

Free Papers: Global Sharing: Nuclear Biological Chemical Hazards

Preparation for Chemical Attacks in a Hospital

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Background: Early decontamination (DECON) on site, triage, second DECON at hospitals and emergency treatment are required for dealing with chemically contaminated mass casualties.

Purpose: To introduce the activities planned for dealing with chemically contaminated, massive numbers of casualties at the hospital and on-site of the exposure.

Methods: The planning, training, and exercises to treat massive numbers of chemically contaminated casualties that were developed and conducted after the 11 September 2001 attacks were reviewed.

Results:

a. DECON showers and outlets of compressed air were set at the bottom of the parking building. Casualties doff their dress at this area. Wet DECON for massive numbers of casualties was conducted using showers and fire engines in the parking area, DECON shelters, and a DECON room inside of the hospital. The type of Wet DECON administered was determined according to severity. Exercises were performed according to the plan using trained, medical procedures wearing level "C" Personnel Protective Equipment (PPE).

b. An exercise was conducted with the Tokyo Fire Department in order to coordinate with the HAZMAT teams and EMT/Paramedics on-site. Triage and emergency treatment were conducted at the warm zone and temporary care tents in cold zone.

Conclusions: At the hospital, preparing DECON shelters was time consuming. For the treatment of massive numbers of casualties, multiple DECON facilities should be prepared including rapid undressing and wet DECON using fixed showers. It is important to play a role in spite of the lack of PPEs, equipment, and a communication system, since Japanese paramedics are not able to provide a full complement of medical care.

Keywords: attacks; chemical; decontamination; exercises; HAZMAT; hospitals; personal protective equipment (PPE); planning; treatment; triage

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Specification and Selection of Chemical Personal Protective Equipment (CPPE) for Health Service First Responders — The United Kingdom Approach

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Introduction: The aim was to provide appropriately specified, evidence-based, generic chemical personal protective equipment (CPPE) to all United Kingdom ambulance

services and emergency departments, which would provide body, hand, foot, and respiratory protection, and take into account usability.

Methods: Protection requirements were defined a priori using national surveillance data for chemical incidents and advice regarding the potential chemical warfare (CW) agents that might be encountered in a deliberate release scenario. A specification was determined using relevant European Standards and by incorporating additional test methodologies for performance against CW agents. The procurement of CPPE to the specification was subject to a competitive tendering process. The selection process required all potential suppliers to submit independently accredited test certificates demonstrating compliance with the specifications. Samples were supplied for CW agent testing. Additionally, a cohort of 20 test subjects wearing CPPE carried out the decontamination of standardised, simulated, chemically contaminated casualties for a period of one hour. Parameters assessed during these 'tests of performance in use' included the microenvironment within the CPPE, weight loss, heart rate, respiratory rate, temperature, and subjective opinions regarding usability.

Results: Upon completion of the process appropriately specified, evidence-based, generic CPPE was selected for purchase for all of the United Kingdom ambulance services and emergency departments. Details of the specification and selection process, together with the CPPE selected, are presented.

Conclusions: The United Kingdom's approach to the specification and selection of CPPE is relevant to health service first responders preparing for NBC hazards in other countries.

Keywords: chemicals; personal protective equipment; specifications; testing; United Kingdom

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Baseline Knowledge of Class A Agents Among Clinicians

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The bioterrorist attacks in the U.S. underscored the need for public preparedness at all levels of the public health system. The Columbia University Center for Public Health Preparedness at the Mailman School of Public Health, which is one of 19 national academic centers supported by the Centers for Disease Control and Prevention, responded quickly to help address the rapid and effective education of the health care workforce, one of the many of the important gaps in our response to this public health threat.

The focus was on the front-line clinicians in the community, who might be reasonably expected to see patients in early stages of bioterrorism-related illnesses, especially as many of these diseases present with symptoms similar to influenza. In order to better understand the educational and training needs of healthcare providers, pre- and post-tests were conducted for the >700 healthcare workers enrolled in a three- hour educational program on the dis-

eases of bioterrorism.

Analysis of the responses indicates that a significant portion of community-based, clinical providers lack an understanding of the appropriate treatment, prevention, and reporting mechanisms of diseases caused by Class A agents.

