



# Mass Gatherings, Emergency Preparedness, and Best Practice

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# Audience Composition



Those with a background in:

Health policy

Management

Education

Clinical practice

Other



You are all “event goers” and so all have a stake in the following discussion.





# Acknowledgements



- Thank you to the planning committee for the invitation to present today.
- Members of our research and medical teams who could not be present.
- Research Support
  - Pre-UBC Department of Emergency Medicine
  - Columbian Emergency Physicians' Association
  - Vancouver Coastal Health Research Institute
  - Justice Institute of British Columbia
  - Fraser Health Authority
  - Michael Smith Foundation for Health Research/MITACS
  - BC Ambulance Service – Special Operations





# Conflict of Interest



- None declared.



# Objectives

- Briefly introduce the Mass Gathering Medicine Interest Group, UBC.
- Explore key issues in relation to planning the medical response for mass gatherings.
- Critically analyze best practice in relation to mass gatherings and disaster preparedness.



# Mass Gathering Medicine Interest Group (MGMIG)

<http://www.ubcmgm.ca>



The screenshot shows the website for the Mass Gathering Medicine Interest Group. The header includes the UBC logo, the slogan "a place of mind", the "DEPARTMENT OF EMERGENCY MEDICINE", and the tagline "Promoting Public Safety at Mass Gathering Events". A navigation menu contains links for HOME, OUR TEAM, CLINICAL, RESEARCH, EDUCATION, ADVOCACY, EVENT CALENDAR, PHOTO GALLERY, and CONTACT US.

The main heading is "Mass Gathering Medicine Interest Group". Below it, a paragraph states: "The Mass Gathering Medicine Interest Group is a group of individuals at the University of British Columbia committed to advancing the academic foundations of this niche field of prehospital care."

The featured article is titled "Collaboration with the British Columbia Ambulance Service – Special Operations Team". It includes a photo of several people in uniform standing around an ambulance. The text describes this as an exciting collaboration where BCAS Special Operations Teams provide patient care at major public events. A "Read More" button is visible at the bottom of the article.

To the right of the article is a "TAGS" section with the MGM logo and a list of event types: Barricade Collapse, Marathon, MCI, MMU, PSU, Rockdoc+, Whistler Collaborators, Gran Fondo, MGM Registry First Aid, Research, Research Day, Bicycling, Event St. John Ambulance, BCAS, JIBC New York City, and Fireworks Disaster Response.

At the bottom of the page, there are several small thumbnail images, including one with a "DANGER HAZARDOUS MATERIAL" sign.







# Mass Gatherings, Emergency Preparedness, and Best Practice



Why be prepared for mass  
casualty incidents at mass  
gatherings?



# Defining Our Terms



Mass gathering:

- an activity that brings together large numbers of people
- the potential to overwhelm local health and community infrastructure



# Canadian MGM Scope

- **Mega/Compound – 3 x Olympics hosts**
  - 1976 Summer - Montreal
  - 1988 Winter – Calgary
  - 1986 World Fair and Exposition
  - 2010 Winter – Vancouver/Whistler
  - 2009 World Police & Fire Games
- **Large (50,000-500,000)**  
Fireworks, parades, fun runs
- **Medium (5000-50,000)**  
Festivals, concerts, air shows, adventure races
- **Small (500-5000)**  
Ubiquitous in all Canadian communities



# Defining Our Terms

## Mass casualty incident:

- Generates multiple casualties occurring due to a single event or series of events
- Overwhelms local infrastructure
- Scale may vary

Examples of mass casualty  
incidents during mass  
gatherings...

# Hajj, A Religious Festival

## November 4-8, 2011

- Source: Muhammed Muheisen/AP. Available at: <http://www.guardian.co.uk/science/blog/2010/oct/11/disease-mass-gathering>
- <http://www.youtube.com/watch?v=NAIpoMgxO10>



# Reno Air Show Crash

## Sept 16, 2011





# Sugarland Stage Collapse

## August 11, 2011

- [http://www.youtube.com/verify\\_age?next\\_url=/watch%3Fv%3DSRkdwrmzYXg](http://www.youtube.com/verify_age?next_url=/watch%3Fv%3DSRkdwrmzYXg)



# Hockey Riot Vancouver, March 2011

- <http://www.youtube.com/watch?v=1q5V6DKH3bw>





What do we know about mass gatherings and emergency preparedness?

