

Abstracts of Poster-Presentations-WADEM Congress on Disaster and Emergency Medicine 2019

POSTER PRESENTATIONS

2018 Natural Disaster Response in Japan

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Introduction: Japan experienced several major disasters in 2018.

Aim: Evaluation of medical response was conducted and problems determined to solve for future response.

Methods: An evaluation conducted on DMAT responding report of Northern Osaka Earthquake, West Japan Torrential Rain Disaster, Typhoon Jebi, and Hokkaido Iburi East Earthquake.

Results: DMAT responded 58 teams for Osaka Northern Earthquake, 119 teams for West Japan Torrential Rain Disaster, 17 teams for Typhoon Jebi, 67 teams for Hokkaido Iburi East Earthquake. At the Osaka Northern Earthquake, by comparing the report of seismic diagnosis, results and, a magnitude of each region, hospital damage was evaluated. At the West Japan Torrential Rain Disaster, a flood hazard map was used to expect inundation at hospitals. At the Hokkaido Iburi East Earthquake, information of hospital generator was gathered and planned assistance for loss of power. Water supply cessation in the West Japan Torrential Rain Disaster and loss of power in the Hokkaido Iburi East Earthquake influenced hospital functionality. More precise preparation for hospital management in the event of a loss of power and water supply situation required in not only in local government but also each hospital. For the West Japan Torrential Rain Disaster, we experienced the same type of major disasters in the past, but could not manage accordingly. For the Hokkaido Iburi East Earthquake, we applied what was learned from the West Japan Torrential Rain Disaster.

Discussion: Disaster medical operation was supposed to be managed with information from the Emergency Medical Information System (EMIS). However, 2018 disasters provided lessons that require a full understanding of disaster prior information and expected disaster damage information to manage disaster assistance. To accomplish effective disaster assistance, information must be gathered of supplies and assistance required by hospitals. An effective system to facilitate lessons learned needs to be developed

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The 14th Asia Pacific Conference on Disaster Medicine in Kobe, Japan: A Brief Overview and a Proposal

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Introduction: The Asia Pacific Conference on Disaster Medicine (APCDM) started in 1988 in Osaka, Japan, and the 14th conference was held from October 16-18, 2018, in Kobe.

Aim: To give a rundown of the 14th APCDM and a proposal for WADEM.

Methods: Retrospective analysis of participants, the category of presentations, and deliverables.

Results: With “Building Bridges for Disaster Preparedness and Response” as its main theme, the 14th APCDM was held near the epicenter of the 1995 Great Hanshin Earthquake in Kobe. The total number of participants was 524 from 35 countries, not only from Asia and the Pacific but also Europe and the Americas. Its program had 10 lectures by distinguished speakers such as WADEM Board members and WHO (World Health Organization), four symposia, two panel, oral and 99 poster presentations. “Preparedness” and “Education and Training” were the categories with the largest number of presentations. The presidential lecture outlined improvements made in Japan since the Great Hanshin Earthquake (disaster base hospitals, disaster medical assistance teams, emergency medical information system, and disaster medical coordinators) and emphasized the importance of standardizing components for better disaster management. This idea was echoed in symposia and round-table discussions, where experts from WHO, JICA (Japan International Cooperation Agency), and ASEAN (The Association of Southeast Asian Nations) countries discussed other components such as SPEED (Surveillance in Post Extreme Emergency and Disasters) and standardization of Emergency Medical Teams.

Discussion: Each country in the disaster-prone Asia-Pacific region has a different disaster management system. However, participants agreed in this conference that we can cope with disasters more efficiently by sharing the standardized components, from both academic and practical points of view. APCDM must provide these deliverables to WADEM, so both

conferences can cooperate and contribute to disaster preparedness and prevention in the new era.

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The 25 Years of Experience Since Inauguration of All-Russian Center for Disaster Medicine “Zaschia” (Protection)

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Introduction: Main functions of the Russian Federation in disasters and emergencies are loaded on All-Russian Center for Disaster Medicine of Ministry Health (ARCDM). The principal strategies of the staff are to play leading roles in preparedness, emergency response, evacuation, recovery of health systems, and education.

Methods: Our presentation includes selection, classification, analysis, and statistics. There about 80 territorial Disaster Medicine Centers working under the leadership of ARCDM. One experience from the Moscow Territory Disaster Medicine Center will be presented.

Results: At the operational and informational department, there are nine special medical emergency teams (three with helicopters). Time of arrival takes between seven and ten minutes, and transport to the hospital takes about five to seven minutes with 33 landing places for helicopters. The operational and control department uses an early warning system. About 1,300 exercises were organized in these centers and hospitals. We will discuss the examples of medical care delivery to the injured in metro Slaviynskie, Basar park Pobedi, Narofominskay, two major fires, and hurricanes. The mobile field hospital worked in more than 12 countries and in many territories in the Russian Federation over 25 years.

Discussion: The last year was very difficult due to the Football World Cup, working hard as a collaborating center in emergencies, and working in the framework of a memorandum with China. Preparedness for an international event next May, which includes a field drill with participants from emergency medical teams of Health Ministries of CIS Countries and from State Health of China. We invite others to observe or join this event. Thus, we have some difficulties and problems, but we must increase solidarity and collaboration due to the scale, frequency, and number of losses in emergencies and disasters. Humanity could be able to cope with emergencies if we take into account these issues.

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Absence of Cultural Awareness Training in International Non-Governmental Organizations

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Introduction: Cultural awareness is the understanding of differences in cultures, and openness to these differences. It

is a vital step in the development of cultural sensitivity and becoming operationally effective when working within different cultures. The benefits of Cultural Awareness have become apparent in recent decades, including within governments, militaries, and corporations. Many organizations have developed Cultural Awareness training for their staff to improve cross-cultural cooperation. However, there has not been a large movement toward cultural sensitivity training among Non-Governmental Organizations (NGOs) who provide aid across a number of countries and cultures. Cultural Awareness can be a useful tool which enables an NGO to better serve the populations with which they engage.

Aim: To evaluate the presence within International NGOs of Cultural Awareness Training to employees and volunteers.

Methods: Ten of the largest international NGOs were identified. Their websites were evaluated for any mention of training in Cultural Awareness available to their employees and volunteers. All 10 were then contacted via their public email addresses to find out if they provide any form of Cultural Awareness training.

Results: Of the ten NGOs identified, none have any publicly available Cultural Awareness training on their websites. One NGO deals with cultural awareness by only hiring local staff, who are already a part of the prevalent culture of the area. None of the others who responded have any cultural awareness training which they provide.

Discussion: Cultural awareness is a vital tool when acting internationally. Large NGOs, which operate in a wide range of cultures, have an obligation to act in a culturally aware and accepting manner. Most large NGOs currently lack cultural awareness training for their employees and volunteers. It is time for these NGOs to develop, and begin to employ, cultural awareness training to better prepare their staff to serve international populations.

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Abu Dhabi Police Ambulance EMTs Medical Errors January-October 2018

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Introduction: Medical errors are a reality for Emergency Medical Technicians (EMT's) working in a prehospital, high-stress environment. A “medical error” can be defined as a mistake or system failure which results in improper care of a patient's injury.

Aim: To study the frequency, severity, types, and causes of medical errors committed by Abu Dhabi Police Ambulance (ADPA) crews, and how to prevent these errors. The study is retrospective. All the data was collected using the Electronic Patient Care Report (EPCR) of all the patient treated and transported by ADPA crew from January to October 2018. After the EPCR auditing and monitoring, the medical errors were identified and discussed by a medical committee.

Results: The total number of studied EPCR (trauma and medical cases) was 36,000. The medical errors identified were 265 cases (0.74%). 134 cases (51%) were moderate (can cause side effects), 115 cases (43%) were minor, and 16 cases (6%) were critical (can lead to death). The most common type of medical errors were cognitive errors. The causes were skill-based errors 27 times (10%) with 16 intravenous failures, 10 intraosseous failures, and one dislodged endotracheal tube after orotracheal intubation. The rule-based errors were committed five times (2%) when the Paramedics did not follow ACLS Algorithm, three times shockable cardiac arrest and two times Pulseless Electrical Activity. The knowledge-based errors were drug indications errors five times (2%). The three EMT's levels in ADPA (Basic, Intermediate, and advanced) committed medical errors. The question to ask is not who made the mistake, but why the mistake was made. Preventing ADPA crew errors requires a systematic approach to modify the conditions that contribute to errors. The strategies are developing more awareness of cognitive errors by education and incorporating simulation into training.

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The Advanced Practice Provider in Federal Disaster Medical Response: An American Experience

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Introduction: Advanced Practice Providers (APP) are utilized in the United States National Disaster Medical System (NDMS) and consist of Certified Registered Nurse Anesthetists (CRNA), Nurse Practitioners (NP), and Physician Assistants (PA). They fill a critical role as Medical Officers in the Federal Disaster Medical Response on both Disaster Medical Assistance Teams (DMAT), Trauma & Critical Care Teams (TCCT), and United States Public Health Service (USPHS). DMAT teams and components of TCCT and USPHS responded to National Security Special Events, multiple natural disasters over the past two years including prolonged hurricane response in 2017 and 2018. The APPs were heavily utilized in key roles throughout the responses with much success.

Aim: To explain how APPs are a vital component to US Federal Disaster Medical Response and are able to fill a multitude of roles as Medical Officers.

Method: We used qualitative data from APPs in the US NDMS system illustrating what roles they filled during recent disaster responses.

Results: The APPs were key components to the US NDMS response to disasters in the US and US territories by providing direct medical care as APPs, aid in medical evacuation, triage, healthcare administration, and medical infrastructure evaluations.

Discussion: The APP is essential in the US Federal Disaster Medical Response and future research would be to obtain quantitative data on APPs in the U.S. NDMS. With increasing natural and man-made disasters affecting more people across the world annually, the increasing global population, and

expected international health care worker shortages, APPs can be part of the overall solution to Medical Officer shortfalls and other key components in future disaster responses throughout the world. As APPs are not widely utilized worldwide, there will need to be education on what APP training is and how they can be utilized in areas not familiar with their abilities.

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Analysis of Disaster Psychiatric Assistant Team Activity During the Past Four Disasters in Japan

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Introduction: The Disaster Psychiatric Assistant Team (DPAT) is Japan's original mental health care dispatched team during disasters. Established in 2013, this team has been involved in the response to many disaster-related mental issues. **Aim:** We Aimed to evaluate the DPAT activity in response to the past 4 disasters (Ontake volcano, Hiroshima flood, Joso flood, and Kumamoto earthquake), using the disaster mental health information support system (DMHISS).

Methods: DMHISS data from the four disasters was extracted. Descriptive statistics were performed from the obtained dataset and the characteristics of the disaster victims from each disaster were compared and examined.

Results: About 2,400 cases were obtained and tabulated to from the database. Based on descriptive statistics, the DPAT support objectives, activities and activity periods Aim to establish (1) the characteristics of the affected areas (population composition, psychiatric medical condition), (2) the scale and content of the disaster (the injured, building damage, number of evacuees), and (3) the activity ability. The number of counseling cases peaked several days after the disaster onset, and the importance of the DPAT activity during the acute phase was confirmed. The time course of the consultation number, which is a measure of the termination, could be predicted from the disaster scale and content. These results suggest that DPAT activity may be a guideline for local disasters for one month and for wide-reaching disasters for two months or longer.

Discussion: It is suggested that the timing of activity and the termination period could be estimated from factors including the type of disaster, the size of the disaster, and the number of evacuees using the disaster mental health medical activities from four disasters. It should be considered necessary to accumulate data and examine indicators related to the DPAT activity.

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Analysis of Emergency Situations in the Russian Federation

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Introduction: Emergency situations (ES) are situations within a certain territory, which have arisen because of an accident, a dangerous natural phenomenon, natural disaster, or other that may cause or have caused human casualties, damage to human health or the environment, significant material losses, and unbalance of living conditions of people. Important characteristics of ES are suddenness and involvement of a significant number of victims who need first aid and emergency medical care. These characteristics determined the organization of the Unified State System for Emergency Prevention and Elimination of the Russian Federation.

Aim: To study the structure of ES in Russia. By the scale of spread and damage caused, ES can be local, municipal, inter-municipal, regional, interregional, or federal, by the source of origin – technogenic, natural, biological, or social. The terrorist acts are usually allocated in a separate group of ES. The structure of ES, according to the EMERCOM of Russia in 2005–2017, is as follows:

1. Technogenic (59.61%)
2. Natural (29.42%)
3. Biological and social (9.91%)
4. Major terrorist acts (1.06%)

Methods: Statistical analysis was conducted. According to the EMERCOM of Russia, every year in 2005–2017 there were 422.5 ± 46.5 ES, resulting in the death of 796 ± 56 people. Polynomial trends in the number of ES and deaths, according to the EMERCOM of Russia, (with significant coefficients of determination $R^2 = 0.85$ and $R^2 = 0.64$, respectively) show a decrease in the number of ES and deaths.

Discussion: The resulting analysis of the structure and number of ES, the number of deaths, the risk of being in an emergency, and the individual risk of death in an emergency can predict the forces and means necessary for the elimination of the consequences of ES.

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Application of Game-Based Learning in the Teaching Process of Disaster Medicine for Medical Students

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Introduction: Classroom instruction of disaster medicine for medical students is complicated and lacks attraction. Nowadays a novel method, which is named Game-Based Learning (GBL), has been used in other fields and received good feedback.

Aim: To apply GBL to the teaching process of disaster medicine and discuss the effect of its application.

Methods: A computer game was devised based on a syllabus of disaster medicine and employed it in classes of disaster medicine for medical students. Then a questionnaire about the

application of GBL in education was used inquiring the demands of medical students for the designing of GBL in disaster medicine, including their platform and game mode preferences. Feedback was collected and data was analyzed after the class.

Results: 201 questionnaires were issued, and the valid rate was 100%. From the responses, 77% of medical students considered the application of GBL in education on disaster medicine was necessary, and 73% of the respondents thought it was practical. Furthermore, over 90% of medical students expressed their expectation for the adoption of GBL. According to another survey of 51 medical students we conducted, after attending a class about knowledge of injury classification with one board game adopted, most of the students believed GBL was better than traditional methods of teaching.

Discussion: There is a high approbation degree among medical students to the adoption of GBL in the teaching process of disaster medicine, which suggests a great possibility for the application of GBL in medical education. It is concluded that GBL can be used in the teaching process of disaster medicine.

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Are Australian Pharmacists Willing to Work in a Disaster?

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Introduction: Current literature suggests that a large percentage of the health workforce may be unwilling to work during a disaster. The willingness of pharmacists to work during a disaster is under-researched internationally and non-existent in Australia.

Aim: To determine if Australian pharmacists are willing to work in a disaster and the factors that affect the willingness to work.

Methods: A 13-question survey was developed from the current literature and released nationally through professional organizations and social media.

Results: Sixty Australian pharmacists completed the survey. Most participants believed their pharmacy was an essential service for their community. Pharmacists reported they would be likely to report to work during a pandemic or biological disaster (73%) or natural disaster (78%). The two major factors likely to prevent pharmacists from working in a disaster are family and safety concerns. Pharmacists perceived that their duty of care to their patients would make them likely to work during a disaster. Most pharmacists noted they would work even if they were expected to work outside their scope of practice, or if their place of work lacked electricity or was damaged.

Discussion: Depending on the disaster, up to 27% of the pharmacy workforce may be unwilling to work in a disaster. Family and safety concerns were the primary barriers to pharmacists reporting to work in the aftermath of a disaster. Providing guidelines on how pharmacists can prepare their family for a disaster may assist in ensuring pharmacists are willing to work. The pharmacists surveyed demonstrated a strong commitment to their duty of care with the majority stating they would be

likely to work in austere work environments. This research raises questions of the safety of pharmacists working outside their scope and in austere environments and whether it is safe for them, their patients, and the broader community.

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Are They Qualified and Trained to Manage Disasters?

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Introduction: In the South African environment, the possibility of lack in the disaster response education and training fraternity was attempted to be mitigated with legislation. The National Disaster Management Framework (2005:162-169) states that national, provincial, and municipal organs of state need to plan, organize, and implement training programs relevant to their respective areas of responsibility. The South African Disaster Management Act (South Africa, 2002:19) encourages a broad-based culture of risk avoidance and the promotion of disaster management education and training throughout South Africa.

Aim: As an organ of the state and a role-player in disaster management the Free State Emergency Medical Services (FS EMS) is responsible for making strategic decisions. Managers and supervisors are obliged to be trained and educated in disaster management. The study ascertained whether managers and supervisors are being trained and educated in disaster management as required by legislation.

Methods: The project made use of quantitative data whereby fifty EMS managers and supervisors in the Free State Provincial Government (FSPG) were assessed by using a questionnaire.

Results: The study found that 66% of the respondents did not receive training to equip them to fulfill their disaster management functions. The remaining 34% indicated that they did receive aspects of disaster management training.

Discussion: Based on the quantitative scores for the different indicators, the research found that there are shortcomings in disaster management qualifications and training among the EMS supervisors and managers in the FSPG EMS. However, the findings make it clear that there are several positive aspects in the already established practice of disaster management education and training in the FS EMS. The results indicated that there is an opportunity for revision and improvement that will contribute and empower the FS EMS managers and supervisors to meet legislative requirements towards disaster management training and education.

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Are We Ready for Bioterrorism? Health Personnel were Affected by Contaminated Meat Cooked at a Daily Routine Hospital Kitchen

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Introduction: Salmonellae are gram-negative motile bacilli. The transmission of salmonellae to a susceptible host usually occurs from the consumption of contaminated foods. Most persons infected with Salmonella develop diarrhea, fever, and abdominal cramps 12 to 72 hours after infection. The illness usually lasts four to seven days, but can be severe enough to require hospitalization.

Aim: Describe a hospital kitchen based mass foodborne infection.

Methods: Descriptive analysis of the foodborne infection event.

Results: 310 health personnel were contaminated from lunch that was cooked at our hospital kitchen. On that day 70 patients came to the emergency department for complaints of vomiting, fever, and diarrhea. During the next two days, we canceled all planned surgical operations. At the second day, we followed 80 patients and third day 150 patients came to our emergency services. Our emergency services and intensive care units were blocked because of personnel illness. We examined all patients, got blood tests and stool stains and cultures. Because of this mass casualty contamination, our infection control committee gave formal information that suspicious of Salmonellosis. 13 of 310 infected health personnel were hospitalized. They got intravenous saline and electrolytes support like calcium and potassium. After two days we got Results of stool cultures, there was inoculation of Salmonella types. None of them died.

Discussion: We realized that we are not ready for mass casualty incidents like this contamination. Because our patient flow was really blocked. We had to call in new doctors and nurses from different hospital staffs. The event was similar to bioterrorism conditions and we suddenly have to put in place hospital disaster plans at the beginning of decontamination. This situation made us to recognize bioterrorism agents like Salmonella types. We have to raise awareness of the community about chemical, biological, radiological and nuclear agents attacks.

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Assessing the Efficacy of a One-day Structured Induction Program in Orienting Clinical Staff to a Novel Prehospital Medical Deployment Model

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Introduction: St. John Ambulance Victoria provides first aid and medical services at a variety of mass gathering events (MGEs) throughout Victoria. Volunteer healthcare professionals and students (termed “volunteers”) form Medical Assistance Teams (MAT) at these MGEs. MAT deployments manage a variety of patient presentations which include critically ill patients. This reduces high acuity patient transfers to the hospital and, where possible, avoid ambulance and hospital utilization.

Aim: To determine the effectiveness of interdisciplinary pre-hospital simulation workshops in preparing volunteers for MAT deployment at MGEs.

Methods: A one-day, simulation-based training session within the MAT environment was implemented to introduce volunteers to the management of various scenarios faced at MGEs. All volunteers were provided an orientation to the equipment and setting up MAT deployments at MGEs. Volunteers then participated in interdisciplinary group-based scenarios such as cardiac arrest management, drug intoxication, spinal injuries, agitated patients, and airway management. To determine the effectiveness of this training session, volunteers were invited to participate in a post-training survey, comprising of Likert scores and open-ended responses.

Results: Seventeen volunteers attended the training session with 10 (58.8%) completing the post-training survey. Volunteers were satisfied with environment familiarization in the MAT (Average 4.47/5.00) and found the simulation-based training helpful (Average 3.67/4.00). The induction overall was well-received (4.60/5.00) with volunteers feeling more confident in being deployed at MGEs (4.20/5.00).

Discussion: The results of the simulation-based training session were positive with volunteers receptive to the need for a training day prior to MAT deployment at MGEs. The simulation session enables volunteers to be comfortable with working in MAT and managing a diverse range of patients at MGEs. This session is likely to improve interdisciplinary communication and teamwork in the MAT. Future research is aimed at following these volunteers after several MAT deployments to improve the training session for future participants.

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Assessing the Impact of a New Emergency Triage System on Head Injury Mortality: Tikur Anbessa Specialized Hospital Emergency Department in Addis Ababa, Ethiopia

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Introduction: One of the improvements in Ethiopia's emergency medical system was the introduction of a five-level Emergency Triage System (ETS) in January 2015 that was piloted in selected Addis Ababa hospitals.

Aim: To assess the effect of this intervention on the head injury mortality in Tikur Anbessa Specialized Hospital (TASH) Emergency Department (ED).

Methods: Data were retrospectively collected from all medical records of head injury patients seen in Adult TASH- ED over two 6 months periods, before and after the new Emergency Triage System implementation: 01/04/2014 – 30/09/2014 versus 01/04/2016 – 30/09/2016. An inclusion criterion was age above 13 for the records that could be retrieved. Exclusion criterion was "patient declared dead on arrival." Mortality and patterns of head injury were compared pre- and post-intervention. Chi-square was used for the analysis using STATA 14.

Results: A total of 522 Head injury patients were analyzed in the ED in both the pre- 258 and post-264 intervention study periods. Among head injury admission in the ED in both study periods, the highest number of patients were Road Traffic Accident/ RTA/ victims, males and young age (<30). Mortality rate among head injury patients decreased from a pre-intervention 44 (17.05%) to post-intervention 27 (10.2%) (OR=0.55 9. 5% CI (0.32, 0.95), p=0.02). The median age of death was 45 years in pre- and 40 years in the post-intervention period, with ages ranging from 13 to 85 and 13 to 96 years, respectively. The proportion of deaths from moderate head injury decreased significantly from 14.0% in pre-intervention to 6.3% in the post-intervention period, respectively (p<0.001).

Discussion: The Emergency Triage System at TASH-ED has decreased mortality caused by head injury. This could increase life years saved and productivity in a cost-effective and easily achievable way in resource-poor settings.

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Assessment of Emergency Medical Rescue Ability of Secondary and Tertiary Hospitals in One City Responding to the Risk of Production and Storage of Hazardous Chemicals

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Introduction: With the development of the economy and the expansion of the hazardous chemicals industry in one city, it is necessary for the city to establish an evaluation model of emergency medical rescue capability for hazardous chemicals production, storage, and exposure risk.

Aim: Establish an emergency medical rescue capacity evaluation model for secondary and higher hospitals in a city to deal with exposure risks of hazardous chemicals.

Methods:

1. Develop an expert consultation form
2. Develop a survey on the status quo of emergency medical rescue capacity of hospitals in secondary and above hospitals in response to exposure and risk of hazardous chemicals production and storage.
3. Calculate the weights of the first, second, and third-grade indicators, and establish a comprehensive evaluation model for the rescue capacity assessment of Chengdu hospitals.

Results: Five levels of first-level indicators were obtained, namely, the weights of the five indicators of "centralized admission ability," "hospital comprehensive ability," "emergency management ability," "material equipment capability," and "health emergency team" were 0.2884, 0.2219, 0.1938, 0.1507, and 0.1453, respectively.

Discussion: The establishment of an emergency medical rescue capacity evaluation model for the risk of exposure and storage of hazardous chemicals in secondary and higher hospitals in a city is related to five capabilities, the most important of which is the ability to focus on admission.

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Assessment of HEMS Teams Performance in Out-of-Hospital Cardiac Arrest (OHCA)

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Introduction: The Out of Hospital Cardiac Arrest (OHCA) procedures constitute one of the most quantifiable indicators of the quality of Emergency Medical Services (EMS). In Poland, HEMS teams perform such procedures both during primary missions and when they support EMS teams.

Aim: To carry out a retrospective analysis of OHCA related calls received from January 1, 2011, to December 31, 2016.

Methods: During the relevant period there were 2,447 OHCA related calls. Of those, 308 cases were excluded from the analysis because no cardiac arrest was confirmed or the patients showed signs of death that prevented any emergency procedures.

Results: The Return of Spontaneous Circulation (ROSC) was achieved in 1,119 cases. Resuscitation was clearly much more effective if CPR procedures were commenced prior to the arrival of the HEMS team. The groups in which higher survival rates were obtained included women, patients younger than 40 and patients who had signs of shockable rhythms. The use of HEMS team allowed for faster transport of patients to relevant specialist institutions, specifically if an invasive cardiologic intervention was needed.

Discussion: The use of HEMS teams in OHCA related calls indicates that such actions are highly effective both in primary missions and when HEMS teams support other EMS terms. An additional advantage is the possibility of quick transportation to a relevant specialist medical center.

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Availability of Essential Medical Equipment for Prehospital Trauma Care on Public Ambulances in Ukraine

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Introduction: The public ambulance system in Ukraine is the primary deliverer of prehospital care for trauma patients in this Eastern European country, but no national assessment has previously been made to ensure the presence of essential medical equipment on these ambulances.

Aim: Working with the Ukraine Ministry of Health, our aim was to assess the availability of public ambulances of medical equipment essential for managing traumatic injury using an internationally recognized standard for prehospital care.

Methods: We identified 53 Advanced Life Support (ALS) ambulances from randomly selected cities for evaluation. We performed an inventory of available medical equipment and supplies on these ambulances against a matrix of essential equipment for prehospital providers developed by the World Health Organization (WHO).

Results: Essential medical equipment in the categories of personal protection, patient monitoring, hemorrhage control, and immobilization were generally available in the ALS public ambulances

surveyed. Deficiencies were noted in equipment and supplies for basic and advanced airway monitoring and management.

Discussion: Public ALS ambulances across Ukraine are adequately equipped with many essential medical supplies to manage traumatic injury, but have deficiencies in both basic and advanced airway management. Correcting these deficiencies may improve prehospital survival of the traumatically injured patient. The results of this study will enable the Ukraine Ministry of Health to develop requirements of essential medical equipment for all public ALS ambulances in the country, to inform resource allocation decisions, and to guide public health policy regarding prehospital trauma care.

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Awareness, Perspective, and Reasons Behind Patients' Rejection of Emergency Medical Services in Thailand

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Introduction: Emergency Medical Service (EMS) increases survival rates and reduces possible disability among emergency patients. However, the number of requests is relatively low in Thailand.

Aim: To inspect the awareness, perspective, and reasons behind the rejection of EMS by patients or their relatives who visit the emergency room.

Methods: Responses were analyzed in 45 government, university, and private hospitals from December 2015 to February 2016. The hospitals were scattered in 7 provinces with the sample group including 2,028 patients, whereby 646 patients visited using EMS and 1,368 did not. The key reasons for self-visit or other means are the convenience of personal transportation (76.0%), not wanting to wait for an ambulance (31.0%), and anxiety caused by the emergency situation (28.9%). Most misconceptions about the service include; 1) Ambulances are used only for casualties from accidents and 2) Ambulance service are not free. In terms of perspective, most patients or relatives hold a negative view towards the emergency medical service, especially the idea that they can help themselves when the condition is not severe or if there are medications or relief devices available. Another view is that the service will delay them from getting to the hospital. These perspectives are from non-users.

Discussion: The study indicated that the cause of non-user involved misunderstandings, poor perspectives, lack of awareness, and the ignorance of the threat of the particular emergency condition. Thus, they do not realize the benefit of using EMS. As a result, regional agencies, the National Institute of Emergency Medicine, and the Ministry of Public Health should discuss the solutions to raise public awareness and improve the perspective towards emergency medical services to promote more usage.

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Back to the Future: Portable Word Processors and the Electronic Health Record

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Introduction: The Electronic Health Record (EHR) is now the standard means for recording and maintaining medical notes in most emergency departments. The EHR is an independent cause of physician burnout, and maintenance of the EHR may occupy 30 to 50% of clinical time. There are software solutions available, but they are connected to fixed, expensive, distracting, and bright electronically powered computers. Scribes have been successfully trialed, but are also expensive and attached to computers on wheels. Portable digital word processors in the form of the AlphaSmart Neo is a redundant technology designed primarily for children with typing difficulties. It has recently enjoyed a resurgence in popularity among professional writers, journalists, and field researchers for the ultimate distraction-free writing experience. The Alphasmart Neo is cheap, nearly indestructible, intuitive, and requires almost no recharging. It is compatible with all software across Mac OS, Windows, and Linux. Notes are entered by the clinician or scribe, independently of computers, at the bedside, and uploaded to any software via USB cable.

Aim: To describe the introduction and impact of the AlphaSmart Neo on the EHR in emergency departments across Australia.

Methods: We will examine the role of the Alphasmart Neo in austere, low power, extreme environments with a demonstration on how to enter, maintain, and transfer an electronic health record independent of any computer or power source.

Discussion: We believe the AlphaSmart Neo is an ideal, personalized, cheap, effective, and efficient hardware solution to entering notes independent of other software and hardware. It is distraction free at the patient's bedside, resulting in better notes that the clinician enjoys writing.

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Basic Principles in Complex Humanitarian Emergency: A Pilot Course

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Introduction: The international and national response team faces many challenges during a complex humanitarian emergency. These include difficult organization, an unprepared national disaster plan, and a disrupted political system. Previous studies showed a reactive approach in earlier disasters in Saudi Arabia and the need for greater involvement of health professionals in disaster management. As a result, several medical education and training institutes began to introduce courses which were mainly about Major Incidents Response, but with less attention to Humanitarian Assistance and Disaster Relief. **Aim:** The course provides Basic Principles in Complex Humanitarian Emergency for healthcare providers in the kingdom and is focused on the aspect of community awareness for disaster and humanitarian relief.

Methods: The interactive competencies-based course in Basic Principles of Complex Humanitarian Emergency was

implemented. The course was designed by 5 experts in disaster medicine and humanitarian relief and was piloted over five days at officers club of Minister of Interior in Riyadh, sponsored by King Fahd Security College. The participants (n=30) were from different health disciplines. They completed the pre- and post-tests and presented three pilot workshops for disaster community awareness.

Results: The overall scores were 44.19% for the pre-test and 62.85% for the post-test (Wilcoxon test for paired sample: $z = 3.729$, $p < 0.001$). There were no significant statistical differences among professions of healthcare providers for both pre- and post-tests.

Discussion: Delivering competencies-based course in Basic Principles of Complex Humanitarian Emergency for health care providers can help in the improvement of knowledge and skills for humanitarian assistance and disaster relief in Saudi Arabia, which is important for disaster preparedness augmentation in the kingdom. The next course for the same group may be recommended for achieving the level that will train them to participate in the National Disaster Assistance team.

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Behavioral Health Resource Utilization of Emergency Department Patients Presenting from Mass Gathering Events

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Introduction: Behavioral health needs of attendees at mass gathering events who require emergency department (ED) evaluation are poorly understood. Appropriate resource allocation of mental health staff and other behavioral interventions necessary to support this patient population are also unclear.

Aim: To describe behavioral characteristics and psychiatric resource utilization of patients presenting to a tertiary academic medical center emergency department from mass gathering events.

Methods: Single-center retrospective study evaluating attendees at mass gathering events who presented to a Chicago ED. Electronic medical records for patients presenting between October 13, 2013, and December 31, 2015, were reviewed and descriptive analyses performed.

Results: 209 distinct records were reviewed. Most patients presented from large outdoor concerts (n = 186, 89%). Forty-two (20.1%) reported a mental health complaint at presentation, including concerns related to pre-existing psychiatric disturbances or onset of new symptoms. Twenty-seven of the total cohort (12.9%) endorsed a prior psychiatric history. Thirty-five (16.7%) reported use of prescribed psychotropic medications, including antidepressants, stimulants, mood stabilizers, and others. Diagnostic testing among the total sample included serum ethanol measurement (31.1%), urinary toxicology (25.4%), acetaminophen (6.2%), aspirin (5.3%), and creatine kinase measurements (11%). Computed brain tomography was ordered for 20 patients (9.6%). Twelve patients (5.7%)

received an anxiolytic (lorazepam) and 113 (54.1%) received intravenous fluids. An antipsychotic (olanzapine) was administered to one patient (0.5%). There were no reports of suicidal ideation, but physical restraints for agitation were employed in 13 patients (6.2%). Police consultation occurred in 10 cases (4.8%). No formal psychiatric consultations were requested by ED providers.

Discussion: Patients presenting to the emergency department from mass gathering events frequently endorse behavioral complaints requiring directed use of diagnostic and other emergency department resources for their ailments. The need for physical restraints and limited use of anxiolytics and antipsychotics in our sample suggest that psychiatric consultation is underutilized.

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The Birth and Growth of the National Ambulance Service in Ghana

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Introduction: This study aimed to document the growth and challenges encountered in the decade since inception of the National Ambulance Service (NAS) in Ghana, West Africa. By doing so, potentially instructive examples for other low- and middle-income countries (LMICs) planning a formal prehospital care system or attempting to identify ways to improve existing emergency services could be identified.

Methods: Data routinely collected by the Ghana NAS from 2004–2014 were described, including: patient demographics, reason for the call, response location, target destination, and types of service. Additionally, the organizational structure and challenges encountered during the development and maturation of the NAS were reported.

Results: In 2004, the NAS piloted operations with 69 newly trained emergency medical technicians (EMTs), nine ambulances, and seven stations. The NAS expanded service delivery with 199 ambulances at 128 stations operated by 1,651 EMTs and 47 administrative and maintenance staff in 2014. In 2004, nine percent of the country was covered by NAS services; in 2014, 81% of Ghana was covered. Health care transfers and roadside responses comprised the majority of services (43%–80% and 10%–57% by year, respectively). Increased mean response time, stable case holding time, and shorter vehicle engaged time reflect greater response ranges due to increased service uptake and improved efficiency of ambulance usage. Specific internal and external challenges with regard to NAS operations also were described.

Discussion: The steady growth of the NAS is evidence of the need for Emergency Medical Services and the effects of sound planning and timely responses to changes in program indicators. The way forward includes further capacity building to increase the number of scene responses, strengthening ties with local health facilities to ensure timely emergency medical care

and appropriateness of transfers, assuring a more stable funding stream, and improving public awareness of NAS services.

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Blockchain Technology for Disaster and Refugee Relief Operations

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Introduction: Blockchain is a distributed ledger technology for storing and transmitting information (value) that is secure, verifiable, and auditable. Two specific use-case opportunities exist, identity management and payment systems.

Aim: A secure and auditable solution for disaster refugee support.

Methods: Gap analysis, literature search, and synthesis using existing technologies.

Results: Strategy foundation: A blockchain identity management system that utilizes the Hyperledger Fabric framework; identification on a large scale, in a distributed model that provides immutable record capabilities to prevent fraud, with the ability to incorporate biometrics and DNA; deploy applications that will provide supply-chain capabilities; cryptocurrency for recipients and other relief functions for refugees/disaster victims; components such as consensus, membership services, and Smart Contracts; cloud-based, with redundancies in multiple vendors and additional complex government cloud requirements/certifications, leveraging NIST 800–53 by utilizing a hybrid public permissions architecture.

Discussion: There are an estimated 68 million refugees worldwide at any time. Valid identification is needed by most refugees to qualify for government or international donor relief. That identification is crucial in getting refugees and victims access to the aid supply chain. Blockchain stores data on a large number of computer nodes connected over the Internet. Each node contains an identical copy that is time-stamped and protected by a cryptographic technique called hashing, and control is decentralized. This blockchain strategy will revolutionize the way the government manages the \$30 billion in foreign aid to refugees. It will build upon the identities established to deploy applications that will provide supply-chain capabilities, cryptocurrency for recipients, and other relief functions for refugees/disaster victims. Stakeholders beyond government will also benefit tremendously. The distributed nature of our application will provide visibility to NGOs, nonprofits, host nation stakeholders, and other relief organizations. A single system that provides information to everyone involved will almost instantaneously change the face of relief.

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Caring for the Vulnerable Geriatric Individual in a Disaster

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Introduction: The elderly have the highest rates of morbidity/mortality in a disaster and are therefore the most vulnerable. 50% of deaths in Hurricane Katrina were ≥ 75 years old. In the California wildfires, most deaths were people in their 70s and 80s living in areas with unreliable communication services (without cell phone service, etc.), and were uninformed of the disaster or unable and/or unwilling to evacuate. Issues include social isolation and limited technology skills (may not receive messages).

Methods: A review of the literature and after action reports from multiple disasters.

Results: Augmented services are needed for persons with decreased mobility (impaired access to transportation and shelters); impaired senses; dependence on devices/technology, comorbidities requiring medications/equipment/oxygen, special feedings, sanitary/hygiene needs increased susceptibility to environmental extremes (heat, cold), inability to do ADLs (need for caregivers), increased susceptibility and increased morbidity/mortality with infections, illnesses, trauma; exacerbation of underlying conditions/illnesses when in crowded transportation vehicles and shelters. Additional stress may precipitate or exacerbate coping skills especially in those with dementia, delirium, or mental health illnesses.

Discussion: Recommendations include the following:

1. Communications: messages in various forms: closed captioning, TTY deaf phones, use of family, friends, neighbors, officials for notification in addition to mass communication notices, house-to-house notification.
2. Medical: Medical/Special Needs Shelters to provide medical care (dialysis, etc.), cache of common medications (diabetic and BP medications) and devices (BP monitoring, glucometers), oxygen, wound care supplies, potable and non-potable water, special diets/formulas, feeding tubes, catheter care, diapers and other hygiene supplies.
3. Independence: Health care professionals to assist with medical and psychiatric needs. Caregivers to assist with ADLs.
4. Supervision: Those with dementia, delirium, mental health conditions may need supervision.
5. Transportation: Need for ambulances, wheelchair vans, specially equipped buses/vans in addition to "usual" school buses/vans with access to water, food, and sanitation if traveling long distances.

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Challenges in Dealing with Supervised and Institutionalized Populations in a Disaster

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Introduction: Those residing in supervised facilities including nursing homes, mental health facilities, group homes, and penal

institutions for health, legal, or security reasons present unique challenges in a disaster.

Methods: A review of the literature and after action reports on supervised and institutionalized populations in disasters.

Results: Recommendations for supervised, institutionalized populations in a disaster include: (1.) preplanned agreements for specialized transportation if needed; (2.) reciprocal agreements between similar facilities (nursing home with another nursing home, prison with other prison, dialysis centers, etc.) for resource sharing; (3.) arrangements for sharing and emergency privileging of personnel in institutions that are not their primary workplace; (4.) just-in-time training for appropriate volunteers; and (5.) accommodations for family members if personnel are to be available during a disaster.

Individuals in some institutions need a personalized disaster plan with pertinent data: next of kin with contact information, medical records, care providers and care plan to accompany a mobilized individual. Long-term care and housing may be needed if the institution is nonfunctional. Dealing with medical and behavioral issues is secondary to the disaster. Chronic issues must be considered as well.

Discussion: Caring for specialized, institutional individuals is complex and difficult. Comprehensive pre-disaster planning can mitigate the effects of the disaster.

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Chemical and Radiation Training for Public Health and Nursing Students: An Under-Utilized Disaster Response Demographic

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Introduction: Public health (PH) and nursing students are an underutilized demographic in disaster response. Knowledge of the disaster response phase may enhance student understanding of preparedness, and provide response capabilities.

Aim: A single four-hour simulation-based training session, with toxicologists as instructors, can effectively improve PH and nursing student knowledge and skills in chemical and radiation response, despite minimal prior experience.

