

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

## CASE STUDIES

### Epidemic Thunderstorm Asthma

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**Introduction:** On November 21 and 22 of 2016, Victoria witnessed an unprecedented epidemic thunderstorm asthma emergency event in size acuity and impact. This scenario was never exercised nor contemplated. The event resulted in a 73% increase in calls to the Emergency Services Telecommunications Authority and 814 ambulance cases in the six hours from 6 pm on November 21, 2016. A 58% increase in people presented to public hospital emergency departments in Melbourne and Geelong on November 21 and 22, 2016 (based on the three-year average). 313 calls were made to the nurse on call from people with breathing, respiratory, and allergy problems (compared to an average of 63 calls for the previous month). Tragically, ten deaths are linked to this event.

**Methods:** A substantial amount of work has been completed, much of which goes towards addressing the Inspector-General for Emergency Management recommendations following a review of the event, including:

- Release of an epidemic thunderstorm asthma campaign and education programs which were rolled out across Victoria for the community and health professionals from September through November 2017;
- Development of a new epidemic thunderstorm asthma forecasting system on 1 October 2017 and updated warning protocols during the 2017 grass pollen season;
- Implementation of a Real-time Health Emergency Monitoring System to alert the department of demands on public hospital emergency departments on the system; and
- Introduction of a new State Health Emergency Response Plan in October 2017 to improve coordination and communications before and during a health emergency.

**Discussion:** The presentation will concentrate on the lessons learned more than two years down the track from the event in November 2016.

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### Hurricane Sandy - Initial Evaluation of Patient Characteristics

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**Introduction:** Disaster medical team response by governmental and non-governmental responders is highly variable and poorly characterized. Each response is unique in terms of caseload, patient demographics, and medical needs encountered. This variability increases the difficulty of determining team member composition as well as supply and equipment needs. In an effort to demonstrate this issue, we have reviewed the National Disaster Medical Response to Hurricane Sandy.

**Methods:** This project was a retrospective chart review of Hurricane Sandy data abstracted from the National Disaster Medical System (NDMS) Health Information Repository (HIR) medical records from the NDMS system response, and were abstracted for data including vital signs, ages, sex, chief complaint, and final impressions. In addition, length of stay among other parameters was abstracted. The data was analyzed using Microsoft Excel and Access with descriptive statistics. In addition, the results were compared to similar indices in a community emergency department and prior NDMS responses.

**Results:** The results indicate a wide range of patient ages, chief complaints, and final impressions. The vast majority of patients seen by Disaster Medical Assistance Teams (DMAT) were stable with relatively low acuity issues. The total number of charts reviewed were 7,905. Respiratory complaints were the most frequent at 845 patients followed by toxicology/injuries at 706 patients and mental health issues at 452 patients. In approximately 3,400 patients, no diagnosis was present in the chart. Length of stay averaged below 1 hour and peak patient ages were between 50-60 with a significant number of infants less than 2 years.

**Discussion:** Characterization of NDMS responses by DMATs and comparison with prior events and community emergency department caseloads can provide an insight into the needs of DMATs and other response organizations in future responses.

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### Level of Emergency Preparedness Before and After a False Missile Alert in Hawaii

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**Introduction:** On January 13, 2018, a false ballistic missile alert that lasted 38 minutes was issued across Oahu, Hawaii, United States. As a result of a system failure, an erroneous text message was sent that stated, "Ballistic missile threat inbound to Hawaii. Seek immediate shelter."

**Aim:** The research team wanted to know the degree of reported anxiety triggered by the event and if knowledge, attitudes, or behaviors for individual/family emergency preparedness (EP) changed post-event.

**Methods:** A 50-question survey that asked about individual and family EP pre- and post-event, and the level of anxiety triggered by the event, was administered to a convenience sample of full-time adult residents of Oahu. The study was conducted over a 6-8 week period post-event. Statistical analysis was used to identify factors associated with an increasing level of EP post-event and reported event-triggered anxiety.