# Gaps in MG and Disaster Literature



Pause for thought...

# Best Practice Point #1

Practice makes perfect.



**PREPAREDNESS 101:**

# ZOMBIE PANDEMIC



U.S. Department of  
Health and Human Services  
Centers for Disease  
Control and Prevention

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© Ien Wilson, Columbia Pictures



# Mass Gatherings as a Disaster Management Training Proxy

## An Untapped Opportunity



“We propose that a synergy exists between mass gathering medicine and disaster medicine.”



EMS

## Mass gathering medicine: a practical means of enhancing disaster preparedness in Canada

Adam Lund, BSc, MD, MDE\*; Samuel J. Gutman, MD\*; Sheila A. Turriss, RN, PhD<sup>†</sup>

### ABSTRACT

**Background:** We explore the health care literature and draw on two decades of experience in the provision of medical care at mass gatherings and special events to illustrate the complementary aspects of mass gathering medicine and disaster medicine. Most communities have occasions during which large numbers of people assemble in public or private spaces for the purpose of celebrating or participating in musical, sporting, cultural, religious, political, and other events. Collectively, these events are referred to as mass gatherings. The planning, preparation, and delivery of health-related services at mass gatherings are understood to be within the discipline of emergency medicine. As well, we note that owing to international events in recent years, there has been a heightened awareness of and interest in disaster medicine and the level of community preparedness for disasters. **We propose that a synergy exists between mass gathering medicine and disaster medicine.**

**Method:** Literature review and comparative analysis.

**Results:** Many aspects of the provision of medical support for mass gathering events overlap with the skill set and expertise required to plan and implement a successful medical response to a natural disaster, terrorist incident, or other form of disaster.

**Conclusions:** There are several practical opportunities to link the two fields in a proactive manner. These opportunities should be pursued as a way to improve the level of disaster preparedness at the municipal, provincial, and national levels.

de catastrophe. Dans la plupart des communautés, des activités sont organisées au cours desquelles un grand nombre de personnes se réunissent dans des endroits publics ou privés dans le but de célébrer ou de participer à un événement musical, sportif, culturel, religieux, politique ou autre. Collectivement, on appelle ces événements des rassemblements de masse. La planification, la préparation et la prestation des services liés à la santé lors des rassemblements de masse s'inscrivent dans la discipline de la médecine d'urgence. En outre, nous constatons qu'en raison des événements internationaux des dernières années, il y a eu une plus grande sensibilisation à la médecine de catastrophe, un intérêt accru pour celle-ci et une hausse du niveau de préparation des communautés aux catastrophes. Nous proposons qu'une synergie existe entre la médecine exercée dans le cadre des grands rassemblements de masse et la médecine de catastrophe.

**Méthode:** Analyse documentaire et analyse comparative

**Résultats:** De nombreux aspects de la prestation d'un soutien médical lors des rassemblements de masse empilent sur l'ensemble des compétences et de l'expertise requises pour planifier et mettre en œuvre une intervention médicale réussie permettant de répondre à une catastrophe naturelle, à un attentat terroriste ou à toute autre forme de catastrophe.

**Conclusions:** Il existe plusieurs possibilités concrètes permettant de relier les deux domaines d'une manière proactive. Ces possibilités devraient être considérées comme un moyen d'améliorer le niveau de préparation aux catastrophes.

- July 2011  
Editorial in  
CJEM

# Best Practice Point #2

Those who do not study history  
are doomed to repeat it.



# The “History” of Mass Gatherings



- Event reports are mostly anecdotal and often single event summaries (Arbon, 2004).
- Reports are descriptive versus explanatory, for the most part (Lorenzo, 1997).
- Virtually no academic papers regarding MCIs at mass gatherings; commonly limited to media reports (manuscript in preparation).





# Mass Gatherings, Mass Casualty Incidents and Best Practice



- 30 years of MCIs (1971-2011)
- 156 reports in published literature
- Only 21 were analytical
- General lack of available evidence providing support for event planners

Soomaro & Murray, 2012

# Nursing Synthesis Course

Our questions:

- What types of MCIs occur at mass gathering events?
- What are typical factors associated with MCIs at certain types of events?
- What, if any, are common themes between event type, event demographics, and MCI type?