Methods: A convenience sample was used to test PH and nursing students in a response training program. An introductory lecture and simulation training reviewed: mass casualty care, triage, personal protective equipment, decontamination, and chemical and radiation exposure toxidromes. An examination was administered pre-training, and then post-training, to evaluate relevant training, knowledge, risk perception, and comfort in response capabilities to chemical and radiation incidents.

Results: Forty-two students attended the course; 39 were included in the study. Seventy-two percent (n=28) of participants had no prior disaster training. Overall, there were significant differences between the pre-test and post-test scores for all students [95% CI: 5.4 (4.7-6.1); $p < 0.0001$, paired t-test]; maximum score 15/15. Comparing scores of nursing and PH

students, despite statistical difference in pre-test scores (median, IQR: 9.0 (7.5-10±2.0); 7.0 (5.7-9.0) respectively; $p=0.048$, Mann Whitney U-test), there were no statistical differences in post-test scores (median, IQR: 14.0 (13.0-14.0); 13.0 (12.0-14.0), respectively, Mann Whitney U-test). All students recognized nerve agent toxidrome and performed SALT triage after the training ($p < 0.0001$, McNemar test). Subjectively, participant comfort level in responding to a chemical or radiological incident improved ($p < 0.0001$, McNemar test). Individual risk perception for chemical or radiological disasters did not improve after training.

Discussion: Improvement of knowledge and comfort was demonstrated, irrespective of previous experience. Simulation-based training of chemical and radiation disaster preparedness, led by medical toxicologists, is an effective means of educating PH and nursing students, with minimal prior fluency.

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Chemical Response Emergency Medical Information System in Chemical Disaster

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Introduction: There are many database sets and websites which provide chemical information, but they do not perform an adequate role for emergency medical support in a chemical disaster.

Aim: To make the basis of a chemical emergency medical information system.

Methods: We reviewed the database sets, mobile applications and websites in the world which provide chemical database and emergency medical response information from a chemical accident or disaster site to hospitals. Also, we examined chemical accident cases which developed during disasters. A chemical database set for emergency medical response was proposed and the algorithm for elicitation of chemicals suitable for emergency medical response and information providing. We performed a survey about chemical emergency medical information system to related personnel.

Results: By four steps of elicitation of chemicals, the number of chemicals more than 100,000 was decreased to less than 1,000. The standard of steps includes accident preparedness, toxicity and circulating amount and expert consultation. Algorithm for elicitation of chemicals was made and 82% of related personnel supported the chemical emergency response algorithm. The emergency medical real-time consultation system for chemical disaster was placed under control of the call center.

Discussion: When mass exposure by toxic chemicals occurs, the chemical emergency medical information system will be helpful for acute identification of chemicals, protection of related personnel and emergency medical response. Also, it can be possible to guide citizens immediately in case of a chemical disaster.

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Collaboration between a Hospital and the Surrounding Communities in an Emergency and Disaster

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Introduction: Muhammadiyah, the Indonesia non-governmental organization (NGO), has more than 300 hospitals. It is one of the forerunners of the Safe Hospital Initiative in Indonesia beginning in 2008. Muhammadiyah realized that hospital strengthening must be done in collaboration with community strengthening. From 2016 to 2018, Muhammadiyah ran a program named Hospital Preparedness and Community Readiness for Emergency and Disaster (HPCRED) that was carried out through strengthening two hospitals and their surrounding communities in Palangka Raya, Central Kalimantan, and Bima, West Nusa Tenggara (NTB). This program was funded by the Australian Government and is in line with the Safe Hospital Comprehensive Framework of the World Health Organization (WHO).

Aim: To strengthen hospitals and the surrounding communities to prepare for emergencies and disasters.

Methods: HPCRED completed 92 activities in two areas consisting of the following: 10 training, 26 workshops, 12 exercises, four monitoring and evaluation meetings, and seven technical sessions/seminars. The exercises consisted of tabletop exercises, skill drills, command post exercise, and full-scale exercise.

Results: There were positive changes in the hospitals and communities particularly on disaster management, policy, procedures, staff and community skills, knowledge, and behavior. The integration and collaboration between the hospital surrounding communities were established and can be examined by documents, agreements, and activities done together between the hospital and community during and after the program.

Discussion: Before the program, hospitals were not ready to face disasters. PKU Bima Hospital collapsed during a flash flood in December 2016. The community, to save housing from water, hollowed the hospital wall out causing water entrance into the hospital. It meant there were no communication and coordination between the hospital and its community. HPCRED not only made them communicate and coordinate but also collaborate and cooperate to reduce risks and response disasters such as responding Lombok Earthquake in July 2018.

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Collaborative Relationships for Mass Gathering Events

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Introduction: Electronic Dance Music events (EDMs) are complex mass gatherings and given published rates of illnesses, injuries, and hospitalizations, these events can place an additional burden on local health care services. Accordingly, during the planning process for EDMs many stakeholders are involved; however, local hospitals, a key part of the medical safety plan, are often excluded. In this case report, it is posited that the involvement of local hospital(s) and the resulting integration of on-site and acute-care service provision during an event, ultimately reduces the burden placed on local hospitals.

Methods: Case report; synthesis of published literature.

Results: A 25,000 person per day, two-day mass gathering EDM event trialed a model of collaborative planning with a local community hospital. Planning included the identification of a hospital liaison, pre-event teleconferences between event staff, contracted and public medical response teams, emergency management teams, harm reduction practitioners, public health, and hospital personnel. Throughout the collaborative planning process, vital information was shared in order to optimize patient continuity of care and streamline the transition of care from site medical response to an acute care setting. Outcomes included the prevention of unnecessary transfers to the hospital; however, those patients who required transfer had their initial treatment started prior to leaving the venue. Further, collaborative planning also contributed to improved bidirectional data sharing to better understand the impact on the local hospital of the event, including transfers from the onsite medical team as well as transports from the community and self-presentations for care.

Discussion: The collaboration of onsite medical and hospital teams improved the delivery of essential medical care to the patrons of the event and added a layer to the safety planning process essential to mass gathering events.

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Comparing Training Techniques in Chemical Disaster Preparedness

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Introduction: Currently, there are no universally accepted personal protective equipment (PPE) training guidelines for Emergency Medicine physicians, though many hospitals offer training through a brief didactic presentation. Physicians' response to hazmat events requires PPE utilization to ensure the safety of victims, facilities, and providers; providing effective and accessible training is crucial. In the event of a real disaster, time constraints may not allow a brief in-person presentation and an accessible video training may be the only resource available.

Aim: To assess the effectiveness of video versus in-person training of 20 Emergency Medicine Residents in Level C PPE donning and doffing (chemical-resistant coverall, butyl gloves, boots, and an air-purifying respirator).

Methods: A prospective observational study was performed with 20 Emergency Medicine residents as part of Emergency Preparedness training. Residents were divided into two groups, with Group A viewing a demonstration video developed by the emergency preparedness team, and Group B receiving in-person training by a Hazmat Team Member. Evaluators assessed critical tasks of donning and doffing PPE utilizing a prepared evaluation tool. At the drill's conclusion, all participants completed a self-evaluation to determine their confidence in their respective trainings.

Results: Both video and in-person training modalities showed significant improvement in participants' confidence in doffing and donning a PPE suit ($p > 0.05$). However, no statistically significant difference was seen between training modalities in the performance of donning or doffing ($p > 0.05$).

Discussion: Video and in-person training are equally effective in preparing residents for donning and doffing Level C PPE, with similar error rates in both modalities. Future trainings should focus on decreasing the overall rate of breaches across all training modalities.

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Comparison of the Effects of Sacco and START Triage Methods in the Death Risk Assessment of Mass Trauma Patients after Earthquake

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Introduction: Compared with traditional START Triage Method, the Sacco Triage Method is a new way to access death risk in disaster scenes. However, due to the difficulties in disaster medical research, there is still no evidence to prove which one is more effective.

Aim: To assess and compare the value of START Triage Method and Sacco Triage Method in the death risk assessment of transport and the one-month death risk assessment of the earthquake mass trauma patients.

Methods: A retrospective analysis was conducted on 1,612 patients who were transferred to the West China Hospital by assigning to different triage levels by Sacco Triage Method and START Triage Method respectively. Both of the triage methods were evaluated based on death cases on either during transport or in the emergency department, using the area under the receiver-operator curve.

Results: For death during the transport and in the emergency department, the receiver-operator curve of two groups reflected as 0.721 and 0.649. For death in a consequence, the receiver-operator curve of the two groups was revealed as 0.667 and 0.519.

Discussion: As an accurate triage method, the Sacco Triage Method may be used in a mass casualty incident. It is a more effective way than the START Triage Method for the evaluation of death risk assessment of the mass trauma patients.

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Comparison of Traumatic Brain Injury Patients by Age Group in Emergency Department

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Introduction: Traumatic brain injury (TBI) is an important public health concern because of the high mortality rate of young people and a high proportion among the trauma. According to studies, patients visiting the emergency department (ED) with TBI comprise 1.4% of all ED patients.

Aim: The authors think that the characteristics of patients with TBI will vary according to the age group. Therefore, the purpose of this study is to investigate the clinical and social characteristics of patients with TBI visiting the ED by age group.

Methods: Trauma patients who conducted brain CT at the ED of Korean University Hospital (three hospitals) for 3 years from March 2013 to February 2016 were enrolled. Medical records were investigated retrospectively. The GCS scores were estimated at initial ED arrival. The primary outcome was to determine the characteristics of each age groups with gender, severity (by GCS score), trauma mechanism, and admission rate.

Results: A total of 15,567 TBI patients received brain CT evaluation during the investigation period. Based on age, patients in their 50s were the most common (16.5%). Regarding the severity, the ratio of mild was higher in under patients under 9 (99.3%); the ratio of severe was higher for patients in their 20s (4.6%). In almost every age group, the male ratio of TBI was higher, except for females aged 70 or older. Under 19 years of age, the ambulance utilization rate was lower than any other age group. The most common injury mechanism was a collision, the next was a traffic accident, and in under 9, a fall was the most common. 70.1% of patients returned home after treatments.

Discussion: Identifying the characteristics of patients with TBI visiting ED is fundamental. Therefore, it is necessary to continuously collect basic data on TBI among patients visiting the ED.

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A Comparison of Two Types of Personal Protective Equipment (PPE) Doffing Process: Frequency and Sites of Contamination

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Introduction: Personal protective equipment (PPE) is a necessary item in the period of unknown and high-risk emerging infectious disease. It is not only the necessary requirement of strict isolation, but also the last line of defense to protect medical staff.

Aim: Compare the differences between contaminated frequency and sites under two types of PPE doffing.

Methods: Recruited 56 health care workers (HCWs) who worked in clinical to follow the different PPE removal guidelines issued by the Chinese Center for Disease Control (CDC) and the World Health Organization (WHO) final resolution for preventing Ebola virus. Eight batches of HCWs were divided to conduct simulations of contaminated PPE removal using fluorescent lotion (Glitter Bug Potion, On Solution Pty Lt). Then we recorded the frequency and sites of contamination of personnel after removal of contaminated PPE by the method of visual observation.

Results: According to China's CDC process, the parts that are easily contaminated during PPE removal are: left hand and wrist (7 times), left calf (7 times), front chest center and left and right chest (6 times each) and left abdomen (5 times). Contaminated parts of the PPE process in accordance with the WHO process from high to low were: right hand and wrist (13 times), left hand and wrist (12 times), middle of the abdomen (10 times), left chest (9 times), and left abdomen (6 Times). There was no statistical difference between the two kinds of PPE piercing and removal ($Z=1.177$, $P > 0.05$).

Discussion: Under the guidance of the two processes recommended by China CDC and WHO, there was no significant difference in the frequency of pollution after removing PPE. It is speculated that the PPE recommendation processes issued by WHO and China CDC are effective for personal protection against fulminating infectious diseases.

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Concerns for Small Hospitals in Rationalising Trauma Services: How Do We Ensure Enhanced Patient Services in Rural Areas?

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Introduction: Trauma bypass has been introduced successfully worldwide with sustained reductions in mortality/morbidity. Analyzing structure, process, and outcome individually and

collectively in systems has been found to focus improvement efforts in the audit cycle. The second Irish report on Major Trauma Audit (MTA) was published in December 2017. The median age of trauma patients in Ireland was 59, indicating an aging trauma population. 28% of patients required secondary transfer to complete their care. The mortality rate for 2016 was only 4%.

Aim: To determine the ability of a road-based EMS system to bring patients from areas of Wexford County to proposed receiving centers within 60-90 minutes.

Methods: Analysis took population centers in Wexford County, used Google Maps to estimate travel times at 3pm on a weekday, and proposed new trauma units and centers in Dublin, Cork, and Waterford.

Results: In Wexford County urban centers, >95% of patients will not reach a trauma unit in less than 60 minutes with current prehospital medical service capabilities. This even excludes response/on-scene time by prehospital practitioners in land-based EMS vehicles.

Discussion: The proposed introduction of trauma bypass systems in Ireland should not disenfranchise patients with respect to the standards they are currently receiving. Gap analysis suggests considerable work is required within the ambulance service to increase critical skill levels of paramedics to support critical patients in the golden hour of their transfer. An increase in vehicles/resources will be required to ensure adequate staffing to meet Health Information and Quality Authority (HIQA) targets of 8 and 19 minutes for response acuity, and for longer durations of transport allied to dynamic resource deployment model as used by National Emergency Operations Centre (NEOC). Unintended consequences of system changes will need to be monitored carefully to avoid further adversely impacting recruitment of staff to bypassed Model 3 hospitals.

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Confusion, Chaos, and Bridging the Gap: A Prospective Study Gauging Disaster Triage Methodologies and Usage Across First Responder Professions

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Introduction: Disasters are unique in that they impact all socioeconomic, class, and social divides. They are complex, hard to conceptualize and operationally define, and occur sporadically without warning. However, regardless of each disaster's innate unpredictability, there is one common need that directly impacts patient morbidity and mortality: effective triage.

Aim: Currently the United States has no uniform triage mandate. The purpose of this study is to gather descriptive data on the type of mass-casualty triage currently being utilized by first responders (Emergency Medical Services/Fire/Nurses) and improve our understanding regarding the prevalence of mass casualty triage.

Methods: A descriptive mixed methods survey is being distributed to first responders/nurses in the Appalachian region. This survey collects respondents demographics, profession, and MCI

triage data. Data will be analyzed and descriptive statistics will be generated. GIS will be utilized to graph findings and visualize local and national trends.

Results: Results of this study are pending.

Discussion: Organizations have addressed the need for a standard triage protocol, even going so far as to create uniform criteria which each triage system should meet. However, the literature does not describe how individual professions train their members in disaster triage, or what triage is currently being utilized in each profession. Nurses and first-responders serve as linchpins in many communities. They remain in a community, both before, during, and after a mass casualty event, but they do not perform in a vacuum. During an MCI (mass-casualty incident) their scope of practice may vary, but they have common foci: the affected community. A better understanding of the type of MCI triage that each profession is using is vital in understanding how triage is being applied, and vital in identifying gaps in application that may impact the effectiveness of field triage, and affect local and national policy, practice, and future research.

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Construction of an Operational Protocol for Multiple Victims and Disasters in Southern Brazil

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Introduction: Unpredictable events, such as disasters, can change the organizational configuration of health facilities. In a situation of multiple victims, this scenario modifies the flow of care to adapt to the reality that is there. In addition, emergency and emergency units provide immediate care to maintain and preserve the lives of these victims, making it a challenge for all health professionals.

Aim: To construct an Operational Protocol for nursing care with multiple victims and disasters in a Hospital Emergency and Emergency Service.

Methods: We used a descriptive study with a qualitative approach using the Focal Group technique (GF). The participants included nursing staff and residents who work in the emergency and emergency unit in a hospital in the south of Brazil. The topics from the GF discussion were analyzed by the scientific content of Minayo (2013).

Results: The operational assistance protocol for multiple victims and disasters was planned with a redistribution of materials, equipment, human resources of the service, and physical restructuring of the service and other units with the construction of a flow chart to meet the proposed demand.

Discussion: In the study, we observed the importance of discussing and planning proposals for care with multiple victims. In addition, the interest of the participants was fundamental to the success of this protocol. This protocol serves as an incentive for nursing professionals and academics for future research that evaluates the effectiveness of using nursing competencies to assist multiple victims in emergency and disaster situations.

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Cooperative System between NGOs and the Private Sector for Disaster Relief in Japan

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Introduction: Disasters disturb the balance of medical supply and demand. Because normal supply chains break down in the wake of disasters, it is difficult to deliver daily necessities to affected areas. In addition, without a reliable supply of medical equipment and medicines, the number of sick and injured patients increases.

Aim: We propose that emergency medical teams should bring medical equipment and daily necessities when responding to disasters.

Methods: The Social Emergency Management Alliance (SEMA) was established in 2017. SEMA is a cooperative system between NGOs and the private sector for disaster relief in Japan. Humanitarian Medical Assistance (HuMA) utilized this system to provide emergency medical assistance during the Western Japan Floods in 2018.

Results: After the flooding, increased amounts of dust caused many cases of conjunctivitis. There were also numerous cases of heat stroke and dehydration, especially in the elderly. We requested SEMA to bring eye drops to wash out dust and isotonic drinks to prevent dehydration and heat stroke to Mabi Town, Okayama. SEMA coordinated with the private sector to provide eye drops and isotonic drinks via a forwarding agent, and we were able to distribute them to affected people and prevent worsening disease.

Discussion: NGOs working within affected areas can assess the exact needs of affected people in order to avoid waste. Such collaboration through SEMA will allow for more effective disaster relief in the future. It is our hope that more private companies join SEMA to reduce the suffering of disaster victims.

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The Core Concepts of an Integrated Information System for Disaster Medical Assistance Teams: Ten-Year Experience in Taiwan

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Introduction: Information systems (IS) have facilitated workflow in the health care system for years. However, the utilization of IS in disaster medical assistance teams (DMATs) has been less studied.

Aim: In Taiwan, we started a program in 2008 to build up an information system, MEDical Assistance and Information Dashboard (MED-AID), to improve the capability and increase the efficiency of our national DMAT.

Method: The mission of our national DMAT was to provide acute trauma care and subacute outpatient care in the field after an emergency event (e.g., earthquakes). We built the IS through

a user-oriented process to fit the need of the DMAT. We first analyzed the response work in the DMAT missions and reviewed the current paperwork. We evaluated the eligibility and effectiveness of the core functions of DMATs by experts in Taiwan and then developed the IS. The IS was then tested and revised each year in two table-top exercises and one regional full-scale exercise by the DMAT staffs who came from different hospitals in Taiwan.

Results: During the past 10 years, we identified several core concepts of IS of DMAT: patient tracking, medical record, continuity of care, integration of referral resources, disease surveillance, patient information reporting, and medical resources management. The application of the IS facilitate the DMAT in providing safe patient care with continuous recording and integrate patient referral resources based on geographic information. The IS also help the planning in real-time disease surveillance and logistic function in the medical resources monitoring.

Discussion: Information systems could facilitate patient care and relieve the workload on information analysis and resources management for DMATs.

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Core Curriculum for Event Medical Leaders

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Introduction: The literature on mass gatherings has expanded over the last decade. However, no readily accessible curriculum exists to prepare and support event medical leaders. Such a curriculum has the potential to align event medical professionals on improving event safety, standardizing emergency response, and reducing community impacts.

Methods: We organized collaborative expert focus groups on the proposed “core curriculum” and “electives.”

Results: Key features of a mass gathering medical curriculum include operations-focused, evidence-informed, best-known practices offered via low barrier, modular, flexible formats with interactive options, and a multi-national focus.

Core content proposed:

- Background (Definitions, Context, Risk, Legalities)
- Event Medical Planning - “The Seven Steps” - (1.) Assessment and Environmental Scan - Event Emergency Action Plan, (2.) Human Resources, (3.) Equipment/Supplies, (4.) Infrastructure/Logistics, (5.) Transportation (To, On, From), (6.) Communication (Pre, During, Post), and (7.) Administration/Medical Direction
- Event After-Action Reporting
- Case-based Activities

Electives mirror Core outline and serve as expanded case-studies of specific event categories. Initially proposed electives include:

- Concerts/Music Festivals
- Running Events

- Cycling Events
- Multi-Sport Events
- Obstacle Adventure Courses
- Staged Wilderness Courses
- Amateur Games
- Political Gatherings & Orations
- Religious Gatherings & Pilgrimages
- Community Gatherings (e.g., Parades, Fireworks, etc.)

Discussion: Complex team learning to standardize real-world approaches has been accomplished in other medical domains (e.g., ACLS, AHLS, ATLS, PALS, etc.). A course for event medicine should not re-teach medical content (i.e. first aid, paramedicine, nursing, medicine); it should make available a commonly understood, systematic approach to planning, execution, and post-event evaluation via a vis health services at events. A ‘train the trainer’ model will be required, with business operations support for sustainable course delivery. The author team seeks community feedback at WCDEM 2019 in creating ‘the ACLS’ of Event Medicine.

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Critical Care Specific Medical Materials Preparedness in the Emergency Department for Mass Shooting Disasters

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Introduction: There has been a dramatic increase in the number of mass shootings (loosely defined as an incident with four or more indiscriminate victims) in the United States (1). Additionally, the use of high-caliber, military-style weapons, has become more common in civilian shootings. These trends should influence how emergency departments prepare for disasters, including an inventory of what critical care medical materials (supplies) are readily available in the event of a disaster.

Aim: To demonstrate the need for the adoption of medical materials planning for disasters to account for new injury patterns from mass shootings.

Methods: A review of injury patterns from recent mass shootings was conducted using available literature (2). The average number of victims presenting to the emergency department in these events was reviewed. Estimation of critical care specific medical materials in the emergency department required for the management of an “average” number of victims with the typical injury pattern of these events was conducted.

Results: Some critical care specific medical materials: intubation equipment, chest tubes, and central venous catheters may be in short supply during a mass shooting event.

Discussion: Emergency physicians must anticipate and prepare for new disaster trends such as mass shootings and high caliber weapons injuries. This includes having specialty medical supplies readily available in sufficient amount. Normal stocking of critical care specific medical materials may be inadequate in a mass shooting event based on the available literature.

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Critical Concepts in Disaster Medicine for Saudi Arabian Emergency Residency Programs: A Delphi Study

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Introduction: Saudi Arabia, the largest country in the Middle East, has suffered numerous terrorist attacks and is the location of Hajj, one of the world’s largest annual mass gatherings. Healthcare providers’ pre-incident knowledge and understanding of basic disaster medicine (DM) concepts are crucial for a unified and effective health-system response. Introducing healthcare providers to best practices is a stated vision of the Saudi Commission for Health Specialties. Standardizing DM curriculum taught to physicians during their residency training will assist this goal.

Aim: To produce expert consensus on the most critical DM topics for the residency curriculum in emergency medicine (EM) in the Kingdom of Saudi Arabia.

Methods: Utilizing a Delphi approach, a panel of Saudi Arabian experts in DM and EM residency directors were surveyed regarding potential DM topics for EM residency curricula. The first round comprised of open-ended questions seeking lists of suggested DM curriculum topics. In subsequent rounds, each participant received a questionnaire asking them to review the items contributed in the first round, summarized by the investigation team. The participants rated each item on a five-point Likert Scale to establish preliminary priorities and added their comments. In further rounds, participants reviewed and prioritized subjects until they reached a consensus of $\geq 80\%$.

Results: The study is ongoing and full data will be available in the new year.

Discussion: This expert consensus from major stakeholders can be used to improve the foundation of the DM curriculum. The Delphi Method gives an evidence-based approach to identification and prioritization of subjects, which should be integrated within the Saudi Arabian Emergency Medicine Residency Curriculum. It also can be used as a cornerstone for implementation in other medical education programs across the Kingdom in the future.

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Culturally Sensitive Disaster Nursing Focusing on Pacific Rim Island Countries: First Report on Japanese Public Health Nurses

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Introduction: Providing culturally sensitive disaster nursing is essential to enhance survivors' resilience, especially in Pacific Rim island countries, which are home to 80% of the disaster victims of the world. Until now, most studies have focused on immigrant culture or language, and few have explored the idea of disaster nursing adjusted to the affected area's culture.

Aim: The study explores public health nurses' (PHNs) tacit knowledge regarding culturally sensitive disaster nursing focusing on the Pacific Rim island countries. This first report is the result of the study that clarified how Japanese PHNs, as relief nurses, considered the local culture to provide care to survivors in Japan.

Methods: Study participants were nine PHNs from seven prefectures, who provided care to survivors of natural disasters that occurred in 2011–2017 in Japan. Semi-structured interviews were conducted with questions such as, "Which culture did you consider while providing care to survivors in each disaster phase?" Data were analyzed qualitatively and inductively and were sorted according to the four disaster phases. The study was approved by the ethical committee at the National Institution of Public Health.

Results: In the acute phase, PHNs utilized close relationships between local residents and health care providers to collect information. They balanced local habits and the prevention of secondary health damage in the subacute phase; for example, balancing sanitation habits and prevention of contaminations. Additionally, they, as strangers to the community, played a role in alleviating tensions between residents under stress. During the recovery phase, they strengthened survivors' attachment to the area.

Discussion: PHNs dispatched from the outside of the affected areas must be culturally malleable to adjust their practice to the local context. Being strangers in an affected area can be advantageous if they utilize their position effectively.

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Current Status of the Japanese Disaster Medical Record

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Introduction: There was no common medical record used in disasters in Japan. At the 2011 Great East Japan Earthquake,

medical teams used their own medical records instead of a unified format and operational rules. As a result, confusion occurred at the clinical practice site. The Joint Committee on Medical Records proposed a standard format of disaster medical records in February 2015. The Ministry of Health, Labor, and Welfare has issued the notification of states' use of a standardized medical record for disaster in 2017. It was confirmed that standardized disaster medical records were used by each organization in the 2018 Western Japan torrential rain disaster and the Hokkaido Iburi Eastern Earthquake, but the actual condition of those records was not clarified.

Methods: We sent a questionnaire to the local governments where the medical team worked in 2018 Western Japan torrential rain disaster and the Hokkaido Iburi Eastern Earthquake. In the questionnaire, we asked about the operation and management of standardized disaster medical records at the time of the disaster and also questioned future management methods.

Results: There was no use of other medical records. Standardized medical records were used in all records. All records were managed and operated by the disaster medical headquarters responsible for health care and welfare. Standardized disaster medical records were recorded on paper. Evacuees included patients who moved from shelter to shelter or to temporary housing to get better living conditions. That created difficulties transferring records since it was recorded on paper and stored in medical headquarters. Some returning patients were checked by several medical teams, resulting in the creation of several medical records of the same patient's condition. Future improvements and management of the recording process and record-keeping are required.

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Description Analysis of Primary Care Issues in Puerto Rico after Hurricane Maria: Results from Federal Medical Shelter Manati

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Introduction: In September 2017, Hurricane Maria devastated Puerto Rico's health care infrastructure. To meet the demands of ongoing primary care and medical emergencies, Federal Medical Shelters (FMS) were set up to serve local communities for the weeks after the hurricane. A team of health professionals from New York assisted federal authorities in the provision of healthcare in the FMS.

Aim: To describe the population of patients requesting medical care in the aftermath of Hurricane Maria at FMS Manati and to categorize the range of problems faced by patients after the hurricane, and examine how this changed longitudinally over the course of the operation.

Methods: Researchers collected basic data of patients at presentation to the FMS. Descriptive analyses were performed of the patient population and nature of presenting illnesses. Chi-squared analysis was performed to compare the change over

time of presenting complaints. Ethics approval was granted by Columbia University.

Results: Data was collected for a two-week period approximately three weeks after the hurricane made landfall. The FMS saw 2,154 patients over a 14-day period. The population of patients (median age = 43 years [IQR 39 years]) assessed was bimodal in distribution, with one peak in children at 1 year. A second peak occurred at age 53 years. 60.2% of presenting complaints were infection- or chronic disease-related. Musculoskeletal complaints were the third most common. Chi-squared tests revealed no statistically significant change in the frequency of specific types of complaints between the start and end of data collection.

Discussion: In the weeks after Hurricane Maria, infants and elderly were seen to predominantly seek medical care. Likely related to the collapse of the healthcare infrastructure, there was a high prevalence of infection-related and chronic medical conditions. The data support the need to focus resources to treat vulnerable populations, infectious issues, and chronic medical conditions.

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Description of Disaster Forms Usage in Health Cluster in Lombok and Palu Earthquake

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Introduction: The effort of medical and health services distribution requires data. However, the data and information were ignored in an emergency situation. For improving the distribution of data and information, the Center of Health Policy and Management, Faculty of Medicine, Public Health, and Nursing Universitas Gadjah Mada (UGM) developed forms based on Health Crisis Response Guideline by Ministry of Health 2016 and the World Health Organization (WHO).

Aim: Describing the implementation and development of forms based on Lombok and Central Sulawesi earthquake in 2018 for health cluster.

Methods: The form contains (1) a volunteer registration form; (2) a monitoring potential outbreak disease form; (3) health problem in health cluster daily report form; (4) a chronological situation form. This will be implemented in health policy-making by the Sulawesi district health office (DHO) and will be regularly analyzed in every week.

Results: North Lombok DHO, Central Sulawesi health office, and volunteers accepted these forms well. Periodically volunteers had reported their activity to DHO. All these reports contain many health indicators including environmental health. Reproductive health and health promotion. Implementation of this form in the other type of disaster in Indonesia is suggested.

Discussion: First, these forms are important to attach to the guideline of health crisis response in order to be accessed by all DHO. Second, all forms are printed documents. It needs to develop into data input and analysis applications.

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Deuce and a Half with a Twist: Repurposing Old Technology to Save Lives in Swiftwater Rescue during Urban and Small Stream Flash Flooding

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Introduction: Vehicles stranded in rising water account for the majority of swiftwater rescues (SWR) during urban and small stream flash flooding. Multiple simultaneous SWR incidents are commonplace during severe storms. Historically, SWR teams have pursued a “reach, throw, row, go” strategy. However, reach and throw attempts are usually futile. Boat operations and/or in-water rescue attempts can be technically complicated, time-consuming, and a drain on rescuer resources.

Aim: To design an ideal SWR modality for use during urban and small stream roadway flooding.

Methods: SWR objectives, strategy, and tactics were mapped against various transportation modalities to develop the safest solution for urban and small stream flood response.

Results: High water vehicles (HWV), such as the “deuce and a half” 6 × 6 military truck, represent a new standard for SWR practicality and safety as they can reduce rescuer time in-water. HWVs are heavy and high enough to be stable on roadways in most flash flooding conditions. A properly designed emergency response package includes a fording kit, multi-directional floodlights for nighttime operations, public safety radios, and a siren that doubles as a public address system to coach victims as a rescue is initiated. Deployable ladders enable rescuer egress from and victim access to a covered lighted cargo bed that holds PPE, throw bags, and rescue rings; a deployable “boat in a bag” for victims who require ferrying; and a heated seating area where medical evaluation can be conducted while staying dry.

Discussion: SWRs are dangerous resource-intensive incidents which account for more rescuer morbidity/mortality than all other technical rescue sub-types combined. These incidents will increase in frequency and severity worldwide due to climate change and overdevelopment. If rescue conditions are still tenable, HWVs are the most efficient and effective platform for conducting SWR from flooded roadways while decreasing safety risks to first responders and victims.

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Developing a Knowledge Program for Large Scale Prehospital Assistance During Disasters and Big Incidents

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Introduction: In the Netherlands, we started in 2016 with a new procedure for large scale medical assistance during a crisis. The normal daily assistance in the Netherlands is organized on a regional level, and we have 25 regions. These regions are far too small to handle big incidents, and cooperation is needed on a

higher level to generate enough capacity. However, the Aim is that most emergency workers continue to do their own work in standard procedures, we also need more coordination, information management, transition of “stay and play” to “scoop and run” and deploying volunteers and citizens.

Aim: We developed the model practice-based, however, we have little big incidents. We feel the urgency to compare this practice to international knowledge.

Methods: The goal is twofold: validation of the starting points of our model, but also further improvement: speeding up the transport and treatment of patients, improvement of capacity, safety of the ambulance staff – especially with terrorist attacks or contamination, civil participation. We held the first survey on scientific literature in English, related to items in our prehospital assistance model. (the article is not yet published).

Results: The conclusion was, that scientific articles are rare, however, a lot of information is given about the practical course of incidents. Scientific research to explore these experiences is rare, partly due to a missing universal terminology on disaster medicine.

Discussion: We want to contribute to enlarging the scientific knowledge on large scale prehospital assistance. We expect that a lot of practical experience can be unlocked by bringing together experts in this field. We want to present the Dutch model, with a focus and invitation to compare this with the models in other countries, to compare experiences, to deepen them and to stimulate international research. We want to commit ourselves to facilitate this.

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Developing a Public Health Risk Assessment Toolkit for Mass Gatherings and Trialling for an International Multi-Sport Mass Gathering Event

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Introduction: Risk assessment for mass gatherings (MGs) is undertaken to enable public health authorities to systematically identify and assess the generic characteristics of an MG, which introduce or enhance particular threats and develop measures to reduce or mitigate these threats. The World Health Organization Collaborating Centres on Mass Gatherings and Global Health Security (WHO CCs) produced a comprehensive guide to MGs called “Public Health for Mass Gatherings: Key Considerations” (KC2). This is being converted into an eLearning resource. A public health risk assessment toolkit is being developed by the WHO CCs to complement and guide organizers in their planning process for the health risks associated with an MG event. Preparations for the Birmingham 2022 Commonwealth Games (BCG) are underway and it is important to involve a public health element in the planning for the BCG.

Aim: To develop a public health risk assessment toolkit for MGs and pilot it as part of the planning process for the BCG.

Methods: Based on KC2 principles, methods included developing and finalizing a public health risk assessment toolkit for MGs. This study also piloted the toolkit for the BCG.

Results: A toolkit will be developed. Key learning will be documented on how the toolkit can be improved. The pilot will identify the key public health risks for the BCG, and assess how to mitigate them.

Discussion: The development of this toolkit will be an innovative contribution to the resources available for those organizing MGs. It will support organizers to conduct risk assessments and thus maximize the potential for health from the event. Piloting the toolkit for the BCG is an opportunity for validating it, and provides valuable learning for its use in future events. It will support the risk assessment process for the BCG and share learning regarding the key risks for this event.

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Developing an Educational Strategy for Delivering an E-learning Disaster Medicine Course for Undergraduate Students in US Medical Schools

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Introduction: Disaster Medicine (DM) is a discipline arising from the marriage of emergency medicine and disaster management. The importance of DM has recently increased, with current wildfire situations throughout the world being examples of mass scale disasters with significant human morbidity and mortality. DM deals with preparedness, mitigation, response, recovery, and prevention of disasters (1).

Aim: To develop an educational strategy and reusable format for delivering undergraduate DM courses online. Man-made, weather-related, humanitarian, and technological disasters occur all around the globe annually, yet the majority of medical schools do not have an undergraduate DM program. This project developed an online course structure accessible to medical schools and students throughout the world.

Methods: Learning theories and models of learning were used to construct a course layout that encouraged students to be active learners, developed long-term retention strategies, and facilitated assessment for and of learning. This was accomplished through innovative educational modalities, including novel apps and external online resources. The course focuses heavily on outcome-based education with an emphasis on the development of applicable skills. Each lecture is divided into a series of learning objectives to allow students to master concepts sequentially, followed by questions to make use of the “testing effect” (2).

Results: Focused review of current medical education literature reveals that students learn best when given short, outcome-focused “mini-lectures” followed by low-stakes assessment and feedback.

Discussion: Medical schools without trained DM staff now have access to expert online material developed by educationalists with a focus on skills and knowledge retention.

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Developing Collaboration Quality Indicators for Major Incidents in an Underground Mine

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Introduction: The underground mining industry has one of the most hazardous industrial occupations, and requires an increased level of preparedness for injury incidents. The most important outcome for seriously injured victims is the reduction in morbidity and mortality. Receiving effective and timely care may mean the difference between life and death. However, mines are usually located in a rural area and the incident site may be deep underground which makes it an extraordinary challenge for the rescue services. A successful rescue response in an extraordinary milieu demands a high level of inter-organizational cooperation skills at the incident site.

Aim: To analyze statements of collaborate activities during a major incident exercise in the underground mine industry, essentially for patient outcome.

Methods: A Delphi technique was performed, asking opinions from experts in iterative rounds to generate, understand, and form consensus on group opinion around this complex issue. The experts were personnel from disaster medicine (n=3), emergency and prehospital medicine (n=10), rescue service (n=16), and mine industry (n=9), all with operative command positions.

Results: Three iterative rounds were performed. The first round was conducted as a workshop to collect opinions about the most important inter-organization cooperation activities to optimize patient outcome from an injury incident in an underground mine. This resulted in 63 statements. The statements included information about: early alarm routines, collaborative support and efforts of early life-saving interventions, relevant resources and equipment, command and control room, and functions. In round two participants shared and communicated decisions about safety, situation awareness, and guidelines for response. All statements reached consensus among the experts in round three.

Discussion: These inter-organizational statements are considered important by experts, and could be used to evaluate collaboration in major incident exercises. Hence, the statements

can also be quality indicators for reporting results from major incident management.

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Development and Challenges of Japan DMORT (Disaster Mortuary Operational Response Team) Association

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Introduction: In 2006, Japan DMORT was established by physicians, nurses, forensic pathologists, social workers, and a journalist (inspired by a major train crash in the previous year) to provide mental support to disaster victims' families who had not received care. However, disaster victims' identification and care of the families were monopolized by police in Japan. Also, our 'study group' status confused people who were affected by disasters.

Aim: To describe the development and future challenges of our association.

Methods: We developed our policy to focus on mental support through various activities such as the 11 closed seminars with disaster victims' families, 21 training courses for disaster responders, and several workshops in medical or nursing conferences. In the Christchurch Earthquake, NZ (2011), with young Japanese casualties in a collapsed building, our core member reported the needs of families' mental support, which showed the validity of our policy.

Results: In the Great East Japan Earthquake (2011), we distributed mental health care manuals for disaster responders. In the landslides in Izu Oshima Island (2013), 3 members supported victims' families through the town office. In the Kumamoto Earthquake (2016), two members made grief work on families of 17 victims at the prefectural police academy. These activities convinced the police of the need for medical/mental support and ourselves of the necessity for legal status. In 2017, we reorganized our association into an incorporated society. We also became official members of crime/disaster victims support liaison councils of two prefectures among 47 in Japan. In 2018, official agreements were made with the Hyogo prefectural police. But in the Heavy Rains and Flooding of July and in the Hokkaido Eastern Iburi Earthquake of September, the local police did not agree to accept us.

Discussion: Official collaboration with police is essential nationwide in Japan. Further relief activities are expected.

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

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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.

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

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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.

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

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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 ≥ 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.

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Development of a Tool Measuring Nurses' Competence for Disaster Response

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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.

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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

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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.

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Development of an E-Learning Platform For EMTs In Ghana

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Introduction: The continuous development of the knowledge and skill of the emergency medical technicians (EMTs) in Ghana is important for the success of the pre-hospital system. Due to distance and time constraints, an online e-learning platform is a good way to educate the Emergency Medicine Technicians in Ghana.

Aim: The study looked at the feasibility of developing a distant learning module for the training and continuous medical education of EMTs.

Methods: EMTs in the Ashanti Region were randomly selected to be part of the study. They received online lectures and notes that were accessible by their mobile phones. They all received a test at the end of each model. The study measured their willingness to participate, average attendance for each model, and the scores for each model test. The study also measured the overall feasibility of the distant learning program.

