

## Oral Presentations—Tsunami in South East Asia

### Disaster Health: Where is the Information?

Marvin L. Birnbaum,<sup>1</sup> Roderico Ofrin<sup>2</sup>

1. World Association for Disaster and Emergency Medicine, Madison, Wisconsin USA
2. World Health Organization South East Asian Regional Office, Delhi, India

**Introduction:** Access to information concerning the health aspects of disasters has been difficult. This study is part of work defining the health aspects of the 2004 earthquake and tsunami in five countries in the South East Asia Region.

**Objective:** The objective of this study was to define the location and access to the health data generated relative to these events.

**Methods:** Information was abstracted from: (1) peer-reviewed literature; (2) non-peer-reviewed publications; (3) governmental, inter-governmental, and non-governmental agencies; (4) media; and (5) the Internet. Of the 407 articles accessed, 38 were not included as they dealt with the physics of the events.

**Results:** Of the 369 included articles, 66% were published in journals/magazines that had published only one article relevant to the health aspects of the tsunami; 13%, two; 6% three; 3%, four, 3%, five; 8%, 6–9; and 3% had published <9 articles. Of these, 43 were published in *Prehospital and Disaster Medicine*, 28 in the *International Review of Psychiatry*, 25 in *Science*, 20 in *Nature*, and 15 in *Lancet*. Principal topic areas were psychosocial, public health, infections, relief, and dead body management. Medical care, warning systems, management, food-nutrition, gender issues, veterinary medicine, water sanitation, education, and healthcare systems were the main topics in <8% of the articles.

**Conclusions:** Health information regarding the earthquake and tsunami is distributed widely, and access requires extensive searches. Much information appeared in non-peer-reviewed sources (gray literature) for which the accuracy cannot be substantiated. There is a need for enhanced methods to catalogue the health information relative to disasters.

**Keywords:** 2004 tsunami; disaster; earthquake; health; information sources; tsunami

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### Barriers to Retrospective Analysis of Health Aspects of the Earthquake and Tsunami of 2004

Patrice A. Kohl,<sup>1</sup> Marvin L. Birnbaum,<sup>1</sup> Roderico Ofrin<sup>2</sup>

1. WADEM, Madison, Wisconsin USA
2. World Health Organization South East Asian Regional Office, Delhi, India

**Introduction:** Beginning in 2007, a detailed analysis of the health aspects of the impact of the 2004 earthquake and tsunami on five countries in the South East Asia Region (SEAR) was performed by the WHO-SEARO and the WADEM. This paper examines the barriers encountered while collecting information for this project.

**Methods:** Researchers used a wide range of sources to collect data for the project and documented the barriers they encountered in the process.

**Results:** Some of the barriers encountered include:

1. Sources of information were widely scattered;
2. The validity of some of the information could not be substantiated as it appeared in the gray literature;
3. The magnitude of the events differed between each of the countries;
4. Much of the information had been removed from the potential sources;
5. No common structure was used in the reports;
6. No common terminology was used;
7. Each country had a different health structure and baseline pre-event status;
8. Record-keeping was inconsistent;
9. Much information had to be obtained using interviews and identification of knowledgeable informants was difficult;
10. Fitting the information into the Utstein Guidelines was difficult and sometimes ambiguous;
11. Some data and information were withheld or rendered inaccessible for parochial reasons; and
12. No standardized indicators were used including injury/disease descriptors and measures of severity.

**Conclusions:** Standardized methods, terminology, and structure should be used in future reporting and all such information must be archived and indexed in a common resource center.

**Keywords:** archives; barriers; information; methods; research; reports; structure; terminology

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### Disasters and Remote Islands: Special Challenges Faced in Responding to the 2004 Tsunami

Patrice A. Kohl,<sup>1</sup> Marvin L. Birnbaum,<sup>1</sup> Roderico Ofrin<sup>2</sup>

1. World Association for Disaster and Emergency Medicine (WADEM), Madison, Wisconsin USA
2. World Health Organization South East Asian Regional Office, Delhi, India

**Introduction:** Disasters can easily paralyze critical services on remote islands and obstruct relief workers trying to reach them with assistance. This paper examines what the 2004 tsunami tells us about the special circumstances disaster management efforts must take into consideration with respect to island communities.

**Methods:** Researchers working on a tsunami publication for the World Health Organization's South East Asia Regional Office collected data on the impact of the tsunami disaster on islands and relief effort carried out among remote island communities.

**Results:** Remote islands exhibited several unique vulnerabilities during the disaster. The most prominent related to water scarcity, poor communications, transportation difficulties, and lack of local resources. Prior to the tsunami, most of these remote islands relied on scarce water resources and were difficult to reach due to underdeveloped transportation infrastructure and frequently adverse sea conditions. Tsunami damages resulted in severe water

shortages, an almost complete breakdown in communications, and badly crippled transportation capabilities. Destroyed ports and harbors could not accommodate ships, and relief had to be ferried from ships to islands using small boats. Recovery on remote islands has been slower than in other impacted communities due to a severe shortage of local resources and high import costs.