# Methods

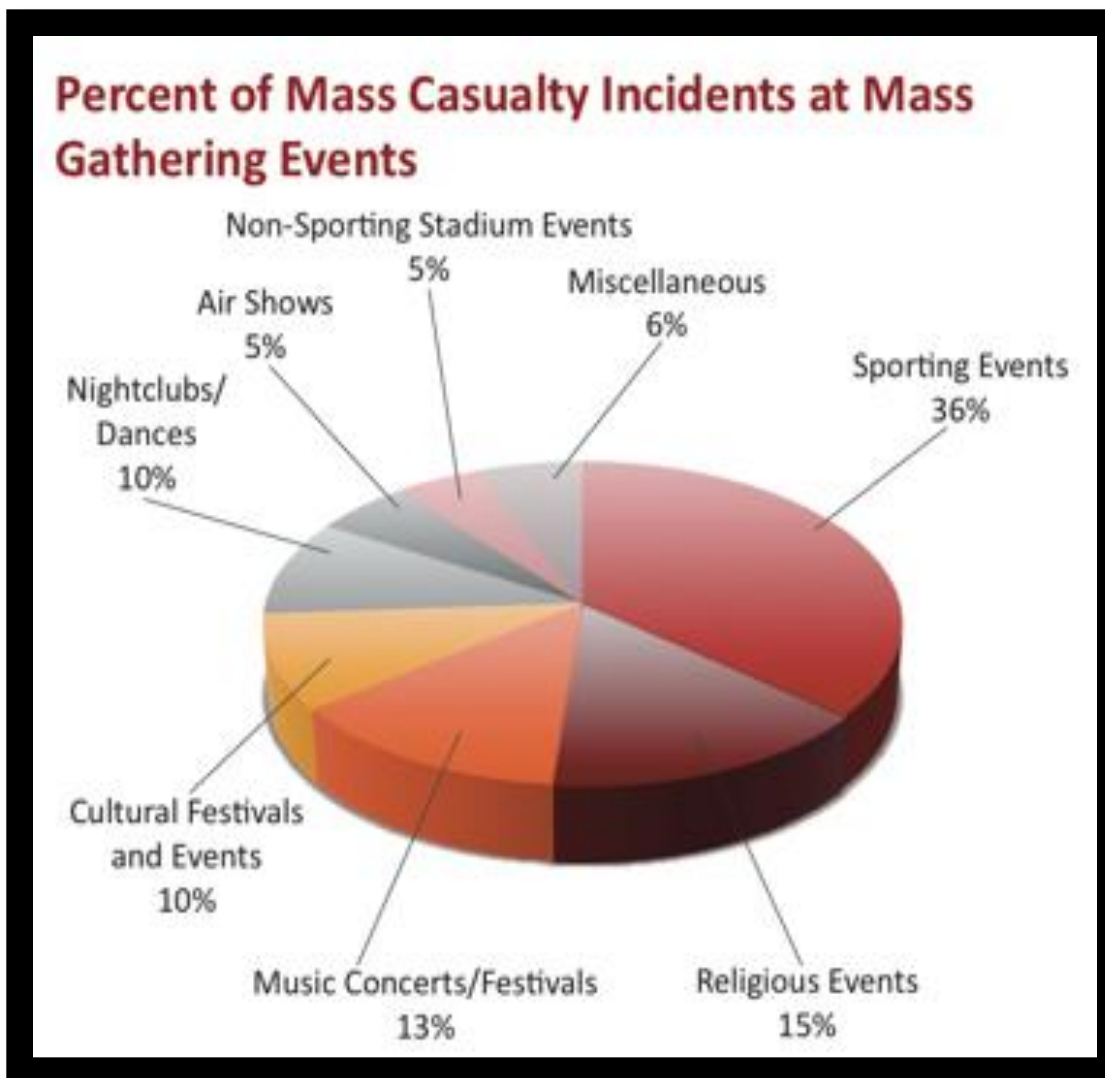


- A systematic review of the mass gathering medicine literature, mainstream media, and grey literature (published in English) to identify MCIs at mass gathering events on a global scale from 1980 to 2012.

What is the most “dangerous”  
category of event to attend?