Results: The study developed a training course comprised of 7 modules: trauma and surgical emergencies, obstetric emergencies, pediatric emergencies, disaster management, medical emergencies, basic ultrasound, and medical research. Tests and quizzes were electronically sent to EMTs over the course of the research period, with an average test score of 70.14% (low: 35%, high: 95%) for the cohort. Feedback from participants showed gains in knowledge and skill delivery. The average attendance for all model was 56.6% ranging from 47.37%–63.16% for the models. Challenges for attendance included internet access, heavy duties, and other personal reasons. The post-training interview showed 100% willingness to participate in future online programs with the most common reasons stated as low cost, ease of attendance for models, and reduced expense.

Discussion: The study concluded that online, distant learning models can be used in Ghana for training and continuous medical education for EMTs. It is an easy and cost-effective model compared to a face-to-face model.

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Development of Trauma and Disaster Response in Togo, Africa

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Introduction: The project was provided under the auspice and support of the Israel Agency for International Development Cooperation (MASHAV) at the Ministry of Foreign Affairs (MFA). Togo, one of the smallest and least developed countries in West Africa, has a population of ~7.9 million. About 65% of its population lives in rural areas. Due to the lack of medical

resources, Togo suffers from health problems including those related to trauma and mass events. In May 2017, a trauma and disaster team came to Togo to train the medical team in the new trauma unit, donated and built by the MFA. The unit was built in the Atakpame Regional Hospital (ARH), located 160km north of the capital, Lomé. ARH serves one million inhabitants, mostly from rural areas.

Methods: The training included lectures, simulations, drills, case studies, bedside teaching, and operation of medical technologies.

Results: Following the training, it was recommended to continue the program and to move forward with advanced training. Following the team's recommendations, MASHAV decided to expand the program and to provide a multilateral project to Togo and ten other West African countries within five months after the first training ended. Twenty participants (mostly senior doctors) were chosen from ten Western African countries and brought to Lomé. The participants joined a two-day Trauma and Disaster Preparedness seminar. Following the seminar, they were moved to Atakpame to join the local team and the facilitators, to visit the trauma unit, and to learn about it as a model for trauma care that can be modified to the capabilities of the local facility.

Discussion: Lessons learned and recommendations from those two projects were brought to the MFA that will try to develop more training and cooperation models to help and establish better trauma care and disaster response, supported by the Israeli team.

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The Diagnostic Value of Ultrasonic Measurement of Inferior Vena Cava Diameter Respiratory Variability on Volume Response Evaluation of Geriatric Hip Fracture

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Aim: To evaluate the value of ultrasonic measurement of the respiratory variability of inferior vena cava (IVC) in the preoperative volume-response evaluation of elderly hip fracture patients.

Methods: Volume-loading tests were carried out in elderly patients with hip fractures requiring surgical treatment from August 2017 to February 2018. The maximum diameter (IVCe) and minimum diameter (IVCi) of the IVC were measured by ultrasound, and the variation of IVC (IVC-CI) was calculated before surgery. SV was monitored by a FloTrac/Vigileo system, and positive volume responsiveness was defined as ΔSV increasing by more than 15%. The sensitivity and specificity of IVC-CI to volume responsiveness evaluation was analyzed by ROC, and the correlation between IVC-CI and ΔSV was analyzed by Spearman correlation analysis.

Results: Ultrasound measurements and volume-loading tests were successfully performed in 39 of the 44 patients. Among them 21 cases were volume responsiveness positive (group R) and 18 cases were volume responsiveness negative (group N). Before the volume-loading test, IVCi in group R was significantly smaller than group N and IVC-CI was significantly larger than group N ($P < 0.05$), while the difference between IVCe and group N was not statistically significant ($P > 0.05$). After the volume-loading test, the differences between IVCe,

IVCi, IVC-CI, and group N were not statistically significant ($P>0.05$). Area under curve (AUC) of IVC-CI to assess volume responsiveness in geriatric hip fracture patients was 0.80 ± 0.08 (0.65-0.95, $P=0.001$), with a 20.69% cut off value, 77.78% sensitivity, and 76.19% specificity. Through the Pearson correlation analysis, IVC-CI and ΔSV were positively correlated with the coefficient $r=0.367$ ($P<0.05$).

Discussion: As a rapid and noninvasive monitoring method, ultrasonic measurement of the respiratory variability of inferior vena cava in assessing the volume responsiveness of geriatric hip fracture patients can provide guidance for perioperative fluid management.

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Disaster and Mass Casualty Incident Responses by Doctor Car

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Introduction: Ambulances with physicians, known as Doctor Car, and Tokyo DMAT are the two prehospital care systems responsible for medical team dispatch in the Tokyo area. While there are 25 designated hospitals for DMAT, Doctor Car is only available at four hospitals. Our hospital incorporates both systems. While the prehospital care system must be utilized at the time of disaster, Doctor Car was dispatched 418 times in 2017, and the use of DMAT is less than ten times per year.

Aim: To review the past disaster responses of our hospital.

Methods: The study reviews three cases where our hospital responded to mass casualty incidents and disasters with either Doctor Car or DMAT. The first case was the treatment of crush syndrome caused by a collapsed parking slope. It took more than 24 hours for the rescue, in which the team treated patients during transport and at the hospital. The second case was our response to a mass stabbing incident committed at a facility for the disabled. In collaboration with the onsite rescue team, we conducted triage, hemostasis, transfusion, etc. The third case was caused by a fire in a building under construction. We provided treatments like triage and tracheal intubation on the spot.

Results: Because paramedics are allowed to conduct only a limited amount of treatments, dispatch of the medical team to the site is effective.

Discussion: For a medical team to be effective at the dispatched site, the team must be accustomed not only to the specific need of medical care during disasters but also prehospital medical care, which may include the abilities to ensure safety during transport and on-site and adapt to the prehospital environment. Doctor Car is a useful way to realize such abilities.

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Disaster Education and Drills in Turkey: Do We Prepare Ourselves for Unexpected Disasters?

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Introduction: Turkey is vulnerable to many natural hazards, including earthquakes, landslides, floods, and terrorist attacks. The 7.1 magnitude Marmara Earthquake in 1999 resulted in over 18,000 deaths and estimated losses of over \$28 billion. The country's largest city, İstanbul, is located on the North Anatolian Fault and thus highly prone to earthquakes. It is estimated more than half of the population in the country are potentially seismically vulnerable. This vulnerability makes us ready for disasters. Turkey has advanced disaster risk management through initiating reforms to better manage and reduce disaster risk and strengthening institutions.

Aim: To overcome institutional fragmentation, the government established the Disaster and Emergency Management Presidency (AFAD) in 2009.

Methods: Assess the 2015 government adopted Turkey National Disaster Response Plan to guide all disaster and emergency response.

Results: In the last six years, Turkey has become one of the world's largest refugee-hosting countries. As of 2018, approximately 3.5 million Syrians under temporary protection have largely been integrated into cities, towns, and villages that stressing the infrastructure and increasing potential risk exposure. This situation makes us recognize disaster protection preparedness. We have many public and civil institutions to prepare society for unexpected situations. The main institution is the Disaster and Emergency Management Presidency. AFAD has many projects for youth, school children and all age groups of society. The second organization is the Red Crescent organization of Turkey. The other organizations are mainly National Medical Rescue Teams (UMKE), some university disaster clubs, and civil institutions like Beşir NGOs.

Discussion: These institutions give main disaster confidence education, main CBRN education, main fire-fighting education, camping life educations, orienteering, mobile oven, and kitchen facilities and drills. We have to raise awareness of the community about preparedness to disasters. We have to share lessons with the whole population for reducing social and economic loss.

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Disaster Medical Management of Pediatric and Perinatal Disaster Medical Liaison (PPDML) for Children and Pregnant Women in Osaka, Japan

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7. National Disaster Medical Center, Tachikawa, Japan

Introduction: Children are a vulnerable population in disasters. However, there were few pediatricians, neonatologists, and obstetricians in the Japan Disaster Medical Assistance Team (DMAT), so disaster medical headquarters had limited knowledge to solve these problems. Pediatric and perinatal disaster liaison coordinators were trained to improve disaster medical management for children and pregnant women since the 2016 Kumamoto earthquake.

Aim: To analyze and report the activity of PPDML during these years in Osaka, Japan.

Methods: The records of PPDML in major disasters and disaster drills from 2017 to 2018 were reviewed.

Results: The DMAT had disaster drills twice a year in Osaka, and PPDML participated in the drill for the first time in July 2017. In the drill, PPDML coordinated the pediatric and perinatal issues with DMAT and Japan Ground Self-Defense Force (JGSDF) in disaster headquarters. In June 2018, 4 months after the drill, PPDML participated for the second time in February 2018 when the North Osaka Earthquake occurred. PPDML coordinated transport of 22 children and babies with congenital heart disease from the damaged National Cerebral and Cardiovascular Center Hospital. The operation was finished within 5 hours after requested transportation.

Discussion: To protect children and pregnant women, cooperation between the disaster medical network and the pediatric and perinatal network is absolutely important for any phase in disaster. Because PPDML had attended in disaster drills before, the experience could make PPDML achieve good performance in a real disaster in North Osaka Earthquake. It can be concluded that cooperation between disaster medical network and PPDML is very useful to manage the disaster issues for children and pregnant women, and the most important thing is to cooperate not only in disaster but also in ordinary days.

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Disaster Preparedness and Management in Pakistan: A Systematic Review

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Introduction: Since its inception about 66 years ago, Pakistan has experienced a variety of both natural and man-made disasters like earthquakes in 2005 and 2015 and widespread flooding in 2010. Pakistan has also experienced a range of politically motivated violence, bombings in urban areas, as well as mass shootings. Such events generate a large number of casualties. To minimize the loss of life, well-coordinated prehospital and in-hospital response to disasters is required.

Aim: To identify all the existing peer-reviewed medical literature on prehospital and in-hospital disaster preparedness and management in Pakistan.

Methods: The search was conducted using PubMed and Hollis plus search engines in accordance with the PRISMA guidelines. The articles selected included articles on both natural and man-made disasters, and their subsequent prehospital and in hospital management. The following search terms and keywords were used while searching PubMed: mass casualty incident preparedness and management Karachi, mass casualty incident preparedness, disaster preparedness Karachi, and disaster management Karachi. To search Hollis plus, we used the terms: mass casualty incident preparedness and management Pakistan, mass casualty incident Pakistan, mass casualty incident preparedness and management Karachi, and disaster preparedness Karachi. We selected only peer-reviewed articles for a literature search and review.

Results: The reviewed articles show a lack of data regarding disaster management in Pakistan. Almost all the articles unanimously state the scarcity of planned prehospital and in-hospital management related to both man-made as well as natural disasters. There is a need for planned and coordinated efforts for disaster management in Pakistan.

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Disaster Preparedness Technician = Striking Cost Savings Ms. Jasmine Dexter^{1,2}, Ms. Melanie Morrow^{1,2}, Ms. Kelly Fogarty^{1,2}, Ms. Abigail Trewin²

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Introduction: The workplace holds a rapidly deployable, self-sufficient field hospital including a medicine cache valued at \$80,000. The cache is rotated through the affiliated hospital pharmacy when they have less than 12 months to their expiry. Rotations are done regularly due to the short expiry dates of stock coming from suppliers. A senior pharmacy technician is employed two days per week at a cost of \$13,024.80 per annum to manage this cache.

Aim: To demonstrate the associated cost savings of employing a pharmacy technician to manage a medication cache.

Methods: Every month, the technician extracts items with less than a year expiry from the stock control system and compares these dates with that of the stock held in the pharmacy. All items with a better expiry date are rotated as long as there is sufficient turnover to ensure use before its expiry. Automatic recording occurs of items rotated, items discarded, and their costs are used as key performance indicators (KPI).

Results: Over a 12 month period, \$52,803 worth of stock was rotated. On average, 48 lines and 7,619 individual items were rotated monthly with a value of \$4,061.83 (range \$0–\$8,820 per month). During this period, there were 2 months where no rotations occurred due to staff changeover and annual leave. 10 lines of medicines at a value of \$4,041 were discarded over this time period. The two main reasons for discarding were that

the medicine was not a pharmacy item or was not used in a large enough quantity to allow rotation.

Discussion: The equivalent of four times the technician's wage was saved over 12 months. This illustrates striking cost savings gained by efficient, timely rotations and the cost benefits of employing a technician.

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Discovering Best Practice Establishing Evacuation Centers for Vulnerable Populations: Findings from Australia and Japan

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Introduction: Potentially vulnerable population groups in disasters include the elderly and frail, people who are isolated, and those with chronic diseases, including mental health conditions or mobility issues. The disasters such as the Queensland flood and Great East Japan Disaster in 2011, affected regions of Australia and Japan. This study is followed by two pilot studies in both countries after the disasters. While both countries have different evacuation center procedures for evacuees, the issues regarding the role and responsibility across governments involving planning, setup, and management of evacuation centers demonstrate similarities and differences.

Aim: This paper will report the preliminary findings of a pilot study undertaken with local government officials and humanitarian agencies in Australia and Japan concerning their involvement in planning for, setting up, and managing evacuation centers for vulnerable populations in recent natural disasters. The objective is to illuminate the similarities and differences that officials and agencies faced, and to highlight the resolutions and lessons learned in the preparation of evacuation centers through this event.

Methods: This is the final stage of the study. After completing an analysis of both phases, a comparative framework to highlight similarities and differences was developed.

Results: Each government's role in relation to the establishment of evacuation centers is legally defined in both countries. However, the degree of involvement and communication with non-governmental organizations from the planning cycle to the recovery cycle demonstrates different expectations across governments.

Discussion: While the role of governments is clearly established in both countries based on the legal frameworks, the planning, set-up, and management of evacuation center differs.

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Does Medical Presence Decrease the Perceived Risk of Substance-Related Harm at Music Festivals?

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Introduction: The use of recreational substances is a contributor to the risk of morbidity and mortality at music festivals. One of the aims of onsite medical services is to mitigate substance-related harms. It is known that attendees' perceptions of risk can shape their planned substance use; however, it is unclear how attendees perceive the presence of onsite medical services in evaluating the risk associated with substance use at music festivals.

Methods: A questionnaire was administered to a random sample of attendees entering a multi-day electronic dance music festival.

Results: There were 630 attendees approached and 587 attendees completed the 19 item questionnaire. Many confirmed their intent to use alcohol (48%, n=280), cannabis (78%, n=453), and recreational substances other than alcohol and cannabis (93%, n=541) while attending the festival. The majority (60%, n=343) stated they would still have attended the event if there were no onsite medical services available. Some attendees agreed that the absence of medical services would have reduced their intended use of alcohol (30%, n=174) and recreational substances other than alcohol and cannabis (46%, n=266).

Discussion: In the context of a music festival, plans for recreational substance use appear to be substantially altered by attendees' knowledge about the presence or absence of onsite medical services. This contradicts our initial hypothesis that medical services are independent of planned substance use and serve solely to reduce any associated harms. Additional exploration and characterization of this phenomenon at various events would further clarify the understanding of perceived risks surrounding substance use and the presence of onsite medical services.

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The Effect of Emergency Department Expansion on Emergency Department Patient Flow

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Introduction: Overcrowding in the emergency department (ED) has been a global problem for a long time, but it is still not resolved.

Aim: To determine if an ED expansion would be effective in resolving overcrowding.

Methods: This was a retrospective study comparing two 10-month periods before (September 2015 to June 2016) and after (September 2017 to June 2018) the ED expansion in an urban tertiary hospital. The existing ED consisted of 45 beds in the adult area and eight beds in the pediatric area. After the construction, the number of beds was not increased, but a fast track

area was newly established in the adult area, and a 25-bed ward for emergency hospitalized patients was opened.

Results: The number of patients visiting the ED increased from 77,078 to 87,927. The proportion of patients who returned home without treatment significantly decreased from 11.5% to 0.9% ($p < 0.001$). The number of adult patients increased from 40,814 to 60,720, but the number of patients who could be treated on the bed decreased (22,166 (54.3%) vs. 17,776 (29.3%), $p < 0.001$). The number of pediatric patients was similar in both periods. Median ED length of stay (LOS) of total patients increased from 193.0 min to 205.8 min ($p < 0.001$). Of the 18,900 hospitalized patients during post-period, 1,255 (6.64%) were admitted to the emergency ward, and the boarding (from admission decision to hospitalization) time of the admitted patients decreased from 239.2 min in the pre-period to 190.9 min in the post-period by 38.3 min. However, more time was required for admission decision in the post-period (216.8 vs. 253.3, $p < 0.001$).

Discussion: The ED expansion allowed more patients to be treated, and the emergency ward reduced boarding times of admitted patients. However, due to the increase in the number of patients, the time required for medical treatment increased.

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The Effects of Current Cold Chain Management Equipment in Controlling the Temperature of Pharmaceutical Stores in an Australian Defence Force Exercise Environment

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Aim: The purpose of this pilot study was to analyze the current cold chain storage methods of Class 8 stores, specifically thermolabile medications and temperature sensitive diagnostics, dressings, and fluids, for the Australian Army in a training area within Australia. This research was designed to identify deficiencies in current storage methods, including the inability to maintain the recommended storage temperature of pharmaceutical stores in accordance with the Therapeutic Goods Administration, as well as foster communication between key stakeholders, including the Royal Australian Army Medical Corps and the Department of Defence Joint Health Command, and to develop a cold chain protocol specific for the Australian Defence Force.

Methods: This pilot study identified the common occurrence of breaches in a specific climate and recommends that current mission essential equipment be replaced. It also discusses the need for clearly defined guidelines with accountability of the stakeholders to ensure that the provision of health support to all Australian Defence Force personnel is in accordance with civilian standards.

Results: This pilot study identified that the carried thermolabile medications and temperature sensitive diagnostics, dressings, and fluids were commonly exposed to temperatures

outside the range recommended by the manufacturers. These findings related mainly to the storage equipment for Class 8 stores used by the Army. As a result, it is recommended that such equipment is replaced so that the cold chain storage meets the Therapeutic Goods Administration Guidelines to ensure that health support to Australian Defence Force Personnel in the field is in accordance with the standard of care expected at a civilian health facility.

Discussion: This pilot study has enabled the Australian Defence Force to qualify and quantify the temperature exposure of the medications and stores and engage with key stakeholders to trial and apply new technologies and processes for the management of the cold chain.

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The Efficacy of Blood Lactate on Predicting the Prognosis of Patients with Multiple Trauma

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Introduction: Because of the rapid progress of multiple trauma patients, the early mortality rate is high. Therefore, early assessment of the severity and prognosis of multiple injuries is crucial for timely treatment and improvement of prognosis. So we need to find parameters related to mortality and severity of multiple trauma.

Aim: To find out parameters related to mortality and severity of multiple trauma.

Methods: This was a single center, trauma registry based, observational cohort study. Data were collected from consecutive patients with multiple trauma who presented to the emergency department of a tertiary referral hospital between April 2015 and December 2016. The main outcomes studied were 28-day in-hospital mortality, 24-hours mortality, emergency operation rate, and ICU admission rate.

Results: 444 patients were eventually included in the study, including 337 males (75.9%) and 107 females (24.1%). The 28-day survival group consisted of 381 patients (85.8%) and the death group accounted for the other 14.2%. Multivariate logistic regression analysis showed that heart rate, peripheral oxygen saturation, lactic acid, partial pressure of carbon dioxide, plasma albumin, hematocrit, and Glasgow score were independent risk factors for 28-day mortality. The area under the ROC curve (AUC) of the above indicators was 0.669, 0.547, 0.868, 0.512, 0.740, 0.627, and 0.815, and the AUC value of lactate was the maximum.

Discussion: When the body suffers from severe trauma, it loses a lot of blood and reduces the circulating blood volume, which leads to absolutely insufficient hemoglobin content and hypoxia of tissue cells. The plasma lactate content increases at this time. Therefore, lactate can be used as an important prognostic parameter for patients with multiple trauma. In addition, we can use lactate to revise the existing trauma score to enhance its effectiveness.

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Emergency Ambulance Dispatch and Drive Times: An Analysis of Prehospital Vehicular Response in the Kingdom of Bhutan

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Introduction: The Kingdom of Bhutan is a small, mountainous country with limited financial resources. Its population is scattered in hard-to-reach villages with poor road access. Ambulance drivers piloting Toyota Landcruisers provide the majority of the country's emergency response and are dispatched by the national emergency response center (Health Help Service/112) to calls in the nation's twenty districts.

Aim: By collecting and analyzing prehospital response data, we aimed to describe Bhutanese emergency medical response (EMS) ambulance activities and make system-wide recommendations to improve the speed of emergency vehicle dispatch, reduce the time between ambulance activation and ambulance arrival on scene, and adequately describe emergency vehicle drive time as it relates to distance driven.

Methods: The following data was compiled in Excel: Dispatch center phone records, EMS ambulance activation times, drive times, vehicle geospatial data, and written records of ambulance drivers. No identifiable data was collected.

Inclusion Criteria: All prehospital calls from 2017 and 2018 where complete data was available.

Exclusion Criteria: Complete data unavailable, i.e. geographic data without a matching call or report.

Statistical Tools: SPSS Statistics Version 25, NVivo 12-12.2.0.3262.

Results: Preliminary analysis of the data shows a significant difference between data collected and data previously reported, the speed of emergency vehicular response and dispatch, drive times, and distance traveled. Facility transfer rather than scene response was found to take more time.

Discussion: Due to adverse road conditions, lengthy drive times, and an inadequate number of personnel and satellite ambulance locations, we recommend optimizing ambulance location using an optimization model that will minimize the number of ambulances needed and maximize response time. Future considerations may include adding a ground arm to the Bhutan Emergency Aeromedical Retrieval team, or a second aeromedical team in the eastern part of the country.

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An Emergency and Disaster Course on Responding to Community and Family Healthcare Problems with Interprofessional Education for Undergraduate Medical, Nursing, and Dietitian Students

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Introduction: Emergencies and disasters need inter-discipline and inter-professional approaches because many problems in a disaster are due to poor coordination and collaboration. The disaster events during a decade in Indonesia highlighted the limitations of the healthcare system in responding to large-scale public health problems. Disaster health preparedness is the key to an effective response to any problems in community and family. Thus, education for health students has become a priority. **Aim:** Preparing fourth-year health students to be aware of disaster health problems in family and community with an inter-professional approach.

Methods: Faculty of Medicine, Public Health, and Nursing UGM were prepared for the fourth year undergraduate health students through a semester "Emergency and Disaster Course" under Community Family and Healthcare with the Inter-professional Education Program, first given in 2016 for four hundred students. Mix method between class lecture, training skill, and simulation. The course goals are to (1) educate students on disaster health management, (2) understand the health preparedness and disaster family kit, and (3) define the principle of health worker's role and collaboration in disaster.

Results: The course was well received and at the 2017-2018 session was improved based on students and faculty feedback. Disaster knowledge of students changed. However, they still had a problem in communication between professions. And addition, they became aware of the function and each role of health profession competency during a disaster.

Discussion: A course for fourth-year health students about emergency and disaster health management is extremely relevant because they will be health workers soon. They must have good awareness, knowledge, and attitude to cope with disaster health problems in the future.

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An Emergency Medical Triage Tool for Swiftwater Rescue

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Introduction: Climate change and overdevelopment increase the intensity and frequency of flash flooding, which may generate more swiftwater rescue (SWR) incidents. Rescue personnel may fail to properly risk stratify (triage) these victims due to limited medical and/or variable SWR training, or due to an adverse rescuer-to-victim ratio. Some victims may attempt to refuse medical evaluation due to lack of awareness of incident-related morbidity and/or comprehension of risk.

Aim: To develop an SWR emergency medical triage tool.

Methods: A cross-sectional literature search identified SWR-related medical conditions. A flow diagram reliant upon incident history, chief complaint, and observational exam rather than interpretation of vital signs was created to guide medical decision-making.

Results: Every SWR victim should receive a medical screening exam focused on six clinical categories—drowning, hypothermia, hazmat exposure, physical trauma, psychological trauma and exacerbation of pre-existing disease. Drowning potential is identified by dyspnea, new cough or a history of (even brief) submersion. Shivering SWR victims and those with altered mental status but no shivering are assumed to be hypothermic. Any victim with open skin lesions/wounds who was immersed in floodwater and anyone who has swallowed floodwater is contaminated; these victims require decontamination and possible antibiotic therapy. SWR victims injured upon entering the water or from contact with either water-borne stationary or floating objects require trauma evaluation. Distraught victims and those who exhibit exacerbation of pre-existing organ-system disease also require ED evaluation.

Discussion: Most SWR course curricula are oriented towards technical rescue; they do not address comprehensive medical decision-making. We present a rapid medical screening exam designed to determine which SWR victims require an ED evaluation. Such a triage tool will assist rescuers to simultaneously honor patient autonomy and avoid risky and uninformed refusal of medical aid. Simplified medical decision-making should enable the application of this tool worldwide.

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Emergency Patients with Mental Crisis Accessing Emergency Medical Services in Thailand

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Introduction: Emergency responders face an increasing number of calls involving people with behavioral and mental crisis issue. Integrated multi-agency schemes involving ambulance, police and mental health services are now being developed to provide urgent and emergency care pathways for these vulnerable patients.

Aim: The objectives were to study the situation, characteristics, issues, and accessibility to emergency medical services (EMS) and appropriate treatment for emergency patients with a mental crisis in Thailand.

Methods: The sample included 26,511 mental crisis patients accessing EMS. Data were obtained from the database of the Information Technology for Emergency Medical System between 2015–2017 and from stakeholders from four provinces distributed regionally using focus groups and in-depth interviews. The data were analyzed using descriptive statistics and content analysis.

Results: The number of patients with mental crisis accessing EMS increased in the past three years. Most patients are male in the working age group from the Northeastern area during the raining and winter season, especially between September and October. During patient encounters with maniacal attacks, assistance will be requested from the police and the emergency medical units. The response depends on the experience and community capability. The emergency responder teams had insufficient knowledge and skills. Emergency rooms in most hospitals lack specific caring unit. Psychiatric hospitals have different criteria for admitting patients. Most had no fast track system and even refuse admittance.

Discussion: Mental crisis patient calls with EMS were rising. However, accessibility to appropriate service centers was still an issue. Most hospitals lack prioritized access and staffs had insufficient knowledge and skills. Cooperation among the police, emergency medical operation team and the rapid psychiatric emergency team is need to be reinforced.

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Emergency Response Training Program for Theme Parks: Experiences of Taiwan

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Introduction: “Tailor-made” training programs have been started in two theme parks in North and East Taiwan after the dust explosion of Ba-xien theme park in 2015. The training programs emphasized several areas. They work to strengthen the incident command system (ICS) and the skills of first responders, especially evacuation, placement, triage, and first aid, as well as to assist the park’s cooperation with local disaster response units, such as the fire department and Health Bureau.

Methods: The first step was to find out the practical problems of the two theme parks, and then make a one-year, tailor-made training program according to the needs of parks and different levels of staff: senior supervisors, middle-level district supervisors, and frontline colleagues. After the phased training, the training results are inspected in the non-scripted exercise mode.

Results: It was found that the staff are relatively familiar with the evacuation process and placement of tourists. The initial

emergency responses such as triage, first aid skills, and patient transport gradually improve after several drills. The ICS operation and communication also became more effective and efficient. The regional emergency response units could understand these theme parks capability and how to cooperate with them.

Discussion: The experience of emergency response training and exercise in these two theme parks has shown that such a model is feasible and should be valued.

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Enhancing the Effectiveness of Disaster Simulations through Contemporary Simulation Design and Technology

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Introduction: Simulation is often employed to test mass casualty and disaster response planning within hospitals, but it is resource intensive and needs to achieve high-quality recreation of scenarios to be effective. The delivery of large-scale interdisciplinary team and system simulation requires consideration of physical safety, system integrity for real patients, simulation team communication, and effective dissemination of outcomes.

Aim: To describe challenges and potential solutions for effective delivery of disaster simulations, drawn from simulation service experience at Gold Coast Hospital and Health Service (GCHHS).

Methods: This case study reviews strategies used to deliver a large-scale multi-team in-hospital disaster and trauma simulation, involving more than 75 participants drawn from paramedic/ambulance, emergency, trauma service, anesthetics, perioperative, surgical, and hospital administrative teams.

Results: Issues reviewed include simulation delivery team composition and briefing, safety strategies, matching simulation methodology to exercise objectives, the use of real-time communications technologies and apps for real-time communication and performance tracking, and leveraging the simulation experience for observers by narrated Facetime stream. Following the simulation, a debriefing was conducted with participants to address performance, communication and interfaces, strengths and weaknesses, and overall opportunity for improvement. Facility-wide dissemination of messages through standardized reporting, infographics, and video vignettes were also reviewed.

Discussion: Simulation is an engaging way to assess protocols and practices for disaster response within a tertiary hospital, and effectiveness can be enhanced through the strategic use of contemporary techniques and technologies.

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Environmental Factors at Mass-Gathering Events: Considerations for Health Research and Evaluation

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Introduction: This poster will document the environmental domain variables of a mass gathering. They include factors such as the nature of the event, availability of drugs or alcohol, venue characteristics and meteorological factors.

Method: A systematic literature was used to develop a set of variables and evaluation regarding environmental factors that contribute to patient presentation rates.

Results: Findings were grouped pragmatically into factors of crowd attendance, crowd density, venue, type of event, mobility, and meteorological factors.

Discussion: This poster will outline a set of environmental variables for collecting data at mass gathering events. The authors have suggested that in addition to commonly used variables, air quality, wind speed, dew point, and precipitation could be considered as a data points to be added to the minimum standards for data collection.

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Establishment of Palliative and End-of-Life Care Services in Sri Lanka

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Introduction: Sri Lanka has a rapidly aging population with an exponential rise in chronic morbidity. There had been no parallel development of palliative and end-of-life care-specific approach in health care.

Aim: To implement sustainable palliative and end-of-life care services in Sri Lanka through the existing systems and resources by advocacy, collaboration, and professional commitment.

Methods: Sri Lanka Medical Association established a volunteer task force for palliative and end-of-life care (PCTF) in October 2016, which comprised of multi-disciplinary health care professionals, legal fraternity, and civil society. PCTF identified the need for sensitizing the general public on the importance of palliative care, for standard guidelines and formal training for practicing health care professionals engaged in hospital and community-based palliative care. These needs are addressed through activities of PCTF in collaboration with the Ministry of Health.

Results: Representing the National Steering Committee of Palliative Care, the members of the PCTF were instrumental in developing the National Strategic Framework to fill the major gap of affordable quality palliative care in the country. PCTF also published the “Palliative Care Manual for

Management of Non-Cancer Patients” as a preliminary guide for health care professionals. The draft document on the End-of-Life Care Guidelines has been formulated and is currently being reviewed by the relevant medical and legal stakeholders. PCTF has organized CME lectures on palliative care all over the country for health care professionals, and also conducted lectures, exhibitions, and mass media programs to sensitize the public on palliative care.

Discussion: Within a brief period, PCTF has played a key role to recognize palliative care by contributing to policy making, training, and public sensitization in palliative and end-of-life care in Sri Lanka.

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Establishment of Research Model on the Correlation Between Psychological Stress Intensity and Personality in Nursing Students Under Different Pressure Sources

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Introduction: In recent years, sudden disasters are occurring frequently, resulting in inestimable casualties and losses. Hence, knowing what personality traits are suitable for stressful works is of vital importance for selecting applicable nurses for disaster relief operation, and helping the nursing students to have a clearer career orientation when choosing the specialty direction. Stress response is divided into psychological response and physiological response. This study focused on the process of physiological response and evaluated the psychological stress intensity through monitoring physiological indexes related to the autonomic nervous system during the stress process.

Method: The experimental subjects were 16 nursing students. In the monitoring experiment, three kinds of pressures were set, including time limitation, threat assessment, and task-interference. The physiological indexes under the resting state of the experimental subjects were recorded as the resting period group (RT). Then, the nursing students performed the operation without setting the pressure condition, called the baseline period group (BL). The experimenter would record all important time nodes. The physiological indexes recorded under the three pressures were the time stress group (TS), the assessment stress group (AS), and the task-interference stress group (INS).

Results: There was no statistically significant difference in heart rate and skin temperature between RT and BL, but there was a statistically significant difference in skin resistance. The heart rate and skin temperature in the stress phase were significantly higher than those in RT and BL. According to the analysis of HRV, the difference between RT and BL has no statistical significance.

Discussion: Models can eliminate the interference of the operation itself to the recording of physiological signals. The time-stress condition caused a more psychological-stress response in nursing students than assessment and task interference. The pressure source was set up effectively and the stress model was established successfully.

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Evaluating Full-Scale Exercises to Optimize Patient Outcome in an Underground Mine

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Introduction: Major incident exercises are expensive to plan and execute, and often difficult to evaluate objectively. There is a need for a generic methodology for reporting results and experiences from major incidents so that data can be used for analysis, to compare results, exchange experiences, and for international collaboration in methodological development. Most protocols use data describing the incident hazards, pre-hospital and hospital resources available and alerted transport resources, and communication systems. However, the successful management of a rescue response during a major incident also demands a high level of command skills.

Aim: The aim of this study was to analyze the command and collaboration skills among the emergency service on-scene commanders and the mine director for safety and security during a full-scale major incident exercise in an underground mine.

Methods: The commander functions were observed during a full-scale major incident exercise. Audio and video observations and notes were analyzed using a study-specific scheme developed through a Delphi study, including inter-agency collaborative support and efforts of early life-saving interventions; relevant resources and equipment; and shared and communicated decisions about safety, situation awareness and medical guidelines for response. After the exercise additional interviews were made with those responsible for the command functions.

Results: Preliminary results indicate that most decisions were not taken in collaboration. Elaborated results will be presented at the conference.

Discussion: Command and collaboration skills can benefit from objective evaluations of full-scale major incident exercises to identify areas that must be improved to optimize patient outcome.

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Evaluation of Published Expedition Medical Resources Compared with Treatment Protocol Recommended Medical Resources for Injuries and Illnesses Encountered on Expeditions

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Introduction: People are increasingly embarking on expeditions into remote wilderness environments and subjecting themselves to increased medical risk. Medical provisions for the management of anticipated injuries and illnesses must be selected carefully due to financial and size and weight constraints on expeditions. Literature suggests decisions surrounding medical resource provisioning are rarely made using evidence-based methods.

Aim: The aim of this study was to evaluate the medical provisions taken on expeditions against the medical provisions

recommended as best practice in published treatment protocols for the management of conditions encountered on expeditions.

Methods: Firstly, a mixed methods study approach was used to develop a conceptual model linking injuries and illnesses with the medical resources (equipment and medications) recommended for their management. In the second part of the study, injuries and illnesses reported in four studies from the published literature were analyzed using the conceptual model.

Results: Expected medical resources for the injury and illness burden were compared to the medical resources included in published equipment and medication lists. It was found that medical resources taken on expeditions were both significantly under-equipped ($p < 0.01$) compared with the list of provisions recommended by the treatment protocols, but also included a range of resources that were not indicated as part of best practice.

Discussion: These findings suggest that unnecessary over-provisioning and under-provisioning risks are being assumed on expeditions. Further research supporting the development of a medical provision recommender system may provide a more evidence-informed method of matching medical resource requirements to anticipated injury and illness profiles on expeditions.

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Evidence for Residual Immunity to Smallpox After Vaccination

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Introduction: Smallpox has been eradicated, but advances in synthetic biology have increased the risk of its re-emergence. Residual immunity in individuals who were previously vaccinated may mitigate the impact of an outbreak, but there is a high degree of uncertainty regarding the duration and degree of residual immunity.

Methods: A systematic literature review using the PRISMA criteria was conducted to quantify the duration and extent of residual immunity to smallpox after vaccination. 29 papers related to quantifying residual immunity to smallpox after vaccination were identified.

Results: Duration of protection of >20 years was consistently shown in the 16 retrospective cross-sectional studies, while the lowest estimated duration of protection was 11.7 years among the modeling studies. Childhood vaccination conferred longer duration of protection than vaccination in adulthood. Multiple vaccinations did not appear to improve immunity. Most studies suggest a longer duration of residual immunity (at least 20 years) than assumed in smallpox guidelines. Estimates from modeling studies were less but still greater than the 3–10 years suggested by the WHO Committee on International Quarantine or US CDC guidelines. These recommendations were probably based on observations and studies conducted

while smallpox was endemic. The cut-off values for pre-existing antibody levels of $>1:20$ and $>1:32$ reported during the period of endemic smallpox circulation may not be relevant to the contemporary population but have been used as a threshold for identifying people with residual immunity in post-eradication era studies.

Discussion: Of the total antibodies produced in response to smallpox vaccination, neutralizing antibodies have shown to contribute significantly to immunological memory. Although the mechanism of immunological memory and boosting is unclear, revaccination is likely to result in a more robust response. There is a need to improve the evidence base for estimates on residual immunity to better inform planning and preparedness for re-emergent smallpox.

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An Evaluation of the Self-Reported Knowledge Base of Disaster Management Core Competencies of Australian Paramedics

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Introduction: Evidence-based training and curriculum are seen as vital in order to be successful in preparing paramedics for an effective disaster response. The creation of broadly recognized standard core competencies to support the development of disaster response education and training courses for general health care providers and specific health care professionals will help to ensure that medical personnel are truly prepared to care for victims of mass casualty events.

Aim: To identify current Australian operational paramedic's specific disaster management education and knowledge as it relates to disaster management core competencies identified throughout the literature and the frequency of measures/techniques which these paramedics use to maintain competency and currency.

Methods: Paramedics from all states of Australia were invited to complete an anonymous online survey. Two professional bodies distributed the survey via social media and a major ambulance service was surveyed via email.

Results: The study population includes 130 respondents who self-identified as a currently practicing Australian paramedic. Paramedics from all states except South Australia responded, with the majority coming from Queensland Ambulance Service ($N = 81\%$). In terms of experience, 81.54% of respondents report being qualified for greater than 5 years. Initial analysis shows that despite the extensive experience of the practitioners surveyed when asked to rate from high to low their level of knowledge of specific disaster management core competencies a number of gaps exist.

Discussion: Core competencies are a defined level of expertise that is essential or fundamental to a particular job, and serve to form the foundation of education, training, and practice for operational service delivery. While more research is needed, these results may help inform industry, government, and education providers to better understand and to more efficiently

provide education and ongoing training to paramedics who are responsible for the management of disaster within the Australian community.

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Evolution of United States Legislation to Facilitate Bystander Response to Opioid Overdose

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Introduction: Opioid overdose deaths in the United States are increasing. Time to restoration of ventilation is critical. Rapid bystander administration of opioid antidote (naloxone) is an effective interim response but is historically constrained by legal restrictions.

Aim: To review and contextualize development of legislation facilitating layperson administration of naloxone across the United States.

Methods: Publicly accessible databases (1,2) were searched for legislation relevant to naloxone administration between January 2001 and July 2017.

Results: All 51 jurisdictions implemented naloxone access laws between 2001 and 2017; 45 of these between 2012 and 2017. Nationwide mortality from opioid overdose increased from 3.3 per 100,000 population in 2001 to 13.3 in 2016, 42, and 35 jurisdictions enacted laws giving prescribers immunity from criminal prosecution, civil liability, and professional sanctions, respectively. 36, 41, and 35 jurisdictions implemented laws allowing dispensers immunity in the same domains. 38 and 46 jurisdictions gave laypeople administering naloxone immunity from criminal and civil liability. Forty-seven jurisdictions implemented laws allowing prescription of naloxone to third parties. All jurisdictions except Nebraska allowed pharmacists to dispense naloxone without a patient-specific prescription. Fifteen jurisdictions removed criminal liability for possession of non-prescribed naloxone. The 10 states with highest average rates of opioid overdose-related mortality had not legislated in a higher number of domains compared to the 10 lowest states and the average of all jurisdictions (3.4 vs 2.9 vs 2.7, respectively).

