

Healthcare facilities are “soft targets.” The “Run-Hide-Fight” mantra can be easily assimilated by the average learner in generic “active shooter” educational programs. However, healthcare professionals, confronting an active shooter situation, must reconcile conflicting goals: personal, staff, and their patient’s safety. Indecisiveness may lead to catastrophe. Targeted education addressing these concerns can be explored in medical simulations.

**Methods:** A case-based simulation medical program (four hours weekly) is included within an emergency medical clerkship involving multidisciplinary students and faculty. At the start of their rotation, students receive “active shooter” educational material including the hospital protocol. While managing a typical ED simulated patient (varying levels of criticality), an “active shooter” component is added. Students must reconcile “Run-Hide-Fight” within the context of patient care. Debriefings follow.

**Results:** Sessions are held twice monthly in a no-threat environment with approval and assistance from university police trained in “active shooter” education. Within a span of ninety minutes, students manage a case into which one active shooter scenario is added. Depending on shooter location and patient condition, students must decide to run (with what and whom) or hide (barricade techniques) and fight (improvisational weapons). Debriefing emphasizes no right answer. Each situation is unique. Lifesaving strategies and tactics emphasize the improvised barricades and weapons that are uniquely found in a patient’s room. Over 100 students have gone through this program since its inception.

**Conclusion:** Incorporating active shooter scenarios in medical simulations is accomplished in a no-threat, no-consequence environment. Regular training of healthcare and public health students through simulation of typical and atypical scenarios in healthcare facilities provides experience and sharpens mental “muscle memory” – allowing them to make wise decisions quickly during an actual active shooter incident.

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### Research Based to Maximize Effectiveness of Simulation for Hospital Disaster Plan (HDP) Teams in Indonesia

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**Study/Objective:** To evaluate a disaster simulation process in a hospital, and determine the HDP team’s awareness in making an operationally HDP document

**Background:** Simulation is a recommended tool to test the functioning of HDP. Nevertheless, it is just a tool.

An effective simulation was determined by a training developer. In Indonesia, HDP simulation becomes one of hospital accreditation points. It was biased, if the principle purpose of simulation was just for accreditation. The Center for Health Policy Management (CHPM FoM UGM) who’s concern is in assisting hospitals to develop an operationally HDP document and simulation. It was important to evaluate simulations in revising the HDP document, and in increasing the hospital staff’s awareness to implementing HDP.

**Methods:** This study used qualitative with pre-post-test design, comparing hospitals using research based simulation and ones that do not. Research based simulation was given in three hospitals. Subjects were HDP teams in 5 hospitals in Java Island, Indonesia who got HDP and simulation assistance by CHPM FoM UGM during 2015-2016. Study instruments were an open questionnaire (scenario conception, job/task identification in normal and disaster situation, gap identification of HDP document), self-evaluation and debriefing documentation.

**Results:** There was no significant difference in scenario conception from the two hospitals. However, they contrasted considerably in job identification and HDP team self-evaluation. In research based simulation, HDP teams could explain their role greatly and found many gaps between disaster simulation and their HDP document. Its impact, revising the HDP document based on disaster simulation gap initiated by HDP teams, was faster ( $\pm 1$  week after simulation) and more correct, especially in disaster SOP and Hospital Incident Command System.

**Conclusion:** Research based simulation could be implemented in the Indonesian hospitals by creating HDP teams, and a more serious and conscious took at the lessons from simulation. It’s important for a training developer to establish an educational and research atmosphere during hospital simulations, to maximize the potency as a lesson learned. In order that, hospital disaster simulations becomes a significant test tool for HDP document.

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### Addressing Healthcare Personnel Preparedness in Disasters: An Introduction of a Participatory Design Educational Model in Greece

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**Study/Objective:** Results of a participatory design educational model regarding medical preparedness in disasters, based on simulation exercises, implemented in the framework of the MSc program “International Medicine-Health crisis management” of the Medical School of Athens, Greece.

**Background:** Disaster response and management has been described as one of the most challenging tasks. Although numerous competencies for disaster healthcare personnel have been developed and endorsed by governmental, professional and non-governmental organizations, universal acceptance and application of these competencies is lacking, resulting in

diversities in mass-casualty incident and disaster preparedness and training curricula.

