

and minimize negative outcomes for patients, liability for festival leadership, and impact on local health care resources.

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First Aid Training and Comfort in Non-Medical Event Staff

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Study/Objective: To evaluate whether non-medical personnel feel adequately trained and prepared to act as first responders to potential medical emergencies at a multi-day music festival.

Background: Music festivals are a high-risk environment for medical presentations. Although dedicated medical services are often present at such events, non-medical volunteers and staff generally outnumber those with formal medical roles and are more likely to make the first point of contact with attendees in distress. Preparation for foreseeable emergencies makes sound safety sense, and more recently litigation has also underscored its importance in minimizing liability. Using the chain of survival model, the provision of timely first responder care by appropriately trained personnel has the best chance of affecting outcomes by minimizing morbidity, mortality, liability and impact on local health care infrastructure.

Methods: This study used an online survey provided to 2,200 non-medical staff and volunteers, at the 2016 edition of a week-long electronic dance music event for 15,000 attendees.

Results: A total of 369 personnel participated, of that 87% had direct contact with festival attendees and 85% had some form of formal first aid training. However, only 51% of this training was up to date, 19% had no CPR training at all, and 49% of those who had did not consider it up to date. A majority of respondents felt first aid training would benefit attendees, but that it should not be a requirement for their position. Respondents were receptive to basic and advanced training free of cost. Most felt comfortable acting as a first responder in scenarios dealing with unconscious, agitated, non-breathing or pulseless patients.

Conclusion: Preparation of non-medical personnel for medical emergencies at music festivals can potentially increase safety and minimize negative outcomes. Such personnel appear comfortable with first response roles but may need help in maintaining training currency. Results may be applicable to other event types.

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Effectiveness of Gamification of Mass-Gathering Health Concepts

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Study/Objective: To measure the effect of participation in a facilitated, board game-based, tabletop exercise focused on health services planning for Major Planned Events (MPEs).

Background: Current best practice for medical care at mass-gathering events involves the integration of event safety plans, on-site health services, and community acute health services into a systematic, coordinated, proactive approach. Unfortunately, as most teams operate in silos, lessons learned from previous event planning and implementation are not often systematically shared. In this study, we assessed the effects of an interactive tabletop gaming exercise on delivery and retention of mass-gathering conceptual knowledge. The use of gamification to deliver medical education is not a novel concept, but rather a well-documented method of engaging learners. Gamification provides opportunities for participants to apply knowledge in a “live-fire” context, to reflect on outcomes critically, and to use feedback and acquired skills to inform future behavior.

Methods: A convenience sample of 28 event race directors and 44 medical students were surveyed before and after engaging in a 90-120 minute, interactive, facilitated mass-gathering tabletop exercise. Survey content assessed respondent comfort on a variety of pertinent considerations faced by event planners and medical direction teams. Domains of survey assessment included: attitudes and beliefs surrounding event preparation, event-specific medical knowledge, and event logistics.

Results: Comparison of pre- and post-exercise responses revealed that the mean and median comfort in all of the domains assessed improved within both populations. Participants rated this exercise as informative, and identified ways in which new knowledge would be applied at future MPEs.

Conclusion: In a convenience sample of race directors and medical students, the use of a facilitated mass-gathering health tabletop exercise is an effective delivery modality for the transmission and integration of knowledge related to the planning and delivery of health services for MPEs.

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Point of Care Ultrasound at a Remote Multi-Day Mass Gathering: A Prospective Case Series

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Study/Objective: We describe a novel application of Point of Care Ultrasound (POCUS) in a remote mass gathering at the 4-day Pemberton Music Festival 2016 attended by over 40,000 participants per day. The objective of this study is to prospectively evaluate the impact of POCUS on diagnosis, management, and disposition of patients.

Background: POCUS has become an important tool for hospital-based clinicians. This is the first study characterizing its use at a remote mass gathering where physicians face numerous challenges including limited resources, complex disposition decisions, and dynamic environments.