Discussion: Effective involvement of bystanders in early recognition and reversal of opioid overdose requires removal of legal deterrents to prescription, dispensing, distribution, and administration of naloxone. Jurisdictions have varied in degree and speed of creating this legal environment. Understanding the integration of legislation into epidemic response may inform the response to this and future public health crises.

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Expand the Understanding of Response Roles: Who Really is First on Scene

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Introduction: The US, as well as many countries, are being beseeched by more natural and man-made events; both small (e.g., shootings) and geographically vast (e.g., floods). Due to a myriad of issues, traditional first responders i.e., EMS, fire department, and police cannot be expected to be the only trained lifesavers on the scene. In the US (as in many countries), it is imperative to begin the discussion to better understand the role of the “injured” and “immediate” responders and how they interact with the “first” responders.

Aim: To open a discussion amongst disaster experts about the merits of training and subsequent promotion of a curriculum for “immediate” responders.

Methods: Literature review.

Discussion: After recent evaluations of events, it is postulated that there are three categories of responders: the injured, the immediate, and the first (EMS, fire department, police). The premise upon which disaster risk reduction and building community resilience are achieved begin with strengthening, empowering, and equipping local populations with the appropriate tools. This would involve education, skills, and training. With the average general public trained, and if they are one of the first two categories, then the community would not only be better able to assist themselves, but also be able to integrate into the recovery process much more quickly and fully. By doing this, they will be empowered to take care of themselves, neighbors, and community, which in turn increases local resilience.

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Experience of Activation of the J-SPEED(MDS) in Japan

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Introduction: The Emergency Medical Team (EMT) Strategic Advisory Group of the World Health Organization has endorsed the EMT Minimum Data Set (MDS) as the standard methodology for EMT daily report. The MDS had been developed on a similar methodology called J-SPEED which developed in Japan. Thus, lessons learned from the J-SPEED can be applied to the MDS.

Aim: To review previous J-SPEED activations and to extract lessons learned.

Methods: Cases of the J-SPEED activation at the Kumamoto earthquake in 2016, West Japan Heavy Rain in 2018, and Hokkaido Earthquake in 2018 were reviewed.

Results: The first large-scale activation of the J-SPEED at the Kumamoto earthquake revealed a significant burden in aggregations of submitted paper forms at the EMT Coordination Cell (EMTCC). To strengthen this function of the EMTCC, electronic system and human capacity development have been identified as key issues. To fulfill this gap, a smartphone app so-called J-SPEED+ has been developed. Also, the J-SPEED offsite analysis support team, which is a team to support analysis of data from outside of an affected area has been established. These two functions contributed to significant improvement of J-SPEED data flow at the West Japan Heavy Rain and Hokkaido Earthquake. These two responses reinforced the necessity of strengthening the capacity of J-SPEED onsite coordinator working at the ETMCC, and national education and training for all EMTs.

Discussion: In order to strengthen the mechanism to run the J-SPEED, nationwide training for all EMTs, onsite coordinators, and the off-site analysis support team have been established. The authors regard this structural approach as a requirement for other countries to run the MDS.

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The Experience of a Mass Casualty Incident Call in a Tertiary Hospital after the 2018 Hualien Earthquake

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Introduction: After a 6.0 magnitude earthquake struck Hualien on February 6, 2018, over one hundred and fifty patients crammed into the emergency department of a nearby tertiary hospital within two hours. The mass casualty incident (MCI) call was activated, and over 300 related personnel responded to the call and engaged with the MCI management.

Aim: This research aimed to analyze the practice of an MCI call and to form the strategies to improve its efficiency and effectiveness.

Methods: The research was conducted in a tertiary hospital in Hualien, Taiwan. Questionnaires regarding the practice of the MCI call were sent out to the healthcare providers in the emergency department who responded to that MCI operation.

Results: Thirty-seven responders in the emergency department were involved in this study. 78% had participated in training courses for hospital incident command system (HICS) or MCI management before this event. On arrival at the emergency department, 69.4% of the responders were aware of the check-in station and received a clear task assignment and briefing. During the operation, 25.7% reported the lack of confidence carrying out the assigned tasks and 54.1% of the participants experienced great stress (stress score over 7 out of 10).

Discussion: MCI is an uncommon event for hospital management. It is universally challenging owing to its unpredictable and time-sensitive nature. Furthermore, the administration could be further complicated by the associated disasters. Despite regular exercises and drills, there are still a significant number of participants experiencing stress and confusion during the operation. The chaotic situation may further compromise the performance of the participants. This study showed that optimizing task briefing and on-site directions may improve the performance of the MCI participants.

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The Experience of Using Informational Systems to Improve the ACLS Process Optimization in the Emergency Department

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Introduction: The best first-aid treatment for cardiac arrest patients is Advanced Cardiac Life Support (ACLS) to not only hope to save lives but to also leave minimal sequelae. The American Heart Association (AHA) published updated ACLS guidelines for care in 2015 emphasizing the concept of teamwork in resuscitation. However, the actual use of ACLS is not easy due to stress and unfamiliarity with the process.

Aim: Therefore, we want to use the information technology to assist the medical team to implement the ACLS process. This information system can help us to save time and labor, as well as increase precision. In addition to this, data analysis is more convenient, which facilitates the management and supervision of resuscitation quality.

Methods: An information system was developed using responsive web design (RWD) website. It can be used on a variety of devices, such as desktops, tablets, or mobile phones, and can be updated simultaneously. The system requires non-synchronous operation to be used in a wireless network environment. When the information system is in operation, the medical personnel can perform the resuscitation actions according to voice prompts, which can periodically remind staff to check rhythm, give correct medication dose, and identify whether defibrillation shock is needed. At the same time, the entire process can be recorded instantly. After the file is uploaded, the medical records are complete at the same time.

Results: After 3 months, the satisfaction of medical staff reached 80.3%, the rate of return of spontaneous circulation (ROSC) of OHCA cases elevated to 45% from 15%, and discharge without neurological sequelae elevated to 33% from 27.4%.

Discussion: All hospital staff can use this system to assist in the correct implementation of advanced CPR. It improves the quality of resuscitation and reduces the burden on clinical and writing medical records of medical staff.

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Exploring the Utilization of Small Unmanned Aerial Vehicles (UAV) Known as Drones in Early Phase Disaster Response

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Introduction: Disaster Medical Response is a challenging field where opportunities for advancement are welcomed. Small Unmanned Aerial Vehicle (sUAV) technology (i.e., drones) has made enormous strides in the past few years and is poised for utilization in the early disaster response phase.

Aim: To discuss current uses of UAVs, proposed utilization and logistical details, technological advancements, current deficits, and training.

Methods: Our Foundation, Luman Medical, is working in the field of UAV integration for small to large scale disaster response. The concept is to equip first responders with small, relatively inexpensive, programmable drones that come equipped with hardware and software that are easy to use for inexperienced as well as skilled sUAV pilots.

Discussion: These UAVs could increase ease and speed of deployment for early assessments of disaster area mapping, thermal imaging, ingress and egress routes, the discovery of survivors, communications, and delivery of supplies. Drone technology offers a new and growing type of tool in the disaster response arena. It is our hope to explore an integration that is easy, safe, and affordable to augment and enhance existing disaster response planning.

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First Aid Management of Hypothermia and Cold Injuries

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Introduction: Best practice first aid management of accidental hypothermia and cold injuries in the prehospital setting is relevant for disaster management in cold environments as well as for wilderness and expedition medicine, and space medicine. In the Australasian context, guidance is currently taken from the Australian Resuscitation Council (“ARC”) Guidelines dealing with these issues.

Aim: To review and update the recommendations of the ARC Guideline 9.3.3 Hypothermia: First-Aid Management (February 2009) and ARC Guideline 9.3.6 Cold Injury (March 2000).

Method: The review is being undertaken through a combination of a focused literature review and expert opinion. Through the author’s membership of the International Commission for Alpine Rescue (“ICAR”) Alpine Emergency Medicine Commission, two northern-hemisphere experts on hypothermia

have reviewed the guidelines and provided commentary and recommendations.

Results: Much of the literature around accidental hypothermia and cold injuries (including frostbite, frostnip, and chilblains), relies on expert opinion and case studies. There are relatively few randomized controlled trials, and these are often confined to the laboratory setting. As a result, there is a heavier reliance on expert opinion than in any other areas of medicine.

Discussion: This presentation will summarize the current best practice recommendations for the first aid management of accidental hypothermia and cold injuries through combining the existing ARC Guidelines with key advances identified through the literature review, and the key management recommendations stemming from expert opinion. This will provide attendees with a cohesive set of clinical practice recommendations which can be used in the field.

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Focused Ultrasound: Applications and Implications for Education

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Introduction: Focused or point of care ultrasound applications have been integrated into prehospital assessments, triage capacities, military applications, trauma, and emergency health care settings, and medical school curriculums. Often, the inclusion of focused ultrasound is to answer specific clinical questions. However, the value is ultimately determined by the experience, skills, and training of the operator performing and interpreting the examination. Ultrasound was reserved for traditional imaging providers as little as two decades ago. However, as the application of ultrasound expands within clinical medicine, there is an increasing necessity for associated education and training.

Aim: To highlight the applications and uses of focused ultrasound in the current diverse health care landscape while identifying the associated educational considerations, including the undergraduate tertiary education sector.

Methods: A search of peer-reviewed published literature was undertaken to determine the range of current usage of ultrasound imaging across professions, and to identify the education and training available.

Results: The results discussed within this presentation will highlight identified trends, ultrasound applications, educational considerations, and potential future practices based on the content of the literature explored.

Discussion: Technology is rapidly advancing in the field of medical ultrasound with handheld ultrasound scanners now smaller, less expensive, and more accessible than ever before. Paralleled with these advances and the more generous use of ultrasound come the expectation and pressures of competent skill diversity among healthcare staff and specialists. Significantly, sonography is still considered by many as the most technically demanding and operator dependent medical

imaging modality available. Therefore, as the application of ultrasound expands within clinical medicine, educational considerations must also align with this expansion to maintain diagnostic accuracy. This means an increasing demand for associated education and training, including in the undergraduate tertiary education sector.

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From Yokohama, Hyogo, and Sendai to the World: The Global Legacy of Kobe

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Introduction: The Hyogo and Sendai Frameworks for Disaster Reduction are well known and have been influential globally. However, less is known of their broader contexts.

Aim: A recent opportunity to visit Kobe, Japan, provided an opportunity to experience the rich, and largely unknown tapestry behind the scenes of the Hyogo and Sendai Frameworks. This paper aims to illuminate the journey of the Kobe Legacy and its global influence.

Methods: An experiential visit to Kobe and exploring its rich resources relating to disaster risk reduction.

Results: The First World Conference on Natural Disasters, was held in Yokohama, Japan, in 1994. Almost immediately, Kobe experienced the Great Hanshin Earthquake, January 17, 1995, resulting in 6,434 dead, 43,792 injured, and 249,180 homes damaged. The United Nations International Strategy for Disaster Reduction (2000 – 2005) culminated in the Second World Conference on Disaster Reduction, Kobe, 2005 and the Hyogo Framework for Action 2005 – 2015. The Great East Japan Earthquake occurred on March 11, 2011, with 18,453 dead or missing, 6157 injured, 1.1M homes damaged, with a tsunami and nuclear accidents. The Third World Conference on Disaster Risk Reduction followed in Sendai in 2015 with the Sendai Framework for Disaster Risk Reduction 2015 – 2030 agreed on. Subsequently, the Sendai Framework has further evolved. However, behind the scenes, Kobe has developed a rich tapestry of insightful and valuable resources which will be outlined in this presentation.

Discussion: In the words of the Mayor of Kobe, Mr. Tatsuo Yada in 2010, “I would like to reaffirm my determination to never allow our experiences of the disaster to fade away. It is our responsibility to make the utmost effort for disaster prevention and mitigation and keep passing on our experiences and the lessons learned to future generations”. This is the real legacy of Kobe.

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Gender-Based Violence After A Natural Disaster

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Introduction: Gender-based violence is endemic across the world. The current evidence suggests that gender-based violence increases after natural disasters. Factors leading to this increase following

natural disasters include physical displacement, loss of community supports and protections, economic hardship, and gendered differences in coping. Multiple agencies are mobilized in response to natural disasters, however, personnel are often not adequately trained to recognize or address gender-based violence.

Aim: To identify challenges faced by disaster responders in recognizing and responding to gender-based violence in disaster settings, and to advocate for gender-sensitive training prior to deployment by responding personnel.

Methods: The world’s literature was reviewed to identify challenges for disaster teams in recognizing and responding to gender-based violence, and to identify principles of training which may be applicable for pre-deployment competency building by disaster response personnel

Results:

Disaster response programs should ensure:

- Collection of data to identify vulnerable populations
- Establishment of procedures for monitoring and reporting
- Inclusion of female staff at all levels of planning and response
- Implementation of holistic services including physical and psychosocial care and legal response
- Safety in designing accommodations and distribution centers

Pre-Deployment training should include:

- Gender-sensitive approach, knowledge of prevalence and impact of gender-based violence
- Familiarity with behaviors and conditions associated with gender-based violence
- Non-judgmental, supportive, and validating approach to inquiry and response
- Familiarity with risk assessment tools
- Mobilization of social supports
- Knowledge of resources, including medical and legal services

Discussion: Natural disasters are destabilizing events which expose vulnerable populations, particularly women, to increased violence. Disaster response teams should be adequately trained on the prevalence and impact of gender-based violence to ensure gender-sensitive interventions. Standard training of response personnel can ensure adequate identification of victims of gender-based violence and referral to appropriate services.

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Happy New Year! Do New Year’s Eve Festivities Influence the Workload of the Emergency Department of an Urban Hospital?

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Introduction: Bruges is the largest city in the province of West-Flanders in Belgium. Because of its ample canals, it is sometimes referred to as “Venice of the North.” As such, it is

a major tourist destination, and during New Year's Eve, there are many festivities. The AZ Sint-Jan is the largest hospital providing medical care to the area.

Aim: To examine the impact of the New Year's Eve festivities on the workload of the emergency department of AZ Sint-Jan.

Methods: Data was analyzed for every patient presenting to the emergency department from the 31st of December starting from 06:00 PM until the 1st of January 08:00 AM from 2009 until 2018. The time of entry, type of injury, gender, age, and whether the patient was intoxicated were evaluated. Ten other dates in this time period were obtained for comparison via a random date generator. Data were analyzed using Jasp®.

Results: There were 826 patients included for analysis. On average, 41 patients presented themselves to the emergency department on New Year's Eve between 06:00 PM and 08:00 AM. On a random day, there were only 31 patients. Most of the patients on New Year's Eve arrived between 00:00 AM and 08:00 AM. 57% of all patients were male. 22% of all patients were intoxicated with alcohol. From 00:00 AM until 08:00 AM, one in three patients were intoxicated. The average age on admission was 36 years.

Discussion: During New Year's Eve there is a consistently higher workload in the emergency department. There is an influx of young males who are intoxicated. These patients tend to stay a long time to "sleep it off" and put considerable stress on the available resources. More attention should be given to risk mitigation strategies tailored to this group to prevent excessive drinking.

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Health Care Provision during a Sporting Mass Gathering: A Structure and Process Description of On-Site Care Delivery

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Introduction: During mass gatherings, such as marathons, the provision of timely access to health care services is required for the mass gathering population as well as the local community. However, effective provision of health care during sporting mass gatherings is not well understood.

Aim: To describe the structures and processes developed for an emergency team to operate an in-event acute health care facility during one of the largest mass sporting participation events in the southern hemisphere, the Gold Coast marathon.

Methods: A pragmatic qualitative methodology was used to describe the structures and processes required to operate an

in-event acute health care facility providing services for marathon runners and spectators. Content analysis from 12 semi-structured interviews with Emergency Department (ED) clinical staff working during the two-day event was undertaken in 2016.

Results: Structural elements that underpinned the in-event health care facility included: physical spaces such as the clinical zones in the marathon health tent, tent access, and egress points; and resources such as bilingual staff, senior medical staff, and equipment such as electrocardiograms. Critical processes included: clear communication pathways, interprofessional care coordination, and engagement involving shared knowledge of and access to resources. Distinct but overlapping clinical scope between nurses and doctors was also noted as important for timely care provision and appropriate case management. Staff outlined many perceived benefits and opportunities of in-event health care delivery including ED avoidance and disaster training.

Discussion: This in-event model of emergency care delivery enabled acute out-of-hospital health care to be delivered in a portable and transportable facility. Clinical staff reported satisfaction with their ability to provide a meaningful contribution to hospital avoidance and to the local community. With the number of sporting mass gatherings increasing, this temporary, in-event model of health care provision is one option for event and health care planners to consider.

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Health Needs Assessment in Disasters by Emergency Medical Teams in the ASEAN Region

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Introduction: Japan International Cooperation Agency has started the project for strengthening the ASEAN regional capacity on disaster health management (ARCH Project) since 2016. This project conducted the start-up regional collaboration drill in ASEAN. All participants from ASEAN countries realized the need for a standardized assessment tool. Several UN agencies and international organizations launched assessment tools, but there is no standard assessment tool.

Aim: To develop an integrated rapid health needs assessment (HNA) tool in the ASEAN region. This paper reports the development process of the HNA tool.

Methods: The project established the project working group (PWG) to developing some tools. PWG consisted of the expert team, project team, Japanese Advisory group and twenty delegates from ten ASEAN member states. PWG established the cycle of the developing process of the HNA tool.

Results: We created a health needs assessment form and a summary form. The assessment form consists of (1) Informant information, (2) Site information, (3) Overall situation of the site, (4) Public health, (5) Health facility damage. The summary form consists of (1) Informant information, (2) Site information, (3) Critical areas for support, (4) Situation of the site.

Discussion: Frequently, the public health emergency operation center in an affected country is not able to obtain the critical information of an affected area in the acute phase of disasters. This HNA tool would be used in the acute phase by the Emergency Medical Teams (EMTs) because the EMT has mobility and workforce for assisting the affected country. We have agreed on the usage of the assessment form as a kind of an “interview guide”. The purpose of this assessment form is to assess a disaster situation. The next step will be to provide more opportunities for the ASEAN member states to use and learn more about this HNA form.

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HESPER SW: A Web-Based Tool to Assess Needs

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Introduction: The Humanitarian Emergency Settings Perceived Needs Scale (HESPER) evaluates experienced needs among disaster-affected populations and has been frequently used in both humanitarian emergencies and research. Today, the use of this tool is increasing among people affected by crises and emergencies. Web-based methods have shown to reduce several methodological and practical challenges in disaster health research.

Aim: This project aims to develop and evaluate HESPER SW (a self-administered, web-based version of the HESPER scale).

Methods: Alternative reliability and test-retest validity of HESPER SW were evaluated using different analytic statistical methods.

Results: The first analysis suggests that HESPER SW is a reliable and valid instrument which is easy to use and that it reduces several methodological and practical challenges in disaster health research.

Discussion: HESPER SW can be used both for humanitarian and research purposes and offers a quick, self-administered, web-based, and scientifically robust way to investigate experienced needs in populations affected by disasters or humanitarian crises.

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The HOPE Model for Disaster Nursing

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Introduction: Despite a large number of nurses involved in disaster situations in different ways, there are few theories or models that define and describe the goal and content of disaster nursing.

Aim: This study aimed to present a model for disaster nursing, based on a literature review of the concept and content of disaster nursing.

Methods: A systematic literature review of 15 original qualitative or quantitative articles was conducted. A thematic synthesis was used to analyze the data.

Results: The main theme of Disaster Nursing: Crossing Borders, included three dimensions (personal borders, professional borders and environmental borders) and four themes describing the process of disaster nursing (being hit by reality; adapting to the conditions; providing aid, relief, and caring; recovering, remembering, and growing). Based on these results the HOPE model was developed. ‘HOPE’ stands for ‘Holistic health assessment and promotion; Organization and management of immediate response; Professional adaptation; Endurance and recovery.

Discussion: The HOPE model for disaster nursing describes the core element and essence of nursing in the disaster response phase and can serve as guidance both for nurses deployed in disasters and in disaster nursing training.

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Hospital C.O.D.E (Clinical, Operational, Disaster, and Emergency) Terminology

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Introduction: Healthcare facilities frequently use disaster codes as a way to communicate with employees that an emergency or incident is occurring. As increasing numbers of providers work at multiple facilities, and healthcare systems continue to build disaster response teams and protocols covering multiple facilities, standardization of disaster code terminology is critical. A lack of consistency in terminology can potentially have a devastating impact on the understanding and response of visiting or relief staff.

Aim: To evaluate the level of standardization in terminology of disaster codes in healthcare facilities.

Methods: A convenience sample was taken from a private Facebook™ group consisting of emergency department nurses from a wide range of facilities. The Facebook™ group was asked to share their hospital disaster codes. Of the 40,179 total members, 78 commented, including 55 photos of quick reference badges, and the rest were descriptions/lists of codes. One badge was excluded due to a blurry photograph. Results were collated and analyzed for trends and standardization.

Results: The most common codes were, “Code Red” for fire (72.7%), “Code Blue” for cardiac arrest (44.9%), “Code Silver” for active shooter/weapons event (37.7%) and “Code Orange” for hazardous materials (33.8%). There were 168 instances of a code term being associated with a particular event by five or fewer facilities. Two facilities used numeric systems, with 11 using plain language descriptions.

Discussion: Disaster code language is inconsistent. Few of the codes were consistently assigned to the same meaning, and none were universal. Color coding was the most common method, but there was little consistency even within color code systems. Additionally, some facilities used a combination of colors, numbers, terms, and plain language. Healthcare facilities should embrace standard terminology and create a consistent language for disaster codes to enhance response capabilities and medical security.

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How Antibiotic Resistance Impacts Responses to Public Health Emergencies and Strategies to Mitigate the Impacts

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Introduction: Antibiotic resistance is when bacteria change and adapt in response to antibiotics, becoming able to defeat these drugs when used to treat infections. A direct consequence of this adaptation is an increased difficulty in treating multiple diseases. Because of increased antibiotic resistance, the World Health Organization has declared it a significant threat to public health.

Aim: One frequent consequence of natural disasters is infections, as seen in the December 2004 Indian Ocean tsunami. Survivors sustained a variety of wound infections that ranged from common pathogens to rarely seen organisms including fungi.

Methods: This research analyzes the microbiology observed in wound infections associated with exposure to freshwater, seawater, soil, fecal, and other contamination after Hurricane Harvey in 2017 and Hurricane Florence in 2018.

Discussion: Therapies for infections will also be discussed in addition to how the utilization of rapid detection technology for antimicrobial resistance and correct treatments require antimicrobial susceptibility knowledge to improve health outcomes, lower economic costs, prevent further spread of multi-drug resistant outbreaks and assist with antimicrobial stewardship.

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How to Shorten the Rescue Time in Marathon by Using BLE Communication Devices: A New Study for the EMS System in Taiwan

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Introduction: More than one million runners have joined the marathon games since 2007 in Taiwan. There were over 150 marathon games held in Taiwan in 2018. The increase rate

was 21% as compared to that of 2014. The medical encounter rate was 1.33% in 2015 and increased to 1.41% in 2017. The most common type of injury was muscle spasm. The second most common was abrasion due to falls. The treatment for muscle spasm was RICE only. Cardiac arrest of marathon runners was reported occasionally and time is critical for rescue.

Aim: To shorten the rescue time of the runners in an emergency. Base on the prodromal research, BLE communication technology is further used to improve the rescue positioning communication technology in the marathon.

Methods: After rescue notification devices have been set up in each 0.5 km on the runway of the marathon, the runner can send a rescue signal through the rescue notification devices in case of emergency. The rescue signal, periodically advertisement SN# with rescue mark, of the runner can be precisely located and the rescue can be started very soon.

Results: In the simulation, the rescue signal can be located in 7.5 minutes, fastest in 3 seconds. The precision rate of timing is $\pm 160\text{ms}/6\sigma$ that under IAAF accuracy requirement. The location error is less than 20 meters, and the rescue time can be shortened to one half as before.

Discussion: The rescue time of runner is correlated with the quality of marathon EMS. It is critical to the runner, especially in cardiac arrest. By using BLE communication devices, the runner can be located faster and more precisely. As rescue time shortened, CPR & AED can be given sooner. The quality of marathon EMS will be improved substantially.

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The Human Disaster and the Urgency of the Intersertorial Join Between Public Social Policies: Lives that are Lost and Stories that Repeat Themselves

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Introduction: The human disaster is a permanent challenge for the Brazilian government because the difficulties faced are related to the lack of interface between public policies, resulting in fragile analyses of risk and non-prevention, being that annually several Brazilian lives are lost in disasters that continue to happen.

Aim: The article is the result of research and presents the analyses of health policy, actions, and programs developed to anticipate the fire victims of the Nightclub Kiss concert hall that took place in 2013 (Santa Maria, Brazil). The objective was to investigate and analyze the disasters and human disasters, especially the fire of Nightclub Kiss when 242 young people died. Causes and determinants were analyzed in order to subsidize public policies, in particular, the health policy.

Methods: A qualitative case study supported by the critical dialectic method with semi-structured interviews, focus group, documentary analysis, and bibliographic review.

Results: The experiences accumulated throughout history show that disaster situations require public policies to be able to act readily, resolve, and pay attention to the needs of the population involved. Disasters are increasingly recurrent episodes and

generate deep social consequences that mark human life. Managing a human disaster remains a challenge for the health policy in Brazil. The difficulties faced are related to the lack of interface with other public policies. The urgency to incorporate intervention/action strategies into health plans is important. Implementation of prevention and training programs, and adopting strategies and protocols for the whole network of attention is critical.

Discussion: It is important to emphasize the importance of broadening the theoretical definitions by overcoming the divergences of the concepts adopted between the theoretical and operational field, by elaborating a review of the Brazilian legislation in order to broaden and contemplate the needs of different people.

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Human Factor and Disasters: Possible Equations

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Introduction: This research starts from the assumption that work accidents, in addition to fortuitous or individual phenomena, imply social and organizational factors, and highlights the social character of the production of the accident at work. For this reason, this study investigates the living conditions and the ways of workers in the oil and gas industry in Brazil.

Aim: To analyze the human factors in the relationship with work accidents on oil platforms from the social dimensions.

Methods: It is qualitative research and it has as instruments of collection the focal group and individual interviews with workers and managers of the platforms, participant observation, and documentary analysis.

Results: The research is still being carried out, but some reflections are possible so far: accidents at work depend on the direct or indirect relationship of workers with the work process itself, the modalities of production of work, and management of work. Possible causes underlying the accident are the quality of life and the conceptions of health and safety. Associated with it are social constructs and the multifactorial causes of occupational accidents including the relations between acts and unsafe conditions.

Discussion: The increase in outsourcing and the decrease in training quality, as well as the prioritization of production, targets the detriment of meeting safety criteria. There is a need to reassess labor management, safety policies, and outsourcing processes. Lack of awareness of the proper use of safety equipment and the organization of the work environment are major causes of work-related accidents. The human factor focuses on the individual, group, organizational, and social dimensions in complex interactions. The identification of social processes between working groups in empirical reality, the influence of elements of culture, organizational management, and their impacts on relations and on safe work performance allows an understanding of social risks.

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Identification of Preventable Death and Severe Complications in Train Crashes in Rural and Cold Environment Using a Simulation-Based Model

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Introduction: The use of rail transport is increasing in Sweden, as well as within Europe, and train speeds are escalating. These factors contribute to an increasing frequency of train crashes and major crashes so severe that they can be classified as disasters. There is a lack of knowledge concerning factors of importance related to the rescue operation that can influence survival rate at train crashes, especially in cold environments.

Aim: The aim was to identify preventable death and severe complications among passengers in a train crash in rural and cold environments using a simulation-based model.

Methods: A train crash scenario was developed based on scientific research, crash reports, and lessons observed in incidents. The scenario was set to a train with seven carriages consisting of 150 passengers that derailed in a curve in 160km/h, 10km from the hospital. In Umeå in the north of Sweden, 12 participants from seven emergency/disaster organizations joined in two preparing workshops and a real-time simulation-based train crash. The Emergo Train System (ETS) was chosen as a simulation tool. Data collection such as rescue capacities, response time, and patient surge were collected and transferred into the ETS.

Results: The results show 17 preventable death and 9 preventable severe complications since the actions were not implemented in the recommended time.

Discussion: The results show that an extended rescue operation can have devastating consequences especially in cold environments. Further experimental simulations are needed with defined interventions to find out how preventable deaths and severe complications can be reduced.

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Immunization Readiness of a Deploying Emergency Medical Team

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Introduction: It is a requirement for a World Health Organization verified Emergency Medical Team (EMT) that all members be immunized against common diseases in the deploying region. Most jurisdictions use private suppliers such as travel doctors for immunization services. When a deployment is announced, members are nominated by their jurisdiction under the condition they are fully immunized. It is up to the individual to monitor their immunization status.

Aim: To determine how many members nominated for deployment were fully immunized.

Methods: Nominated members sent their completed vaccination record to a central location for assessment of their immunization status. The following data were recorded: vaccination

status, last-minute booster doses required, and the number of emails sent by the assessor in processing the records. The number of phone calls made and received were not recorded.

Results: To complete the skills matrix for a field hospital containing an emergency department and operating theater (an EMT type 2), 61 members were nominated. At the time of assessment, 32 (52%) were fully immunized, requiring no further booster doses (vaccinations or serology tests). Three members were removed from the deployment as they were not fully immunized. Last-minute booster doses were required by 27 (44%) members, with a total of 74 booster doses administered (range 0-5). 19 of the booster doses administered were immunizations required to work in any health facility in Australia. The most common vaccines requiring booster doses were rabies (n=21) and typhoid (n=15). 58 emails were sent over a period of 5 days to 24 members to clarify vaccination status.

Discussion: This deployment highlighted a gap in members' perception of their immunization status, leading to delays in deployment readiness for the team. A new electronic system where vaccine status tracking occurs in real time should address this issue.

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The Impact of the New European Union General Data Protection Regulation (GDPR) on Data Collection at Mass Gatherings

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Introduction: As of May 2018, a new European privacy law called the General Data Protection Regulation (GDPR) is in order. With this law, every organization operating in the European Union (EU), needs to adhere to a strict set of rules concerning collection and processing of personal data.

Aim: To explore the consequences of the GDPR for data collection at mass gatherings in the European Union.

Methods: Since the law was published on April 27, 2016, a thorough reading of the law was conducted by 4 persons with a background in mass gathering health. The GDPR consists of 99 articles organized into 11 chapters. There are also 173 recitals to further explain certain ambiguities. Key articles and recitals relating to healthcare and scientific research were identified. Possible pitfalls and opportunities for data collection and processing at mass gatherings were noted.

Discussion: Under article 4, key definitions are noted. There is a clear definition of "data concerning health". According to the GDPR, health data is a special category of personal data which should not be processed according to article 9(1). However, there is an exception for scientific research (article 9(2)(j)). There are a few safeguards in place, as laid out in article 89. One interesting point is that according to article 89(2), certain derogations can take place if the law interferes with scientific research. The GDPR has major consequences for data collection and processing in the EU. However, with the use of certain safeguards (e.g.,

pseudonymization) there are still ample opportunities for scientific research. It is important to review one's method of data collection to make sure it complies with the GDPR.

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Impact Scale for the Continuity of Care in Contingency Management Situations - Operationalization of the Crisis Standards of Care

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Introduction: A common language is needed to compare the impacts of incidents, crises, and disasters among health care coalition members, such as emergency medical services, general practitioners, and hospitals. A generic impact scale was developed, based on the Crisis Standards of Care, and was put to the test during the 2017 and 2018 winter/flu-seasons.

Aim: To define an impact scale for the quantitative assessment of the hospital response to incidents, crises, and disasters.

Methods: An impact scale has to be generally applicable to be useful in the context of a health care coalition. It should be applicable to all hazards and all parties in proactive and reactive, real-time settings. In addition, the scale should be easy to understand and score and should be independent of the various information systems in use. The Crisis Standards of Care were chosen as basis and were operationalized in a seven-point Likert-scale for expert-based scoring: "No impact," "Buffer capacity needed," "Buffer capacity sufficient," "Unusual adaptations to care needed," "Unusual adaptations sufficient," "Disturbance of continuity of care inevitable without external assistance," and "Disturbance of continuity of care inevitable."

Results: During the 2017 and 2018 winter/flu-seasons, crisis managers of ten hospitals scored the scale almost daily for three months. This served as a regional monitor and created the possibility to distribute patients and resources more evenly over the hospitals and with the care sector.

Discussion: The impact scale improved communication and mutual understanding between hospitals and with other health care organizations, and is expected to have helped in maintaining the continuity of care during the 2017 and 2018 winter/flu-seasons. More research is needed on the reliability of the response. Nevertheless, the scale has since become an integral part of the regional contingency planning.

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Implementing Guidelines for Ambulance Services

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Introduction: If there is consensus about how to handle a patient with a specific condition, from the ambulance service point of view, it matters less for the patient which ambulance arrives to take care of the patient. Guidelines are a way of standardizing treatment or management of the patient for a given patient condition. Clear and implemented guidelines that promote the handling of the patients is done from best practice and are evidence-based according to the best ability of the organization.

Aim: The aim of the current study was to implement guidelines into an organization that was not currently using guidelines. The study was conducted as a collaborative effort between a Swedish pre-hospital training organization and the local ambulance service organization in Kosovo.

Methods: An iterative process of implementing the guidelines was applied:

1. Identify guidelines appropriate for the local organization. For each iteration, five guidelines are chosen.
2. Have the five guidelines translated into Albanian.
3. The guidelines are adapted to local conditions and context.
4. The five guidelines are approved by an expert group.
5. The five guidelines are implemented in the organization.

Results: The initial iteration included was carried out in the form of a workshop where 22 persons (doctors and nurses) from the local ambulance service in Kosovo participated. During the workshop, the first three implementation steps were taken, while remaining steps were carried out by the local organization.

Discussion: With the local management and ambulance personnel involved throughout the process, the implementation of guidelines were delivered in a more feasible way as well as more easily accepted and adhered to. Supporting a standardized treatment or management of the patient will benefit future patients. These standards should be based in evidence-based practice adopted to local conditions.

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Improving Emergency Preparedness among Children with Special Health Care Needs in a Pediatric Infant Disease Clinic

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Introduction: Children with Special Health Care Needs (CSHCNs) are at an increased risk for physical, developmental, or emotional conditions, and require special services beyond what is typically required by children. Improving emergency preparedness amongst families with CSHCNs has been advocated by the Centers for Disease Control (CDC), Federal Emergency Management Agency (FEMA), and The American Academy of Pediatrics (AAP).

Aim: We evaluated the preparedness of children and family members, who are infected, or affected, by HIV illness and require daily medications.

Methods: A convenience sample was used to enroll patients and their parents at a pediatric infectious disease clinic. Surveys were used to assess baseline emergency preparedness. Patients were then given an educational intervention on improving personal preparedness. Participants were provided with emergency go-kit and educational materials. Follow up was completed in 30 days to re-assess preparedness by re-administering the initial survey with additional questions.

Results: Thirty-eight patients were enrolled and 10 were lost to follow up. Data from a total of 28 patients were used for study results analyses. Chi-squared testing was used for non-parametric variable analyses for an $N < 30$. Participants who designated an emergency meeting place outside of their home, post-intervention, were statistically significant-X² (1) = 29.20, p-value <0.0001. Participants who completed an emergency information form, post-intervention, were statistically significant-X² (1) = 13.69, p-value <0.0002. Participants who obtained an emergency kit of supplies for 3 days, post-intervention, were statistically significant-X²(1) = 8.92, p-value <0.0028. Participants who obtained a home first aid kit, post-intervention, were statistically significant-X²(1) = 12.16, p-value <0.0005. Five families obtained an emergency supply of medications, post-intervention-X² (1) = 1.99, p-value = 0.1582. This result was not statistically significant.

Discussion: This study demonstrates that brief educational intervention has potential to improve the preparedness of CSHCNs, including those living with HIV illness.

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The Incidence of Post-Traumatic Stress Disorder Among Healthcare Providers After the 2018 Taiwan Hualien Earthquake

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Introduction: On February 6, 2018, a magnitude 6.2 earthquake struck Hualien, Taiwan. Over 150 patients crammed into the emergency department of nearby hospitals within two hours. Mass casualty incident (MCI) management was activated. During the recovery phase, little attention was paid to the mental health of hospital staff.

Aim: To analyze the prevalence of post-traumatic stress disorder (PTSD) among healthcare providers (HCPs) and explore the possible risk factors.

Methods: 63 HCPs in the emergency department of the single tertiary hospital near the epicenter were included. The Chinese version of the Davidson Trauma Scale (DTS-C) was used to evaluate the prevalence of PTSD. Questionnaires were sent to explore the possible contributing factors.

Results: The average age of the HCPs was 32.7 years (30.3 years for nurses; 40.4 years for physicians). The prevalence of PTSD was 3.2% eight months after the incident. The mean DTS-C score was 8.9/136. Nurses had a higher score than physicians (10.8 and 4.7). HCPs with 6-10 years working experience had the highest score (14.2), while those with less than 3 years experience had the lowest (4.8).

Discussion: We found HCPs had a lower prevalence of PTSD compared with earthquake survivors (Chou 2007), and physicians had longer working years and lower DTS-C scores. The professional training may help HCPs going through psychological impacts during the disaster. HCPs with 6-10 years of experience in the emergency department were found to have a higher risk of developing PTSD. Most of them were taking the responsibility of a team leader during the MCI, which may cause significant stress to these staff. Adequate training regarding MCI management could help to relieve tension and frustration, hoping to prevent the development of PTSD. Based on our study, PTSD among HCPs is an ignored issue, and we should follow-up HCPs' psychological condition in the future.

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Incident Command Adaptations during Sustained Mega-Shelter Medical Clinic Operations during 2017 Hurricane Harvey Response in Dallas, Texas

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Introduction: The Dallas Convention Center received over 3800 evacuees because of the unprecedented flooding caused by Hurricane Harvey. A multidisciplinary medical clinic was established onsite to address evacuee needs for medical evaluations, emergency care, chronic disease management, pharmaceuticals, durable medical equipment, and local health services integration. To operate efficiently, the Dallas Mega-Shelter Emergency Operations Center (EOC) worked with the Mega-Shelter Medical Clinic (MMC) under a fluid incident command (IC) structure that was National Incident Management System (NIMS) compliant. Iterations of MMC IC demonstrated maturations in organizational structure while supporting MMC operations that varied from rigid NIMS doctrine.

Aim: To explore the use of a fluid IC structure at a large evacuation medical shelter after Hurricane Harvey.

Methods: We observed evolutions of IC organizational charts and operational impacts.

Results: Modifications through just-in-time iterations of the IC organizational chart were posted and reviewed with MMC IC and EOC sector chiefs. Changes in the organizational chart were noted to improve identification of logistical needs, supply delivery, coordinate with other agencies, and to make decisions for resource typing and personnel utilization. Adaptations also improved communication, which led to timely situational awareness and reporting accuracy.

Discussion: MMC medical services were improved by allowing modifications and adaptations to NIMS compliant MMC IC organizational roles and duty assignments. The fluidity of IC structure with ability for just-in-time modifications directly impacted the provision of disaster medical services. Unique situational awareness, coordination of care pathways within the local innate health infrastructure, compliance with health service regulations, and personnel resource typing all

contributed to and benefitted from these IC modifications. MMC and EOC IC collaboration facilitated effective communication and maintained an appropriate span of control and efficient activity reporting.

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Influenza Vaccine Uptake and Associated Factors in Aged Care Facilities

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Introduction: Influenza vaccine is recommended for high-risk populations in Australia (including those aged over 65 years) but is less effective in the elderly due to a progressive and predictable age-related decline in immune function, referred to as immunosenescence. Aged care facilities (ACF) are known to be at high risk of explosive outbreaks of influenza (even in highly vaccinated populations) and may reflect a higher intensity of transmission within the closed setting of ACF, as well as lower immunity and immunosenescence in the frail elderly.