Skill Testing Question

# Results





# Results

## Reported Mass Casualty Incidents and Mass Gathering Medicine Events, 1980-2011

Mass Gathering Event	Mass Casualty Incident							Total
	Stampede	Fire	Riot/Violence	Crowd Surge	Failed Infrastructure	Vehicle Crash	Miscellaneous	
Sporting Event	27	1	16	1	7	1 (Boat)	0	53
Religious Event	20	1	0	1	0	0	0	22
Music Concert/Festivals	10	2	2	1	3	0	1 (Heat exhaustion)	19
Cultural Festivals and Events	1	3	0	0	3	1 (Car)	1 (Electrocution) 5 (Trample)	14
Nightclubs/dances	7	4	0	0	0	0	2 (Substance abuse) 1 (Dehydration)	14
Air Shows	0	0	0	0	0	7 (Plane)	1 (Falling debris)	8
Non-Sporting Stadium Events	5	0	1	0	0	1 (Motorcycle)	0	7
Miscellaneous Casino (1) Band appearance (1) Dance competition (1) Film festival (1) Free gift giveaway (1) Hiring fair (1) Store opening (2)	6	1	0	0	1	0	1 (Explosion)	9
<b>Total</b>	<b>76</b>	<b>12</b>	<b>19</b>	<b>3</b>	<b>14</b>	<b>10</b>	<b>12</b>	<b>146</b>

# Best Practice Point #3

Chance favors only the prepared  
mind. Louis Pasteur

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"YOU'RE WRONG!... RULES ARE NOT JUST ROUGH  
GUIDELINES."

# Resources for Planning

- Experience
  - Anecdotal evidence (most commonly used)
- Grey literature
  - Event guides
  - Practice guidelines from professional organizations
  - World Health Organization (WHO)
- Published literature
  - Event reports for similar events

# Best Practice, Guidelines for Mass Gatherings



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# PREHOSPITAL EMERGENCY CARE

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THE NATIONAL ASSOCIATION OF STATE EMS DIRECTORS  
THE NATIONAL ASSOCIATION OF EMS EDUCATORS

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World Association for Disaster and Emergency Medicine

# London Riot July, 2011



# Best Practice Point #4

An ounce of prevention is worth a pound of cure.



# How do we classify events?

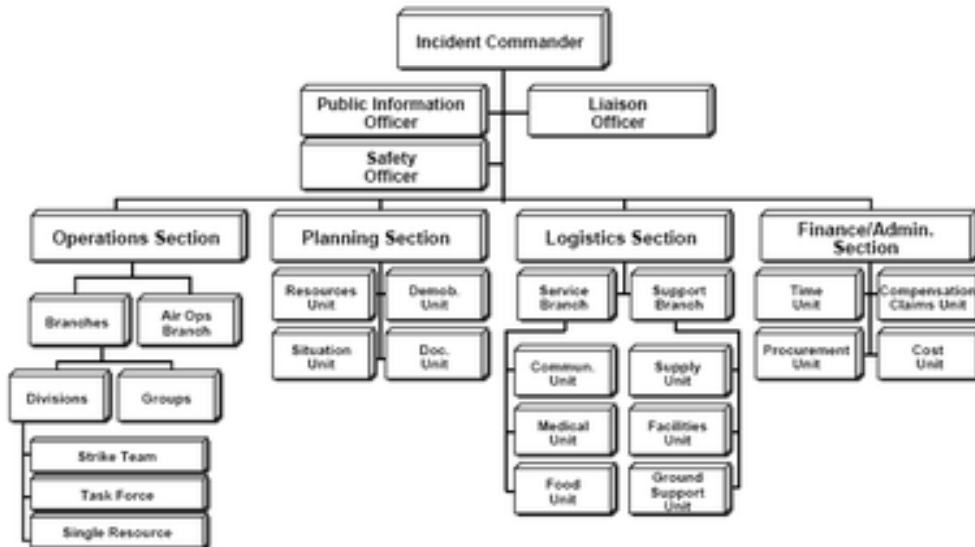
- bounded or unbounded (e.g., Ride to Conquer Cancer versus a football game at a stadium)
- seated or mobile (e.g., classical concert versus folk festival)
- size of gathering (e.g., more than 1,000, more than 10,000)
- type of gathering (e.g., parade versus air show versus sport versus ???)

# How do we classify events vis a vis risk?

## Examples of event risk classification systems:

- Emergency Medicine Society of South Africa, 2008
- Western Australia Health, 2008
- Hartman et al, Annals of Emergency Medicine, 2009

# Risk Mitigation



**MCIs in “slow motion”**

# Best Practice Point #5

Many hands make light work.

