Volume 12 | Issue 2 | Article 2

AUSTRALASIAN JOURNAL OF **PARAMEDICINE**

Mass gathering medical planning: An overview of the Australian Surf Life Saving Championships

David Reid
Edith Cowan University, Western Australia

Stephen Leahy
Westpac Life Saver Rescue Helicopters

Anne-Marie Widermanski
WA Safety and Education Services

Research

Mass gathering medical planning: An overview of the Australian Surf Life Saving Championships

David Reid MHM(Hons), GradCertHSM, BSci (Paramedic Science), Senior Lecturer,¹ Stephen Leahy DipBusMgt, Chief Executive,² Anne-Marie Widermanski MEd, MHSc, Principal Consultant³ and Sessional Lecturer⁴

Affiliations:

¹Edith Cowan University, Western Australia

²Westpac Life Saver Rescue Helicopters (Southern Region)

³WA Safety and Education Services

⁴Curtin University, Western Australia

Abstract

The Australian Surf Life Saving Championships (the 'Aussies') were held between 31 March and 6 April 2014, at Scarborough Beach in Western Australia. The event attracted 6,000 persons including competitors, support staff and officials. It is estimated that 70,000 spectators attended the event over the 7 days of competition.

This article provides an overview of the Aussies, outlines its medical planning and role of the medical team, and describes the team structure and deployment and equipment used. It also identifies some of the challenges that the Aussies present to medical planners due to the unique factors that influence the number and type of patient presentations. Finally, improvement recommendations are made which outline a number of simple, yet key strategies to improve medical planning for future events.

Keywords

SLSA; Surf lifesaving; mass gatherings; medical planning; major incidents; disaster medicine; major events; paramedic; paramedicine

Corresponding Author: David Reid, d.reid@ecu.edu.au

Introduction

The Australian Surf Life Saving Championships are a national sporting event held annually on the Australian coast. This descriptive article provides an overview of the medical planning for this mass gathering event held in Perth, Western Australia in 2014. Based on the published literature that identifies important components of mass gathering planning, it outlines the role of the medical team and the governance structures that were enacted. It also identifies the clinical equipment used at the event, and describes how teams were deployed to ensure timely access to injured and ill persons. Unique influences in patient presentations are highlighted, and suggested improvements to planning and management are identified.

Event overview

The Australian Surf Life Saving Championships are the largest surf life saving event held in Australia. Held annually, the event attracts the lifesavers from around the country to compete

on the beach and in the water. The 'Aussies', as they are colloquially known, were held over 7 days of competition, with an additional five being set up and pack up. In 2014, the event attracted 5,200 competitors, 750 officials and support staff, and an estimated 70,000 spectators. As a multi-day event with a large number of competitors it can be classed as a mass gathering for medical planning purposes (1).

The Aussies were held at Scarborough Beach, in Western Australia, over a 2-kilometre stretch of beach. There were 10 competition arenas, consisting of four each for beach and water competition, with two boat arenas (Figure 1). In addition, there was a community marketplace with merchandise, sponsorship booths, meal areas and VIP seating, event co-ordination and 'back of house' logistical areas (Figure 2). Attracting a significant number of competitors, as well as support staff, means that the event has the potential to place additional pressures on local health services making it important that appropriate medical care is provided on-site.

As an outdoor event held over multiple days, the weather has a significant influence over number of patients, as well as the type of presentations. Zeitz et al (2) has previously identified a significant correlation between maximum daily temperature and the number of patient presentations. Weather, from information provided by the Bureau of Meteorology (3), was fine with temperatures varying between 13OC and 31OC. Over the course of the 7-day event there was 1 mm of rainfall with maximum wind gusts between 26 km/h and 41 km/h. Relative humidity across the week of the event was low (36-87%) with an average of 54%. Surf conditions, from information provided by the WA Department of Transport were largely mild with tidal movements of less than 1 metre (4).

Figure 1. Ski area

Figure 2. Event site map

Over the competition period 290 patients were treated by the medical teams. Patient complaints included cardiac conditions, minor trauma, overexposure and neurological conditions. Three patients were referred to hospital by ambulance. Workload remained constant throughout the main competition days, with the exception of the second last day where workload increased by almost three-quarters (Figure 3).

It is challenging to compare the patient attendance rate to other events. As Ranse and Hutton (5) identified, the collection of patient presentation data and analysis of the presentation rate is variable and author dependent. However, in one article by Zietz et al (2), the authors found that over a 9-day agricultural show, patient presentations totalled 1,028 persons. The average number of presentations per day at the Surf Life Saving Australia (SLSA) event was 36, compared to the agricultural show rate of 114 per day. This result shows that the patient presentation rate for events can be vastly different, a finding confirmed by a number of other authors including Burton et al (6) and Milsten et al (7).

