

various nuclear disaster, new concept and new comprehensive disaster medical system is necessary as well as effective utilization of pre-existing resources.

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### The New Radiation Emergency Medical System in Japan: Lessons from the Fukushima Nuclear Plant Accident

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**Study/Objective:** Our aim was to clarify the new radiation emergency medical system in Japan, and the related activities at our hospital after the Fukushima No. 1 Nuclear Power Plant accident.

**Background:** The radiation accident at Fukushima No. 1 Nuclear Power Plant occurred on March 11, 2011. After this accident, the Japanese radiation medical system was in a state of confusion because health care workers had no knowledge about radiation emergencies and there was no appropriate organization to handle the control of a radiation disaster.

**Methods:** The Japanese government created two special radiation medical centers after the accident. First was a Radiation Disaster Medical Care and general Support Center comprised of four hospitals, with the role of coordinating the radiation emergency medical assistant teams, treatment of radiation exposure patients, and training of the hospital staff in Radiation Emergency Medicine (REM). Second was an Advanced Radiation Emergency Medical Support Center comprised of five hospitals with an advisory role in dispensing advice about professional REM dissymmetry for internal exposure, special training for professional research, and knowledge about REM. Our hospital was designated as a member of the above two centers, and we investigated our related activities.

**Results:** Since our designation, we have rebuilt the REM system in our hospital. Our achievements mainly include education, the development of training contents for activities in our hospital, and lectures on REM for the hospital staff including the doctors, nurses, radiologists, laboratory technicians, and office employees. Hands-on training and lectures were given on REM for medical students. We have also participated in REM training on the national and prefectural levels.

**Conclusion:** It is important for us to educate all of the health care workers in our hospital about radiation emergencies, and to train professional staff who are familiar with both general disaster medical care and radiation emergency medical treatment.

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### Development and Effect of Personal Protective Equipment, Train-the-Trainer Program for Hospital Nurses

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**Study/Objective:** To develop a standardized Personal Protective Equipment (PPE), Train-the-Trainer Program for hospital nurses and to investigate the effect of the program.

**Background:** Despite the importance and perception of nurses in preparation for contaminated and/or infectious crisis, a standardized program to develop competencies is still lacking in Korea. Many hospitals train for protective equipment through large group lectures. Some institutions conduct hands-on training, but the educational contents and assessment tools are not standardized. PPE training is needed for all hospital personnel that has the potential to be in contact with patients. The number of hospital personnel mounts to more than 1,000, and it is very difficult to train everyone in a single place by few trained instructors. Therefore, it is important to train trainers to be competent in training PPE.

**Methods:** Staff from the Office of Infection Control, Office of Quality Improvement, Department of Emergency Medicine, Department of Nursing, and Center for Disaster Training gathered to develop a standardized training content and assessment tool. The tools were validated through the content validity index. After pilot testing, 44 nurses from five different departments were selected to become trainers. The educational intervention consisted of a 2-hour workshop. A pre- and post-survey was conducted to evaluate the differences in perception and performances in personal protection (paired t tests). The statistical level of significance was set at 0.05.

**Results:** Pre- and post-survey differences in perception for PPE knowledge and confidence were 5.3 to 8.4 and 5.3 to 8.3, respectively. Average performance points out of 10 was 9.1, and the observed points in the role of trainers was 9.0 out of 10. All 44 participants passed the minimum passing score of 90 percentage.

**Conclusion:** A standardized train-the-trainer program for PPE was successfully developed, and the newly trained trainers will be performing their roles as trainers for PPE.

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### Middle East Respiratory Syndrome Coronavirus (MERS-CoV) Outbreak and National and Hospital Response in Korea

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**Study/Objective:** The study objective is to understand the MERS-CoV outbreak outside the Middle East.

**Background:** The outbreak of Middle East Respiratory Syndrome Coronavirus (MERS-CoV) infection in the Republic of Korea started from the index case who developed fever after returning from the Middle East. He infected 26 cases in Hospital P, and consecutive nosocomial transmission proceeded throughout the nation. The author provided an epidemiologic description, the hospital response, and the first case of mortality from the outbreak.

**Methods:** Epidemiological research was performed by direct interview of the health care professionals, and reviewing medical records in the hospital where the first mortality occurs in Korea.

We also analyzed the characteristics of super-spreaders, factors associated with mortality, and hospital response to infection.

