cases abstracted were limited strictly to victims whose injuries were directly related to the Ji Ji Earthquake, and those who died but whose death was not related directly to the Earthquake were excluded. Geographic and seismographic information, time of origin, location of epicenter, and the depth and magnitude of the Earthquake were obtained from Central Weather Bureau. Department of General Budget, Accounting and Statistics (DGBAS) provided the data for economic loss due to the Ji Ji Earthquake.

Result: There were 2,347 deaths and 11,305 persons were injured in this disaster. Based on the summary of deaths in the stricken areas, Taichung had highest number of deaths (1,777) followed by Nantou (824) and Taipei (132). The epicenter was located, within Nantou county whereas Taichung had the highest number of death. Total economic loss from this disaster has been estimated at US$11.5 billion, including US$8.4 billion in asset loss. The asset loss consists of US$7.9 billion in buildings and equipment and US$0.5 billion in transportation infrastructure. The remaining US$3.1 billion was due to the loss of potential revenues includes US$0.1 billion in agriculture, US$2.3 billion in industry and US$0.7 billion in service.

Conclusion: Traumatic death, the 3rd leading cause of death in Taiwan from 1967 to 1997, was dropped to the fourth place in 1998 due to the implementation of motorcyclists' helmet use law effective on 01 June, 1997. However, the casualties of the Ji Ji Earthquake made trauma the second leading cause of death in Taiwan, only second to cancer in 1999. The data suggest the importance of disaster prevention, which also is a crucial public health issue.

Keywords: cost analysis; disaster; injury, Ji Ji earthquake; Taiwan
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Morbidity Following Chi-Chi Earthquake in Taiwan

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Objective: To observe the characteristics of victims at different areas following Chi-Chi earthquake and provide a view for disaster preparedness in the future.

Methods: A retrospective study of 6,970 victims was conducted during the first three days after Chi-Chi earthquake that caused 8,722 injuries. Medical records were reviewed from the local hospitals, and the characteristics of the victims, visiting day, and diagnoses were collected and analyzed. Additional information was obtained from the government, local Health Bureau, and field hospitals.

Results: On the day of earthquake, there was a sharp increase in the number of the patients (odds ratio = 2.65), most for head injuries (odds ratio = 3.5), and then, declined dramatically on the following days. 80% of patients were clustered around epicenter, Chi-Chi in Nan-tou, but the critics occurred more in Taipei (odds ratio = 1.12), less in Nan-tou (odds ratio = 0.22), the location of epicenter. The elderly were more susceptible to severe injury (odds ratio = 1.67), but not the children. Victims with head injury were more frequent in Taipei (odds ratio = 1.5) and less in Nantou (odds ratio = 0.21). Burn patients occurred mostly on the day of earthquake (odds ratio = 1.41), and the children were hurt more (odds ratio = 4.77).

Conclusion: The medical needs following a mass-disaster were recognized. New proposals should be made that will improve patient care in future catastrophes.

Keywords: Chi-Chi earthquake; children; elderly; injuries; odds ratio
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Prediction of the Devastating Effects of a Typhoon—A Prediction Model Based on Logistic Regression

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Objective: Typhoons are the most common natural disaster-producing event in Taiwan. Accurate alarm systems play a pivotal role in mitigation of the damage produced. A statistical model was devised to predict the impact of typhoons.

Methods: The climate characteristics of the typhoons in recent 40 years were collected from the Central Weather Bureau. Their health effects were derived from the official reports of the Department of Interiors. Logistic regression with forward variables selection method was used to build a prediction model for the odds ratio (OR) of a typhoon to cause great loss.

Results: From 1958 to 2000, 205 typhoons were analyzed. A steady decline trend in severity was noted (OR = 0.94). When typhoons approach terrain, great damage ensured (OR = 4.49). Other risk factors included the duration of >48 hours (OR = 4.20) and diameter (OR = 1.007 km). They also contributed to predicting property damage. Other factors including the seasons, categories of intensity, route, and atmospheric depression were not contributory statistically. A prediction model with acceptable sensitivity and specificity was proposed.

Conclusion: Through this proposal, it was possible to predict the impact before attack. More people could be evacuated in time and disaster response resources could be activated and properly allocated. The devastating effects could be alleviated.

Keywords: tropical cyclone; typhoon; logistic regression; prediction model
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Dissater Response/Evaluation

What Have We Learned, So Far?