**Conclusions:** Disaster responses and management plans that address disasters occurring on remote islands must take into account the unique vulnerabilities exhibited by islands in order to be effective.

**Keywords:** disaster; islands; remote islands; special populations; tsunami

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### Injury Reporting Following the 2004 Indian Ocean Tsunami

Patrice A. Kohl,<sup>1</sup> Marvin L. Birnbaum,<sup>1</sup> Roderico Ofrin<sup>2</sup>

1. World Association for Disaster and Emergency Medicine, Madison, Wisconsin USA
2. World Health Organization South East Asia Regional Office, Delhi, India

**Introduction:** Similar disasters often repeatedly occur in the same regions. Therefore, local medical care workers usually know what injuries to anticipate, based on past experiences. But unlike the cyclones that frequent Bangladesh or earthquakes that frequent Indonesia, the 2004 Indian Ocean tsunami was unusual and medical care workers could not draw on past experiences to anticipate injuries. This paper explores what the 2004 tsunami has taught the medical community about the nature and frequency of injuries following a tsunami.

**Methods:** Researchers working on a tsunami publication for the World Health Organization's South East Asia Regional Office collected and compared injury data reported by government sources, hospitals, and medical responders.

**Results:** The tsunami resulted in flesh wounds, fractured bones, and near-drowning cases. Near-drowning cases were unique, in that the water inhaled by tsunami victims was saline, and heavily laden with dirt, bacteria, and other contaminants. Near-drowning victims who survived beyond the first day of the disaster often developed a type of aspiration pneumonia coined "tsunami lung". Similarly, the highly contaminated water deeply penetrated flesh wounds suffered during the tsunami. Unfortunately, injury data were poorly recorded and the frequency with which tsunami survivors suffered various injuries remains poorly understood. Additionally, a tally of all injuries suffered due to the tsunami cannot be calculated, since local and national tallies are incomplete and unreliable.

**Conclusions:** The development of a standardized injury reporting method at the national and international level would help medical care workers better anticipate injured survivors' needs during future disasters.

**Keywords:** 2004 tsunami; disaster; injury; injury reporting; tsunami  
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### Oral Presentations—Migrating Populations

#### Assessing Quality through Measurement of Unmet Needs of Disaster Populations after the 2007 Southern California Wildfires

Thomas D. Kirsch,<sup>1</sup> Lauren M. Sauer,<sup>1</sup> Yu-Hsiang Hsieh,<sup>1</sup> Lauren E. Cooper,<sup>2</sup> Jennifer L. Jenkins<sup>1</sup>

1. Johns Hopkins University, Baltimore, Maryland USA
2. Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland USA

**Introduction:** Currently, the quality of disaster response is assessed by process, not outcome measures. This study attempts to measure outcomes by directly assessing the needs of a displaced population, and how efficiently they were met.

**Methods:** Heads of households were surveyed at open Local Assistance Centers (LAC) and shelters in San Diego and Riverside counties 10–12 days after initial evacuation. The survey assessed the sheltering, food, water, healthcare, personal supplies, transportation and communication needs of the displaced population.

**Results:** A total of 162 heads of households were surveyed at three shelters and seven LACs representing 522 persons (3.3 persons/house; females = 50.8%). Households moved an average of 1.7 times during evacuation; only 20.4% stayed in a public shelter. The greatest needs (75–96%) were for public health issues—shelter, food, water, while medical care was needed by <25%. Mental health needs were uncommon, but poorly met. The needs of the affected population were met <90% of the time in all areas, but supplies such as clothing, hygiene, and household. The need for transportation and communication services also were assessed for the overall time period—18.6% needed transportation of which 40.0% were unmet. A total of 32.9% had communications needs. Of these, 39.6% were unmet.

**Conclusions:** This study attempts to assess the quality of a disaster response by measuring the outcome of needs, met and unmet, over time. Overall needs are well met, but there appears to persist a difficult population to reach. Further study is needed to validate this quality measure and to better identify the difficulty of reaching a persistently needy population.

**Keywords:** capacity building; disaster; measurement; quality assessment; wildfire

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#### Epidemiological Review of the Risk Factors of Measles Outbreaks in Displaced Populations

Isidore K. Kouadio; Taro Kamigaki; Hitoshi Oshitani

Tohoku University Graduate School of Medicine, Department of Virology (Diseases Surveillance and Control), Sendai, Japan

**Introduction:** Measles is a highly contagious disease with a significant public health impact, especially among displaced populations. Disasters have contributed in the increase of refugees and internally displaced persons to 9.9 million and 12 million, respectively.