successfully maintained during the EURO08; (2) the chosen equipment was experienced as appropriate; (3) several minor cases corroborated the risk analysis; and (4) manpower and training requirements were considerable.

Conclusions: While it is possible to perform medical care within the hot zone, concepts are rarely tested in reality and the necessary efforts raise the question of proportionality.

Keywords: chemical, biological, radiological, and nuclear; contaminated patients; decontamination; detection; hazardous material; mass gatherings; mass events
Prehosp Disast Med 2009;24(2):s157

Fifteen Years since the Tokyo Subway Attack and Development of Chemical, Biological, Radiological, Nuclear, or Explosive Terrorist Countermeasures in Japan

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Introduction: Although 15 years have passed since the Tokyo subway attack, it was the preparations for the Kyushu-Okinawa G8 summit (2000) five years thereafter that catalyzed the development of countermeasures and policy against chemical, biological, radioactive, nuclear, or explosive (CBRNE) threats in Japan.

Report: No substantial progress was made for five years after the subway attack. Preparedness for the Kyushu-Okinawa G8 Summit included promulgation of the Civil Protection Law (2004), which codified the responses to CBRNE terrorist attacks, and consequently, the effectiveness with which the countermeasures against CBRNE terrorism acts could be deployed at a national level. Countermeasures included the establishment of a CBRNE task force, syndromic surveillance programs, and the stockpiling of antidotes, antitoxins, and antibiotics. Decontamination facilities were introduced throughout Japan. **Conclusions:** Preparedness for the summit facilitated recognition of the need for medical countermeasures against CBRNE threats to protect healthcare providers in Japan. In the 15 years since the Tokyo Subway Attack, the measures implemented in the last five years have been most effective. However, future challenges include the promotion of civilian awareness, inter-agency collaboration, and increasing the mutual-aid capacity of local communities.

Keywords: chemical, biological, radiological, nuclear or explosive; Japan; preparedness; terrorism; Tokyo
Prehosp Disast Med 2009;24(2):s157

Responsibility and Methods for Detection of Chemicals and Radioactive Substances and Decontamination

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Introduction: The response to incidents with chemical and radioactive substances has been shaped primarily by firefighters' experiences with hazardous material (HAZMAT) accidents. Globally, HAZMAT tactics consist of the main elements of: (1) appropriate use of personal protective equipment; and (2) cordons regulating access into and egress from designated zones. Detection and casualty decontamination are far less uniformly organized.

Methods: Review and analysis of open-source (medical- and first responder-oriented) English and German lan-