**Results:** 209 participants completed the survey (29% male, 71% female) with about one half living with children. One third were essential workers. Key factors that correlate with increasing various areas of EP post-event include higher educational, receipt of electronic emergency alerts, prior emergency training, and higher reported connectedness to community. Those with higher event anxiety were more likely to develop and practice an EP plan post-event, encourage EP with friends, and report a higher level of community connectedness. The elderly were more likely to have higher levels of EP before and after the event but were less likely to receive emergency alert notifications or have EP training.

**Discussion:** While the event was very unfortunate, it did seem to stimulate citizen disaster EP among some groups. Additional research should explore the utility of increasing EP education for communities immediately after disasters, tailoring this education for groups, and targeting the elderly for participation in the emergency alert system.

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### Morwell Coal Mine Fire as a Cascading Disaster: A Case Study

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**Introduction:** Despite the influential Hyogo and Sendai Frameworks, risk remains poorly understood in the emergency preparedness sector. Hazard assessment and risk management are usually considered before events. An alternative view considers risk as a cascade of potential consequences throughout an event. The 2014 fire in the Victorian rural community of Morwell included a three-phased event: a small bush fire, from which embers ignited a persistent fire in a disused open cut brown coal mine fire. The consequent air pollution precipitated a public health emergency in the nearby community of 15,000 people.

**Aim:** To examine this event as a case study to investigate concordance with accepted definitions and key elements of a cascading event.

**Methods:** Selected literature informed a risk cascade definition and model as a framework to examine the key post-event public inquiries available in the public domain.

**Results:** Informed by a Conceptual Framework for a Hazard Evolving into a Disaster (Birnbaum et al., 2015), Wong and colleagues promote a Core Structure of a Comprehensive Framework for Disaster Evaluation Typologies (Wong, 2017). This Core Structure provided an adequate model to examine the sequence of events in the Morwell event. Definitions of cascading effects is more complex (Zuccaro et al., 2018). Our analysis of the Morwell event used the authoritative definition of cascading disasters published by Pescaroli and Alexander (2015). Using this definition, the Morwell event increased in progression over time and generated unexpected secondary events of strong impact. The secondary events could be distinguished from the original source of disaster, and demonstrated failures of physical structures as well as inadequacy of disaster mitigation strategies, while highlighting unresolved vulnerabilities in human society.

**Discussion:** The Morwell coal mine fire of 2014 reflects the key criteria of a cascading disaster and provides understandings to mitigate the consequences of similar events in the future.

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### Multiple Patients with Burn Injury Induced by a Chemical Explosion Managed by Physician-staffed Helicopters

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**Introduction:** The management of chemical and explosive events is critical to reducing morbidity and mortality. However, initial patient care considerations and protective actions for staff are unfamiliar to most frontline clinicians.

**Methods:** This study evaluated an Incident report.

**Results:** On December 1, 2017, a factory of chemical industries in Japan exploded. Dust forming as a byproduct from the crushing and packing process of the resin for ink exploded at the facility. A local fire department requested the dispatch of two physician-staffed helicopters (known as a doctor helicopter [DH] in Japan). The first party of emergency services established a headquarters and first-aid station. However, this area was feared to be at risk of a second explosion. Physicians performed re-triage for all 11 burned patients. Three severely injured patients were transported to emergency medical service centers either by ground ambulance or the DH without undergoing any decontamination. The physician who escorted the patient by ground ambulance complained of a headache. One of the severely injured patients was treated at a local hospital and then transported to an emergency medical service center after undergoing decontamination and intubation. Fortunately, all patients who were transported to medical facilities obtained a survival outcome.

**Discussion:** Chemical, biological, radiological, nuclear, and explosive incidents are rare, but can be fatal for responders to this kind disaster. As such, all who work at such scenes should be prepared and train adequately to ensure they have the knowledge and skill to both manage patients and protect themselves from harm.

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