

### Development and Effect of a Pandemic Disaster Training Program for Healthcare Providers from Designated Hospitals for Infectious Patient

Ms. Jiyoung Nob<sup>1</sup>, Professor Hyun Soo Chung<sup>2</sup>, Ms. Hye Mi Jin<sup>1</sup>, Ms. Jayoung Hur<sup>1</sup>, Ms. Min Ji Kim<sup>1</sup>, Ms Chan Mi Kang<sup>1</sup>, Ms Ga Hyun Lee<sup>1</sup>

1. Center for Disaster Relief, Training, and Research, Yonsei University Severance Hospital, Seoul, South Korea
2. Department of Emergency Medicine, Yonsei University College of Medicine, Seoul, South Korea

**Introduction:** South Korea experienced Middle East Respiratory Syndrome (MERS) outbreak in 2015. To mitigate the threat posed by MERS, the Ministry of Health and Center for Disease Control designated hospitals to be responsible for managing any suspected or confirmed infectious patient. These hospitals receive mandatory training in managing infectious patients, but many of the trainings lack practical skills practice and pandemic preparedness exercise.

**Aim:** To develop and evaluate a training course designed to train healthcare providers from designated hospitals to enhance their competencies in managing emerging infectious diseases and potential outbreaks.

**Methods:** A two-day course was developed by the Center for Disaster Relief, Training, and Research in collaboration with the Korea Health Promotion Institute using Kern's 6-step approach. The course consisted of didactic lectures, technical skills training, tabletop simulation, and scenario-based simulation. Table-top simulation exercises consisted of cases involving a single infectious patient detected in the outpatient clinic and outbreak in the emergency department. Scenario-based simulation exercises involved managing a critically ill infectious patient in an isolated ward. A post-survey questionnaire was used to evaluate the course and assess the perception changes of the participants. All pre-to-post differences within subjects were analyzed with paired t-tests.

**Results:** A total of 121 healthcare providers participated in three separate courses. The competencies for pandemic preparedness knowledge, skills, and attitude improved from pre- to post-course. The differences were all statistically significant ( $p < 0.05$ ). Overall course satisfaction in average for expectation, time, delivery method, and contents were 9.5, 9.2, 9.4, and 9.2, respectively.

**Discussion:** There needs to be tests and exercises to recognize gaps of systems in place for pandemic preparedness. Simulation exercises are ideal tools for this purpose. Although this was only a two-day intensive course, this increased familiarity with workflows, tested the coordination of workflows between different disciplines and allowed the identification of gaps.

*Prehosp Disaster Med* 2019;34(Suppl. 1):s118

doi:10.1017/S1049023X19002516

### Development and Initial Validation of a Stochastic Discrete Event Simulation to Assess Disaster Preparedness

Mattias Lantz Cronqvist MSc<sup>1</sup>, Carl-Oscar Jonson PhD<sup>2</sup>, Erik Prytz PhD<sup>1,2</sup>

1. Department of Computer and Information Science, Linköping University, Linköping, Sweden

2. Center for disaster medicine and traumatology, and Department of Clinical and Experimental Medicine, Linköping University, Linköping, Sweden

**Introduction:** Assessing disaster preparedness in a given region is a complex problem. Current methods are often resource-intensive and may lack generalizability beyond a specific scenario. Computer-based stochastic simulations may be an additional method but would require systems that are valid, flexible, and easy to use. Emergo Train System (ETS) is an analog simulation system used for disaster preparedness assessments.

**Aim:** To digitalize the ETS model and develop stochastic simulation software for improved disaster preparedness assessments.

**Methods:** A simulation software was developed in C#. The simulation model was based on ETS. Preliminary verification and validation (V&V) tests were performed, including unit and integration testing, trace validation, and a comparison to a prior analog ETS disaster preparedness assessment exercise.

**Results:** The software contains medically validated patients from ETS and is capable of automatically running disaster scenarios with stochastic variations in the injury panorama, available resources, geographical location, and other variables. It consists of two main programs: an editor where scenarios can be constructed and a simulation system to evaluate the outcome. Initial V&V testing showed that the software is reliable and internally consistent. The comparison to the analog exercise showed a general high agreement in terms of patient outcome. The analog exercise featured a train derailment with 397 injured, of which 45 patients suffered preventable death. In comparison, the computer simulation ran 100 iterations of the same scenario and indicated that a median of 41 patients (IQR 31 to 44) would suffer a preventable death.

**Discussion:** Stochastic simulation methods can be a powerful complement to traditional capability assessments methods. The developed simulation software can be used for both assessing emergency preparedness with some validity and as a complement to analog capability assessment exercises, both as input and to validate results. Future work includes comparing the simulation to real disaster outcomes.

*Prehosp Disaster Med* 2019;34(Suppl. 1):s118

doi:10.1017/S1049023X19002528

### Development of a New Triage Method to Prioritize Patients Arriving at the Emergency Room

Dr. Tomoaki Natsukawa, Dr. Ryo Deguchi, Dr. Naoki Akita, Dr. Sadayori Uemori, Dr. Toyokazu Miki, Dr. Noboru Kato  
Yodogawa Christian Hospital, Suita, Osaka, Japan

**Introduction:** By prioritizing emergency patients, triage facilitates the timely provision of care to the largest possible number of patients arriving at an emergency room (ER). Previous triage methods include the Canadian and Japan Triage and Acuity Scales. Since these methods sort patients into five categories, multiple patients are often categorized into the same category. Furthermore, since these scales adopt original complex algorithms to determine the triage category, triage personnel need to be very familiar with the algorithm. Hence, a simple triage method is needed to prioritize ER patients.