Event medical planning and medical team role

Memish and Al-Reebah (8) have identified that mass gathering events have the potential to overwhelm health services. As a result, mass gatherings require careful planning. At the Australian Surf Life Saving Championships medical planning is one component of the overall event Safety Operations Plan, a formal document that also includes the event risk assessment,

water safety and traffic management. Event safety planning commenced immediately after the previous year's event, with a review of incidents and analysis of anticipated conditions at the 2014 venue.

Medical planning commenced approximately 3 months before the event with a critical review of presentations, management, equipment and general 'lessons learned'. However, data had not been collected in a systematic manner and there were some gaps in the information available. Gaps included types of patient presentations, timing and acuity.

Jaslow (9) has identified the key components of a medical plan. Planning elements include governance and oversight, equipment, level of care and transportation. The medical plan for the Aussies had not traditionally been a formalised document, rather being a small part of the overall event safety plan. Emergency Management Australia (10) and Boatright (11) identify suggested components of a robust medical plan, and Boatright through his previous work has developed a framework for mass gathering medical plans.

Mass gathering medical plans (Table 1) should contain both retrospective and prospective information, to inform responders of the types of injuries and illnesses they are likely to see, how the teams will be deployed, and if required, the process for transportation of patients to definitive care.

Figure 3. Patient workload by day

Table 1. Example medical plan contents

- Services involved
- Past experience/history of injuries/illnesses
- Management/medical structure
- Anticipated patient volumes
- Level of care and staffing
- Medical equipment lists
- Logistics
- Patient extrication processes/transport
- Public health requirements
- Communications
- Disaster/major incident processes
- Documentation
- Event review and continuous quality improvement

During the Aussies there were daily briefings for all senior officials, including the manager of medical services. A daily briefing was held for all medical and first aid staff at 0630 hours (prior to equipment checks and daily deployment). The brief covered weather and surf conditions, the previous day's presentations, deployment and incidents of note.

The role of medical teams has been identified across the literature as including emergency medicine, as well as public health surveillance (12,13). The role of the medical team was to provide emergency care and treatment to competitors, team members and spectators. It was not anticipated that the team would provide primary care (general practitioner) services. However, with over 750 officials (with an age range of 20-70+ years), it was apparent that there was a demand for primary care services. Examples include officials who misplaced prescription medication (or left it at home), had exacerbations of acute conditions, or sought out the doctor on duty for a 'check-up'.

Management and clinical structure

Grange et al (14) have previously identified that on-site physicians can reduce the number of ambulance transports from mass gatherings to hospital. To ensure that the appropriate clinical governance is effective, a formal structure needs to be in place. The management structure for the event was dictated by SLISA down to the manager of medical services, who reported to the event safety manager. A clinical structure was also implemented to ensure that lines of clinical authority were clear. The clinical response structure (Figure 4) was based on the various clinical areas: either the medical centre (medical practitioners and nurses), rapid response (paramedics) or event arenas (first responders). A medical practitioner, when on duty, took overall clinical responsibility. The use of a medical centre, acting as the highest level of on-site assessment and treatment is not uncommon at mass gatherings. Hardcastle et al (15) describes the use of a casualty clearing station at the 2010 FIFA World Cup, and the medical centre at the Aussies was not dissimilar, albeit on a smaller scale.

Various authors have identified that team deployment is critical in ensuring that patients are accessed in a timely manner. Personnel at the Aussies were deployed according to the availability of staff, and clinical need of the various competition arenas. The medical room was staffed with a doctor and nurses. Rapid response vehicles (a team of two) had at least one paramedic, and many first responders held advanced first aid qualifications. Where possible, a paramedic team was also placed in the boat arena, as traditionally this was the highest risk arena for competitor injuries. Separate to the medical team were physiotherapists and chiropractors who operated as independent practitioners outside of the event management structure.

The use of medical practitioners has been shown to reduce the need for ambulance transports, and therefore use of external services (14). At the 2014 event, at least one medical practitioner was available on competition days and the tiered response and assessment structure (see further in this article)

Management structure

Clinical structure

Figure 4. Event structures

meant that patients were not automatically referred to external services. Across the 7 days of competition only three patients were transported by ambulance. Had medical practitioners not been on site, it is highly likely that additional patients would have been referred to hospital for further assessment via ambulance.