**Results:** The first mortality by MERS-CoV in Korea was infected by the first super-spreader in Korea. The lessons after the outbreak were as follows: - A higher index of alerting system to find the source-patient earlier. - Appropriate numbers of Airborne Infection Isolation Rooms (AIIRs) should be constructed and maintained. - Proper training on putting on and take off of Personal Protective Equipment. - Well-trained health care workers to care for patients infected with highly contagious pathogens must be fostered. - Crowded and narrow hospital rooms should be converted to visitor controlled, larger-spaced hospital rooms.

**Conclusion:** Multiple potential factors were associated with the super-spreading events: misdiagnosis, delayed hospital admission, inter-hospital transfers without accurate information, and also behaviors such as ignoring instructions regarding infection control, and poor environmental conditions. Institutional and health care systems' preparedness is required to prevent such outbreaks.

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### Training and Preparedness for CBRN Emergencies in a Conflict Zone, Lebanon

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**Study/Objective:** Providing training and preparedness for Chemical, Biological, Radiological and Nuclear (CBRN) emergencies to local actors, will increase knowledge and skills of the disaster response community and health care providers, and prepare them for undertaking future responses, while providing training to both local and international actors, will increase the response capacity of humanitarian relief workers who have a large presence in border areas of and among Syrian refugee populations.

**Background:** Following the chemical attack in Syria, with the resulting mass casualties, Lebanese Ministry of Health, with the support of the World Health Organization and in cooperation with the Lebanese Syndicate of Hospitals, worked on increasing the preparedness and response capabilities of healthcare providers, especially those situated near Syrian borders. Concerned parties and responsible stakeholders became more interested and aware of the importance of training field workers on CBRN emergencies.

**Methods:** Eleven workshops were offered throughout Lebanon (North, Beirut, Bekaa, South); 8 of which were dedicated to non clinical staff (total of 207) and 3 to clinical ones (total of 105). It was facilitated using multiple methods to engage participants and reinforce messages. It was delivered in English and/or Arabic. Tools included videos, PowerPoint presentations, case studies and group exercises.

**Results:** The pre/post tests allowed for evaluating trainees; the evolution percentage for the Non clinical staff ranged from a minimum of 19% (Beirut) to a maximum of 49% (Tyr). As for clinical staff, it ranged from 8% (Tripoli 3) to 45% (Beirut 3).

**Conclusion:** Following the international community and the Non-Governmental Organizations (NGOs) effort and urgent need, the CBRN National Team in Lebanon was founded. It is headed by the Secretary General of the Higher Council of Defense and composed of representatives from all relevant parties. CBRN incidents present various challenges at all levels, including decision makers and first responders. Continuous training and preparations with strong cooperation and coordination between all parties, may decrease the impact of such event. A lot remains to be done in this regard where further research is needed.

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### Live Animal CBRN Surveillance: The XIV Pan-American Games Case Experience

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**Study/Objective:** Develop and implement a comprehensive live animal Chemical Biological Radiological and Nuclear (CBRN) surveillance program to support the XIV Pan-American Games.

**Background:** After the September 11, 2001 terrorist attacks, preparedness and response was raised at international sports events, including enhanced surveillance and rapid detection of terrorist-induced or natural events for a timely intervention. The Pan-American Games are the fourth most important international athletic event in the world. Hosted by the city of Santo Domingo, DR, the XIV Pan-American Games Security Directorate developed a CBRN unit.

**Methods:** The unit had strategic and operational mandates. For operational support, two strike teams were active at any given time, each team consisted of five members including a team leader, field physician, and tactical officers. Syndrome surveillance was performed by means of direct communications between the hospitals and units, as well as use of an electronic Web-based surveillance tool. For active real-time surveillance and recognizing the value of the lethal dose 50 concept (LD50 is the dose of a substance required to kill half the members of a tested population, the LD50 is body mass dependant), a live animal surveillance station (LASS) program was developed and placed in strategic areas. The LASS consisted of bird cages located in confined spaces and a fresh water fish tank with a continuous stream.

**Results:** Bird stations were placed at VIP areas at major sporting venues and a small fish tank emanating from the centralized water tank supplying the Pan-American village, all monitored 24/7 by webcams. Early morning the day of the opening of the village, the surveillance system identified dead fish in the tank. Investigations found non-malicious cause related to over chlorination of the water pipe system; this incident prompted activation and testing of the emergency response protocol.

**Conclusion:** Live animal stations offers a cost-effective surveillance method for CBRN support units.

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