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Prior to the last decade, reports pertaining to Disaster Medicine were a series of anecdotes and descriptions.

There was no structured methodology used to design, conduct, and report what happened in a way that could be reproduced in subsequent studies. Since the landmark studies in the late 1980s, the qualitative data collection techniques that have been used for a century in the social sciences, were adapted for use in the study of disasters. Use of these techniques has facilitated the study of Disaster Medicine, and has fostered the conduct of scientifically valid and reproducible studies. The repeated demonstration of similar findings in the same and different disasters, thus, has increased the external validity of numerous studies (ability to generalize to other disasters), so that use of these techniques finally is accepted as being "scientific" by the medical community.

This presentation outlined many of the findings from studies conducted within the last decade that have gained sufficient validity to now be considered as "facts". In addition, the discussion will suggest possible implications of these facts for both planning and response to potentially catastrophic events. Such planning activities should include the elimination or modification of manmade hazards, augmentation of the ability of a society at risk to absorb future events without the generation of a disaster (absorbing capacity), as well as enhance the efficacy, efficiency, and benefits of future responses with a minimum of cost. Thus, these facts now must be applied to our practice of Disaster Medicine and should provide us with direction in our future responses. Using the Guidelines for Research and Evaluation presented at this conference and as outlined in the Executive Summary already published in PDM, the next decade should be filled with the identification of many more facts that will help us to refine our future work in Disaster Medicine. What exists now is only the beginning.

Lastly, a set of charges to the Disaster Medicine community was generated by the 5th APCDM. For the most part, these charges entail the review of all that is known about disaster medicine as identified by experts. These reviews are to be placed into a series of white papers. This work is essential to allow for assignment of priorities for future action. A major question surrounding such activities is identification of resources to support the required work. Efforts are underway to find such resources.

The time is right and we must move together to demonstrate our ability to deal with the crises of today and those forthcoming in the future.

Reference:

Task Force on Quality Control of Disaster Management (KO Sundnes, Chair): Health disaster management: Guidelines for evaluation and research in the Utstein Style. Executive Summary. *Prehosp Disast Med* 1999;14(2):43–52.

Keywords: absorbing capacity; evaluation; disaster medicine; facts; future; hazards; research; risk; validity

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A Systems Approach to Triage and Management of a Large-scale Bioterrorist Event

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The most challenging management issues in a bioterrorist event are the demands it will place on the public health and emergency medical services. A large-scale (PICE stage I-III) event will require unique triage and management, and resource allocation decisions. The traditional emergency medical services systems (EMSS) will take a secondary role to emergency public health services. This discussion will define the management requirements and systems architecture required for the population cohort of susceptible, exposed, infected, removed and vaccinated (SEIRV Model) individuals. The concepts of lateral decision-making, triage exclusion criteria, and the use of measures of effectiveness are described for communicable and non-communicable agents. In addition, examples of lessons learned will be illustrated as well as the unique challenges faced by hospital emergency departments.

Keywords: decision-making; emergency medical services systems; management; measures of effectiveness; public health; resource allocation; systems; triage

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Evaluation of Disaster Response in the Tottori-Ken Seibu Earthquake, 2000: A Preliminary Approach Using the Utstein Template

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Introduction: The Task Force for Quality Control of Disaster Management (TFQDM) of WADEM has developed the research Guideline and Utstein Template for use in disaster research. A major earthquake, M 7.3 on Richter scale, struck the Tottori-Seibu district on 06 October 2000. The Japanese Association of Disaster Medicine dispatched a site-visit research team to the affected area.

Methods: This presentation describes a trial use of the application of the Disaster Severity Score for assessment of the status and the response to the earthquake.

Results: The components of the Severity Score included:

1. Medical indicators: Death = 0, Injury = 1, Communicable disease = 0, Other acute and chronic disease = 0, refugees = 2, Missing and trapped = 1, Hospital beds = 0, Total = 6.
2. Public health: Portable water = 1, Food = 0, Nutrition = 0, Immunization = 0, Solid waste = 1, PTSD = 0, Total = 2.
3. Impact on health care system: Health care providers = 0, Transport = 0, Health equipment = 0, Health supply = 2, Hospital beds = 2, Health administration = 0, Total = 8.
4. Preparedness: Plan = 4, Simulation exercise = 5, Training = 4, Total = 13.
5. Deficiency in response capacity: Health staff = 0,