Methods: A handheld GE V-Scan™ with Dual Probe ultrasound was available for use by physicians in the main medical tent. All treating physicians consented to participate and self-reported their training and proficiency using POCUS. After each use of POCUS, physicians completed a survey recording the indication, scans performed, and impact on diagnosis, management, and disposition of patients.

Results: In total, POCUS was used on 28 patients out of the 686 patients seen in the main medical tent. The three most common indications for ultrasound were abdominal pain, gynecological complaints, and dyspnea. POCUS narrowed the differential diagnosis in 64% (18/28) and altered the working diagnosis in 21% (6/28) of patients. It confirmed the management plan in 57% (16/28) and altered it in 39% (11/28) of patients. Use of POCUS reduced the burden on the local healthcare infrastructure in 46% (13/28) of patients and prevented ambulance transport to a higher level of care in 32% (9/28) of patients.

Conclusion: Physicians reported that POCUS aided in the diagnosis, management, and disposition of select patients at a remote multi-day mass gathering. POCUS helped to reduce the local healthcare burden caused by hosting a large-scale mass gathering by preventing or altering the urgency of transport to hospital for higher level care or diagnostic imaging.

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Organization of Health Services and Risk Preparedness during the 2016 Rio de Janeiro Olympic Games

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Study/Objective: To present information on an organization of health services and risk preparedness during the 2016 Rio de Janeiro Olympic Games.

Background: Mass gatherings of international importance occur frequently in Brazil, especially in Rio de Janeiro. In 2014 and 2016 the country received two global sports events – the 2014 Fifa World Cup, and the 2016 Olympic Games in several Brazilian state capitals and in Rio. These events joined a great contingent of people and demanded the health sector to prepare for reception of incoming participants and visitors.

Methods: The ‘Prepara Brasil’ Project investigated health services preparedness in Rio de Janeiro. A literature-based data collection instrument to assess available health infrastructure, health services and safety risks concerning the 2016 Olympic Games was made available online for spectators in all Olympic events. Filling out the survey form in real time and directly from the sports venues, was voluntary and participation was maximized through snowballing. After the Games data was accrued and analyzed.

Results: A total of 61 spectators, 70% of which were university graduates completed the form. Participants attended 26 events in 42 different sports, during 17 of the 19 days of competition. Roughly 45% of respondents clearly identified locations of health services in Olympic venues. Inside the arenas, 17% of respondents could point out health services and health services personnel at a maximum distancing 50 meters or less (.3 mi) from their seats. Half of participants identified emergency exits and escape routes, and 80% considered safety measures in sports venues as strict. According to participants, crowding was observed in 3% of sports events.

Conclusion: Shortcomings regarding overall information and identification of health services were perceived by spectators to the 2016 Rio de Janeiro Olympic Games. However, spectators also regarded that risks related to infrastructure and safety were adequately approached by the venue organization.

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Health Service Impact from Mass Gatherings: A Systematic Literature Review

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Study/Objective: This literature review aims to develop an understanding of the impact of mass gatherings on local health services.

Background: Mass gatherings are events where a large number of people congregate for a common purpose, such as sporting events, agricultural shows, and music festivals. When definitive care is required for participants of mass gatherings, municipal ambulance services provide assessment, treatment, and transport of participants to acute care settings, such as hospitals. The impact on both ambulance services and emergency department services from mass gathering events was the focus of this literature review.

Methods: This research used a systematic literature review methodology. Databases were searched to find articles related to aim of the review. Articles focused on mass gathering health, provision of in-event health services, ambulance service transportation and hospital utilization.

Results: Twenty-four studies were identified for inclusion in this review. These studies were all case-study based and retrospective in design. The majority of studies (n = 23) provided details of in-event first responder services. There was variation in reporting of the number and type of in-event health professional services at mass gatherings. All articles reported that patients were transported to hospital by the ambulance