Methods: To measure the impact of influenza in aged-care staff (ACS) and residents as well as vaccine effectiveness, a prospective observational epidemiological study was conducted in collaboration with an aged-care provider with multiple sites from March to October 2018. Weekly active surveillance on influenza-like symptoms and questionnaires were used to collect data on two groups: ACS and residents. A range of variables was examined against their 2018 influenza vaccination status in statistical analysis.

Results: Vaccination rates were high in residents and consistent with other studies. Vaccine rates in aged-care staff were lower and consistent with other studies.

Discussion: Residents and relatives are unlikely to change their minds about vaccination from year to year unless there is targeted effort to persuade them to so, and negative perception of the vaccine is likely to persist. Workplace influenza vaccination programs targeted at staff could be an effective method of raising vaccine uptake.

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Innovating Disaster Health and Medical Emergency Responses for an Emerging Global Threat

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Introduction: The global health threat posed by the ongoing deterioration in natural ecosystems and damage to our physical environment is growing at a rapid pace. Less recognized is the threat from natural hazard disasters, which concentrate contaminants from the damaged environment and expose large vulnerable populations to life-threatening medical conditions and disease. Currently neither international nor any national

health and medical emergency response protocols or programs have prepared health responses to protect the health of communities in such events.

Aim: This study performed a retrospective health risk assessment on two recent events where such impacts unfolded, namely the 2015 southeast Equatorial Asia smoke haze disaster and the 2016 Melbourne thunderstorm asthma epidemic. The primary objective was to test if the characterization of health risk could have been identified earlier and catastrophic levels of mortality and morbidity reduced.

Methods: The study employed a two-staged retrospective health risk characterization assessment. The first step applied the UNISDR (2017) framework for health risk disaster assessment combining a thematic and targeted word literature review to identify the level of health and medical risk knowledge prior to each event. The second stage applied a risk characterization matrix developed using ISO and Australian Health Department semi-quantitative health assessment standards.

Results: The 2015 southeast Equatorial Asia smoke haze disaster risk assessment was characterized as an extreme health risk and the 2016 Melbourne thunderstorm asthma epidemic characterized as a high health risk.

Discussion: Innovative medical response approaches are urgently needed to mitigate the growing health risk to whole populations from natural hazard disasters compounded by deteriorating natural ecosystems and the physical environment. This requires emergency medical and health teams to recognize the two-tailed human health risk from natural disaster hazards, along with investment in advanced planning, environmental risk surveillance, specialist training, technical guidance, and multi-sector coordination.

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An Integral Hospital Response Protocol for Emergencies and Disasters from the Emergency Department

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Introduction: Mexico has suffered multiple social and natural events that tested its response capacity. Hospital units of the third level of care are an axis of response and a central reference. Guaranteeing their integral and organized response promotes risk prevention and mitigation strategy in emergencies and disasters.

Aim: To analyze the national and international regulations and the existing documents about emergency and disasters related to a hospital with the identification of the critical actors in the response.

Methods: This research consists of a cross-sectional and descriptive study with a mixed methodology (qualitative and quantitative), that generates a protocol for response in a third level care hospital. Quantitative analysis was carried out using central tendency measurements based on a surveys (training, knowledge) performed in the hospital services that provide a

critical response with the ED in emergencies or disasters (ED, ICU, Supplies, Nursing, Operating Room, Security, Hospital Admission, Crisis Committee). In the quantitative analysis, the staff were interviewed about their experience in responding to previous events (to the same critical services), recognizing importance and points of improvement with a discourse analysis methodology.

Results: With the information collected and based on the protocols of Safe Hospital program (PAHO/WHO) we generated a protocol organized by the ED that involves massive victims.

Discussion: Regulations oblige hospital units to have protocols of action in critical situations linked to Safe Hospital program, so it is a great tool for planning. All the surveyed personnel consider that it is important to have a plan that allows for immediate steps to ensure quality and timely patient care, considering it an ethical and social obligation. Analysis suggests that continuous training and the contribution of an operational plan per service provide security and better prognosis to the victims. The protocol includes all critical response services with a clinical practice guide.

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Inter-Authority and Cross-Border Cooperation Using the Tetra Digital Radio Network

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Introduction: The Tetra digital radio network enables a secure and encrypted environment for verbal and minimal data (SDS, Unit Alert) communication. In Finland (population 5.6 million), the technology has been in use since 2002, and the network currently has close to 40,000 end-users representing several authorities including emergency medical services and health care, police, fire and rescue services, Border Guard, Customs, and defense forces. The national dispatch authority uses the network to dispatch and communicate with EMS, police, and rescue services, and inter-authority talk groups have been designed to enable direct communication between each or all actors as needed. On a daily basis, the network transmits more than 7.5 million messages and 150,000 verbal contacts. The system has proved to be extremely stable during mass casualty incidents needing simultaneous actions by hundreds of individuals representing several authorities. Finland, Sweden, and Norway have common borders in the north, which EMS units routinely cross on a daily basis responding to urgent missions. Both Sweden and Norway have nationally implemented the Tetra communication network, but are using different operators.

Methods: The need to facilitate communication between Tetra end-users in the Nordic countries using each other's networks resulted in an inter-system-interface (ISI) solution enabling network roaming. Between Finland and Norway, the mechanism was launched late in 2017 and is being implemented between Finland and Sweden in 2018.

Results: Pending configuration of necessary talk groups, the system will be functional and in use in 2019.

Discussion: Based on agreements on cross-border emergency assistance between Nordic countries in mass-casualty and other major incidents, the countries have developed national capacities to deploy response teams to neighbor countries for on-scene assistance and medical evacuation. Planning of necessary talk groups is in progress, and practical testing will be performed during the Barents rescue exercise hosted by Sweden in 2019.

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The Integration of a Unique QR[®] Code and Video to Improve the Correct Application of a Hemorrhage-control Tourniquet by a Naïve Population - A Feasibility Study

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Introduction: The use of tourniquets by the civilian population has been deemed a critical aspect of the initial response during an active shooter situation. Tourniquet deployment in public-access must be accompanied by education. Studies indicate that the act itself is not an intuitive process and enclosed instructions may be inadequate. However, civilians for diverse reasons may not avail themselves of accepted training programs.

Aim: To develop an alternative means of “Just-In-Time” education to enable a naïve responder to apply a commercial tourniquet efficaciously.

Methods: A video (~40 seconds long) was created highlighting the actual application of a C-A-T[®] (Combat Application Tourniquet) on a human model. It was uploaded to YouTube on a public channel. A QR[®] code was generated using <https://www.qr-code-generator.com>, embedding the link for the YouTube[®] video. An appropriately-sized QR[®] code was printed and applied with packaging tape (Scotch[®]) to the exterior wrapping of a C-A-T[®] device. The C-A-T[®] with code was then accessed with the iPhone[®].

Results: With the iPhone[®] camera app activated and focused on the C-A-T's QR[®] code, a request popped-up to open “YouTube.com” in Safari. When pressed, the full-screen video appeared immediately with audio of excellent quality.

Discussion: The use of a QR[®] code and its video link is a feasible option to provide “Just-In-Time” training to a naïve civilian population who are responding to an active shooter situation. This offers the naïve responder two options of immediate education: the enclosed instructions and the QR[®] code. Redundancy in communications is essential in any emergency response. An important limitation of this innovation is the inability to obtain Internet[®] access and therefore, the availability of the enclosed instructions is still critical. Research to prove that this innovation will allow the application of a tourniquet to proceed expeditiously with few errors is currently underway.

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Introduction of Japanese Association of Disaster Medicine (JADM) Disaster Medical Coordination Support Team

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Introduction: The Japanese Association for Disaster Medicine (JADM) Disaster Medical Coordination Support Team (DMCST) was formed in 2016 when Japan experienced Kumamoto earthquake to support other disaster medical assistance teams in terms of headquarter operation logistics.

Aim: Introducing medical association-based disaster medical support team.

Methods: JADM DMCST was formed by an association member who had experience in disaster medical headquarter operation and logistic support. Disaster medical headquarter tends to have a gap between acute phase and sub-acute phase due to an alternation of disaster medical assistance team. To keep disaster medical management at medical management headquarter, experienced manpower requires. JADM DMCST provided assistance to fill those gaps.

Results: For 2016 Kumamoto Earthquake, 107 members responded as a JADM DMCST, 78 members responded for 2018 West Japan Torrential Rain Disaster. Most of the members responded to the medical headquarter of affected prefecture's, city's, and medical region's headquarters. Members provided logistic support in headquarter operation, gathered medical needs information, helped medical team dispatch coordination, gathered evacuation shelter information, provided heat stroke support for evacuees, assisted deep vein thrombosis management, provided AED delivery operation, and helped statistical information analysis based on WHO standards.

Discussion: JADM DMCST could provide medical management support at each headquarters without time span restrictions which the most of disaster medical assistance team has. Since all members were experienced in disaster medical management, they could connect and keep providing medical assistance to the affected people. At the time of disaster, disaster medical management headquarter is always short handed due to a large amount of incoming information. All this information was managed by the support team. Although JADM DMCST contributed to support headquarter management, each member had to pay for his/her transportation, hotel, food and any devices required for headquarter operations. Therefore, improving member's responding condition is next problem to solve.

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An Introduction to Coastal Wilderness Medicine: BEACCHEs

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Introduction: Beginning Education at Central Coast Hospitals (BEACCHEs) was developed as an experiential

wilderness experience to assist with student exposure to new hazards when commencing at a coastal regional hospital. The coast has several hazards which are specific to the area.

Aim: To provide students with first responder education for situations commonly encountered on the Central Coast.

Methods: Sessions on first responder training specific to coastal and remote locations included: first aid and surf safety with the Ocean Beach Surf-Lifesaving Club and anti-venom education with the Australian Reptile Park. Education was provided regarding the transition from academic to clinical medicine including support and workload management. A two-day workshop was held on the Central Coast. Pre- and post-workshop surveys were conducted with a combination of matrix questions, Likert response scales, and long answer questions. Ethics was obtained. Both quantitative and qualitative responses were analyzed.

Results: Excellent feedback regarding this program was received. All students reported an increase in knowledge in all three domains of critical medicine and evacuation issues, student health and workload management, and Central Coast community and environment. The areas of greatest knowledge in each of these domains were the management of surf incidents, signs and symptoms of PTSD, and Central Coast marine and ocean environment. A confidence increase was seen in responding effectively to an emergency, particularly, in response to improvisation in the field. All findings were statistically significant with all P-values <0.01.

Discussion: The addition of BEACCHEs to the orientation of medical students at the Central Coast Medical School has demonstrated to be an effective program for allowing students to adjust more quickly to the new clinical environment. Following the success of this program, BEACCHEs is expected to become part of the new Junior Medical Officer orientation in 2019.

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Investigation of the Relationship Between Disaster Experiences and Disaster Measures: Potential for Specific Measures Against Disasters

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Introduction: Japan is known worldwide as an earthquake-prone country, and large-scale landslide disasters have occurred frequently in recent years. Early preparation is essential for taking precise action in case of an emergency. People with disaster experience are often discussed in the importance of evacuation drills. However, most people have no disaster experience, so awareness of disaster countermeasures is desirable for non-experienced people.

Aim: To clarify the concerns of non-experienced people and consider how to strengthen disaster measures as an evacuation drill host or educator.

Methods: From February to March 2018, we enrolled teachers and parents whose children attend Hiroshima City Elementary School. Based on disaster experiences, we divided them into two

groups, non-experienced and experienced, and a comparison of measures was performed between them. We used SPSS ver.22 and did a chi-square test.

Results: There were 1,702 valid responses (145 teachers and 1,557 parents); 1,406 were non-experienced, and 289 were experienced. The issues both groups were most concerned about were “children’s safety at school” (non-experienced 61.7%, experienced 57.3%), “securing food and drink at school” (39.0%, 3.3.9%), “acceptance and distribution of relief supplies” (28.1%, 2.6.6%), and “resident evacuation” (25.4%, 2.4.0%). The experienced were most concerned with “children’s mental care” (60.2%), and the non-experienced were most concerned with “children’s safety at school” (61.7%).

Discussion: Regardless of experience, parents tend to be deeply concerned about all things pertaining to their children. Physical safety, as well as psychological needs, were of high importance. For non-experienced, we should develop interest by focusing on children’s needs when writing manuals for disaster measures and evacuation drills. Therefore, future projects to strengthen awareness of disaster prevention for the non-experienced should focus on three key issues: “step-by-step approaches for children,” “physiological needs,” and “safety of schools and shelters.”

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Investigation on Level of First Aid Knowledge among Undergraduates

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Introduction: First aid in a short time is the key to saving lives. As undergraduates step into society, they should have enough ability to save others. As a result, first aid knowledge and training are essential for them.

Aim: To investigate the cognition level of the first aid knowledge among undergraduates, and to improve the training for undergraduates.

Methods: A questionnaire was designed for this study. It includes the basic information of the test subjects, attitude towards first aid, level of first aid knowledge, etc. The subjects of the questionnaire were mainly undergraduates in Sichuan province.

Results: There were 302 valid questionnaires. The percent correct of the first aid basic knowledge quiz was only 47.62%. Using Chi-Square tests to analyze, medical education can make a significant difference in the level of first aid knowledge. (Chi-Square=251.004, P<0.01) Additionally, 78.81% of undergraduates thought it was significant to learn and master first aid knowledge, and the most common way to learn first aid knowledge was through university (81.46%).

Discussion: Universities should strengthen the training for undergraduates to improve their first aid skills. This is a feasible approach to promote a public level of first aid knowledge.

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Issues of Which Organization is Responsible for Hospital Evacuation in Nuclear Disasters

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Introduction: At the time of a nuclear disaster, residents should evacuate from areas with high air dose rate. In the Great East Japan Earthquake, about 10% of patients died in a hospital evacuation in which medical teams were not involved in transportation.

Aim: To determine if hospital evacuation improved after the Fukushima nuclear accident.

Methods: This research investigates how the medical system of a nuclear disaster in Japan changed.

Results: There are 41 hospitals designated as Nuclear Emergency Core Hospitals, and they have 53 Nuclear Emergency Medical Assistance Teams (NEMAT; disaster medical dispatching team specialized in nuclear disasters consisting of medical doctors, nurses, and radiological technologists) that can support hospitals and information in the acute phase.

Discussion: At the time of a nuclear disaster, NEMAT is supposed to evacuate residents from the Urgent Protective Action Planning Zone (UPZ; within about 30 km radius). Tens of thousands to one million people live in this area. Hospital evacuation of more than several thousand patients is necessary. The entry of workers for transportation vehicles and lifeline restoration is limited within UPZ, so staying in a hospital is virtually impossible. There are over 2000 Disaster Medical Assistance Teams (DMAT), and many Red Cross Relief Teams; both of which are stipulated not to conduct clinical treatment in high dose areas and are not educated on nuclear disasters. Although there are Radiation Emergency Medical Assistance Teams (REMAT) consisting of doctors and technicians specializing in radiation medicine, they are few in number. They can perform dose assessment, but general medical care cannot be performed because an emergency physician is not included. Therefore, although NEMATs will conduct emergency and hospital evacuation in the affected area, the number of teams is too small to respond. The issue of which organization is responsible for massive hospital evacuation remains unsolved.

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The Knowledge, Attitudes, and Practices of Search and Rescue Teams of Sri Lanka Army Regarding Search and Rescue as a Response to Disasters

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Introduction: Sri Lanka Army is a valuable resource for the country as a capacity factor in disaster situations. Sri Lanka Army has established Search and Rescue teams (SAR teams) in all 25 districts.

Aim: To describe the knowledge, attitudes, and practices of SAR teams regarding search and rescue as a response to disasters.

Methods: A descriptive cross-sectional study was carried out from October to December 2017. Five platoons were selected randomly from high and medium risk district categories, and all five platoons were selected from the low-risk category. The total sample size was 465. A pre-tested self-administered questionnaire was employed.

Results: The median age was 28 years. 3.2% were officers, 96.8% were soldiers, the majority (80.4%) were educated up to G.C.E. (O/L), and 62.4% were married. 52.9% of the population had undergone SAR training during the past three years in Sri Lanka, and none had undergone training outside of the country. Overall knowledge regarding search and rescue as a response to disasters seem to be good (57.2% received higher than a score of 75%). 93.8% has desirable positive attitudes. 73.5% had participated in search and rescue operation as a response to disasters. Overall practices seemed to be poor, (71.3% of the population received lower than a score of 75%). A statistically significant association was observed with a level of education ($p = 0.001$), designation ($p = 0.004$), and knowledge on search and rescue as a response to disasters. Level of education, designation, and SAR training had no significant association with attitudes on search and rescue as a response to disasters. A statistically significant association was observed with designation ($p = 0.021$) and practices.

Discussion: Search and rescue drills should be carried out regularly. Knowledge of search and rescue as a response to disasters should be incorporated into training programs for officers and soldiers.

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Lack of Prioritization Causes Extended Time to Assessment of Severely Injured Trauma Patients in a Resource-Scarce Emergency Department

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Introduction: The time between injury and medical intervention is crucial in trauma care. Triage is essential to ensure prioritization and timely assessment of injured patients.

Aim: To investigate how the lack of triage system impacts timely intervention in a sub-Saharan hospital emergency department, and to investigate potential benefits of triage towards efficient management of trauma patients.

Methods: A prospective study including adult trauma patients admitted to the emergency department at Moi Teaching and Referral Hospital in Eldoret, Kenya, was conducted. Mode

of arrival, vital parameters, time before physician's assessment, and mortality were registered. Retrospectively, Injury Severity Score (ISS) was calculated, and patients were categorized according to the Rapid Emergency Triage and Treatment System (RETTTS).

Results: A total of 571 patients were analyzed, revealing a mean ISS of 12.2 (SD 7.7) and a mean length of stay of 11.6 (SD 18.3) days. 70% of the patients arrived by taxi, private car, or police car; only 17.6% were transported by ambulance. RETTTS categorization was compared with ISS using a Kruskal-Wallis test with Dunn's multiple comparisons post-test. A higher average ISS was found in the red category compared to other categories ($H(df) = 24.47(4)$, $p < 0.001$). A Spearman correlation test between ISS and time to assessment revealed an r value of -0.041 ($p = 0.43$).

Discussion: The results clearly illustrate a lack of correct prioritization of patients in relation to the need for timely assessment. Since there was no difference in time to assessment regardless of ISS, the need for a triage system is apparent. Currently, the implementation and evaluation of a validated triage tool at the emergency department are underway. Moreover, the finding that less than 18% of trauma patients are transported to the emergency department by ambulance illustrates the need to develop prehospital care systems.

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Leadership and Factors Enabled the "Group Allocation" which Preserved Pre-existing Local Social Ties in Prefabricated Temporary Housing After Great East Japan Earthquake (GEJE)

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Introduction: Social isolation and death alone in the prefabricated temporary housing after a disaster has been a social concern. The importance of social ties among the community has been suggested and several reports pointed out the positive effect of "group allocation" which preserves pre-existing local social ties compared to the "lottery allocation".

Japan Red Cross Society recommended "group allocation" as a better option than "lottery allocation" on their guidelines. However, many municipalities carried out "lottery allocation" for temporary housing arrangement after the Great East Japan Earthquake (GEJE).

Aim: To collect the information about the accelerating factors and bottlenecks when practicing the "group allocation".

Method: In-depth interview was conducted between August and November 2013. Interviewees were the professionals of disaster management, individuals who were involved in arranging the prefabricated housing and the residents. This research was supported by the Ministry of Education, Culture, Sports, Science, and Technology in Japan.

Results: This study found the municipality which carried out "group allocation" had characteristics such as: (1.) the staff in charge of housing arrangement had the information about the positive effect of "group allocation", and (2.) pre-existing community leaders were able to gather residents' opinions, and citizens were involved in the decision making to some content.

Discussion: Although this study is based on the experience of a limited number of key persons, it would be useful to give the insight about the possible bottleneck for the practitioners who will be in charge of housing arrangement under the disaster setting in future. Also, the relevancy and evidence about "group allocation" should be carefully examined in the context of preventing social isolation as well as various long-term effects. It would be essential that the knowledge and experience will be accumulated and shared between municipalities in a usable and comparable format.

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Learning Effects of Cross Road Game Using a Clicker-Nano System

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Introduction: There are some tools for teaching disaster countermeasure in Japan. Cross Road Game was developed to get a concrete image of a disaster situation and is based on interviews from Kobe city government officers in an area affected by the 1995 Great Hanshin-Awaji Earthquake. The alternative includes a lot of 'dilemmas' that sacrifice something based on whichever outcome is chosen. For example, "There are 2000 meals at the evacuation center with 3000 refugees. Do you distribute these foods or not?" This game was developed for five to seven players, however, it is not suitable for class lessons with a hundred students. Thus, we tried to employ the Clicker-Nano system for an interactive lesson.

Aim: To provide a brief introduction to this new style of teaching disaster countermeasure.

Methods: The study included involved a classroom discussion using Clickers-Nano system in addition to Cross Road Game.

Results: Nursing students could learn the concrete details of disaster countermeasure in an enjoyable format. They could share thoughts and compare opinions while deciding how to resolve the dilemma at the time of disaster.

Discussion: The most important issue faced was how to develop an educational effect for nursing students. Even if five or seven students (players) could enjoy the game, it would not lead to the accumulation of unified knowledge of disaster countermeasure compared to a lecture at the university. The use of the Clickers-Nano system avoided differences in the reach of

learning due to differences of facilitators' capabilities. This study suggests a new style that combines interactive discussion not only with small but also large numbers of students.

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Learning from Disasters: How Do We Share the Knowledge and Experience?

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Introduction: Understanding the difficulties of sharing knowledge generated from disaster situations is essential to allow for a better process of disseminating the "lessons learned" from the ongoing natural and man-made situations which result in healthcare crises.

Aim: To explore nurses ways of gaining knowledge from previous experiences, with a particular focus on earthquakes and natural disasters in the New Zealand (NZ) setting.

Methods: Initial analysis of a series of individual, semi-structured interviews with a small group (n=10) of emergency department registered nurses from a range of geographical areas in NZ.

Results: While familiar with the major earthquake events that have recently affected different areas of NZ (most notably Canterbury, Kaikoura, and Wellington), few could recall detailed information or lessons generated from these events. When asked about the most effective means of learning about and from disasters, the direct experience was identified as the most effective, followed by narrative retelling and vicarious experience.

Discussion: Recognition of the value of "story-telling" in sharing information, and of the importance of offering experiences in a way that allows colleagues to experience or place themselves in the situation in a "virtual" sense is necessary for learning to occur. This involves an emotional as well as an intellectual connection to occur. There is a risk for knowledge to be lost, and lessons to be constantly "re-learned," as each succeeding generation needs direct involvement to retain the information and insight generated. We need to tailor the medium by which this information is shared, for maximum effect.

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Let's Rock and Roll Baby! Strengthening Skills to Deliver Basic Obstetric Care in Sudden Onset Disasters

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Introduction: In 2017 the New Zealand Medical Assistance Team (NZMAT) were verified by the World Health Organization (WHO) as an Emergency Medical Team Type 1. During the verification process, the WHO highlighted the need for further NZMAT capability in the specialty areas of reproductive, sexual, and maternal health. The NZMAT

consists of doctors and nurses from many different clinical sub-specialties but with a predominance of emergency and rural medicine or general practice. Due to the subspecialist nature of hospital medicine in the New Zealand environment most GPs, emergency physicians, and nurses have very little exposure to normal labor and birth in their day-to-day work and limited exposure to obstetric complications.

Methods: To increase the knowledge and skill level of the NZMAT, a two day Basic Emergency Obstetric Care (BEOC) course was designed by Kass Jane, a midwifery educator, researcher, and member of NZMAT, in consultation with the NZMAT Clinical Director Emma Lawrey.

Results: This presentation will outline the curriculum design, the course delivery, and the feedback from participants on this inaugural BEOC for the NZMAT, as well as the findings of a post-course review and plans for further BEOC courses for NZMAT members.

Discussion: This presentation will address why courses of this type have value, especially where the delivery of basic obstetric care in a low technology or austere environment may translate into skills for other Australian clinicians wishing to work either in a humanitarian or developing world context.

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Living Condition Relating to Social Isolation and Suicidal Thoughts Over 65 Years Old Living in Prefabricated Temporary Housing After the Great East Japan Earthquake (GEJE)

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Introduction: The Great East Japan Earthquake (GEJE) and subsequent devastating tsunami struck the northeastern coast of Japan on March 11, 2011. According to the previous studies about displaced evacuees, increases in suicide rates and social isolation (especially among older adults) have been reported. However, the living condition of residents at prefabricated temporary housing after GEJE is unclear.

Aim: To explore potential factors which might relate to social isolation and suicidal thoughts among older adults by using a qualitative method.

Methods: Inclusion criteria for this study were older adults over 65 years living in prefabricated temporary housing since the GEJE. Data were collected by face-to-face-interviews with semi-structured questionnaire between October and December 2014. The protocol of this study was approved by the Ethics Board of the Tokyo Metropolitan Institute of Gerontology. This research was supported by the Ministry of Health, Labor, and Welfare of Japan (No.H25-iryuu-shitei-003).

Results: Twenty older adults participated in the study. Most of them had been engaged in agriculture or fishery and experienced the sudden loss of family members, friends, and property in the aftermath of the GEJE. Findings indicated that social connections formed through the collective construction of prefabricated temporary housing. The study found that individuals who had

less emotional and financial support experienced a greater feeling of sadness, social isolation, and suicidal thoughts. The study also suggested that people who live in temporary housing are strongly affected by economic insecurity and that it aggravates the risks for social isolation and psychological distress.

Discussion: Although there were limitations regarding standardization and compatibility, this research found that the qualitative method can obtain the data which the quantitative method cannot reach. Scale-up of universal guidelines including the knowledge from qualitative research and case report under the devastating disaster setting is anticipated for better evidence base for next coming disaster.

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Low-Cost High-Efficiency Joint Training Program

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Introduction: As the second largest metropolitan area in Canada, Montréal has its share of risks for disasters and major incidents. In such events, the interoperability of emergency services is critical to effective interventions. As the emergency medical service (EMS) for the cities of Montréal and Laval, the Urgences-santé Corporation (USC) has close ties with several emergency partners on the territory, including police and fire departments. These different organizations have joined forces to develop a tabletop exercise program (TEP) to train operational managers to initiate a better-coordinated response on joint interventions.

Aim: The TEP was designed to enhance interoperability in the field by improving communication and the understanding of the roles, responsibilities, methods of coordination and decision-making in each of the organizations involved. The aim is for all of USC's operational managers to participate in at least one exercise of the TEP within the first year of the program.

Methods: Selection criteria were established to gather, for each exercise, managers that are likely to work with one another on a real intervention. The TEP was also designed in such a way that its implementation would require few resources and yield minimal impact on regular operations.

Results: After four pilot exercises to fine-tune the approach, the program was launched on October 5, 2018. We have now run eight exercises, each involving one or more USC supervisor. The response has been very favorable from the participants as well as their directors.

Discussion: In the short term, the TEP helps managers understand their counterparts' key issues, and has already yielded improvements in our joint interventions. In the longer term, the program will help identify specific training needs to better equip responders.

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Low-Cost Tabletop Simulation for Disaster Triage

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Introduction: Disaster Medicine training in most parts of the world is done in a practical manner to allow users to practice the skills of triage and resource allocation.

Aim: To develop a low-cost tabletop simulation and measure its effectiveness from the user perspective.

Methods: A modified Delphi approach was used in developing a low-cost tabletop simulation exercise. Simple playing cards were used as patients with specific vitals and injuries. Two Hundred trainees of the National Ambulance Service were used to test the exercise. All the participants had an equal chance to triage a patient and arrange transport to an appropriate facility.

Results: All participants expressed their satisfaction in the design and implementation of the tabletop exercise. Over 90% showed interest in replicating the exercise in their respective setting due to the low-cost nature of the setup. During the exercise, 0% of the patients were triaged correctly, while 80% were transported from the scene in an orderly manner. All the participants agreed on the useful and educational value of the exercise.

Discussion: The use of a low-cost tabletop exercise in disaster medicine training is essential for low- and middle-income countries to promote education, and has been shown to be acceptable and feasible.

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Management of Dead in Mass Disasters: A Review of Sri Lankan Perspectives since 2004

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Introduction: Sri Lanka has experienced a multitude of natural and man-made disasters during the last five decades. Man-made destructions were common during the 30-year-long conflict period. Though the local system in the country was able to manage the dead in such circumstances, the South-Asian tsunami in 2004 highlighted the limitations and deficiencies of the system that was in place to handle the management of the dead during major disasters. Though the first Disaster Management Act was introduced in 2005, it has no mentioning regarding management of dead in mass disasters. Inappropriate handling of the dead could hinder the establishment of the identity of the dead, loss of valuable forensic evidence, and dignified burial. Hence, the families could experience difficulties in calming insurances and inheritance, resulting in economic hardships. In this backdrop, the forensic community strongly felt the necessity of stipulating best practices in managing dead.

Aim: To critically assess the measures taken to improve the standards of managing dead in mass disasters in Sri Lanka over the past 15 years.

Methods: The process of drafting guidelines for management of dead was initiated with a series of consultative meetings with the Disaster Preparedness and Response Unit of the Ministry of

Health, the Disaster Management Centre (DMC) and the Institute of Forensic Medicine and Toxicology (IFMT) in collaboration with the College of Forensic Pathologists of Sri Lanka. A working group representing forensic and legal experts, military, police, fire brigade department, and disaster management were involved in drafting these guidelines. Further guidelines for the effective conduct of mass burials following mass disasters were also prepared and published in 2007.

Discussion: Despite all these efforts the efficacy of managing dead in recent mass disasters is still far from satisfactory.

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Mass Gatherings and Youth Peer Volunteerism

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Introduction: Music and sporting events are mass gatherings with unique risks related to participation. “All-ages” events, which include participants below the age of majority (18 in many jurisdictions), have been observed to have an over-representation of patient presentations in the youth category. Peer helpers may lower the barrier to seeking on-site care. Youth (peer-aged) volunteerism provides opportunities for exposure to new environments, skills, and mentorship. Medical volunteerism may promote personal satisfaction through prosocial behavior (i.e., helping others), community engagement and immersion into a potential health professions career path.

Methods: We conducted an observational pilot feasibility study with feedback forms and semi-structured interviews. The pilot program paired youth with parents/guardians/responsible adults as health care volunteers at special events.

Results: Youth/adult dyads volunteered for a variety of events in Canada during the 2018 event season. All participants in the “Juniors Program” completed at least a Standard First Aid course, including orientation to personal safety and confidentiality. Each pair worked in one of two areas: first aid or Festival Health (the harm reduction space at music events) providing peer-to-peer and “all-ages” support. Post-event feedback from the dyads revealed many positive experiences and universally called for more opportunities.

Discussion: A strong volunteer base is an asset to any community. In this pilot study, the volunteer experiences were supervised by a team of credentialed health care professionals. The authors report on qualitative feedback in themes based on patient perspective, volunteer perspective, team perspective, and event management perspective. More research is needed to measure the outcomes of the Junior’s Program. More investigation is needed to determine not only the long-term benefits of participation on event medical teams, but also to identify factors that shape a positive experience for youth, their parents, and the event participants that they support.

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Measuring Student Nurses’ Preparedness and Resilience for a Disaster Setting

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Introduction: Nurses have long been utilized in disaster response and recovery and they possess broad skill sets, which are critical in times of crisis. However, studies show that more than 80% of nurses who volunteered in disasters settings have no disaster education.

Aim: This project explored the disaster knowledge, preparedness, and resilience of 2nd and 3rd-year undergraduate student nurses in a Bachelor of Nursing Science program in a regional university to garner support for the introduction of dedicated disaster nursing education, which is currently absent from Australian undergraduate nursing curricula. Whilst disaster management processes in Australia are robust and Australian health care systems have explicit plans in place, the same cannot be said for all countries and health care systems. Australian trained nurses are highly valued and actively sought in the global health workforce market. In a world marked by increasing change and instability, the lack of dedicated disaster education and skills in the largest health workforce increases the overall vulnerability.

Methods: Data were collected using the Disaster Preparedness Evaluation Tool, the Connor-Davidson Resilience Scale, simple demographics, and a previous disaster experience questionnaire.

Results: The results highlight important gaps in current practice and vulnerabilities in the current disaster management framework. Local students scored higher results in preparedness and resilience.

Discussion: Student nurses are an underutilized resource in disaster preparation and by response teams around the world. With a global intent of shared responsibility and increased resilience in individuals and communities before, during, and after disaster events, dedicated capacity building of nursing staff has the potential to address key factors and simultaneously utilize an underappreciated demographic of student nurses. To the best of the author’s knowledge, this project is the first to explore disaster knowledge, preparedness, and resilience in undergraduate student nurses using validated disaster preparedness and resilience tools in Australia.

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Measuring the Masses: Guidelines for Publication of Case Reports on Mass Gatherings

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Introduction: The science supporting event medicine is growing rapidly. In order to improve the ability of researchers to access event data and improve the quality of publishing mass gathering cases, it would be of benefit to standardize event reports to permit the comparison of similar events across local and national boundaries. These data would support the development of practice standards across settings.

Aim: The authors propose the creation of a publication guideline to support authors seeking to publish in this field.

Method: Derivation study via analysis of published case reports using the Delphi process.

Results: Data elements were inconsistently reported within published case reports. Categories of variables included: event demographics (descriptors of date, time, genre, activity, risks), attendance and population demographics, data related to climate and weather conditions, composition and deployment of an onsite medical team, highest level of care available onsite, patient demographics, patient presentations and measures of impact on the local health care system such as transfer to hospital rates. Of note, there was a high incidence of “missing” variables that would be of central interest to researchers.

Discussion: Approaches to standardizing the collection and reporting of data are often discussed in the health care literature. The benefits of consistent, structured data collection are well understood. In the context of mass gathering event case reporting, the time is ripe for the introduction of a guideline (with accompanying guidance notes and dictionary). The proposed guideline requires the input of subject matter experts (in progress) to enhance its relevance and uptake. This work is timely as there is ongoing work on improving an international event medicine registry. If the evolution of both proceeds in lockstep, there is a good chance that access to a rigorous data set will become a reality.

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Medical Activity Training using SDF Ship at Wide Area Disaster

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Introduction: We have repeatedly trained to use the SDF ship as a temporary medical facility during acute disasters. The Maritime Self Defense Force has various types of ships: supply ship (Oumei type), transport ship (Osumi type), and escort ship (hinge type, whip type) which has a large hangar and a treatable medical compartment.

Methods: The points of training are collaboration between the SDF and the commander’s line of medical personnel, construction of a method of contact with the outside, construction of contact method inside the ship, kind of patient, medical contents, use of medical zone, method of transporting to the ship, method of transporting to the outside of the ship, positioning of the ship in the afflicted area, etc.

Results: Assuming the Nankai Trough Earthquake, the activities of SDF vessels in coastal areas are affected by the extent to

which the functions of medical institutions in inland areas are kept, how transportation methods can be secured, and how many injured people there are.

Discussion: As a result of the examination thus far, the range of activities of SDF vessels is limited. The function of the ship is considered to be offshore SCU, hospital evacuation support, etc. Tight collaboration and training with the SDF are necessary in the future.

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Medical Measurement Against the Mega-Disaster: The Necessity of Systematization of the Disaster Medicine or the Disaster Medicine Compendium

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Introduction: The large number of casualties during major or mega-disasters are a global problem.

Aim: The role of medicine against mega-disasters is analyzed from a worldwide perspective.

Methods: Chernobyl incident, the Tokyo Subway Sarin Attack, the 9-11 attack, the Indian Ocean earthquake/tsunami, Hurricane Katrina, the Flu pandemic, the Higashi Nihon Earthquake followed by the Fukushima nuclear plant incident, etc. are critically analyzed, based on the actual medical experiences.

Results: These mega-disasters often have a wide, severe negative influence. Linked catastrophes often form catastrophic circulus vitiosus (CCV) or malignant cycles on a global scale. The typical example is the Chernobyl incident which caused not only many deaths by radiation exposure/thyroid cancer and world anxiety, but also is considered to have contributed to the end of the Eastern European Communism system in 1989 (East Germany) and 1991 (USSR).

Discussion: Many roles of medical doctors and staff were requested, including creating preventive life-saving systems, in addition to the prevention of mega-disaster measurement to minimize the unhappiness. Moreover, medical ethics and philosophy are important, which were often overlooked. It is necessary for medical care and support to have a broad perspective. Although the classical philosophy of utilitarianism is often accepted without suspicion, it comes with the risk of disregarding vulnerable/weak people. The concept of justice according to John Rawls (USA) and the Minimal Unhappiness Theory by Naoto Kan (Japanese politician) should be considered, too. From such viewpoints, it is our conclusion to urge the establishment of systematic disaster medicine or to compile a disaster medicine compendium. Although the tentative first version was compiled with 22 volumes in 2005, only one-fourth was available in English. The English part increased up to nearly three-fourths by adding several new versions in which the nuclear/biological/chemical

hazard version, tsunami measurement, and psychological care version are included at the moment.

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Mental Health Impacts on People Living in Subdivided Flats in Hong Kong

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Introduction: Housing has always been a source of stress for people in Hong Kong (HK), especially to those living in sub-optimal settings. About 210,000 people are forced to live in subdivided flats in HK. Most of these flats cannot meet health standards set by the UN even for prisoners, in terms of the floor space, climatic conditions, lighting, air quality, and ventilation. Fire and public safety equipment are lacking. Most believed that the substandard environment has a negative impact on one's mental health.

Aim: To investigate how the living condition in a subdivided flat affects a person's mental health.

Methods: 104 households living in the subdivided flats in Kwai Tsing, one of the 18 Districts of HK, were surveyed by HKJCDPRI's Collaborating Partner, HKSKH Lady MacLehose Centre in February 2017; while a follow-up study with purposive sampling was conducted in October 2017 to interview 10 households on their mental health status. A mixed Methods was used combining the quantitative Results of the WHO Quality of Life-BREF scale and Depression Anxiety Stress Scale 21, and qualitative Results of face-to-face interviews.

Results: 80% of 104 households surveyed suffered from mental distress. The follow-up study revealed that seven of them displayed signs of depression and/or anxiety, while two were diagnosed with a mental disorder. Distress is proven to associate with the environmental and health risks, including fire and disease outbreak, as well as chronic issues resulting from poor indoor air quality and extreme weather.

Discussion: Low level of perception and preparedness among HK people is making these public health risks more apparent. The already desperate housing and land policy don't seem to offer any help in the near future. Public education efforts need tremendous enhancement, to engage, mobilize and empower individuals and communities, to actively plan and prepare for future shocks.

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Misericord Injuries: Ancient and Modern

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Introduction: The Misericord, or stabbing pike, was a frequently used battlefield implement in medieval times. The misericord was used by battlefield clerics to relieve the suffering of irreparably wounded soldiers. Its cultural parallels include the Roman gladius, the Japanese wakazashi, and the eponymous Liston knife used in pre-Victorian era surgery in England.

Methods: This demonstration will analyze modern misericord injuries in the light of the current epidemic of long knife (or zombie knife) attacks in London and the domestic terrorist threat in Australia.

Discussion: A review of this weapon is pertinent to the projected low-technology, low-impact, and deep-penetrating wounds expected in urban terrorism in Australia and other cities globally. The talk will emphasize field discussion, demonstration, and disarming techniques against modern misericord-type weapons.