The level of care at mass gatherings has also been found to be important, in that a tiered system has been shown to be effective in ensuring that patients are treated by the most appropriately qualified clinical professional (12). At the Aussies, first responders had nationally recognised senior first aid certificates, as well as (at a minimum) training in oxygen resuscitation (bag-mask and oropharyngeal airways); many also had spinal immobilisation and pain relief certification. These qualifications were aligned to the structure required by SLSA. First aiders were drawn from a range of organisations including surf clubs, Edith Cowan University (second and third year paramedical students) and St John Ambulance Event Health Services. Drawing first aiders from a range of organisations allowed organisers to provide a wide skill mix at each first aid point. However, each organisation had its own clinical protocols and pharmacologies that created challenges when first aiders wanted to implement treatment outside of the scope anticipated by event organisers.

Paramedics, nurses and doctors all had pre-hospital and/or emergency department experience. Nurses and paramedics had insurance provided by the event organisers, however, medical practitioners were required to have their own insurance if they wanted to carry out procedures. This limited some medical practitioners because they could only assess and refer to further care for procedural treatment. If the patient load had been higher, this could have had a negative effect on local health services.

Clinical equipment

There is no standardised list of medical equipment for mass gathering events, and the literature to date does not detail a definitive list of equipment. However, it is reasonable to assume that equipment commensurate with the clinical staff's skill level will be available.

Clinical equipment used by the medical teams was supplied by SLSA, with some being sourced from surf lifesaving clubs in Western Australia. This was allocated based on role and clinical skill level. First aid kits were all stocked using standard first aid kit lists. First responders were issued a primary response kit, spine board and collars, oxygen resuscitation kit and ice, as well as a radio on a dedicated medical channel.

The medical centre was established as an emergency clearing station, with the capability for resuscitation, monitoring and patient assessment. However, a definitive list of medical equipment was not available for the medical centre, nor was one available for the paramedic responder kits.

Team deployment and communications

Teams were deployed across the event, with two rapid response vehicles, staffed by paramedics, available to back up the first responders on the beach. At each first aid station at minimum of three and usually four or more first responders was available. The layout of the event arenas meant that should any one first aid station have been overwhelmed the neighbouring stations could assist within a short timeframe. Individuals worked either full or half day shifts, commencing at 0600 hours until the event finished for the day, generally around 1700 hours.

Communications were maintained on a dedicated medical network, one of 23 channels available across the event. The provision of a dedicated medical channel was important given the size of the event, number of medical staff and logistics for all the various areas.

Patient flow (Figure 5) was clearly defined, although patients were free to self-present to the medical centre at any time. Where incidents occurred away from where first responders were stationed, the medical centre despatched either a first responder or paramedic direct to the scene based on the information provided. Dual response was also undertaken for incidents that had a high index of suspicion, such as collapse, head injuries and boat roll-overs.

Influences on patient presentations

It is difficult to create definitive patient estimates for mass gathering events, because of the unique variables facing each event (7). A number of authors have identified the factors which can influence the number of patients seen at a range of specific event types, such as the Olympic or Commonwealth Games (16), 'raves' (12), stadium based events (17), and multi-day community shows (18).

At the Aussies, competitors ranged in age from 14 to 60+ years. Officials often commenced work at 0600 hours, not finishing until after 1700 hours. A number of officials had chronic conditions that required regular multiple medications.

Arbon (19) has shown that environmental, crowd demographics and type of event has an influence on the number and type of patient presentations. The Aussies is no different in this regard. In 2014, the weather was mild, with no extremes of temperature, humidity or rain. Crowd demographics were primarily family oriented and although alcohol was available at areas surrounding the event, the event itself had a 'no alcohol' policy.

Unique influences on patient presentations

Unlike other mass gathering events from which there is published analysis available, patient presentations at the Aussies are also significantly influenced by surf, tide and sand conditions at the venue. Surf conditions, in particular, can

Figure 5. Patient flow

change rapidly and have an immediate influence on the number and severity of traumatic injuries. Individual waves, or sets of waves, can roll surfboats, cause racing skis to be swamped, or result in rescue boards rolling, all of which can cause traumatic injuries. Less common, but by no means less severe, are injuries caused on the beach as competitors clash heads diving for beach flags, or twist ankles and knees in sand sprints, or running into/from the water.

Similar to other multi-day events, the length of the event is also a factor on the number and type of presentations. Set up for the Aussies commences weeks before the event, with activity ramping up 4 days prior to the event, and the competition running for 7 days, commencing at 0600 hours (for officials briefings) and often not finishing until after 1700 hours. What is unique is the length of time that officials in particular, are exposed to direct sunlight and weather conditions. There is a high potential that, as the event continues, chronic conditions may be exacerbated, requiring assessment and treatment.