**Aim:** To develop a new triage method to prioritize patients arriving at the ER.

**Methods:** Patients aged  $\geq 13$  years who arrived at the ER of Yodogawa Christian Hospital without being transported by ambulance between January 2016 and October 2018 were assessed. We analyzed correlations between the items included in the triage sheet and admission. We calculated risk ratios (RRs) of the items that were significantly related to admission. The RR of an item was considered its score, and the triage score was calculated by summing the individual RR scores for each patient. We performed receiver operating characteristic (ROC) analysis of admission and triage scores.

**Results:** Among 20992 patients, 2030 patients (9.7%) were admitted to the hospital. The triage scores of all the patients ranged from 26.5 to 62.3. According to the ROC analysis, the area under the curve was 0.791 and the optimal cutoff value for the triage score was 32.7 (sensitivity: 0.74, specificity: 0.70).

**Discussion:** Since this research was based on data from a Japanese secondary level emergency hospital in an urban area, our triage method can be adapted to the many ERs in Japan that share a similar background. The method used to develop this triage method can also be used to develop triage methods for ERs with different backgrounds.

*Prehosp Disaster Med* 2019;34(Suppl. 1):s118–s119

doi:10.1017/S1049023X1900253X

### Development of a Tool Measuring Nurses' Competence for Disaster Response

*Dr. Sandra Mara Marin<sup>1</sup>, Dr. Regina Rigatto Witt<sup>2</sup>*

1. Universidade do Estado de Santa Catarina, Chapecó, Brasil
2. Universidade Federal do Rio Grande do Sul, Porto Alegre, Brasil

**Introduction:** Disasters are situations of complexity and unpredictability that require the performance of teams from various instances with preparation and qualification to assist the victims, recover the environment, and restore living conditions. Health services are essential in the response to a disaster, and nurses all over the world play a significant role in these disasters.

**Aim:** To develop a valid and reliable scale to identify nursing competencies in disasters.

**Methods:** Competencies were selected from those related to the framework developed by the International Council of Nurses. A methodological study was developed in two stages: I) validity of content and appearance verification and II) verification of applicability and reliability with test-retest. The participants of stage I were eight specialists in emergencies and disasters in Brazil. In stage II, 326 nurses from the Emergency Mobile Assistance Service in Southern Brazil participated. Data analysis utilized the Content Validity Index and Interest Reliability Index. Psychometric properties of the instrument were measured with Cronbach's alpha coefficient; applicability and test-retest reliability with the use of the t-test and intraclass correlation coefficient and factorial validity.

**Results:** Forty-one competencies of 51 were organized in three domains according to Factor Analysis. Cronbach's alpha values showed good internal consistency. There was no significant difference between the test and retest scores. The intraclass

correlation coefficient values were adequate. The instrument showed reproducibility and adequate applicability.

**Discussion:** This tool will assess nurses' competencies for disaster response and provide evidence for the development of educational policies in disasters, creating a reliable and prepared workforce to respond more effectively during a disaster.

*Prehosp Disaster Med* 2019;34(Suppl. 1):s119

doi:10.1017/S1049023X19002541

### Development of an Active Learning Program for a Community Utilizing a Scenario Participating as Simulated Rescuers and Sufferers in an Earthquake Prone Area of Japan

*Dr. Taichi Takeda*

Mie University Hospital, Tsu-city, Japan

**Introduction:** Major earthquakes with a magnitude of 8-9 are anticipated to occur in the next 30 years at a 60 percent chance on the southern coast of Japan. Since the most part of our Prefecture is likely to be damaged by tsunami and landslides, residents are expected to take a self-reliant approach on the initial several days after the earthquakes and tsunami.

**Aim:** To improve the resilience of the local communities we have developed and applied an educational program of disaster response.

**Methods:** An active learning program was designed on roles of rescuers and sufferers, and conducted two-hour sessions for high school students using a scenario in which they encountered an earthquake during a field trip. Half of the participants were assigned to play students on a field trip and asked to discuss options as a small group to survive and secure their safety in an isolated situation after an earthquake. They exchanged ideas to stay alive, cooperate with local residents and request disaster assistance using very short radio messages to the appropriate counterpart. The other half of the participants were assigned to be school administrations and asked to estimate the situation of sufferers. Their task as a small group was to organize assistance based on the best assumption from the limited information of the isolated students and local villagers.

**Results:** After the sessions, the participants expressed their discovery in the discrepancy of situational recognition between the two groups and they learned about assumption-based planning as well as good information sharing.

**Discussion:** Through this program, the participants experienced simulated situations and learned perspectives from both sides; providing relief as rescuers and receiving aid as sufferers. The participants were motivated to share and utilize their knowledge and skills to make their community resilient to disasters.

*Prehosp Disaster Med* 2019;34(Suppl. 1):s119

doi:10.1017/S1049023X19002553

### Development of an E-Learning Platform For EMTs In Ghana

*Dr. Joseph Bonney<sup>1</sup>, Dr. Ana I. L. Namburete<sup>2</sup>,  
Mr. Sesinam Dagadu<sup>3</sup>, Dr. Nana Serwaa Quao<sup>1</sup>,  
Dr. Maxwell Osei-Ampofo<sup>1</sup>, Dr. Dominic Awariyah<sup>4</sup>,  
Ms. Sonia Cobbold<sup>1</sup>*