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A Mixed-Methods Analysis of the Spatial and Temporal Relationship Between Boko Haram Activity and Lassa Fever Incidence in Nigeria 2017-2018

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Introduction: Two major public health issues facing Nigeria in 2017 and 2018 were the terrorist activity by the Boko Haram Islamist group and an unprecedented outbreak of Lassa fever.

Aim: To determine if Boko Haram activity was temporally or spatially related to the incidence of Lassa fever in Nigeria and if so, to identify potential concurrent causes and mitigation measures.

Methods: The study was a mixed-methods design. First, we conducted a secondary analysis of the Armed Conflict Location and Event Data (ACLED) Project for all known Boko Haram activity and of the weekly Nigeria Centre for Disease Control reports for suspected Lassa fever cases. Data were analyzed for January 2017 through June 2018. The ACLED data were spatially overlaid with suspected Lassa cases for each of Nigeria's 36 states. Secondly, we conducted interviews with six aid workers in Nigeria regarding Boko Haram activities and Lassa fever cases.

Results: In the study period, 596 Boko Haram activities occurred in 13 states (36.1%): 416 in 2017 and 180 between January and June of 2018. During the same period, 3,137 suspected Lassa cases were reported from 21 states (58.3%): 1,022 in 2017 and 2,115 in January through June 2018. Only one state, Sokoto, was unaffected by either issue. Aid workers reported a positive relationship between Boko Haram activity and increased negative health outcomes.

Discussion: The investigation found little geographic overlap in Nigeria between Boko Haram activity and the 2018 Lassa fever outbreak, suggesting independence of these two issues. However, unmeasured factors, such as public fear and mistrust of governmental activities, may affect both issues. It is also critical to note that widespread co-occurrence (97.2% of 36 states) of these two issues presents significant public health, medical, and security challenges for Nigeria, calling for overarching solutions such as governmental stability and economic stimulus.

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Mortality at Music Festivals

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Introduction: Fatalities at music festivals are seldom reported in the academic literature, making it difficult to understand the full scope of the issue. This gap in our knowledge makes it challenging to develop strategies that might reduce the mortality burden. It is hypothesized that the number of fatalities is rising. Building on earlier research, two further years of data on mortality at music festivals was analyzed.

Methods: Synthesis of grey/academic literature.

Results: The grey literature for 2016-2017 documented a total of 201 deaths, including both traumatic (105; 52%) and non-traumatic (96; 48%) causes. Deaths resulted from acts of terror (n = 60), trampling (n = 13), motor-vehicle-related (n = 10), thermal injury (n = 6), shootings (n = 5), falls (n = 4), structural collapses (n = 3), miscellaneous trauma (n = 2), and assaults (n = 2). Non-traumatic deaths included overdoses/poisonings (n = 41), miscellaneous causes (n = 36), unknown/not reported (n = 18), and natural causes (n = 1). The majority of non-trauma-related deaths were related to overdose (44%). No academic literature documented fatalities that occurred while attending a music festival during 2016 or 2017.

Discussion: Reports of fatalities at music festivals are increasingly common. However, the data for this manuscript were drawn primarily from media reports, a data source that is problematic. Currently no rigorous reporting system for fatalities exists. In the context of safety planning for mass gatherings, a standardized method of reporting fatalities would inform future planning and safety measures for festival attendees. The hypothesis that mortality rate reporting increased was substantiated. However, the proliferation of music festivals, the increase in attendance at these events, and the overall increase in internet usage may have influenced this outcome.

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Needs of Family Survivors of Floods in Molepolole, Botswana

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Introduction: Floods are common worldwide and are the leading cause of fatalities. They are destructive to property, crops, and livestock, and leave survivors homeless or displaced to evacuation camps.

Aim: To explore the needs of family survivors of floods in Molepolole, determine assistance received and needed, and identify coping strategies used to deal with the impact and effects of floods.

Methods: Jordan (2015) model of disaster survivors' hierarchy of needs guided the study. Purposive sampling selected six families, and seven participants from these families enrolled in the study. A pilot-tested semi-structured interview guide collected data. Data were analyzed using the content style.

Results: The study findings confirmed that survivors of floods had immediate and long-term needs, and these were classified into basic, safety, recovery, stress reaction, grief and loss, and growth. Not all survivors were grateful for the assistance they received following floods. Survivors used varied coping strategies to deal with their stressors. The study was conducted in Molepolole, hence, the findings may not be applicable in other settings. Individuals were interviewed on behalf of the entire family.

Discussion: There is a need for a multidisciplinary team which will keep the community at the forefront in tackling flood mitigation and developing policies specific to floods. Policies will include indigenous flood mitigation practices and will strengthen awareness of communities to improve knowledge, skills, and attitude. More research is needed on the needs of each survivor.

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Needs of Patients in the Triage Category "Expectant" in Prehospital Disaster Settings: A Survey Among German Medical Incident Commanders and Palliative Care Physicians

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Introduction: The treatment of patients in the triage category "expectant" is not in the focus of the prehospital disaster medicine. The aim is to save as many lives as possible in situations with very limited resources. It is necessary to allocate the life-saving interventions to those who have the chance to survive, but there is a human right of best assistance even for those who are expected to die.

Aim: In Germany, it is possible to use the triage category "expectant" in overwhelming disasters, so there should be preparedness for those patients, who receive this categorization. A survey was conducted to find out what the needs are of those patients.

Methods: An online-survey was submitted to German medical incident commanders and palliative care physician in function of expert groups via their national associations.

Results: 219 physicians participated. The majority confirmed a necessity to treat those patients and to be prepared. Currently, in most of the areas, there is no preparation. The main needs are the treatment of pain, dyspnoea, fear, and loneliness. Following the "Dying person's bill of rights" (1), the most relevant rights are:

- To be treated as living human being until I die
- To be free from pain
- To express the feelings and emotions
- To die in peace and dignity

Discussion: Palliative care should be part of disaster medicine planning. It is not too difficult to prepare a special group of helper for the care of dying patients. Medical incident commanders and palliative care physicians agree in the majority about the

necessity, so SOPs can be implemented to teach non-medics. The medics will be needed for the first aim of disaster medicine.

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Neuropsychiatric Manifestations of Wildfire Exposure

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Introduction: Wildfires are life threatening incessant fires in thickly vegetated areas that spread extremely rapidly to human habitat and are difficult to control by human force. The impact of wildfires is enormous on population health and causes tremendous financial burden to individuals and communities.

Aim: The aim is to understand the potential disease burden secondary to wildfires both at an individual and population level and reflect upon the immediate and delayed neuropsychiatric manifestations of smoke exposure.

Methods: Data on wildfires associated direct and indirect costs on individual health and health care delivery appears to be scant. The effort of this presentation is to present the federal data from 2012 to 2016 on nationwide wildfires, estimated acreage consumed in wildfires, the population exposed, and deaths. Information was extracted from the National Interagency Fire Center, the United States Fire Administration, and the Federal Emergency Management Agency. Through literature review on neuropsychological sequelae of wildfires smoke inhalation and associated trauma, the goal is to reflect upon potential healthcare burden secondary to neuropsychiatric manifestations.

Results: Per National Center for Health Statistics, the national fire death rates from 2012 to 2016 ranged 10 to 11 per million population each year, and the property loss both residential and non-residential was estimated at 9 to 10 billion dollars each year. We know healthcare cost is expensive in the United States, and with the stated estimates, one can only envision the health care and public health system burden.

Discussion: The characteristic neuropathology of carbon monoxide toxicity is bilateral Globus pallidus necrosis and the common neuropsychological symptoms include fatigue, affective conditions, emotional distress, memory deficits, sleep disturbance, vertigo, dementia, and psychosis. The health effects and associated disability demand policymakers to allocate resources for wildfire prevention/containment and primary health care providers education, research, and building effective healthcare delivery systems.

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Next Level Triage: Applications of Point-of-Care Ultrasound in Disaster Response and Recovery

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Introduction: Ultrasound applications are widespread, and their utility in resource-limited environments are numerous. In disasters, the use of ultrasound can help reallocate resources by guiding decisions on management and transportation priorities. These interventions can occur on-scene, at triage collection points, during transport, and at the receiving medical facility. Literature related to this specific topic is limited. However, literature regarding prehospital use of ultrasound, ultrasound in combat situations, and some articles specific to disaster medicine allude to the potential growth of ultrasound utilization in disaster response.

Aim: To evaluate the utility of point-of-care ultrasound in a disaster response based on studies involving ultrasonography in resource-limited environments.

Methods: A narrative review of MEDLINE, MEDLINE InProcess, Epub, and Embase found 20 articles for inclusion.

Results: Experiences from past disasters, prehospital care, and combat experiences have demonstrated the value of ultrasound both as a diagnostic and interventional modality.

Discussion: Current literature supports the use of ultrasound in disaster response as a real-time, portable, safe, reliable, repeatable, easy-to-use, and accurate tool. While both false positives and false negatives were reported in prehospital studies, these values correlate to accepted false positive and negative rates of standard in-hospital point-of-care ultrasound exams. Studies involving austere environments demonstrate the ability to apply ultrasound in extreme conditions and to obtain high-quality images with only modest training and real-time remote guidance. The potential for point-of-care ultrasound in triage and management of mass casualty incidents is there. However, as these studies are heterogeneous and observational in nature, further research is needed as to how to integrate ultrasound into the response and recovery phases.

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No More Suffering: Building Human Resource Capacities with the Sphere Standard

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Introduction: Nankai Trough earthquake, with an anticipated death toll of 323,000, is a disaster for which the country of Japan set the highest priority on building capacities. Tokushima prefecture aims to minimize preventable death among survivors and has strived to build a medical and health response system and strengthen outreach systems for vulnerable populations. To actualize these aims, Tokushima prioritized human resource development.

Methods: Tokushima has initiated periodic trainings based on the Sphere Standard, the internationally recognized minimum standards for humanitarian aid, since 2015. The trainings were conducted by certified trainers and trainees received an official certification recognized by the Sphere Project, Geneva. The training materials were localized and the trainings were contextualized to Japan as a developed and super-aged nation. The learning outcome was evaluated by a pre-post test.

Results: Between April 2015 and November 2018 the two-day training was held seven times. There were two hundred twelve participants from various clusters such as health, education, logistics, nutrition and food, security, and protection. The results of the pre-post test were statistically significant (still in process) indicating the effectiveness of the training on knowledge. Training evaluations suggest nurturing ethical attitudes and skills utilizing the Sphere Handbook.

Discussion: Despite under-recognizing the Sphere Standard in Japan, the Standard has been incorporated into the disaster risk reduction plan in Tokushima. For larger scale human resource development, training local representatives to be trainers would be the next step.

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Novel Delivery of Meaningful EMS and Disaster Medicine Content to Residents and Medical Students

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Introduction: Residency education delivery in the United States has migrated from conventional lectures to alternative educational models that include mini-lectures, small group, and learner lead discussions. As training programs struggle with mandated hours of content, prehospital (EMS) and disaster medicine are given limited focus. While the need for prehospital and disaster medicine education in emergency training is understood, no standard curriculum delivery has been proposed and little research has been done to evaluate the effectiveness of any particular model.

Aim: To demonstrate a four-hour multi-modal curriculum that includes lecture based discussions and small group exercises,

culminating in an interactive multidisciplinary competition that integrates the previously taught information.

Methods: EMS and disaster faculty were surveyed on the previous disaster and prehospital educational day experiences to evaluate course content, level of engagement, and participation by faculty. Based on this feedback, the EMS/Disaster divisions developed a schedule for the four hour EMS and Disaster Day that incorporated vital concepts while addressing the pitfalls previously identified. Sessions included traditional lectures, question and answer sessions, small group exercises, and a tabletop competition. Structured similarly to a strategy board game, the tabletop exercise challenged residents to take into account both medical and ethical considerations during a traditional triage exercise.

Results: Compared to past reviews by emergency medical faculty, residents, and medical students, there was a precipitous increase in satisfaction scores on the part of all participants.

Discussion: This curriculum deviates from the conventional education model and has been successfully implemented at our 3-year residency program of 66 residents. This EMS and Disaster Day promotes active learning, resident and faculty participation, and retention of important concepts while also fostering relationships between disaster managers and the Department of Emergency Medicine.

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A Novel Strategy to MCI Management

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Introduction: On February 6, 2018, a 6.0 magnitude earthquake struck Hualien, a county of East Taiwan. Hualien Tzu Chi Hospital, the only tertiary hospital in East Taiwan, activated the mass casualty incident (MCI) call and received 144 patients that night. Our operation did not perform satisfactorily despite regular MCI drills. Thus, a new strategy to cope with the increasing frequency of disaster-related MCIs was developed.

Aim: To facilitate the management of disaster-related MCIs, we developed a novel Disaster Response System which includes a triage system combining Simple Triage and Rapid Treatment (START) and Five-Level Taiwan Triage and Acuity Scale (TTAS), a novel registration system for MCIs, and anonymous patient identification and reporting system.

Methods: We begin the triage with the START method and then shift to the TTAS. The new registration system only needs the patient's gender, age, and triage category. Patients are then assigned to different treatment areas accordingly. Further dispositions are applied after initial stabilization management. To identify the anonymous disaster victims, we take photographs of victims after clean-up and display them on an electronic bulletin with the patient list to the families in our emergency department. Real-time casualty statistics are collected automatically and synchronized to the governmental administrative system.

Results: This novel Disaster Response System reduces the time from patient arrival to definite treatment and disposition in a simulated mass casualty incident exercise. The victim

identification bulletin provides clear information to those who are seeking their family, and thus, avoids the chaos of the scene.

Discussion: From the experience of the earthquake-related MCI, we found that inadequate training causes time mis-triage and treatment delays. Our Disaster Response System facilitates the workflow with an easily practiced algorithm, reveals on-time and easily accessible information to the public, and altogether improves our MCI management.

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Nurse Leadership in a Small Hospital in the Less Developed Country: Is It Needs or Circumstances?

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Introduction: Clinic Communal de Miniera is a small hospital located in the poor Dixinn district in Guinea Conakry. The hospital functions with seven general physicians, three surgeons, one gynecologist, one dentist, and fifteen nurses. The facility provides small admitting wards for medical, gynecologist (mostly maternity), and pediatric patients. The average number of patients per day is about forty, including acute and ambulatory patients. Although there is a medical director, the daily work is run by the Head Nurse (HN) who is specialized (on spot) as an Emergency Nurse. Management of all emergency patients is based on her experience, personality and the reality of the organization.

Results: The circumstances emphasized the gaps between the managerial needs and existent reality, and raised the HN role to a team leader. The work will present the situation in the hospital as a case study related to “non-conventional” management due to a “deferent” situation and will highlight questions related to capabilities and risk factors.

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Nursing Can Improve Shelter Environment: Cluster Approach and the Sphere Standard Based Community Shelter Drill

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Introduction: As Florence Nightingale stated, nursing plays a critical role in environmental management for people in sick, injured, and even good conditions. In current practice, affected people are forced to reside in the evacuation shelters for a prolonged period in Japan. Unfavorable living conditions lead to adverse physical and psychological outcomes including cardiovascular events, depression, and more. However, environment management cannot be achieved without involving the community.

Aim: To initiate community into shelter environment management a multi-cluster drill was coordinated by the Department of Psychiatric and Mental Health Nursing, University of Miyazaki,

which appointed a director of Shelter Management for the annual nation-wide disaster drill hosted by the Cabinet Office of Japan.

Methods: With the Department of Health and Pharmaceuticals, Miyazaki Prefecture, the director invited local communities and held an exhibition type disaster drill on August 4, 2018.

Results: 36 organizations, including prefectural and municipal crisis management departments, health care organizations, a social welfare council, Red Cross, a telecommunication company, WASH cluster organizations, and the Japan Ground Self-Defense Force participated. The director requested to develop a plan filled with tactics and techniques protecting the health of people living in the shelter. Through meetings, the organizations recognized similarities and differences in roles, responsibilities, and capacities leading to an organized inter-cluster network. Participants created and prosecuted the plan independently and the director only orchestrated and negotiated with other supporting entities. The organizations exhibited and demonstrated how residents can protect their own physical and psychological health by setting up a proper shelter environment. Direct feedback from residents to organizations resulted in an expanded local network and the organizations improving their capacities.

Discussion: Shelter environment cannot be managed by nursing solely but coordination by nurses may consolidate multi-cluster aid organizations so that shelter environment management would be done by residents and local organizations.

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One Hospital's Timeline for In-Hospital Vertical Evacuation during a Flood Disaster

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Introduction: Recently, the risk of flood disasters due to concentrated heavy rains has been increasing in Japan. While some cases of hospital evacuation have been reported, standards for hospital evacuation have not been established and regional administrative evacuation plans do not include medical facilities.

Aim: To clarify the timeline for in-hospital vertical evacuation during a flood disaster.

Methods: A timeline was set for vertical evacuation as criteria of the hospital's emergency response based on the Arakawa River Downstream Timeline, which is an estimate of the time until river flooding based on the water level of the Arakawa River located near the facility. The timeline was calculated backward from 0 hours to when the river floods. A drill was held for verification.

Results: The timeline was based on the water level of the Arakawa River and objective evidence of risky transfer of critical patients; therefore, the decision to evacuate was made when the water level reached a dangerous level (-3 hours). However, this

did not provide enough time to evacuate patients in all hospital departments simultaneously, resulting in a shortage of human resources. There was a planned shutdown of the electronic clinical record system at 0 hours to avoid water damage and evacuation of its server, but three hours were not enough to prepare patient clinical summaries.

Discussion: There is a need for greater and earlier preparation for evacuation to reduce or discharge patients who can leave the hospital when a flood disaster is predicted. Only in-hospital vertical evacuation was considered because it is very risky to transfer critical patients without an evacuation order from government or municipal officials. In fact, over 10,000 patients would need to be evacuated in the region if the Arakawa River floods. Therefore, a regional plan is indispensable for such large scale and simultaneous hospital evacuations.

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Organohalogen Contamination in Vietnamese Women Electronic Waste Recyclers Living and Working in Rural Northern Vietnam

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Introduction: Electronic waste (e-waste) is increasing worldwide and is often shipped from developed to developing countries. Many of these products contain toxic levels of metals, organics, etc. When unsafe recycling approaches or methods are used (e.g., burning wire to reclaim copper), the resulting occupational exposures can adversely affect the health of e-waste recyclers.

Aim: To identify which polybrominated and which polychlorinated dibenzo-p-dioxins/furans are higher in electronic waste recyclers when compared to non-recyclers.

Methods: This study focused on female e-waste recyclers and non-recyclers that live in rural northern Vietnam. Whole blood, urine, and serum of forty e-waste recyclers and twenty Vietnamese comparisons and were evaluated for metals, organics, and dioxin-like exposure by the Center for Disease Control. This paper will be reporting on serum organohalogenes. The Vietnamese cohorts were compared to the U.S. general population, using the National Health And Nutrition Examination Survey. TEQ's were calculated and statistical significance was determined using Wilcoxon Rank Sum Test. The IRB of the University of Texas Health Science Center Houston and the Ethics Board of the Hanoi School of Public Health oversee this study.

Results: 12378-PeCDF, 123678-HxCDD, 123678-HxCDF, and 1234678-HpCDF were significantly different between recyclers and Vietnamese comparisons. Total dioxin TEQ was higher in e-waste recyclers than comparisons. Of the polybrominated dioxins and furans, 12378-PeBDD and 2378-TeBDF were significantly different between recyclers and comparisons.

Discussion: This is the only study with data on polybrominated dibenzo-p-dioxins/furans in female electronic waste recyclers from rural Northern Vietnam, and the first to describe serum levels of both polychlorinated and polybrominated

dibenzo-p-dioxins/furans in Vietnamese female e-waste recyclers. Improved occupational protocols may reduce potential adverse health effects such as cancer, endocrine, reproductive, developmental, and other disorders.

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PARABORN: A Training Program for “Outdoor” Activities by Pregnant Urgent Patients for Paramedics

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Introduction: Spontaneous delivery is a completely physiological phenomenon. Occupational obstetric care in a hospital environment focuses on supporting the mother, the smooth progression of the baby, and the treatment of the newborn child. Occupational activities play a rather supportive and assisting role. The obstetrician and the midwife are ready to respond immediately in the hospital environment to any complications or sudden emergencies. During a birth outside of the hospital environment, there are a number of influences that can cause complications in an unprepared environment without professional assistance, endangering the condition of both the child and the woman.

Methods: The educational concept of PARABORN focuses on situations outside the hospital environment. It is generalized and adaptable to varying geographic, economic, and cultural-political conditions of the target providers, particularly to rescue and paramedic teams. Educational concepts are specialized, interactive courses. The course includes a theoretical and practical block. In the theoretical part, the participants acquire knowledge of urgent obstetric conditions in an out-of-hospital environment including an overweight birth, bleeding, premature delivery, or a complicated delivery (non-standard position, umbilical cord prolapse, etc.). In the practical block, participants acquire the skills of acute interventions as well as methods of communication in these emergency situations. Practical training takes the form of case studies and can be tailored to the real geographic and cultural conditions in which the intervention units operate such as remote terrain, conflicts zones, etc.

Discussion: The knowledge of the cultural and political environment is a necessary prerequisite for managing the urgent situation. Paramedics, as first responders, should have adequate training to manage maternity situations in an out-of-hospital environment where a hospital environment is not available or accessible either by choice or circumstance.

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Pediatric Outpatient/Urgent-Care Emergency and Disaster Planning

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Introduction: Children are frequently victims of disasters, however important gaps remain in pediatric disaster planning. This includes a lack of resources for pediatric preparedness planning for patients in outpatient/urgent-care facilities. The

New York City Pediatric Disaster Coalition (NYCPDC) is funded by the NYC Department of Health and Mental Hygiene (DOHMH) to improve NYC's pediatric disaster preparedness and response.

Aim: After creating planning resources in Pediatric Long-Term Care Facilities, Hospital Pediatric Departments, Pediatric and Neonatal Intensive Care Units and Obstetric/Newborn Services within NYC hospitals, the NYCPDC partnered with leaders and experts from outpatient/urgent-care facilities caring for pediatric patients and created the Pediatric Outpatient Disaster Planning Committee (PODPC). PODPC's goal was to create guidelines and templates for use in disaster planning for pediatric patients at outpatient/urgent-care facilities.

Methods: The PODPC includes physicians, nurses, administrators, and emergency planning experts who have experience working with outpatient facilities. There were 21 committee members from eight organizations (the NYCPDC, DOHMH, Community Healthcare Association of NY State, NY State DOH, NYC Health and Hospitals, Maimonides Medical Center and Presbyterian/Columbia University Medical Center). The committee met six times over a four-month period and shared information to create disaster planning tools that meet the specific pediatric challenges in the outpatient setting.

Results: Utilizing an iterative process including literature review, participant presentations, discussions review, and improvement of working documents, the final guidelines and templates for surge and evacuation of pediatric patients in outpatient/urgent care facilities were created in February 2018. Subsequently, model plans were completed and implemented at five NYC outpatient/urgent-care facilities.

Discussion: An expert committee utilizing an iterative process successfully created disaster guidelines and templates for pediatric outpatient/urgent care facilities. They addressed the importance of matching the special needs of children to available space, staff, and equipment needs and created model plans for site-specific use.

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Perceptions of Climate Change and Disaster Risk in Oceania

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Introduction: This study profiles climate change as an emerging disaster risk in Oceania. The rationale for undertaking this study was to investigate climate change and disaster risk in Oceania. The role of this analysis is to examine what evidence exists to support decision-making and profile the nature, type, and potential human and economic impact of climate change and disaster risk in Oceania.

Aim: To evaluate perceptions of climate change and disaster risk in the Oceania region.

Methods: Thirty individual interviews with participants from 9 different countries were conducted. All of the participants were engaged in disaster management in the Oceania region as researchers, practitioners in emergency management, disaster health care and policy managers, or academics. Data collection was conducted between April and November 2017. Thematic analysis was conducted using narrative inquiry to gather first-hand insights on their perceptions of current and emerging threats and propose improvements in risk management practice to capture, monitor, and control disaster risk.

Results: Interviewees who viewed climate change as a risk or hazard described a breadth of impacts. Hazards identified included climate variability and climate-related disasters, climate issues in island areas and loss of land mass, trans-nation migration, and increased transportation risk due to rising sea levels. These emerging risks are reflective of both the geographical location of countries in Oceania, where land mass due to rising oceans has been previously reported and climate change-driven migration of island populations.

Discussion: Climate change was perceived as a significant contemporary and future risk, and as an influencing factor on other risks in the Oceania region.

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Perspective of an Academic Consortium for Preparedness of Emergency/Disaster Medical Response during 2020 Tokyo Olympic/Paralympic Games

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Introduction: A large number of visitors to Tokyo during the Tokyo Olympic and Paralympic Games in 2020 resulted in an increase of injury/illness and burden to the routine emergency medical services system. Furthermore, extremely hot and humid weather, terrorism, and outbreaks of infectious diseases are marked risks.

Aim: We introduce the present status of an academic consortium (AC2020) to fulfill our mission as academic organizations. The Japanese Association for Acute Medicine (JAAM) and six academic associations have initially established the AC2020 since 2016, which consists of the 23 associations at this time. The role of the AC2020 is to provide knowledgeable evidence, intelligence, and support for constructing response plans for medical problems via the website (<http://2020ac.com/>).

Methods: The joint committee of the AC2020 (JC-AC2020) has been launched to accomplish consortium activities; make statements and recommendations, compile manuals, conduct seminars, and coordinate the training program of on-site medical teams. The JC-AC2020 organizes nine working groups of heat stroke, lightning strike, nursing, athletes, first responders, foreigners, pre and in-hospital response of MCI, and data collection for audit.

Results: As of December in 2018, AC2020 has released 30 documents and 10 event-news on the website including seven

statements, two recommendations of a prerequisite of the on-site medical team, and two manuals concerning the treatment of gunshot and explosive injuries. Based on some of these statements, the Tokyo government has already enhanced the previous plan. **Discussion:** The AC2020 will propose the web site as a portal site and platform, disseminate the activities widely to society, and ask for the cooperation of other related organizations and academic societies. The AC2020 will aim to provide the landmark project of mass-gathering medical care in Japan as well as the transition to the Olympic Games in Paris in 2024.

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Pharmaceutical Prescribing Patterns and Costs During Hurricane Harvey Shelter Operations in Dallas, Texas

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Introduction: Hurricane Harvey made landfall in southeast Texas in August 2017, causing unprecedented flooding throughout the Texas coastal region. Residents of affected regions were forced to evacuate to nearby unaffected areas, including Dallas, TX, where a large shelter operation was opened for 23 days to care for those evacuees. Retrospective evaluation of pharmaceutical prescribing patterns for the evacuees who self-presented to the Megashelter Medical Clinic (MMC) established in the shelter contributes to developing evidence-based planning strategies for healthcare delivery in the post-disaster setting.

Aim: To describe the pharmacy needs of a displaced population following a large-scale evacuation after a hurricane

Methods: De-identified prescription records written and filled at a shelter pharmacy were reviewed, looking at both cost and category of medications dispensed over time.

Results: Approximately 41% of evacuees with a total of 2,654 visits utilized the MMC clinic, resulting in 1,590 prescriptions filled with an associated cost of \$78,039. The most commonly prescribed drug categories were cardiovascular (21.2%), neuro-psychotropic (15.6%), infectious disease (12.5%), and endocrine (9.6%). While the most commonly dispensed were antihypertensives, diabetes treatment-related prescriptions, antibacterials, antidepressants, and NSAIDs, the costliest individual prescriptions were antiretrovirals and antipsychotics.

Discussion: Prescribing patterns for the MMC differed from normal prescribing patterns of a general population. Of the prescriptions dispensed at the MMC, pharmaceutical prescription patterns suggest the immediate needs of evacuees differ from later needs. There is a greater need for chronic disease management in the early phase of shelter operations, and an increasing need for neuropsychotropic and infectious disease prescriptions over time. Understanding overall patterns of drug utilization over the duration of the shelter provides valuable insight on post-disaster medical resource utilization in evacuee populations.

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Pharmaceutical Relief Activities at Western Japan Torrential Rain Disaster

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Introduction: The torrential rain triggering massive flooding and hundreds of landslides was the worst weather disaster in Western Japan. A temporary pharmacy was established in the Kurashiki health center, which provided medicine to victims.

Aim: To evaluate the supply status of prescription under the health insurance system during a disaster.

Methods: When the enormous disaster occurred, victims get a prescription in the hospital or community pharmacy under the Disaster Relief Act or Health Insurance Act. Under the Disaster Relief Act, prescriptions that are given at a first aid station are able to be filled at the mobile pharmacies at no cost to the patient from the local government. Prescriptions that are issued by a medical institution, and are in accordance with the Health Insurance Act or National Health Insurance Act, can be dispensed at hospitals or community pharmacies. Patients may be exempt from the co-payment by being covered by their health insurance. Here, we investigated the supply status of prescription to affected people.

Results: The good points of the supply status were as following: 1) dispensing out of disaster area was a good system to relieve a pharmacist. 2) J-SPEED was also a good reporting system to provide appropriate medicine inventory management, and 3) sending prescription using a mobile phone was very useful for pharmaceutical activities. On the other hand, the points for improvement were as following: 1) more time to learn the medical insurance system during the disaster was needed, and 2) the mobile pharmacy is better to make the rounds of shelters including health care consultation.

Discussion: In case of a disaster, two different medicine supply systems cause confusion to medical relief teams. It is considered that collaboration relief activities with relief teams that included a pharmacist was very important.

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Pharmaceutical Services Preparedness of Military Units in an Institution of Brazilian Armed Forces

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Introduction: Military participation in humanitarian operations, both in cases of armed conflict and in response to natural

disasters, is a common phenomenon in several countries. In Brazil, the Armed Forces have a history in providing humanitarian assistance to victims of emergencies through their field hospitals, such as medical and dental care, laboratory and imaging diagnosis, and pharmaceutical services.

Aim: To verify pharmaceutical services preparedness of military units in an institution of Brazilian Armed Forces to disaster response and humanitarian aid.

Methods: A transversal study was carried out. The methodological approach was based on a logical model and indicators related to the preparedness of pharmaceutical services. Field research was carried out and good storage practices were investigated in loco. Key stakeholders were interviewed based on an open-ended questionnaire on the preparedness of pharmaceutical services. Interviews were transcribed and analyzed for overall content, according to analytical categories stemming from the literature and indicators prior defined.

Results: Key stakeholders of three military units were interviewed, and official documents and guidelines were also analyzed. Some pronounced shortcomings were identified, such as the lack of a specific budget for medicines management, no surplus of health supplies, lack of appropriate transports, and need of capacity building of health professionals and support team. The existence of a disaster plan, selection of essential medicines for primary reaction, forecasting of medicines, field hospitals as mobile and adaptable health structures, and a system for military mobilization are some of the strengths identified. Two military units are better structured in the management of pharmaceutical service. The third unit still needs to mature its processes to fit the health purposes of its mission.

Discussion: These findings can subsidize the improvement of pharmaceutical services' efficiency and quality in means of providing better response in emergency situations supported by the Brazilian Armed Forces.

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A Pilot Investigation of the Effect of Transport-Related Factors on Care Quality in a Moving Ambulance

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Introduction: Providing patient care in a moving ambulance can be difficult due to various transport-related factors, (e.g., accelerations, lateral forces, and noise). Previous research has primarily focused on cardiopulmonary resuscitation (CPR) performance effects but has neglected to investigate other care interventions.

Aim: To test a range of different care interventions during different driving scenarios.

Methods: A workshop with ambulance practitioners was held to create a list of care interventions to be tested. Two ambulance

practitioners were recruited to drive an ambulance on a closed test-track while performing care interventions on simulation models. Three driving scenarios of differing difficulty were used. Main outcome measures were estimates of workload using the NASA Task Load Index (TLX) and task difficulty. G-forces and video-data were also collected.

Results: Estimated workload increased overall as the difficulty of the driving scenario increased, as did task difficulty estimates. However, some care scenarios and interventions were affected less. For example, placing intravenous access increased greatly in difficulty, whereas saturation and blood pressure measurements had more modest increases. TLX scores showed that the primarily estimated physical workload and effort that increased, but also mental and temporal demands for some care scenarios. The more difficult driving scenarios primarily increased the variability of measured G-forces but not necessarily the overall driving speed, indicating that force variability is an important factor to study further.

Discussion: The study was intended as an initial pilot test of a wide range of care interventions. It will serve as input to future, larger studies of specific interventions and transport-related factors. Overall, this small pilot indicates that more interventions than only CPR should be studied in moving ambulances to investigate potential performance effects. This is important for traffic, patient, and work safety for ambulance workers and patients.

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A Pilot Study of Surge Capacity in the Metropolitan Area of South Korea

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Introduction: Seoul is the third most densely populated area in the world except for the city-state. However, a national disaster plan has not yet been established.

Aim: From September 2017, representatives of seven regional emergency medical centers in Seoul met monthly and decided to investigate basic data for the future establishment of surge capacity planning.

Methods: Staff, supply, space, and systems for surge capacity were surveyed in seven hospitals. The additional surveyed data were as follows: hospital incident command system and actual operational experience; performance of disaster drill; safety and security plan; estimation of surge capacity in normal operating conditions and extreme operating conditions; alternative therapeutic spaces; back-up plan to call non-duty medical staff; decontamination equipment; contingency plan for staff shortage; etc.

Results: All the hospitals reported they have hospital incident command systems and held disaster drills every year, however, the two hospitals (28.5%) had no real experience of hospital incident command system activation. Five hospitals (71.4%) did not have a safety and security plan. They replied they can treat average 7.7 emergency patients (Korean Triage and Acute scale

(KTAS) ≤ 3), 10 non-emergent patients (KTAS >4), 0.9 surgical patients and 0.7 unstable patients simultaneously in normal operating conditions. In extreme operating conditions, they replied they can treat average 26.4 emergency patients (KTAS ≤ 3), 54.3 non-emergent patients (KTAS >4), 37 surgical patients and 2.3 unstable patients simultaneously. The two hospitals (28.5%) had no alternative therapeutic spaces, no back-up plan to call non-duty medical staff and no contingency plan for staff shortage. Three hospitals (42.9%) did not have decontamination equipment.

Discussion: The survey revealed the basic data for surge capacity planning in Seoul. Data from hospitals other than regional emergency medical centers should be collected for the completion of disaster plans.

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Planning for the Use of Imaging in Mass Casualty Incidents

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Introduction: A mass casualty incident presents a challenging situation in any health care setting. The value of preparation and planning for mass casualty incidents has been widely reported in the literature. The benefit of imaging, in particular, forensic radiography, in these situations is also reported. Despite this, the inclusion of detailed planning on the use of forensic radiography is an observed gap in disaster preparedness documentation.

Aim: To identify the role of forensic radiography in mass casualty incidents and to explore the degree of inclusion of forensic radiography in publicly available disaster planning documents.

Methods: An extended literature review was undertaken to identify examples of forensic radiography in mass casualty incidents, and to determine the degree of inclusion of forensic radiography in publicly available disaster planning documents. Where included, the activity undertaken by forensic radiography was reviewed in relation to the detail of the planning information.

Results: Limited results were identified of disaster planning documents containing detail of the role or planned activity for forensic radiography.

Discussion: While published accounts of situation debriefing and lessons learned from past mass casualty incidents provide evidence for integration into future planning activities, limited reports were identified with the inclusion of forensic radiography. This presentation provides an overview of the roles of forensic radiography in mass casualty incidents. The specific inclusion of planning for the use of imaging in mass fatality incidents is recommended.

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Practicing What You Preach

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Introduction: During a mass casualty incident (MCI) seminar in Rome, Italy a survey was used to gauge the self-efficacy and confidence of the participants in managing an MCI. Following the course, a follow-up presentation was held by the Torino EMS Medical Director to evaluate and debrief the Torino Railway incident that occurred one day prior. Students partook in a seminar on MCI management, as well as a debriefing of the Turin Railway accident in which they evaluated the skills used by teams on the scene to manage the incident.

Methods: Medical students partook in a seminar to learn to manage an MCI scene, as well as a debriefing of the Turin Railway accident. Following both seminars, the students were given a survey to assess their sense of self-confidence in managing such a situation.

Results: The mean level of self-efficacy prior to the MCI training (M=3.43, SD+0.42) increased after the training (M=3.71, SD+0.37) and remained at the same higher level (M=3.71, SD+0.51) after the medical students were exposed to the details of the Turin train accident. The overall difference between the mean self-efficacy scores in the three time frames was not found to be significant. The mean level of confidence in managing MCIs prior to the training (M=2.83; SD+0.89) increased after the training (M=3.56; SD+0.53) and remained higher following the presentation of the Turin train accident, despite a slight decrease (M=3.52, SD+0.63).

Discussion: The participants' surveys showed an increase in their self-efficacy and confidence following the course and follow-up presentation. It is our professional recommendation that real-life events be used in such seminars to increase self-efficacy and confidence. The topic will continue to be evaluated further.

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Preparing for Disaster: Behind the Scenes of Maintaining and Deploying an Emergency Medical Team . . . Equipped. Prepared. Ready.

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Introduction: Deploying an EMT to respond to a sudden onset disaster entails significant operational activities and support back home to deploy and support a responding team. These activities also include peacetime operations, exercising, innovation, engagement, training, and development of both team members and operational staff to further knowledge and experience.

Aim: To exhibit the operational activities and complexities of maintaining a deployable cache of equipment and consumables for deploying a self-sustaining Emergency Medical Team (EMT). This includes the elements of managing a high-performance team, human resource management ensuring the readiness of personnel to rapidly respond, maintaining World Health Organization (WHO) international standards for

EMTs, and the operational aspects and support behind the scenes to deploy a team.

Methods: Analysis of operational activities and support for pre-deployment, deployment, and post-deployment phases including preparedness through innovation, collaboration, development, and maintenance of a high-performance team and cache.

Results: The analysis of operational activities behind the scenes of deploying EMT maps the unique complexities of maintaining and deploying a high-performance team at all stages of deployment, demonstrating the success of a team in the field is attributed to the support and activities of the team back home to deploy them.

Discussion: There is substantial preparation and behind the scenes operational activities that are undertaken to deploy and support a deployed EMT. Lessons learned from each deployment build on the operational capacity of staff deploying a team and on the future directions, innovations, and practices of a deployed team in the field.

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Preparing Health Care Professionals for Public Health Disaster Management

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Introduction: Disasters are a major challenge for public health because of damage caused by death, injury, or illness that exceeds health services' ability to respond. Health professionals and students require awareness and understanding of particular aspects of disaster planning, mitigation, response, or recovery. In Brazil, despite the increase in the number and intensity of disasters, there is no formal acceptance regarding the need to integrate disaster content into curriculum guidelines (1)

Aim: To develop and test referential and models for disaster management health professional education.

Methods: Competence-based education has been proposed. The methodology adopted was developed by the Association (2) and adapted to be used in the Brazilian context. An initial literature search was performed in MEDLINE via PubMed, Google Scholar, Lilacs, and Scielo databases using disaster and competencies as descriptors.

Results: Articles and documents in Portuguese, Spanish, and English were identified for: public health (21), nursing (20), multi-professional (16), psychology (4), pharmacy (4), dentistry (2), medicine (1), veterinary (2), and nutrition (1). Data were organized according to a proposal from the literature (3) Selection of benchmarks for the preparation of education models identified 27 referential, three of them developed in Brazil.

Discussion: Application and evaluation of the methodology developed with undergraduate students of the Federal

University of Rio Grande do Sul consisted of an initiative to prepare health care professionals for disaster management.

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The Problems on Your Desk: A Research Study to Define and Describe Paramedic Practice in Canada

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Introduction: Paramedicine is a rapidly evolving profession, growing from its initial role of providing emergency care and transportation of the sick and injured into a broad discipline providing a wide range of care in multiple practice settings, yet the field is relatively unexplored. Much of the research in the field centers on patient care, often from the perspective of emergency medicine. A growing body of literature describing the discipline itself is largely descriptive.