Event improvements

Following a review of the information available, a number of areas for improvement were identified. Recommendations included:

- A formalised medical plan being created to promote consistent planning between events
- The various roles of the medical team being documented

- Full equipment lists for all medical equipment from response bags to the medical centre being developed
- Guidelines for staff bringing their own equipment being drafted
- Formalised and consistent recording of patient presentations to enable tracking and comparison between and within events being implemented
- Formalising an induction/training process for as many medical personnel as possible.

Conclusion

The Aussies is one of the largest annual sporting events in Australia. As a mass gathering it is important that robust planning is in place to ensure that an appropriate level of care is available. Sufficient resources should be available on-site to reduce reliance on local medical services. Formalised planning for this event promoted a high quality service and ensured that all injuries and illnesses were responded to in an appropriate and timely manner.

Conflict of interest

The authors declare they have no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

References

1. Ziad AM, Gwen MS, Robert S, Qanta AA. Mass Gatherings Health 1: Emergence of medicine for mass gatherings: lessons from the Hajj. *Lancet Infect Dis* 2012;12(1):56.
2. Zeitz KM, Schneider DPA, Jarrett D, Zeitz CJ. Mass gathering events: retrospective analysis of patient presentations over seven years. *Prehosp Disaster Med* 2002;17(3):147.
3. Meteorology TBo. Monthly statistics. Canberra: Bureau of Meteorology; 2014.
4. Transport WDo. Tide predictions. In: Transport Do, editor. Fremantle: WA Department of Transport; 2014.
5. Ranse J, Hutton A. Minimum data set for mass-gathering health research and evaluation: a discussion paper. *Prehosp Disaster Med* 2012;27(6):543-50.
6. Burton JO, Corry SJ, Lewis G, Priestman WS. Differences in medical care usage between two mass-gathering sporting events. *Ibid.* 2012;27(5):458-62.
7. Milsten AM, Seaman KG, Liu P, Bissell RA, Maguire BJ. Variables influencing medical usage rates, injury patterns, and levels of care for mass gatherings. *Ibid.* 2003;18(4):334.
8. Memish ZA, Al-Rabeeah AA. Mass gathering medicine: a leisure or necessity? *Int J Clin Pract* 2012;66(6):530-2.
9. Jaslow D, Yancy A, Milsten A. Mass gathering medical care. *Prehosp Emerg Care* 2000;4(4):359-60.
10. Emergency Management Australia. Safe and healthy mass gatherings. In: Australia EM, editor. Canberra: Emergency Management Australia; 1999. p. 149.
11. Boatright JR. Emergency medical service--mass gathering action plans. *Journal of emergency nursing: JEN: official publication of the Emergency Department Nurses Association.* 2004;30(3):253-6.
12. Krul J, Sanou B, Swart EL, Girbes ARJ. Medical care at mass gatherings: emergency medical services at large-scale rave events. *Prehosp Disaster Med* 2012;27(1):71-4.
13. Arbon P, Cusack L, Verdonk N. Mass Gathering Public Health and Emergency Medicine Literature Review: Levels of Evidence. *Australasian Journal of Paramedicine* 2013;10(1).
14. Grange JT, Baumann GW, Vaezazizi R. On-site physicians reduce ambulance transports at mass gatherings. *Prehosp Emerg Care* 2003;7(3):322-6.
15. Hardcastle TC, Samlal S, Naidoo R, et al. A Redundant Resource: A Pre-Planned Casualty Clearing Station for a FIFA 2010 Stadium in Durban. *Prehosp Disaster Med* 2012;27(5):1-7.
16. Dutch MJ, Senini LM, Taylor DJ. Mass gathering medicine: the Melbourne 2006 Commonwealth Games experience. *Emerg Med Australas* 2008;20(3):228-33.
17. Locoh-Donou S, Guofen Y, Welcher M, Berry T, O'Connor RE, Brady WJ. Mass-gathering medicine: a descriptive analysis of a range of mass-gathering event types. *Am J Emerg Med* 2013;31(5):843-6.
18. Zeitz K, Zeitz C, Kadow-Griffin C. Injury occurrences at a mass gathering event. *Australasian Journal of Paramedicine* 2012;3:1.
19. Arbon P. The development of conceptual models for mass-gathering health. *Prehosp Disaster Med* 2004;19(3):208-12.