Following the program, important gains in knowledge were observed, at least in the short-term, indicating that educational programs on this topic may be important adjuncts to improving the readiness of clinicians with respect to bioterrorism response.

Keywords: bioterrorism; bioterrorism response; health care workers
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Analysis of Disaster and Emergency Medical Systems in Nuclear Plant Accidents in Korea

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Introduction: There are 18 nuclear power reactors operating in four regions in South Korea that generate more than 40% of the country's total electrical energy. Medical preparedness and response systems for a nuclear plant accident are increasing due to the current terrorism and socio-political environment.

Methods: A questionnaire was distributed to each nuclear plant and related institute, to confirm that inspections were done at the related institutes. Themes studied were: (1) Emergency medical systems in place around the plants; (2) Nuclear disaster medical systems; (3) Transport and communication; and (4) Preparedness and drills to address nuclear event.

Results: Data were obtained from four regions (16 nuclear reactors) and 24 hospitals. Of the related hospitals, one is a central radiation medical center, 12 are region-wide emergency centers, and 11 are hospitals sited close to the plants. The primary Emergency Medical System (EMS) in the nuclear plants was considered to be good when patients were not seriously injured during the daytime, but there are problems with the EMS system when accidents occur during nights or holidays; at such times, the degree of injury is severe, and the number of injured is high. The systems for detecting contamination and for primary decontamination of patients at accident locations were excellent. Except for one central center, receiving centers were not prepared for secondary decontamination screening of contaminated patients. There are guidelines for a nuclear event occurring in each plant, but no individual medical guidelines are in place except in one central center. No hospitals provide education or training programs, except in one central center. Disaster drills have been performed regularly only in the central center and in the plants, but the proportion that focused on medical considerations is relatively low. Most emergency transporting vehicles, including helicopters are not equipped for nuclear protection. Personal protection devices for prehospital personnel only are minimally provided, and those for medical teams, are not available except at one central center. There are no specific medical communication systems between the plants and the hospitals. The communication system depends on regular EMS communication and nuclear disaster communication systems.

Basically, primary care during regular times and guidelines and disaster drills in the nuclear plants are acceptable.

Conclusions: For the medical aspects of nuclear disaster preparedness, there is insufficient preparation, especially in the aspect of hospital preparedness, secondary and personal decontamination, medical equipment for nuclear disaster, and specific communication systems. Therefore, efforts to improve medical preparedness for a nuclear disaster in South Korea are necessary.

Keywords: contamination; decontamination; disaster drill; emergency medical systems; Korea; nuclear disaster; nuclear plant; nuclear reactor
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Decontamination of Injured Persons after Chemical Incidents: Fundamentals and Frontiers

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More than eight years after the Tokyo subway sarin attack, there still are more questions than answers for the management of such incidents in civilian populations. Besides the lack of communication and cooperation of various "forces" during the Tokyo incident, the key problems were the lack of emergency medical support, the absence of a plan of response for the decontamination of CWA victims, and the failure of the rescue teams to protect themselves due to the absence of protective equipment.

Sponsored by the National Fund for Disaster and Civilian Defense, a plan of response with regard to the German emergency medical service and fire fighting structures was established and evaluated. Both the emergency medical service and the firefighters will operate together a decontamination area. In this plan, the necessary personal protective equipment (PPE), material resources, and the complete steps in the patient's "run" are defined. All injured persons must be registered and triaged with respect to their physical condition and their exposure to the chemical substance. During this triage process, an initial treatment of the patients before body decontamination is crucial. This treatment — which consists, for example, of basic life support, spot decontamination of wounds and exposed body areas, and the use of antidotes — will be performed by different teams. After this "pre-treatment", patients will be decontaminated with water depending on their status (litter patients or walking). Behind the "hot line" the regular emergency medical system will care for the patients.

Keywords: chemicals; decontamination; exposure; personal protective equipment (PPE); plan; rescue; treatment; triage
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Policy Formulation for Disaster Management to Hazard Exposure in the Workplace

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Objectives: To formulate a policy framework for disasters that may emerge from hazard exposures at work.

Methods: This study was conducted among 500 workers in various manufacturing industries. Questionnaires were