Aim: This interactive presentation describes and contributes to an applied research project that will define and describe Canadian paramedic practice. The research will develop frameworks, common taxonomy and designs, and evidence to support development of a national Canadian Paramedic Information System.

Methods: This two-year mixed methods study is gathering data from a literature review, stakeholder workshops, and key informant interviews. The project will develop "user cases" that explore the issues and challenges facing Canadian paramedic stakeholders and identify the information and data required to address those issues.

Results: The presentation will present initial findings that describe core concepts, data/knowledge structures, and models that are foundational to understanding and informing current and emerging paramedic practice. It will explore this data in relation to operational needs of practitioners, operations, communities, and stakeholders to inform decision-making, guiding policy and direction, and advancing the profession. Lastly, it will develop explanatory principles, models, and relationships in a conceptual framework that describes paramedic practice.

Discussion: The study will develop models and core data sets that guide research and support policy development at local and national levels, and inform operational and strategic decision-making. The presentation will provide an overview of the research and findings to date. Participants will engage in activities that explore the user-cases and selected findings, applying

the results of the study through the lens of their own backgrounds and operational contexts.

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Putting the Theoretical to Practical Use

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Introduction: Managing an MCI (Mass Casualty Incident) can be a daunting task for emergency responders. Effective management can be a matter of life and death but can be directly impacted by the feelings of the incident commander.

Aim: Students were trained to be incident commanders, then following the course were given a survey. In the days following the training, an MCI occurred involving a train full of passengers. The students were then given another survey to assess their readiness following the practical use of their studies.

Methods: Students were given a survey to determine their mean level of confidence in managing MCIs prior to training, and following the training. Following the training, there was an increase in confidence. After the training, there was an MCI in which their theoretical knowledge was put to the test.

Results: The pre-training self-efficacy mean scores of younger students ($M=3.5$, $SD+0.23$) increased after the training ($M=3.8$, $SD+0.28$) and rose even more following the presentation of the Turin train accident ($M=4$, $SD+0.26$). While a similar increase in self-efficacy was found among the more mature students post-training compared to the level prior to the training ($M=3.7$, $SD+0.44$ versus $M=3.4$, $SD+0.56$), the mean self-efficacy score of the mature students decreased following the presentation of the Turin train accident to the pre-training level ($M=3.4$, $SD+0.51$).

Discussion: Mean scores of self-efficacy and confidence in managing MCIs were found to be higher among medical students that were previously trained in coping with MCIs compared to medical students who participated in such a training program for the first time.

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A Qualitative Study of Household Emergency Preparedness of the Elderly and the Medically Frail Living in Coastal Urban Environments

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Introduction: As more chronically ill people are living in the community and disasters are occurring frequently, the elderly and the medically frail vulnerable populations are experiencing significantly more disaster-related morbidity and mortality than the rest of the population. A failure to adequately address these vulnerabilities has been shown to have negative effects on the response to the disaster and the community as a whole.

Aim: The purpose of this research was to understand how older and/or medically frail adults have experienced disaster and how

this experience impacts what they do now to prepare for disaster. A second purpose was the generation of theory regarding the process through which community members prepare for disasters.

Methods: This study employed a qualitative descriptive methodology, Situational Analysis, to explore the social processes of disaster preparedness in older and/or medically frail adults.

Results: The core category was “Experience is the Best Teacher.” Based on the findings, it was theorized that these community members are generally considered unprepared for disaster. Their lack of preparedness is due in large part to a lack of education on how best to prepare. Once educated, motivation for self-responsibility of household emergency preparedness can be expected. Community interventions like distributing disaster supply kits and offering evacuation assistance help overcome their situational impediments to preparedness and provide the best chance for these community members to survive disasters without becoming ill or injured or experiencing a decline in their baseline functional status. If these community members are incidentally prepared, it is largely due to their past experience with disaster or their professional experience.

Discussion: The results from this study could inform emergency plans and policy efforts to better meet the needs of elderly and medically frail community members during disaster.

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A Quantitative Study of the Dimensional Change of Inferior Vena Cava on Computed Tomography During Acute Hemorrhage Shock

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Introduction: The collapsed inferior vena cava (IVC) in computed tomography (CT) images can be found in patients with hypovolemic shock, making it an attractive diagnostic sign in early treatment of trauma patients. However, current research results are controversial.

Aim: To examine the dimensional change of IVC during acute hemorrhage through a volume controlled acute hemorrhagic shock model in swine.

Methods: Volume controlled hemorrhage was performed in 10 adult Bama minipigs. Enhanced CT scan and hemodynamic monitoring were performed when the cumulative blood loss volume reached 0%, 10%, 20%, 30%, and 40%. The transverse diameter (T) and anteroposterior diameter (AP) of IVC were measured in axial images. Hemodynamic parameters were obtained with a Pulse Contour Cardiac Output (PiCCO) hemodynamic monitor device. Arterial blood samples were also collected for artery blood gas analysis at each time point.

Results: As the blood loss volume increased, the collapsibility (T/AP) and cross section area (CSA) of IVC significantly changed in hepatic level and pre-renal level. The significant decrease of the CSA of IVC (shrink) occurred early when the blood loss volume reached only 10%.

Discussion: The IVC shrank early but collapsed late during acute hemorrhages in swine. The collapsed IVC on CT scans

suggested a severe hypovolemic shock state but not an early indicator for shock.

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Radiation: Preparing for the Glow That You Can't See

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Introduction: In 2013, a multinational collaboration met to improve the global and nation-specific preparedness and response in managing casualties from nuclear and radiological disasters. From this meeting, a survey was developed and distributed in both Japanese and English. The results published four years later illustrate a lack of understanding about radiation and risks to the health care provider.

Aim: To dispel myths and increase understanding regarding trauma treatment and healthcare risks for healthcare providers during a radiologic event.

Methods: IRB approved survey and literature review

Results: A total of 418 surveys were analyzed. Although 44% of participants acknowledged that they had taken at least one radiological training course, the majority of the respondents were still not comfortable with radiological emergencies.

Discussion: Despite the plethora of both online and in-person radiological training availability, healthcare providers are not comfortable with the topic. Based on information from the survey, it is important to dispel myths and educate healthcare providers so that they have reasonable expectations regarding risks and to ensure that they are comfortable coming to work. By doing this, there will be an adequate healthcare presence to help take care of patients who are not only in need of immediate trauma and radiologic exposure care but also with non-affected patients coming for emergent and scheduled health care needs.

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Real-Time GIS for Health Disaster Response in the Largest Archipelagic Country

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Introduction: Besides being located on the Pacific Ring of Fire, Indonesia is the largest archipelago country in the world. Some parts of the country are not very accessible. It raises difficulties in controlling and monitoring a disaster response mission remotely in real-time. Muhammadiyah, the Indonesian non-governmental organization (NGO) that has been responding to disaster since 1919, used Geographic Information Systems (GIS) for Health Disaster Response (HDR) in the Lombok Earthquake 2018, in cooperation with ESRI Indonesia, as one alternative to disaster response controlling and monitoring.

Aim: To show the benefit of using real-time GIS for HDR in an archipelago country.

Methods: While responding to the disaster in Lombok, the Muhammadiyah Health Disaster Response Team was collecting data of patient, medication, problem, need, location, and resource with computers and smartphones, inputting the data that was forwarded to the ArcGIS platform. The Health Disaster Response Team coordinator and Muhammadiyah Board monitored and analyzed the health response through the GIS dashboard in Yogyakarta, 652km far from Lombok Island.

Results: Using real-time GIS has been useful for disaster response. It was efficient by cutting flight and other transport costs, connected by the internet, and communicative by graphic and map dashboard. It was a green approach since it was paperless, and analysis-friendly by real-time data compilation and computation.

Discussion: One of the big gaps in disaster response monitoring seems to be real-time data. Especially in an archipelago country, it is costly, time-consuming, and resource consuming. Daily big data may be frustrating and can become “white paper syndrome.” One of the good approaches to that is GIS Web services although it must be realized that the internet connection in a rural area can be another challenge. It can be solved by in-gadget data memory that can be delivered while the internet connection is available.

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Regional Engagement Program: Supporting Local Leadership and Building Local Skills and Knowledge in Order to Develop a Systematic Approach to Disaster Medical Management

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Introduction: One of the key components in any effective disaster response is the capacity of local communities to respond in a timely and efficient manner. Over the last 3 years, the National Critical Care and Trauma Response Centre in Darwin has been involved in building regional capacity across the Asia-Pacific, supporting local leadership and building local skills and knowledge in order to develop a systematic approach to disaster medical management.

Aim: This presentation is to describe the Regional Engagement Program, its strengths, weaknesses, and outcomes.

Methods: We will describe the background to the program, the process for regional engagement and the Results of our evaluation. The program used the Major Incident Medical Management Systems (MIMMS) approach which was delivered in-country and included identifying and using local personnel to deliver the program. The program was conducted across the region in Myanmar, Fiji, Tonga, Vanuatu, Samoa, Timor, and Indonesia. Initially the courses were run by personnel from Australia but through engagement with local Ministries of Health and collaboration with identified key

stakeholders, we have been able to build local faculty to ensure sustainability and local ownership.

Results: Thirty-six personnel have been trained across four countries. Thirty-six candidates are now instructors, with a further 36 identified for future development as instructors. The evaluation illustrates the long-term partnerships that have been developed and the ongoing capacity development of key regional partners.

Discussion: The Regional Engagement program demonstrates that prolonged engagement with key regional stakeholders and adequate and sustained mentoring will successfully build local capacity to the level needed to mount a successful response to a disaster. Personnel trained through this program helped guide the response to the Lombok earthquake and in Fiji, a MIMMS Team Member training program was conducted with minimal external support.

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A Registry Software for Road Traffic Injury Patients at Apex Trauma Centre in India: An Innovation

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Introduction: A trauma registry is a disease-specific data collection composed of a file of uniform data elements that describe the injury event, demographics, prehospital information, diagnosis, care, outcomes, and costs of treatment for injured patients.

Aim: To establish a trauma registry system on an electronic platform enabling data capturing through Android phones.

Methods: A software has been developed for the registry data collection for road traffic injury patients arriving at JPNATC, AIIMS, New Delhi. The software has been designed to use in the Emergency Department on Android phones/laptops with internet access.

Result: A detailed registry data set has been prepared to enter prehospital, in-hospital, and post-discharge details of all the admitted patients. This includes demographic data, prehospital data, injury event data, vital signs within 24-hrs of arrival, ED disposition (date and time), operative procedures within 48 hours of arrival, chest x-ray (date and time), CT (date and time), ventilation days, ICU-stay days, hospital disposition (date and time), injury coding data (region, severity level, ISS, AIS, ICD-10) and Others, e.g., first neurosurgical consultation (date and time) and first blood transfusion (date and time). There are two panels for this software; one for user panel and another for the administrative panel. User panel is being used for data collection by the trained data collectors 24/7 at the emergency department on a rotation basis. The administrative panel is accessible to only the investigator or other authorized persons. The administrative panel and user panels are password protected. The entered data is being saved in a spreadsheet in the backend and can be used for periodic data quality check and data analysis.

Discussion: There is no trauma registry in India so far for the road traffic injury patients. Present innovation would lay the foundation of national Trauma Registry in India.

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Required Competencies for Clinical Nurses during the Initial Phase of Disaster Emergence

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Introduction: A learning project was launched to prepare for natural disasters such as earthquakes and floods. Competencies were developed for clinical nurses in the Initial phase of disasters as an indicator to build a bridge between daily training and actions during crises. There are two predominant features of the competencies that differ from other works. First was to concentrate only on “the initial phase” of a crisis outbreak. The second was to associate each competence with services and roles of clinical nurses.

Methods: The development has been conducted in accordance with the ibstpi[®] competency development model. First, 50 outlining competencies from earlier studies were selected, like ICN Framework and Disaster Nursing Core Competency for undergraduates in Japan. Then a web-based questionnaire was carried out with a four-point scale of “able,” “probable,” “impossible,” and “cannot understand meaning” for incumbent nurses in order to gauge their adequacy.

Results: There were 86 responses with an average of 14 years (1-40) of nursing experience. We compared them in three groups; those with a job post (G1), those with experience of longer than five years (G2), and those with experience of fewer than five years (G3). The average competency score (total 150 points) was 96.7 (67-129) in G1, 88.2 (53-145) in G2 and 80.2 (59-114) in G3.

Discussion: The results imply, even in G1, the average score is low at 65/100 points. This may indicate most clinical nurses should make efforts to develop their skills and knowledge of disaster nursing through daily work. Only 32 competencies (G1), 14 (G2), and 5 (G3) were marked as “able” or “probable” by over 80% of responders. Thus with consideration, depending on the result and expert reviews, the competencies determined to be “required” for clinical nurses were finally refined down to 35 items including the premise of ten.

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Rescue Operations in Underground Mines: Caring for Patients in a Challenging Environment

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Introduction: Major injury incidents in underground metalliferous and mineral mines are rare, but if, e.g., a major fire would occur, it is the emergency medical service (EMS) together with the mining company and rescue service who perform the rescue operation. Therefore it is important to develop safe and efficient rescue operation procedures for all the organizations involved, especially the EMS personnel.

Aim: To examine EMS personnel's perceptions and experiences regarding underground mining incidents.

Method: Individual interviews were performed with 13 Swedish EMS personnel. The interviews were transcribed verbatim and analyzed with qualitative content analysis.

Results: The theme "providing the same care in a difficult environment" emerged. Depending on the type of incident, the EMS personnel considered if the injured mining workers could be cared for either outside or in the mine in order to access and care for the injured mining workers as quickly as possible. The EMS personnel mentioned that it was difficult to make the decision if they should enter the mine or not due to the uncertainty of their safety. They also considered that it could be harder to accomplish the same level of care as in other incidents due to the difficult environment. In some instances, they cannot drive their ambulance vehicles into the mine, so they have to prioritize which equipment to bring as well as consider how to transport the patients.

Discussion: The results identify some of the difficulties the EMS find challenging. Therefore the results could be used in finding solutions and making the EMS prepared for an effective and timely response for injured in underground mines.

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Research on Design of a Disaster Medicine Course for Clinical Medical Student

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Introduction: Currently, there is no uniform and standard disaster medicine course for students in medical school.

Aim: To design a disaster medicine course model based on knowledge structure, teaching and evaluation methods according to experts' advice and interest of undergraduates majoring in clinical medicine.

Methods: The first and second level catalog defined as chapters and sections for the disaster medicine curriculum were drafted based on literature and summary of fragmentary experience. The teaching syllabus with methods of teaching and evaluation was initially outlined. The expert consultation form and student questionnaire were designed and validated. Experts in disaster medicine in China were consulted and students in our medical school were investigated. Delphi Methods was used and the chapters and sections were adjusted and weighed according to experts' advice through the Analytic Hierarchy Process. The teaching and evaluation methods for each knowledge module were obtained based on suggestions from experts and students.

Results: A total of 31 experts were consulted. 320 students were inquired. By two rounds of consultation with Kendall

coordination coefficient W value 0.207, chi-square value 128.781 ($p=0.01$), consensus about the knowledge structure for the curriculum were achieved, which consisted of 6 chapters (as Introduction to disaster medicine, incident command, medical knowledge and skills in disaster, public health, ethics in disaster, information management, with the weights of 0.1486, 0.1999, 0.4209, 0.0785, 0.0748, 0.0774 respectively) and 25 sections. Teaching methods for different knowledge module were determined, which included lecture, demonstration, case discussion, drill and sand table simulation. And the evaluation methods were affirmed as a quiz, written examination, skill test and team-work test assessed by intra-group and inter-group evaluation.

Discussion: Through scientific investigation of experts in disaster rescue and undergraduates majoring in clinical medicine, a disaster medicine course model for clinical medical students was established.

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Resilience Training of Regional Medical Command and Control

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Introduction: Resilience is often described as a desirable holistic approach to disaster preparedness. However, the term has a wide variety of meanings and is hard to operationalize and implement in disaster management. A goal for the EU H2020 project DARWIN was to operationalize resilience for incident management teams.

Aim: To test the resilience operationalization by analyzing command team behaviors in a major incident exercise and trace observations to resilience theory.

Methods: A regional medical command and control team ($n=11$) was observed when performing in a functional simulation exercise of a mass casualty incident (300 injured, 1800 uninjured) following the collision of a cruise ship and an oil tanker close to the Swedish coast. Audio and video recordings of behaviors and communications were reviewed for resilient behaviors based on the DARWIN guidelines using the "resilience markers for small teams" framework (Furniss et al., 2011).

Results: A total of 121 observed instances of resilient behaviors were found in the material. In 95 cases (79%) the observed behaviors followed a priori hypothesized connections between resilient strategies and general markers. Certain marker-strategy combinations occurred frequently, such as 18 observations where the strategy "understand crucial assumptions" occurred together with the marker "adapting to expected and unexpected events."

Discussion: Resilience has the potential to contribute to a more holistic disaster management approach. The findings that the observations, in general, correspond to the expected relationship between theoretical concretization and contextualization supports the DARWIN effort to operationalize resilience theory. This is a prerequisite for developing observational

protocols for training and further studies of resilient behaviors in disaster management teams.

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Revised Hospital-MIMMS Course for Japan

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Introduction: HMIMMS (Major Incident Medical Management and Support: The Practical Approach in the Hospital) has been introduced by ALSG (Advanced Life Support Group, Manchester, UK) and developed for many countries for preparing to accept huge numbers of casualties at a hospital during major incidents. The original HMIMMS course has been held in Japan since 2007, produced over 1,200 providers. Japan has a crucial history of natural disasters, earthquakes, tsunamis, and typhoons often resulting in extensive damages to infrastructure and communications.

Aim: The MIMMS-JAPAN and the Japanese Association for Disaster Medicine have joined to plan to revise the original HMIMMS course from the point of view of the difference of the type of disaster.

Method: By the permission of ALSG, two subjects were added “Hospital Evacuation” and “Business Continuity Plan” as lectures, workshops, and tabletops to the original HMIMMS course. Before attending the course, students were required to watch e-learning for deeper understanding and time-saving. Total program was organized into two days.

Results: Main points of modification are to:

1. Replace a system peculiar to the UK with a Japanese system.
2. Add unique contents of a Japanese disaster.
3. Add the important subjects especially in Japan.
4. Modify the presentation slides to understand easily for Japanese students. But the fundamental concept that hospital functions upon ‘CSCATTT’ is strictly preserved.

Discussion: Newly revised HMIMMS course will start in 2019 for Japanese learners. Many reflections must be accumulated and further revisions will continue.

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Risk Mapping of Road Traffic Incidents in Greater Kampala Metropolitan Area for Planning of Emergency Medical Services

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Introduction: Compared to high-income countries, low and middle-income countries (LMICs) bear the heaviest brunt of road traffic incidents (RTIs), which is a serious public health and development burden. Like other LMICs, Uganda has been experiencing a worryingly high burden of RTIs and their associated impacts with the highest number of all the total registered RTIs in Uganda registered in the Greater Kampala Metropolitan Area (GKMA). This places a tremendous demand on the few existing emergency medical services (EMS) to adequately respond to those affected. **Aim:** To aid in better planning of EMS for the victims of RTIs by using risk mapping of RTIs in the GKMA.

Methods: A mixed methodological approach involving a systematic review, Delphi panel technique, retrospective data analysis, and a cross-sectional method.

Results: With Uganda progressing forward as envisaged in its “Vision 2040,” the GKMA, which is the country’s political and socioeconomic epicenter, is experiencing significant changes in terms of population growth. This has significantly increased RTIs, which puts pressure on the pre-hospital emergency care for those affected unless necessary actions are taken.

Discussion: Therefore, the road safety vis-à-vis injury prevention measures, which are needed to reduce the burden of RTIs, should be multifaceted in nature so that they closely correlate with the ongoing dynamics that cause them, particularly in the GKMA which experiences the highest number of RTIs and Uganda as a whole. The WHO “Safe System Approach” is desirable for this purpose as it represents the most appropriate approach because it is broad enough to comprehensively manage any of the ongoing dynamics (political, socio-cultural or economical) that are known to contribute to RTIs.

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The Role of the Nurse Disaster Preparedness Coordinator at a Large Suburban Teaching Hospital

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Introduction: Mass casualty incidents, whether man-made or natural, are occurring with increasing frequency and severity. Hospitals and health systems across the United States are striving to be more rigorously prepared more such incidents. Following a mass shooting in 2012 and significant growth and expansion of our hospital and health system in the following years, a need was identified for more staff to support preparedness efforts.

Aim: To discuss the roles and responsibilities of Nurse Disaster Preparedness Coordinator (NDPC), a dedicated position in the Emergency Department (ED).

Methods: The role of Nurse Disaster Preparedness Coordinator was implemented in 2016, is a part-time position in the Emergency Department and reports to the ED Manager while working closely with the ED Director of Emergency Preparedness and the hospital Emergency Manager. The role addresses all areas of the emergency

management continuum, from planning and mitigation to response and recovery.

Results: The NDPC's responsibilities fall into the categories of all-hazards preparedness, chemical, biological, radioactive, nuclear and explosive (CBRNE) response, and general nursing practice. All-hazards preparedness includes ED staff training, policy and procedure development, and liaising with hospital emergency manager to coordinate hospital-wide efforts. CBRNE response includes the training and maintenance of a patient decontamination team, a high-risk infectious disease team, and their equipment. General nursing practice addresses research, nursing indicators as they apply to disasters, promoting evidence-based practice, and community outreach.

Discussion: A dedicated Nurse Disaster Preparedness Coordinator has allowed transition from intermittent larger exercises to a regular and frequent exercise schedule and better application of full-scale exercises. Overall, the creation of the role has strengthened hospital readiness for mass casualty incidents while alleviating the vast scope of emergency management responsibilities for a large suburban hospital.

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The Role of Emergency Medical Team: Experience Acute Response in Earthquakes and Tsunami at Palu, Central Sulawesi, Indonesia, 2018

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Introduction: The natural disasters of the earthquake and tsunami occurred in Palu, on September 28, 2018, at around 17.02 WIB. The earthquake measured 7.7 magnitude with the epicenter at a depth of 10 km in the direction of 27 km northeast of the city of Donggala, followed by a tsunami along the coast of Talise town of Palu. Some of the victims of the disaster have died, and in addition to many deaths, there were reported trauma cases such as fractures, torn wounds, and other injuries where many did not receive medical help.

Aim: To revitalize hospitals in Palu with the medical assistance team.

Methods: Sardjito hospital formed a medical team sent to the disaster area which consisted of 22 members from various disciplines (anesthetists, orthopedic surgeons, general surgeons, neurosurgeons, internal medicine doctors, pediatricians, general practitioners, anesthesia nurses, emergency nurses, surgical room nurses, sanitarians, sterilization officer, technical officers, and nutrition officers). The ICS informed the targets of this emergency response that the following must be accomplished within 2 weeks: revitalize the health care facilities and deliver health care. The sanitarian officer coordinated dealing with the problem of the former corpse in Bhayangkara Hospital by doing disinfectants in the area of the former mortuary. Sardjito Hospital's medical team revitalized health services in Bhayangkara Hospital by providing 24-hour emergency services and surgery.

Results: The medical team of Sardjito general Hospital gave medical service in Bhayangkara Hospital and Torabello Regional Hospital. The total number of treated patients was 158, and most cases of surgery were orthopedics.

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A Sense of Trust, the Norwegian Way of Improving Medical On-Scene Managing Major Tunnel Incidents: An Interview Study

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Introduction: Norway is a country with many road tunnels and therefore also has experience with rescue operations in tunnel environments. Major incidents always challenge involved emergency services' management skills. Oslo, Norway has a specially trained medical on-scene commander, a function already existing in police and rescue service. Intra-agency communication and management of personnel are essential factors for a successful rescue effort.

Aim: To investigate the medical management provided by the specially trained Norwegian medical on-scene commander in relation to tunnel incidents.

Methods: Interviews were conducted with six of the seven medical on-scene commanders in Oslo. The collected data were analyzed using qualitative content analysis.

Results: An overarching theme emerged: A need for mutual understanding of the tunnel incident. The medical on-scene commanders established guidelines for response in collaboration with the other emergency services. By creating a sense of trust, the collaboration between the emergency services became more fluent. Socializing outside of work resulted in improved reliance on their counterparts in the other services. The management also included that the medical on-scene commander supervised his personnel on site by providing support using knowledge of the risk object and surrounding area.

Discussion: A forum for the emergency services on-scene commanders where they share ideas and knowledge, improve the on-scene intra-agency communication, and trust is desirable. A culture of trust between the organizations is needed for a mutual understanding. Further research on this subject is needed in other contexts and countries.

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Sleep in Emergency Services Workers: What Do We Know and Why Does It Matter?

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Introduction: Emergency service workers perform physical work while being subjected to multiple stressors and adverse, volatile working environments for extended periods. Recent research has highlighted sleep as a significant and potentially modifiable factor impacting operational performance.

Aim: This presentation would (a) examine the existing literature on emergency service workers' sleep quantity and quality during operations, (b) synthesize the operational and environmental factors that impact sleep (e.g., shift start times, shift length, sleeping location, smoke, noise, heat), and (c) assess how sleep impacts aspects of emergency service workers' health and safety, including mental and physical health and performance.

Methods: This presentation would be based on a narrative review conducted by the authors which used a systematic search strategy of health-related databases. Articles that were not relevant, duplicate or from non-peer-reviewed sources were excluded.

Results: Sleep is restricted during emergency service deployments, particularly when shifts have early start times, are long duration, and/or when sleeping in temporary accommodation (e.g., tents, vehicles). Shortened sleep impairs cognitive but not physical performance under simulated emergency services conditions.

Discussion: Depending on the organization and jurisdiction, these findings warrant re-evaluation of existing policies, formalization of beneficial but currently ad-hoc practice, or provide support for current procedures. Work shifts should be structured, wherever possible, to provide regular and sufficient recovery opportunities (rest during and sleep between shifts), especially in dangerous working environments where fatigue-related errors have more severe consequences. For agencies to continue to defend local communities against natural hazards, strategies should be implemented to improve and manage emergency service workers sleep and reduce any adverse impacts on work.

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Social Media in Disasters

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Introduction: Individuals may not receive messages via usual sources. Social media such as Facebook, LinkedIn, Twitter and social networking groups have been useful in the notification, information dissemination, safe notices, and reunification.

Methods: A survey of the literature and of social media sites to determine what possibilities of notification, information exchange, marked safe, and reunification information that can be helpful in disasters.

Results: Social media is useful during all phases of a disaster: pre-disaster notification, information dissemination during disasters, and safe notices/reunification post-disaster

Discussion: Social media is internet-based and requires a device that needs power. There is widespread internet access to various forms of social media, such as email, various broadcast sources,

and social networking sites. Social media may provide pre-disaster warnings (weather alert app, reverse 911), evacuation/sheltering information, blocked routes, open gas stations, stores with supplies, hotels/motels with rooms, and shelter locations. Social networking groups were full of messages informing others they could shelter someone fleeing the California wildfires and recent hurricanes. Volunteers can be alerted and responses collected via social media groups. Social media may reach individuals earlier than official announcements, although sometimes accuracy may be in question. Rumor and malignant information source as well as inaccurate information are possible and may need to be managed. Separation is common during disasters. Knowing if their loved ones are safe and well, then reunifying is critical, especially for the vulnerable: children/infants, elderly, and disabled. Reunification systems need safeguards for vulnerable individuals who may be exploited or abused during disasters. In previous disasters (Hurricanes Maria, Mark, and others; California wildfires), when usual communication was nonfunctional due to downed power lines or damaged/destroyed substations; social media was deluged with individuals giving names and identifying information for family and others and asking whether anyone has seen or heard from them.

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Standardized Measurement of Capillary Refill Time using Novel Technology

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Introduction: In a patient going into shock, blood is redistributed from the periphery to the central circulation, making an assessment of skin perfusion useful in a prehospital setting. Capillary refill time (CRT) is the time required for a pressure blanched skin site to reperfuse. Currently, CRT is tested by manually applying pressure for 5s to the skin and observing the time before reperfusion. Guidelines state that CRT should be 2-3s in a healthy patient. Shortcomings in this procedure include lack of standardization of pressure, subjective assessment of the time for reperfusion, and not accounting for the patient's skin temperature.

Aim: To develop a standardized objective procedure for testing CRT in the prehospital setting.

Method: The study protocol was approved by the Ethics Committee at Linköping University (M200-07, 2015-99-31). An electro-pneumatic device exerting constant force (9N) over 5s was developed. CRT was measured using the Tissue Viability Imager (Wheelsbridge AB, Sweden) which relies on polarization spectroscopy. To simulate hypothermic conditions, healthy volunteers were subjected to low ambient temperature (8°C). Blood loss was simulated using a custom-built lower body negative pressure (LBNP) chamber. In both scenarios, the CRT test was carried out on three test sites (finger pulp, forehead, and sternum).

Results: CRT on the finger pulp and sternum was shown to be increased following the hypothermic conditions, but not on the forehead. Skin temperature on the three sites followed the same pattern, with the forehead being virtually unchanged. Tests performed during LBNP revealed an apparent effect on CRT following the simulated blood loss, with prolonged CRT for all sites tested.

Discussion: A successful methodology for objective assessment of CRT was developed, which was validated on healthy volunteers following hypothermia or simulated blood loss. Ongoing work will investigate a combination of hypothermia and blood loss to more accurately simulate the prehospital setting.

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Strategies to Decrease Nurses' Stress in a Federal Medical Station (FMS) Medical Needs Shelter in the U.S. after a Hurricane Disaster

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Introduction: National Disaster Medical System (NDMS) Disaster Medical Assistance Teams (DMATs) are used to provide medical care when local and state resources are overwhelmed in response to natural and human-made disasters. The stress these professionals experience during these events requires intentional and therapeutic interventions to support emotional and mental resilience. Evidence-based interventions will be presented.

Aim: DMATs were deployed after Hurricane Maria to work in a Federal Medical Station (FMS), at the Coliseum Bencito, Manati, Puerto Rico. The FMS was operated through a collaboration of federal agencies and non-government agencies. Community infrastructure was impacted, including two damaged area hospitals, overwhelming available resources with increased patient care demands. The facility provided acute care and short-term services around the clock for a 10-day period, serving several hundred clients, in and around the municipality of Manati.

Methods: Several strategies were utilized to decrease stress levels while nurses worked at the FMS included having a safe and secure environment, sharing stories with peers, taking scheduled breaks, utilizing physical activities (Zumba), and having designated sleeping areas. Additional strategies used for clients were relief supply choices, allowing one person to stay with special needs client, and bereaved care.

Results: Nurses were able to decrease stress levels to themselves and clients while working with community partners providing acute and chronic health care needs at the area where health care services were impacted. Verbal and written feedback was provided during formal and informal meetings as well as receiving client comments on the services given at the facility.

Discussion: Contribution to practice-heightened emotional responses in a disaster setting are expected and should be a focus of intervention even with health care providers. Nurses were able to employ disaster nursing knowledge, including mental

health strategies in this setting and be able to better address the needs of others.

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Study of Guardians' Recognition of Children's Safety After a Disaster

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Introduction: In Japan, after an earthquake, or when there is a heavy downpour, transportation is affected and guardians of children may not be able to reach home in time from the office. In elementary schools, because the guardian is unable to come and pick up the child, the teacher needs to ensure that the children are protected, and therefore, bears enormous responsibility. Since commuting times to work are long, guardians need to instate measures for the safety of their children.

Aim: This study aims to clarify guardians' recognition of children's safety in the event of a disaster, and examine the corresponding challenge they face in terms of commuting distance.

Methods: The subjects are 2,181 guardians of children in four elementary schools near places where landslides had occurred in Hiroshima city in 2014. The questionnaires distributed throughout the school produced 1,027 valid responses. Guardians were divided based on commuting distance into two groups; one of whom were within 3-km commuting distance and the other of more than 3 km. The two groups were compared for their recognition of children's safety using a chi-square test.

Results: Children's safety in school was a concern for 73.9% of guardians. The safety of school buildings in case of a disaster was a cause of concern for 80% of guardians who are close commuters, and 73.9% of guardians whose commute distance is longer ($P = 0.015$). The fact that children cannot return home was a cause of worry for 33.9% of guardians whose workplace is nearby, and for 29.9% whose workplace was distant ($P = 0.044$).

Discussion: Most parents, especially guardians going to work far away, do not recognize that they cannot reach home, and therefore, need to think about providing safety measures for their children in the disaster.

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Study on the Effectiveness Evaluation of Personal Protective Equipment for Health Care Staff Trained with Graphical Interpretation and Operation

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Introduction: Proper use of personal protective equipment (PPE) is essential when facing emerging infectious diseases.

Proper training methods can promote the use of the PPE correctly.

Aim: To explore the effect of the training method of sequential operation training on medical staff to master PPE penetration and removal skills, and to study the memory attenuation after training.

Methods: Fifteen medical staff with no experience of PPE operation in a hospital were trained to wear PPE in accordance with WHO standards by illustration and sequential operation method. The training included 30 minutes of theoretical teaching and 60 minutes of practical exercises. At the end of the training and 1 week after the training, the training objects were evaluated for PPE operation. A 2.5 x 2.5 cm fluorescent agent was applied on 6 parts, such as hands, chest, abdomen, and knees, to simulate contamination. After taking the PPE off, the parts of the whole body and the inner layer of clothing that were fluorescently contaminated were recorded. The whole operation process was recorded by video to evaluate whether the operation was correct. The error rates of two operations and the contamination position and frequency were compared.

Results: The error rate of the operating PPE after training was 18.6%, rising to 31.9% after 1 week ($Z=16.0$, $P<0.05$). After the training, the average number of contaminated PPE removal was 1.96 ± 1.56 , which rose to 2.96 ± 2.03 one month later. The difference was statistically significant ($Z=8.92$, $P<0.05$). The main vulnerable sites are the wrist, chest, abdomen, and left calf.

Discussion: Illustrative sequential operation training is an important means to improve the way for medical staff to wear PPE, but it must be completed more than once to ensure that medical staff can firmly master the skills of wearing and removing PPE.

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A Study on the Process of Donning and Doffing Personal Protective Equipment of Health Care Workers (HCWs) in China

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Introduction: Personal protective equipment (PPE) is a necessary item in the period of unknown and high risk emerging infectious disease. It is not only the necessary requirement of strict isolation but also the last line of defense to protect medical staff.

Aim: To determine the frequency and sites of contamination of personnel during the process of using Chinese PPE.

Methods: Recruit 56 health care workers (HCWs) who worked in front-line clinical to test PPE issued by the Chinese Center for Disease Control for preventing Ebola virus. Eight batches of HCWs were divided to conduct simulations of contaminated PPE removal using fluorescent lotion. Then the frequency and sites of contamination of personnel were recorded after removal of contaminated PPE. The method of visual observation was used to determine contamination.

Results: The frequency of easily contaminated parts included: left hand and wrist (7 times), left calf (7 times), front chest center, left and right chest (6 times each), and left abdomen (5 times). Mistakes in the process of wearing PPE included: clothing touching the ground (20.00%), N95 air mask tightness not checked (13.33%), glove air-tightness not checked (4.44%), protective clothing zipper not checked (4.44%). Mistakes in doffing PPE included: clothes touching the ground or the inner surface is polluted (20.00%), the wrong method of removing N95 mask (14.44%), touching the pollution goggles mirror with hands (12.22%), incomplete washing steps, insufficient time and frequency of hand hygiene (11.11%).

Discussion: It is necessary to carry out training on PPE donning and doffing for Chinese medical workers.

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A Study to Determine the Nature and Risk Factors for Road Traffic Injuries

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Introduction: In 2010, an estimated 1.3 million road traffic injury (RTI) deaths occurred worldwide, accounting for about 2.5% of all deaths. Mortality in serious injuries is 6 times worse in a developing country such as India compared to a developed country. Strengthening and undertaking research on the public health burden and impact and understanding the risk factors of trauma is the need of the hour.

Aim: To identify the nature of injury in terms of causes and severity of injury.

Methods: Using a quantitative approach, a retrospective cross-sectional survey was conducted at the emergency and trauma center in Ram Manohar Lohia (RML) Hospital, New Delhi. The information of all the injured patients seeking health care during the past one year from October 2015 - September 2016 at Emergency and trauma center was collected from the trauma registry forms filled at the time of registration.

Results: A total of 1952 cases of road traffic injury sought health care during the study period. The average number of cases reported per day was five. Maximum of the cases (40%) were reported between 12-6PM. Among the injured, 82% were males and the majority of victims were between 20-30 years age group followed by 30-40 years.

Discussion: Trauma services need to be coordinated in infrastructure and human resources so that the right patient is taken to the right hospital at the right time. This calls for a lead agency at the district, state, and finally national level. Safety education regarding road safety should be imparted, especially to all victims, relatives, and the general public to make the care comprehensive. Students in schools and colleges should also be the target for intense safety education.

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Survey on the Disaster Prevention System in Rural Areas and Isolated Islands: Preparing for the Nankai Trough Earthquake

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Introduction: An expert government committee in Japan decided to revise the chance of a Nankai Trough earthquake in the next 30 years from 70% to between 70 and 80% in 2017. If a mega-earthquake occurs, medical institutions in disaster regions are required to perform self-contained activities during the super-acute phase. Human damage varies depending on whether medical functions can be sustained, particularly in rural areas and isolated islands. Here we examined actual situations.

Aim: To identify the issues of a disaster medical system in rural areas and isolated islands that need solving.

Methods: Regarding disaster preparedness planning, we conducted a survey on 10 hospitals undesignated as disaster key hospitals of remote area medical care bases (survey group), and 69 hospitals designated as disaster key hospitals (control group) in three prefectures in the Tokai region (Aichi, Mie, and Shizuoka).

Results: We received responses from four hospitals in the survey group and 52 hospitals in the control group. The hospitals in the survey group responded that they could accept 74 severe casualties and 85 moderate casualties. We identified problems such as insufficient stockpiling of fuel, water, and oxygen, and lack of a prioritized lifeline supply contract.

Discussion: It was predicted that human damage would be relatively minor given smaller populations in rural areas and isolated islands in the Tokai region. However, the number of patients would exceed their acceptance capacity. Moreover, the system for sustaining infrastructure is not adequate for providing medical services. Thus, it was indicated that these regions would be isolated in terms of disaster measures. It is imperative to establish a disaster medical system in rural areas and isolated islands that lack adequate disaster medical systems to manage Nankai Trough earthquakes.

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Susceptibility of Host Immunity to Infectious Diseases in the Spacecraft Environment

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Introduction: The principles of Disaster and Emergency Medicine are applicable beyond the confines of planet Earth. With the accelerating rate of climate change, natural disasters, and overpopulation, as well as the innate human appetite for knowledge and technological advancement, there has recently been an increased interest in the prospect of long-duration spaceflight with a view to colonize extra-terrestrial bodies, such as Mars. However, there is a need to understand the risk of adverse medical events in the hostile environment of space.

For example, previous incidences of infectious disease and immune dysregulation during a short-term mission have threatened to jeopardize the crew dynamic and the mission objectives. The risk of infectious diseases to the astronaut is one of the many knowledge gaps that must be addressed before long-duration flight is considered.

Aim: To review how spaceflight impacts an astronaut's in-flight susceptibility to infectious diseases.

Methods: Research was guided by the Microbiology section of the NASA Human Research Roadmap Program. Search terms in the University of Adelaide Library Search database collection included: "infectious diseases + spaceflight," "astronaut + immunity," "analog," and "inflammatory marker."