# Germany, 2010 Love Parade



# MCI – Germany's Love Parade



# Exciting Initiatives





# Best Practice Point #6

The single biggest problem with communication is the illusion it has taken place.

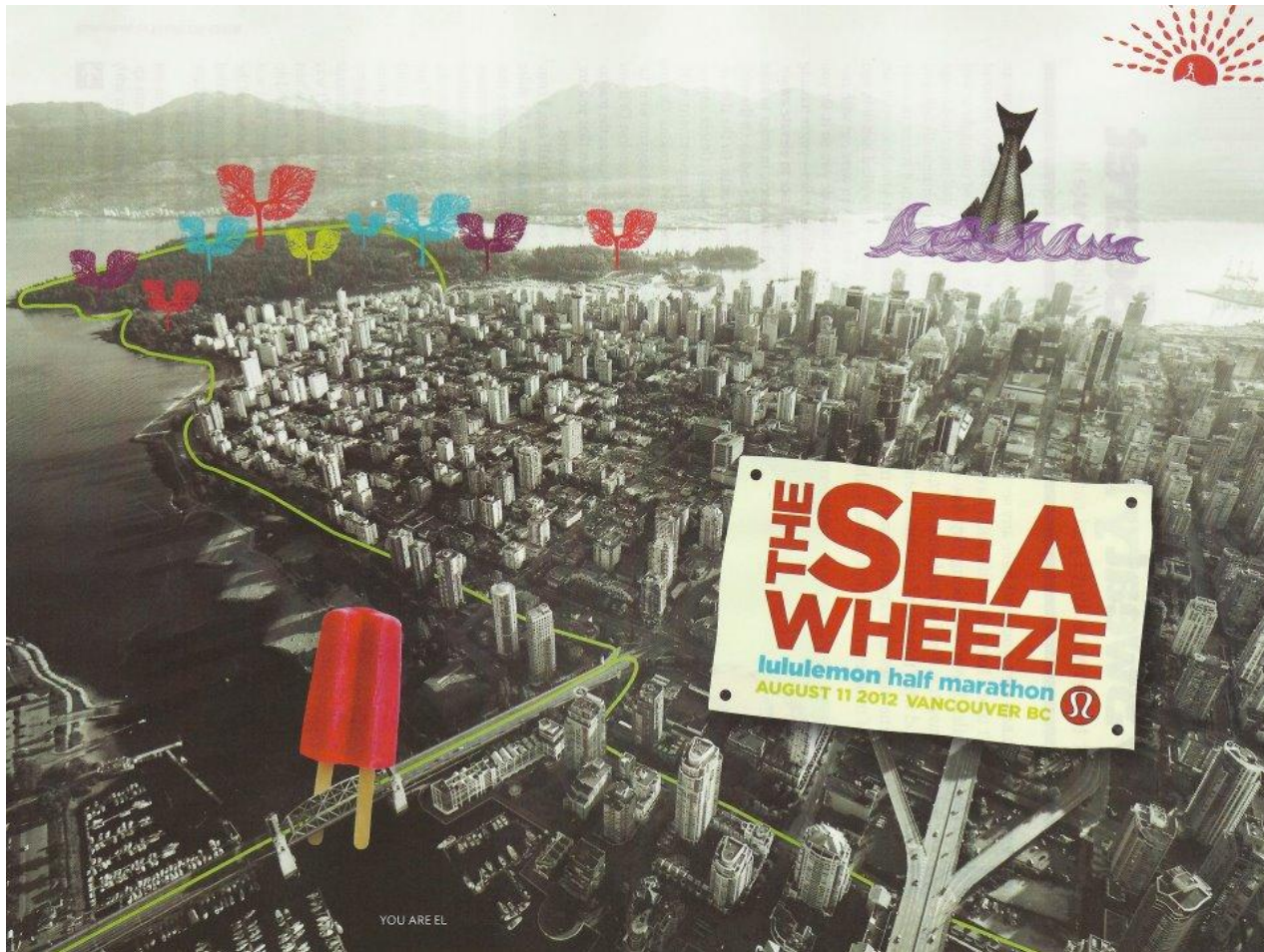
George Bernard Shaw



# Governance

# Case Example # 2

## Running Event



# The Challenges...

- **Governance**
- **Disaster management capacity**





# Governance: Who is Responsible?



- Europe
- Britain
- Australia
- USA
- Canada
- Developing world

# Exciting Initiatives



# Best Practice Point #7

No crowd ever waited at the gates  
of patience.