**Methods:** Extensive literature review, quantitative data analysis of the feedback of 50 trainees (medical professionals (55%), paramedics (25%), social scientists (20%)) in two phases, before and after their participation in the simulation exercises; and qualitative analysis of 2 focus group discussions composed by facilitators and 7 expert external evaluators.

**Results:** Expressed concerns and challenges before the simulation exercises were afterwards, characterized as acquired skills and knowledge (increased awareness regarding disaster preparedness, enhancement of non-technical skills such as decision-making, communication, conflict resolution, teamwork and coordination among stakeholders, improvement of technical skills such as identification of critically patients and triage). Furthermore, all parties involved in the study recognized the following innovating elements: -the involvement of public medical professionals, and civil protection officers and their direct interaction with the trainees, -the active contribution of trainees in the simulation scenarios design (ie roles allocation independently their professional background) -the use of fully functional public spaces as training locations for the simulation exercises (hospitals, airport, port, hotels).

Overall, participants described feeling more prepared and confident for disaster response compared to prior the training.

**Conclusion:** Learning by doing, facilitating cross-sectoral and transdisciplinary collaboration, transposing real events into educational processes, enabling actual challenges, are proposed as a remedy to the apparent disconnect between theory and methodology used in disaster preparedness drilling.

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### High Fidelity Simulation With the Use of 360-degree Virtual Reality for Aeromedical Training in Search and Rescue

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**Study/Objective:** Recent experience has demonstrated the benefits of virtual and hybrid simulation training. A successful simulation model should provide customized environments to facilitate skill training and enhance complex contextual learning, especially for disaster scenarios, which may be infrequently met by an individual.

**Background:** The Government Flying Service (GFS) of Hong Kong is responsible for providing 24/7 emergency helicopter and fixed-wing flying support. The GSF and the Hong Kong College of Anaesthesiologists collaborated to organize the Air Crew Resuscitation Simulation Refresher Course for the Air-crew Officers, to enhance their medical skills for search and rescue missions. In order to enhance learning outcomes, this training made use of high fidelity simulation search and rescue scenarios.

**Methods:** The training includes topics such as triage process, pre-hospital and helicopter resuscitation in trauma, amongst other emergency clinical skills. With the support of the Hong Kong Jockey Club Disaster Preparedness and Response Institute, Virtual Reality (VR) aeromedical incident films were produced, which will be displayed using 360 degree goggles and a dome-shaped projection platform. To enhance fidelity of the simulation, sound effects and a mock-up cockpit will be produced. The hybrid training will be established by requiring the participants to carry out first aid and resuscitation procedures on mannequins. A self-administered questionnaire will be distributed to participants for process evaluation.

**Results:** Regular trainings will be conducted throughout two years, reaching a total of 50 participants. The first training is on December 3, 2016. Results of the process evaluation will be ready after data collection and analysis.

**Conclusion:** It is anticipated that the use of VR in search and rescue training will add a more realistic aspect to this area of training, and allow for consistency in trainings and for the ease of evaluation, yet keeping the training in a safe environment and at a low-cost.

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### Use of Virtual Reality in Motorsports Emergency Training

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**Study/Objective:** To explore the benefits of using VR simulation in motorsports medical incidents training.

**Background:** With the increasing popularity of using Virtual Reality (VR) in training, there has been a paucity of studies showing that content retention in memory is better, and compared to other simulations, VR bridges the gap of inconsistency of trainings while allowing participants to be trained in a realistic yet safe environment. In view of the first electric motor race in Hong Kong, the Federation Internationale d'Automobile (FIA) Formula E Hong Kong ePrix held in October 2016, a training for the medical community for such events was thus organized by the Hong Kong Jockey Club Disaster Preparedness and Response Institute. The aim of the course was to enhance command and coordination with different parties, including the marshal team, chief medical officer, first aid team, extrication team, and fire services. In the scene coordination session, participants were immersed in interactive simulated motor accident scenes, created by a VR game-based tool to interact with each other to communicate.

**Methods:** Two levels of assessments were done, including a self-administered course process evaluation questionnaire and a video analysis of performance assessment, which assesses the fidelity of the simulation to the real situation.

**Results:** A total of 80 emergency first responders, who would be on the ground during the event as emergency medical teams, were trained. The evaluation (72 questionnaires returned) showed the