Results: Studies that have been conducted in-flight and on Earth demonstrate that both the astronaut and the microbe are affected by spaceflight. Stress, microgravity, and the isolated nature of the spacecraft have been found to compromise the immunity of the astronaut, as shown by reduced T cell counts and increased viral shedding of dormant viruses. Microbes have demonstrated rapid adaptation mechanisms, including genetic mutation and increased virulence.

Discussion: This paper identifies a significant need for further research into host immunity during spaceflight to mitigate infectious disease risk. It is recommended that in-situ studies and terrestrial space analogs are most effective and that current knowledge on the principles of wilderness and expedition medicine be applied where possible.

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The System of Disaster Dispatch Team Corresponding to the Nuclear Disaster of Nagasaki University

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Introduction: After accidents of Fukushima Daiichi power plant, the Japanese Government distinguished some medical institutions corresponding to the nuclear disaster by roles and functions. Nuclear Regulation Authority is managing these medical institutions. The Nagasaki University was designated as two centers for "the advanced radiation emergency medical support" and "nuclear emergency medical support". We established "Headquarters for Nuclear Disaster Response and Preparedness in Nagasaki University" (NDRP) and prepared for emergency ordinarily. The staff of headquarters are mainly concentrating their power on the network construction and joint training with each facility. We are improving the dispatch system of nuclear emergency medical assistance team, but some problems were found through the experiences of some trainings.

Aim: To stimulate discussion and listen to opinions from several facilities.

Methods: The dispatch system of nuclear emergency medical assistance team imitated the system of Japan Disaster Medical Assistance Team (DMAT). Specifically, activity days of all teams are limited, and all teams should come under the command of the head of support acceptance medical institution of a disaster area. Particularly the main duties of the dispatch

team, which is sent from the nuclear emergency medical support center, are unification and adjustment of the team activities from other facilities. Some other duties include offering appropriate medical care to patients at the disaster area and support of patients' transportation from the hospital at the disaster area to "advanced radiation emergency medical support center" or "nuclear emergency medical support center."

Discussion: In training the many facilities that participated, we realized that we couldn't proceed with each activity quickly and smoothly without support from the nuclear emergency medical assistance teams from outside the boundaries of disaster areas. We need to clarify the problems that are obtained from trainings and improve the current system corresponding to a nuclear disaster with efficiency.

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A Systematic Review of Earthquake-Related Head Injuries

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Introduction: Earthquakes have killed around 800,000 people globally in the past 20 years, with head injury being the main cause of mortality and morbidity.

Aim: To conduct a systematic review to determine the characteristics of head injuries after earthquakes for better disaster preparedness and management.

Methods: All publications related to head injuries and earthquakes were searched using Pubmed, Web of Science, the Cochrane Library, and Ichushi.

Results: Thirty-six articles were included in the analysis. Head injury was the third most common cause of injury among survivors of earthquakes. The most common injury after an earthquake occurred was in the lower extremities (36.2%), followed by the upper extremities (19.9%), head (16.6%), spine (13.3%), chest (11.3%), and abdomen (3.8%). Earthquake-related head injuries were predominantly caused by a blunt strike (79%), and were more frequently associated with soft tissue injury compared to non-earthquake-related head injuries and less frequently with intracranial hemorrhage. The mean age of patients with earthquake-related head injuries was 32.6 years, and 55.1% of sufferers were male. The most common earthquake-related head injury was laceration or contusion (59.2%) while epidural hematoma was most common among inpatients with intracranial hemorrhage after an earthquake (9.5%). Early wound irrigation and debridement and antibiotics administration are needed to decrease the risk of infection. Mortality due to earthquake-related head injuries was 5.6%.

Discussion: Head injury was the main cause of mortality and morbidity after an earthquake. The characteristics of earthquake-related head injuries differed from those of non-earthquake-related head injuries, including the frequency of multiple injuries, and occurrence of contaminated soft tissue injury and epidural hematoma. This knowledge is important for determining demands for neurosurgery and for adequate management of patients, especially in resource-limited conditions.

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Tabletop Simulation Exercise of Critically Ill Patient Evacuation from a Hospital Fire

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Introduction: Recent hospital fire incidents in South Korea have heightened the importance of patient evacuation. Moving patients from an intensive care unit (ICU) or emergency department (ED) setting is a challenge due to the complexity of moving acutely unwell patients who are reliant on invasive monitoring and organ support. Despite the importance of patient evacuation, the readiness of ICU and ED for urgent evacuation has not been assessed.

Aim: To enhance the readiness and competencies of workers from ICU and ED in the evacuation of patients during a simulated tabletop fire exercise.

Methods: A tabletop simulation exercise was developed by the Center for Disaster Relief, Training, and Research referencing the fire evacuation manual developed by the hospital's ICU and ED. The scenario consisted of evacuating patients horizontally and vertically from each department. The participants' actions were assessed using a checklist. A debriefing was completed after the exercise to discuss the gaps observed. A post-survey questionnaire was used to evaluate the exercise 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 22 and 29 people participated in the exercise from ICU and ED, respectively. Knowledge and confidence improved post-exercise for both ICU and ED scenarios ($p < 0.05$). Course satisfaction was 7.9 and 8.7, respectively for ICU and ED exercise. Correct performance rates for ICU and ED were 59% and 58%, respectively. Common gaps noted for both ICU and ED were wearing protective masks, patient hand-over communication, and preparation for resources.

Discussion: There need to be exercises to recognize system gaps in place for hospital fire evacuation preparedness. Tabletop simulation exercises are ideal tools for this purpose. Although this was a short 90-minute exercise, this increased familiarity with the evacuation plan, tested the plan, and allowed for identification of gaps.

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Tactical EMS Deployment at the G7 Summit in Charlevoix, Quebec

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Introduction: The G7 Summit was held in Charlevoix, Quebec (Canada) on June 8 and 9, 2018. The Urgences-santé Corporation (USC), in charge of prehospital emergency services in Montreal and Laval, was asked to intervene outside of its usual territory during the Summit, mainly because it has the only tactical medical team in the province of Quebec to be equipped and trained for high-risk situations.

Aim: Part of USC's tactical medical team was deployed to the Charlevoix region from May 29 to June 10, 2018. The team had two responsibilities: act in the event of a chemical, biological, radiological, nuclear or explosive (CBRNE) attack, and in the event of social disturbance or violence, provide care for protestors and the police officers tasked with maintaining and restoring order.

Methods: The mission required rigorous preparation to ensure the team's safety outside its usual area of activity while maintaining full coverage of metropolitan Montreal, where the impacts of the G7 Summit were also felt. Emphasis was placed on intensive coaching of the tactical medics, on joint training, and on the coordination of intervention protocols across EMS, fire and law enforcement.

Results: A total of 14 tactical medics and two managers were sent to Charlevoix for the Summit. Before their departure, three joint training days were held, and our training center provided six days of training to our partners.

Discussion: While no CBRNE incident or major social disorder occurred during the Summit, USC was able to gain more visibility and therefore reach out to different organizations on site. Close ties were developed with the Sûreté du Québec (provincial police), with whom USC now regularly collaborates during training and interventions. The lessons learned also helped consolidate our extra-territorial deployment procedures.

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To Sedate or Not to Sedate? Lessons Learned from a Novel Pediatric Simulation-Based Training Curriculum for Procedural Sedation Privileges in Acute Care Pediatricians

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Aim: To develop a simulation-based pediatric procedural sedation curriculum for acute care attending physicians to achieve and maintain privileges in this important skill.

Methods: Neonatal and pediatric intensive care physicians participated in simulation-based sedation training to achieve and maintain sedation privileges. Participants were required to review pediatric sedation materials prior to participation. Demographic data were collected prior to the simulations, and all participants completed a pre-test to assess their baseline knowledge. Sessions were held in the simulation center or neonatal intensive care unit

(depending on group), and the attending physicians, in pairs, participated in two high-fidelity mannequin scenarios (sedation for a painful procedure; hypoxia during sedation). Simulations were followed by a facilitated debriefing session while utilizing a standard performance checklist. All participants completed a program evaluation at the conclusion of their training.

Results: Neonatal (n=11) and pediatric (n=9) intensive care attending physicians participated in the sedation simulation training. The program was well received and 100% rated it as "excellent" or "very good". All participants strongly agreed the instructors allotted time for questions/answers, 100% strongly agreed the debriefing/feedback was effective, 95% strongly agreed instructors had a thorough knowledge and understanding of the program, were supportive, and facilitated learning, and 95% strongly agreed the equipment and physical environment were conducive to learning. Participants reported that simulation-based training and the use of a standardized checklist during facilitated debriefing were very helpful and effective for sedation training. Additionally, many participants indicated the desire for more simulation-based training.

Discussion: Simulation-based sedation training is a feasible, easy to implement, and viable learning technique for acute care physicians.

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Train Related Injuries: Growing Concern in Developing Countries and Five-year Experience at Level-1 Trauma Center in India

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Introduction: Indian railway systems are fourth largest in the world, and cause on average 15 deaths daily due to various intentional and unintentional reasons. This study presents a 5-year retrospective data analysis of polytrauma patients with train-related injuries.

Aim: To highlight key lessons learned from data analysis to inform better safety measures and laws.

Methods: Trauma registry data between 2012 and 2016 were analyzed for patients with train-related injuries. Data from 726 patients were analyzed for demographics, event, injuries, management, and final outcome. ISS was used to quantify the extent of injury.

Results: Mean patient age was 33 years with an 86% to 14% male to female ratio. 62% of patients were in the 20- to 40-year age group. Average time of arrival at health facility post-injury was 3.3 hours. Half of the patients were trespassers. Mean ISS was 11.65. Chest injuries were present in 24.6% of patients, with half requiring interventions like ICD insertion or surgery. 20% of patients underwent amputations of extremities. 40% of patients needed admission to the ICU. 3.5% died in the Emergency Department (ED). Mean hospital stay was 17 days with an in-hospital mortality of 17.4%.

Discussion: This analysis is the largest to date showing comprehensive injury patterns and outcomes of train-related injuries

from a developing country. Patients injured on the platform and off the platform had the same severity of injuries. This analysis shows the need for safety measures and strict law enforcement both at the station and at the track.

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Transformative Surgical Team Training

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Introduction: Sudden onset disasters exceed the capabilities of local health services. Emergency Medical Teams (EMTs), including the Australian Medical Assistance Team (AUSMAT), are a vital element of the Australian Governments capacity to respond to regional and international sudden-onset disasters. AUSMAT has the capacity to deploy an EMT Type 2 surgical field hospital and has been successfully verified by the World Health Organisation (WHO). All AUSMAT members must complete AUSMAT Team Member training. The National Critical Care and Trauma Response Centre, Darwin, Australia is responsible for all AUSMAT training.

Aim: To educate and train the Surgical Team (perioperative nurses, surgeons, and anesthetists) in preparation for AUSMAT deployments in the austere environment.

Methods: Prior to 2015, the surgical AUSMAT training was conducted via two courses: one for perioperative nurses and a separate course for surgeons and anesthetists. In 2015, the course was redesigned with the aim of collaborative training with all the Surgical Team Members. The new Surgical Team Course (STC) engages all three professions to learn alongside each other and discuss potential difficulties in techniques, the daily running of the operating room, and ethical discussions.

Results: Since the rejuvenation of the STC, 15 surgeons, 17 anesthetists, and 18 perioperative nurses have completed the course. The attendees are familiarized with operational and clinical guidelines, the surgical field hospital, and operating room equipment including CSSD. A pivotal component of the course focuses on the essentials of medical records and Minimum Data Set reporting for EMTs as defined by WHO.

Discussion: Since 2015, the NCCTRC has successfully run two courses. The revised collaborative model for AUSMAT STC has enhanced the quality of the program and subsequent learning experiences for participants.

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Triage Problem Among the Ambulance Crew (Paramedic) in Japan

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Introduction: At various accidents or disaster sites, rescue, first aid, and transport to hospitals has been provided by ambulance

crews (paramedics). In the case of mass casualties, they also need to operate triage for injured people.

Aim: To consider and reveal challenges in triage by ambulance crews (paramedics) on-site.

Methods: Interviews of seven ambulance crews (paramedics) and their instructors were conducted and their answers were analyzed.

Results: (1.) Triage black tags: declaring “deceased: not able to survive” might give a heavy mental burden and psychological responsibility. Legal protection and an interstitial rule will be necessary in the future. (2.) Missed triage: the ambulance crew cannot perform a triage that may develop a legal problem. It is always important to prevent ambulance crews from being charged. (3.) Triage education and training: there are few triage trainings at fire departments although the number of emergency medical responses is increasing compared to fire response. It will be necessary to increase time of the triage education and training in near future. (4.) Command system (characteristic rank system in the fire department): There is a problem with the rank system in fire departments since confusion occurs when a commander of the First Aid Station is not a licensed paramedic. The ambulance crew (paramedic) usually consists of the three different ranked people. Individual operations are difficult during operation. Education for the paramedic executive is necessary for the fire organization.

Discussion: For the triage by ambulance crew (paramedic), legal protection by medical control operation is required, and it may lead to a reduction of heavy mental burden. Triage training is needed to improve the training of triage. The ambulance crew (paramedic) operates under the fire department command system. However, at the time of disaster, the ambulance crew (paramedic) should also work under the medical command system.

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Unexpected Lessons from a Mass Casualty Simulation: Strategies for Management of the Minimally Injured Can Increase Efficiency and Decrease Chaos

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Introduction: The SALT Triage system has been advocated as an easy-to-use sorting and treatment system for mass casualty incidents (MCI). Minimally injured (GREEN) patients tend to be in the majority and may cause impediments to access and treatment of the most critically injured (RED). By identifying flaws in MCI communications that impair effective patient care, responders can be more effective.

Aim: To discover strategies that effectively manage the minimally injured and leverage their help, increasing triage efficiency and treatment of the immediate casualties.

Methods: Direct observation, after-action debriefing, and literature search.

Results: The literature was vague regarding recommendations on a bystander and trained provider communication best practices. Feedback from standardized patients (actors) and participants during a structured debriefing following a 2018 American Society of Anesthesiology MCI exercise suggested that triaging providers under stress may communicate poorly, contributing to increased patient anxiety, disruptive behavior, and less effective team dynamics during a disaster. Strategies suggested include: eye contact; therapeutic touch (culturally appropriate); using slow, clear, reassuring speech; clearly explaining what is happening and why (sickest (RED and YELLOW) first priority, minimal (GREEN) next, expectant (BLACK) last); acknowledging their emotional state and their grief (not ignoring them); assigning nontechnical tasks to those capable of helping (putting pressure on a wound, moving casualties, or comforting the injured, dying, and the emotionally distraught).

Discussion: Bystander engagement has been repeatedly identified as a means to increase the capacity of first responders to provide care to patients during an MCI. Utilization and management of the minimally injured and any uninjured bystanders and responders can become a force multiplier for the triage/treating responders. Developing a best practice dialogue to be used in training first responders could help improve many of these issues and augment current MCI training programs.

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Uniform Guideline on Risk Characterization for Approval of Mass Gatherings

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Introduction: Mass gatherings may have far-reaching effects on medical care because of the potential high load on the health care system. In preparation of large events (mass gatherings), such as music festivals or marathons, an extended risk assessment forms the basis for issuing advice on health and safety and possible necessary precautionary measures. In the Netherlands, the 25 regional Public Health Directors are responsible for public health and safety. This includes responsibility for advice on large-scale events, based on which the local authorities (e.g. the mayor) decide on the approval. Health care professionals are looking for better tools with regard to the arising dilemmas around responsibilities and risks. Also, as new forms of events are created, uniform (safety) regulations are lacking. GGD GHOR Netherlands (Dutch Society of the regional Public Health Services [GGD] and Major Incident Medical Planning and Coordination Offices [GHOR]) has updated the existing national guideline in collaboration with the Academic Network for Applied Public Health and Emergency Management (Anaphem). The focus was on improving the guideline by including all current expertise and experience in the field. **Methods:** Various expert sessions were held in 2017 and 2018 to collect all relevant knowledge, evidence, and experience that

is currently accessible to develop an improved uniform approach for risk assessment and process steps.

Results: A new dynamic national guideline, including fact-sheets in various topics being effective by 2019. As a result, a list of topics is formulated for further research.

Discussion: The new guideline includes the current knowledge and raised awareness among the experts of some important gaps in current evidence on several topics.

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The University of Colorado Graduate Medical Education Fellowship in Climate Change and Health Science Policy

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Introduction: Climate change is intricately related to human health and impacts acute and chronic diseases leading to increased demands on the health care system.

Aim: The University of Colorado Graduate Medical Education (GME) Fellowship in Climate Change and Health Science Policy (CCHSP) aims to train and equip a new generation of clinicians knowledgeable in climate science, proficient in climate health education, and facile with advocacy skills in order to become leaders in health policy.

The CCHSP fellowship is funded by the Living Closer Foundation and hosted through the University of Colorado Department of Emergency Medicine. It is a one to two-year program tailored to the fellow's specific goals with the opportunity to earn an MPH or MA. Clinical work is supported through the UCHealth network. Site placement occurs at partnering organizations, including the National Institutes of Health, the Centers for Disease Control and Prevention, and fieldwork throughout the world (via Colorado School of Public Health, Harvard FXB Center for Health and Human Rights).

The first fellow was recruited in 2017 and has participated in and completed multiple projects: technical contributor to the US Government's Fourth National Climate Assessment; advocating for women's health policy in India; authorship of climate change and health resource documents for the World Bank; climate change leadership within SAEM; advocacy work with local and state governments; multiple research publications.

Discussion: As climate change continues to impact human health with widespread consequences, we need effective and articulate leaders to affect policy. Although this Fellowship originated in Emergency Medicine, its competencies and structure are replicable for other clinical specialties. Climate change will be one of the core global health challenges for generations. A strong foundation of clinicians who understand its causes and the strategies for adaptation and mitigations are necessary to optimize health outcomes amidst this growing threat.

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Use of Clinical Algorithms for Evaluation and Management of Pediatric and Adult Sepsis Patients in Low-Resource Clinical Environments

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Introduction: Acute infection in post-disaster settings is associated with increased morbidity and mortality. Sepsis management in low resource settings is controversial with recent research suggesting that aggressive fluid resuscitation may cause greater harm than benefit. However, the vast majority of international sepsis guidelines still suggest large initial fluid boluses as part of sepsis algorithms.

Aim: To create an adult and pediatric sepsis algorithm to be applied in low resource clinical settings. This is part of a larger project to create clinical algorithms to provide standardization of emergency case management for low-resource clinical environments.

Methods: A literature search was performed through PubMed identifying and reviewing fluid resuscitation in adult and pediatric sepsis patients in high and low resource clinical environments. The pathways were created based on interpretation of the available evidence-based literature. Focus groups were conducted in Zambia in March 2018 for feedback from local practitioners regarding feasibility of pathways. The pathways were then modified, reviewed by experts peer-review and revised.

Results: Final pediatric and adult sepsis clinical algorithms were created and posted to the free web-based application AgileMD™. They will be available via app access, an online platform, or printable pathways for use in the clinical environment.

Discussion: The study is currently undergoing IRB approval with a plan for implementation of multiple clinical algorithms at a referral hospital site in Zambia in January 2019. Site direction at Ndola Hospital will be conducted under the leadership of an Emergency Medicine trained physician, who will assist in implementation of algorithms and collection of data. Initial data review will be conducted in May 2019. There will be incremental site visits by organizing researchers throughout the implementation and data collection period. Statistical analysis will examine sepsis associated processes and outcome indicators pre and post-intervention to further delineate sepsis management in low resource clinical environments.

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Using Clinically Based Vignettes to Further Develop a Mass Gathering Triage Tool

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Introduction: This research builds on a previously developed triage: Mass Gathering Triage Scale (MaGaTT) by Cannon, et al (2017). This tool was targeted towards non-health care professional first responders within mass-gathering events (MGEs). However, this tool had not been evaluated.

Aim: To further develop the previously designed MaGaTT using vignettes of clinical cases to: 1) determine variation in decision-making, and 2) inform further tool development prior to real-world testing.

Methods: Volunteer members of St. John Ambulance Australia were surveyed using 18 vignettes of de-identified real patient record forms from MGEs covered by St. John Ambulance Australia (NSW) in 2013-2014. Participants were given the MaGaTT and written instructions on its use. Participants triaged 18 patients, recording their decisions on the online survey. Responses against the vignettes were analyzed using Fleiss Kappa [p-bar] measure. A score of 0.61 – 0.8 represented substantial agreement and a score of between 0.41 and 0.6 represented moderate agreement between participants.

Results: There were 110 completed responses. The majority of participants were male (n =66, 60%), having completed a Bachelor's Degree (n =38, 34.5%), and holding the clinical skill level of "first responder" (n=42, 38.2%). The overall agreement [p-bar] for the 18 items was moderate at 0.55. When examined by triage category, the "Resuscitation" category had substantial agreement (0.69), when compared with moderate agreement for "Urgent" (0.52) and "Minor" (0.52) categories.

Discussion: This research demonstrates that the MaGaTT can be used with moderate agreement, and substantial agreement within the resuscitation category. This is similar to triage tools internationally, where high levels of agreement relate to triage categories for patients requiring resuscitation when compared to patients requiring lower levels of clinical care. Slight changes have been made to the original MaGaTT as a result of this research.

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Using Security Guards and Civil Volunteers as First Responders in Medical Emergency Response - Tasks, Needs, and Challenges

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Introduction: Public sector challenges have initiated new forms of collaboration between emergency response organizations, occupations from other societal sectors, and civil citizens, not the least in socio-economically vulnerable areas. As collaborations emerge, there is a need to explore the tasks, needs, and challenges of the new resources when providing medical emergency response.

Aim: To explore two cases of 1) security guards and 2) organized civil volunteers collaborating with the ambulance services and municipal rescue services, and identifying relevant tasks,

needs and challenges. The presentation will focus on their dispatch on medical alerts. A brief comparison of the two groups will also be performed.

Methods: A case study approach was applied involving interviews and workshops with security guards, civil volunteers, ambulance services, and rescue services personnel.

Results: The civil volunteers are dispatched on medical alerts concerning heart failures and accidents requiring first aid, including stopping major bleedings. The scope of tasks of security guards is broader since they are also dispatched on suicide and assault alerts. Needs in both cases include, e.g., proper training, joint exercises, equipment in terms of defibrillators, torquedos, and first aid kits, and proper ICT/GPS positioning support for dispatching. Challenges are mainly organizational and legal where security guards are somewhat protected by their own employer (e.g., through agreements, trauma support, and safety measures such as receiving a hepatitis vaccine) while civil volunteers do not have sufficient protection in any of these respects.

Discussion: Both groups are useful resources in future medical emergency response since they are often close to the incident site and can provide first response while waiting for the professional resources, thereby saving lives and reducing consequences of trauma. However, they need to be better integrated into the professional emergency response system.

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Using the Past to Prepare for the Future: A 2018 Pilot Study to Improve the Hospital Response for Mass Casualties via a Multi-Dimensional Approach

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Introduction: Recent mass shooting events remind us of the importance of hospitals' preparedness to manage a large number of patients in a short period of time. While prehospital systems triage for field interventions and priority of transport, they were not designed to triage for the scarce resources of a hospital. Therefore, upon arrival to hospital, clinicians must then quickly determine how to best assess and provide life-saving interventions based on their limited resources.

Methods: In collaboration with the Greater New York Hospital Association (GNYHA), the Center for Disaster Medicine at New York Medical College piloted an interactive and intensive eight-hour course at four New York State hospitals that covered critical areas such as: current literature on Mass Casualty Events and Triage, review of hospital emergency management, hospital-based triage principles, a MCI exercise in the emergency department, a surge capacity tabletop exercise, and use of ultrasound. While targeted towards physicians to foster team-based care and learning, nurses, physician assistants, and hospital administrators also participated in the pilot course.

Results: Sixty persons from four hospitals participated in the pilot phase. Preliminary findings post-training reveal the

following: 58% of participants expressed greater confidence in distinguishing between emergency department triage and triage during disasters; 59% of participants expressed greater confidence in performing initial triage of victims; 49% of participants expressed greater confidence in describing the use of ultrasound-guided triage; and 95% of participants reported an enhancement in their ability to perform their clinical role.

Discussion: Preliminary findings reiterate the ongoing need for hospitals to provide training to their staff in the unique aspects of hospital triage and surge management using tools specifically designed in order to be prepared for the rapid influx of a large number of patients. A multipronged training model is a positive approach to help hospitals prepare for large-scale disasters.

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Using the Patient Data in the Hualien Earthquake to Analyze the Reasons of Visit, the Trauma Injury Sites and the Severity

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Introduction: On February 6, 2018, a magnitude 6.2 earthquake struck Hualien, the eastern part of Taiwan. The quake resulted in 17 deaths and more than 300 people injured. Four buildings completely collapsed and hundreds of houses were damaged.

Aim: The aim of this research was to use the patient data to analyze the reasons for visits, the trauma sites, and the severity. **Methods:** We obtained the patient information from the Taiwan Eastern Medical Emergency Operation Center. Medical records were reviewed to analyze the primary diagnosis, the trauma mechanisms, and the sites of injury. Injury severity score (ISS) was used to assess trauma severity.

Results: Two hundred and eighty patients were included in the study, with 90.3% being traumatic patients. Among them, 18.2% was geriatric trauma, 4.7% was pediatric trauma, and 0.4% was obstetric trauma. The most common injury site was lower extremities (33.2%), followed by head (31.4%) and upper extremities (27.1%). The mean injury severity score (ISS) was 1.9. The geriatric population had an average ISS of 2.4, and the pediatric group had a mean ISS of 1.2.

Discussion: In our study, the majority of the patients had minor trauma. Lower extremities may be more vulnerable during the evacuation of an earthquake, and thus, became the most common injury site. The elderly patients had a higher ISS, which may be explained by their immobility and fragility of the body. In the future, it is critical to educate citizens about self-protection during earthquakes, focusing on protecting the head and the extremities. Healthcare providers and emergency medical technicians need to be well-trained to handle geriatric trauma since it poses unique challenges and is associated with increased mortality.

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Utilization of the Multi-Pathogen Approach in an Online Program for Prehospital Responders in High Consequence Infectious Diseases

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Introduction: The prehospital disaster and emergency medical services community stands on the front-line in the response to events such as novel influenza, multi-drug resistant tuberculosis, and other high consequence diseases such as the Ebola Virus Disease.

Aim: To address provider and community safety, we developed an online educational program utilizing a Multi-Pathogen Approach to infectious disease personal protective equipment (PPE) deployment by prehospital providers. Such vigilance starts with syndromic recognition and quickly transcends to include operational issues, clinical interventions, and public health integration.

Methods: The University of Maryland, Baltimore County (Maryland, USA), Department of Emergency Health Services partnered with the Maryland State Department of Health (USA), to develop an online educational curriculum. The curriculum was developed through an expert panel consensus group including prehospital providers and is hybrid in design and includes awareness level training and procedural guidance.

Results: Currently deployed online, this educational content demonstrating the use of the Multi-Pathogen Approach is accessible open-access via YouTube worldwide on computers, tablets, and smartphones. This curriculum is also accessible for continuing medical education to over 50,000 prehospital, hospital, and clinic personnel throughout Maryland and the National Capital Region of the United States. The curriculum consists of twelve modules of didactic and live videotaped demonstrations.

Discussion: The development of the Multi-Pathogen Approach for the deployment of PPE and the use of online education modules has given prehospital providers an easily accessible open-access tool for high consequence disease management. The development of educational efforts such as these can help ensure better patient care and prehospital EMS system readiness.

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Weaknesses and Capacities Affecting the Prehospital Emergency Care for Victims of Road Traffic Incidents in the Greater Kampala Metropolitan Area: A Cross-Sectional Study

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Introduction: Prehospital emergency care is a vital and integral component of health systems, particularly in resource-constrained countries like Uganda. It can help to minimize deaths, injuries, morbidities, disabilities, and trauma caused by road traffic incidents (RTIs). This study identifies the weaknesses and capacities affecting the prehospital emergency care for the victims of RTIs in the Greater Kampala Metropolitan Area (GKMA).

Methods: A cross-sectional study was conducted in the GKMA using a three-part structured questionnaire. Data related to the demographics, nature of RTIs and victims' pre-hospital experience and existing Emergency Medical Services (EMS) were collected from victims and EMS specialists in 3 hospitals and 5 EMS institutions, respectively. Data were descriptively analyzed, and a principal component analysis was employed to identify the most influential weaknesses and capacities affecting the prehospital emergency care for the victims of RTI in the GKMA.

Results: From 459 RTI victims (74.7% males and 25.3% females) and 23 EMS specialists (91.3% males and 8.7% females) who participated in the study between May and June 2016. key weaknesses and 5 key capacities were identified to affect the prehospital emergency care for RTI victims in the GKMA. Although some strengths exist, (e.g., ambulance facilitation, EMS structuring, and coordination), the key weaknesses affecting the pre-hospital care for victims were noted to relate to the absence of predefined EMS systems, particularly in the GKMA and Uganda as a whole. They were identified to involve poor quality first aid treatment, insufficient skills/training of the first responders, inadequate EMS resources, and avoidable delays to respond and transport RTI victims to medical facilities.

Discussion: Though some strengths exist, the weaknesses affecting prehospital care for RTI victims primarily emanate from the absence of predefined and well-organized EMS systems in the GKMA and Uganda as a whole.

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Who Can Evaluate the Safety of a Hospital Building Just After a Great Earthquake?

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Introduction: The earthquake-resistant standard of the buildings of Japan is maintained by several levels. After the Great Hanshin-Awaji Earthquake(1995) the Ministry of Land, Infrastructure, Transport, and Tourism in Japan classified the earthquake-resistant performance for the base facilities into 3 levels. The hospital manager often selects the middle level of earthquake-resistance. However, 10 hospitals were closed down for the destruction of facilities by the Kumamoto earthquake. Who may evaluate the safety of a hospital after a great earthquake? The purpose of this study is to consider the methods to evaluate the safety of hospital buildings just after a great earthquake.

Methods: The damage to hospitals and the measures based on Japanese Law are arranged. Then it is considered who can declare the safety of hospital buildings after a great earthquake.

Results: Hospital buildings collapsed in the Hanshin-Awaji Great Earthquake and many hospitals lost a function by a tsunami in the Great East Japan Earthquake. In addition, the glass and the ceilings of the hospital were damaged in the Kumamoto Earthquake. The damage occurred although these many hospitals had an earthquake-resistant standard established in the Building Standard Act of Japan. It is necessary for the experts to judge the safety of the hospital building just after a great earthquake.

Discussion: The safety of hospital buildings is the responsibility of the hospital manager. However, there isn't an expert of building structure employed as staff at a hospital. Thus, the hospital personnel must allow the expert of the building structure to advise a manager. In the future, it is important that the evaluation methods that can judge the damage of a hospital are developed, and the practical training for the hospital personnel are repeated.

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A Verification Test for an Assessment System: Rapid Assessment System of Evacuation Center Condition-Gonryo and Miyagi (RASECC-GM) that Utilizes Mobile Devices

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Introduction: On March 11, 2011, the Great East Japan Earthquake struck the northeastern coast of Japan with the magnitude nine. Ishinomaki medical zone was affected most severely with 328 evacuation shelters and approximately 50,000 evacuees. The Ishinomaki Zone Joint Relief Team gathered information directly from all evacuation shelters using assessment sheets. Based on this assessment data, various measures were carried out for environmental improvement of the shelters. To prepare for the next major disaster, a software program called Rapid Assessment System of Evacuation Center Condition - Gonryo and Miyagi (RASECC-GM) was

developed, which computerizes the whole process, including entering, tabulating, and managing of shelter assessment data. **Aim:** To verify the feasibility, usability, and accuracy of RASECC-GM, a verification test was performed using mock shelter data on October 23-26, 2018, to coincide with Logistics Training Course of Medical Logistics for Disasters held by Iwate Medical University.

Methods: On October 22, 2018 at four simulated disaster relief and health care branches, participants at each branch were asked to enter two mock shelter data items, submit a closed shelter request, and register a new shelter using RASECC-GM, respectively. The next day participants were asked to enter two mock shelter data items per branch while offline and upload the data to the server when next online. The uploaded data was checked for accuracy and whether it could be viewed on the management screen. After the test, a questionnaire survey was given to participants to verify the feasibility and usability of RASECC-GM.

Results: It was confirmed that RASECC-GM functioned almost correctly. All participants answered that input operation was easy to understand, and 90.9% of participants could input without a mistake and did not feel stress when inputting data.

Discussion: RASECC-GM appeared to be useful to shelter assessment, but further improvements are needed for practical use.

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Who Revisits Medical Services at a Music Festival?

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Introduction: Attendees at music festivals rely upon on-site medical services for their emergency and medical care needs. Patients previously cared for can re-present for services at different times over the course of an event.

Aim: To identify the proportion of visits that are repeat presentations at music festivals and discuss themes in the medical care needs of these potentially resource-intensive patients.

Methods: This study included a review of prospectively enrolled patients presenting for health services over five years at a number of music festivals in Belgium and Canada. Patient data were extracted from existing databases of visits as well as visit documentation, and linked by name and date of birth to identify repeat visits. Data were de-identified and visit times, triage acuity, chief complaints, treatments, and discharge instructions were extracted.

Results: Re-presentations constituted approximately 5% of all on-site medical visits. The majority were for minor care (e.g., wounds, dressings, foot care). Repeat visits for major issues included chronic disease (e.g., asthma, seizures, diabetes) and serial intoxications; these were high risk for transport to hospital. Festival duration was positively correlated with the number of patients with multiple visits. Three or more visits or visits in different years were rare occurrences.

Discussion: At music festivals, a small but significant proportion of attendees utilize medical services repeatedly. Most are

low acuity issues that could potentially be avoided with counseling or supplies at the initial visit. However, higher acuity re-registrations, both within and between event years, are a higher risk for transport and could benefit from early identification. Having a plan to identify and potentially remove the sicker, higher risk patients from the event could be important for safety and liability.

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Why Patients Refuse to Enroll in Hospital-Based Research: Perception of Patients Presenting to KATH Emergency Department

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Introduction: Komfo Anokye Teaching Hospital Emergency Department (KATH ED) is a tertiary referral center in Ghana. Anecdotally, patients seeking care at KATH ED do not actively participate in research initiatives.

Aim: To find out why patients presenting to KATH ED do not enroll in research studies that are conducted in the department.

Methods: The study was a cross-sectional survey of patients presenting to the ED for one month in June 2017. A semi-structured questionnaire was presented to patients presenting to KATH ED from 8:00–20:00 each day. Patients who were interviewed were all patients presenting to the ED for care, including those who had refused to enroll in the ongoing ACESO study. Patients had to be conscious, alert, and with conditions that did not require immediate management.

Results: 35% of the interviewees (91/260) had been approached to enroll in research studies at some point in the past. 13.5% had refused to enroll in a research study. 45.7% of those who refused to enroll admitted that they were afraid to enroll in a study; 28.6% had inadequate information and 22.9% perceived enrolling in a study would delay their treatment. The Akan language (73%) was most commonly used by research assistants then English (26%), and finally Hausa (1%) to interact with patients. There was a significant association between educational background and explaining a study to a patient before they enrolled. Males were more willing to enroll in an ongoing study compared to females. All age groups correlated significantly with being approached to enroll in a research study and similarly all age groups also correlated with refusing to enroll in a research study

Discussion: Patients are paramount to hospital research. Efforts must be made to ensure that patients concerns and needs are addressed to ensure increasing participation.

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Working Together to Develop Best Practice: Rescue Operations in Confined Settings

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Introduction: Major injury incidents in confined settings such as tunnels and underground mineral- and metalliferous mines are rare, but when they do happen, the consequences may be severe with potential for many injured. The incident site is underground and it is difficult for the rescue and emergency medical service to get an overview and reach the injured. Therefore, it is important for the emergency medical service, rescue service, and the company responsible for the underground environment to have a good collaboration.

Aim: To develop best practices of conducting rescue response from a disaster medicine perspective in tunnels and underground mines through increased education.

Method: Within an EU-program, the university collaborates with stakeholders such as rescue service, emergency medical service, and two mining companies. Within this project, an explorative case study with participatory research is conducted. This is managed with the help of representatives of the stakeholders, workshops, and through planning for and conducting observations of table-top and full-scale exercises.

Results: At the first workshop the stakeholders built a timeline presenting their activities from a major incident occurring in an underground mine until the last injured was transported to the hospital. Thereafter, several workshops were conducted to find improvements that could be made regarding collaboration between the organizations. Table-top and full-scale exercises have also revealed further challenges. Within the project, prototypes are being developed and will be presented during the conference.

Discussion: This project involves stakeholders in the research process, and they, therefore, have a direct impact on the development of best practices of rescue in major underground incidents.

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A Workplace-Based Observation Strategy to Assess Prehospital Care Delivery by Public Ambulances in Ukraine

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Introduction: Current methods to evaluate the delivery of urgent prehospital care often rely on inadequate surrogate measures or unreliable self-reported data. A workplace-based strategy may be feasible to assess the delivery of prehospital care by ambulances in selected populations.

Aim: To perform a nationwide assessment of the psychomotor performance of public ambulance workers in Ukraine, we created a plan of workplace-based observation. We conducted a post-hoc analysis of this strategy to assess feasibility, strengths,

and limitations for future use in assessing prehospital ambulance performance.

Methods: With support from the Ministry of Health, we sent teams of trained observers to 30 ambulance substations across Ukraine. Using data collection tools on mobile devices, these observers accompanied Advanced Life Support ambulances on urgent calls for periods of 72 hours. We evaluated this program for collecting patient encounter data against the investment of time, personnel, and financial resources.

Results: Over a two-month period, we directly observed 524 patient encounters by public ambulances responding to urgent calls at 30 ambulance substations across Ukraine. We employed 6 observers and 2 administrators over this time period. Collecting our observations required 2,160 person-hours at the ambulance substations. The total distance traveled to these sites was 11,375 kilometers. Project costs amounted to 37,000 USD, equating to 71 USD per observed patient encounter.

Discussion: Workplace-based assessments are a cost-effective strategy to collect data on the delivery of prehospital care in select populations. This data can be useful for identifying the current state of EMS care delivered and evaluating compliance with established treatment protocols. Successful implementation depends on effective planning and coordination with a commitment of time, personnel, and financial resources. Issues of patient privacy, legal permission, and observer training must be considered.

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Young Doctors' Emergency Medicine Rotation Qualifications and Relation with Self-Confidence

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Introduction: Medicine is one of the most important areas of higher education. It is important that undergraduate students are well educated and have theoretical knowledge, but also have good clinical skills after graduating from medical training.

Aim: To understand whether the training objectives of the emergency medical internship was completed or not and to find the relationship between young doctors' self-confidence and what they can do via using Rosenberg self-esteem scale (RSES). In addition, an objective was to consider which learning methods are more useful based on the feedback.

Methods: This survey study was performed in 2018 at Bülent Ecevit University, Faculty of Medicine, Zonguldak, Turkey with the students who completed an emergency department rotation in the 2017-2018 education term. The questionnaire was composed by the researchers. It consisted of three parts which were included demographic information and education methods in emergency medicine of internships, questions about knowledge goals and learning goals for basic medicine applications, and RSES to assess young doctors' self-confidence.

Results: 96 young doctors with the mean age of 25.22 ± 1.216 years (minimum 23 and maximum 30 years) were in the study. 3 (55.2%) of which were female. All young doctors were evaluated with RSES4. (4.2%) of which were low self-confidence and 32 (33.3%) of which were high self-confidence. The best useful learning methods were clinical application of interaction with patients (n=828. 5%) and invasive procedures performed on patients (n=727. 5%).

Discussion: The more you practice, the more you learn. Practice-based education is an important factor in a young doctor's life. Besides, the higher self-confidence you have, the more you can. Young doctors with high self-esteem see themselves as qualified to perform applications even in complicated situations. However, more studies are needed to find out whether they could really perform or not.

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