# Final Thoughts





- Al-Tawfiq JA, Memish ZA. The Hajj: undated health hazards and current recommendations for 2012. *Eurosurveillance*. 2012;17(41). Available at: <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20295>
- Arbon P, Bridgewater FH, Smith C. Mass gathering medicine: A predictive model for patient presentation and transport rates. *Prehosp Disaster Med*. 2001 Jul-Sep;16(3):150-8.
- Arbon P. The development of conceptual models for mass-gathering health. *Prehospital Disaster Medicine*. 2004;19(3):208-212.
- Brady (Ed). *Prehospital Emergency Care Sixth Edition*; 2009. Mistovich, Joseph J. et al pg, 866.
- De Lorenzo RA. Mass gathering medicine: a review. *Prehospital Disaster Medicine*. 1997;12(1):68-72.
- Emergency Medicine Society of South Africa. (2011). Mass gathering medical resource model, pp. 1.5. Available at: <http://emssa.org.za/documents/em009.pdf>
- Hartman N, Williamson A, Sojka B, Alibertis K, Sidebottom M, Berry T, Hamm J, O'Connor RE, Brady WJ. Predicting resource use at mass gatherings using a simplified stratification scoring model. *Am J Emerg Med*. 2009;27(3):337-343.
- Hawkins ER, Brice JH. Fire jumpers: description of burns and traumatic injuries from a spontaneous mass gathering and celebratory riot. *Journal of Emergency Medicine*. 2010;38(2):182-187.
- Hutton A, Zeitz K, Brown S, Arbon P. Assessing the psychosocial elements of crowds at mass gatherings. *Prehosp Dis Med*. 2012;26(6):414-421.
- Lund A, Gutman SJ, Turris SA: Mass gathering medicine: a practical means of enhancing disaster preparedness in Canada. *CJEM* 2011 Jul; 13(4):231-6.
- Memish ZA, Alrabeeah AA. Jeddah declaration on mass gatherings health. *Lancet*. 2011;11(5):342-343.
- Milsten AM, Maguire BJ, Bissell RA, Seaman KG. (2002). Mass gathering medical care: a review of the literature. *Prehosp Disaster Medicine*. 2002;17(3): 151-162.
- Molloy, M., Sherif, Z., Natin, S., McDonnell, J. (2010). Management of Mass Gatherings. In K. Koenig & C. Schultz, *Koenig and Schultz's Disaster Medicine: Comprehensive Principles and Practices* (228-252). New York: Cambridge University Press.
- Ngai KM, Burkle FM, Hus A, Hus EB. Human stampedes: A systematic review of historical and peer-reviewed sources. *Disaster Med and Pub Health Preparedness*. 2009;191-195.
- Ransie J, Hutton A. (2012). Minimum data set for mass gatherings. *Prehosp Dis Med*.
- Ravello A, Marzio A. Mass gathering event risk scoring model: a score to predict risk level and medical usage during metropolitan events. *Prehosp Disaster Med*. 2011;26(S1):s76.
- Soomaro L, Murray V. Disasters at mass gatherings: lessons learned from history. Accessed: October 12, 2012. Available at: <http://currents.plos.org/disasters/article/disasters-at-mass-gatherings-lessons-3wkcplftb6ss-5/>
- Teich JM, Wagner MM, MacKenzie CF, et al. The informatics response in disaster, terrorism, and war. *JAMIA* 2002;9:97-104, doi:10.1197/jamia.M1055.
- World Health Organization. (2007). *Mass Casualty Management Systems: Strategies and Guidelines for Building Health Care Sector Capacity*, pp. 1-38, World Health Association.
- Yazawa K, Kamijo Y, Sakai R, Ohashi M, Owa M. Medical care for a mass gathering: The Suma Onbashira Festival. *Prehosp Dis Med*;22(5):431-435.
- Zeitz KM, Tan HM, Grief M, Cousins PC, Zeitz CJ. Crowd behavior at mass gatherings: A literature review. *Prehosp Dis Med*. 2009;24(1):32-38.
- Zeitz KM, Zeitz C, Arbon P. Forecasting medical work at mass-gathering events: Predictive model versus retrospective review. *Prehospital and Disaster Medicine*. 2005;20(3):164,165-168.

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