

function inadequate. Thus, the interaction and relative impairment of any function can be depicted as a change from the pre-event status.

A series of three templates provides a structure for the study of disasters. Template (A) fits the aspects of a disaster into working units required for study. For the purpose of analysis, there is an absolute need to group the chronological, continuous mayhem of a disaster into recognizable, well-defined phases: (1) Pre-Event Status; (2) Event; (3) Assessments of Overall Damage; (4) Disturbances in Health Status; (5) Needs Assessment; (6) Responses; (7) Changes in Health Status; and (8) Restoration of Health Status. The endpoint of the management a disaster is the time when the pre-event situation for the societal function has been recovered. The second provides a structure and guidelines for the conduct of such studies, and the third provides a structure and guidelines for the design of such studies. The Guidelines presented in the two research/evaluation Templates outline the steps in detail for the performance of studies related to situations in that do not lend themselves to collection of experimental data collection. The Templates provide a structure for the design, conduct, and reporting of evaluations and research into disasters. Their use should enhance the reproducibility of the studies, and hence, increase the external validity of studies in a more complete and rapid fashion.

Two severity scores are proposed: (1) A Disaster Severity Score; and (2) A Health Disaster Severity Score. The use of the proposed severity scores will facilitate the comparison of the damage of disasters of similar severity and should facilitate the identification of factors that mitigate or intensify the effects.

A set of recommendations for implementation and testing of the Guidelines and their templates is provided. The Guidelines are a dynamic document. The application of these Guidelines should result in more efficient, efficacious, and cost-effective medical responses to disasters.

**Keywords:** benefit; conceptual framework; cost; damage; definitions; disasters; effectiveness; efficiency; evaluation; Guidelines; mitigation; preparedness; prevention; research; responses; severity scores; templates

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### Guidelines for Evaluation and Research of Health Disaster Management in the Utstein Style — Progress and Outcomes

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**Background:** As noted in the preceding presentation by Dr. Sundnes, the development of Guidelines, thus far, have consumed eight years. The papers that follow have been based on the original version of the severity scores. Nonetheless, the basic findings have substantial implications for Disaster Medicine in that they demonstrate the potential utility of the use of severity scoring in Disasters: Events of different types may produce similar damage and dysfunction of the same basic societal functions. Further, a

given level of damage may or may not produce a disaster in different societies.

**Progress:** This presentation reviews each of the phases of the Disaster Template with emphasis on the following processes that are necessary to validate the concepts: (1) Fit previous reports and studies into the Template and re-analyze them in the context of the Template in order to identify similarities and differences; (2) Score the severity of the previously reported disasters that resulted from different events in terms of the overall disaster and the functional status of the medical and public health functions; (3) Revise the proposed severity scores in accordance with the findings from historical data; (4) Define similarities and differences between historical events; (5) Design and implement all new evaluation and research studies in accordance to the Guidelines; (6) Develop appropriate indicators of function and of adequacy of supplies that can be tested against historical and new data; and (7) Evolve mechanism for the collection, storage, maintenance of pre-event inventories for each of the basic societal functions with particular emphasis on the medical and public health functions. Appropriate example are used for each of these processes.

Expected outcomes from the use of the Guidelines include: (1) Gaining a progressively more accurate understanding of the pathophysiology of disasters; (2) Apply the knowledge gained into the prevention of events or mitigation of the damage and likelihood of disasters developing from specific hazards in a given society/culture; (3) Apply the knowledge obtained into the mitigation of unnecessary pain and suffering; (4) Optimize the use of limited resources to decrease the human, economic, and environmental costs of disasters; and (5) Enhance the ability of the persons in the multiple disciplines involved in disaster preparation and responses to communicate with each other.

**Conclusions:** The application and testing of the Guidelines and Templates must be initiated. The Guidelines are dynamic and will need to be adjusted following re-examination of historical data and design and implementation of new evaluation or research studies. Indicators must be defined and validated. The Guidelines will be refined progressively as we learn more and more of the pathophysiology of disasters.

**Keywords:** adequacy; comparison; design; disaster; evaluation; function; Guidelines; indicators; outcomes; pathophysiology; progress; review; research; scores; severity; supplies

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### Assessment of Disaster Medical Responses Using the Utstein Template: Preliminary Comparison between the Great Hanshin Earthquake, West Tottori Earthquake in Japan, and the Chi-Chi Earthquake in Taiwan

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**Objective:** The disaster medical responses to three earthquakes were assessed using the Utstein Template. The three earthquakes that had almost the same level of energy were: (1) The Great Hanshin (Kobe) Earthquake in 1995; (2) the West Tottori Earthquake in 2000 in Japan; and (3) the Chi-Chi Earthquake in 1999 in Taiwan.

**Methods:** The Gothenburg version of the Utstein Template was applied to the three earthquakes, especially focusing on the initial medical responses during the first days after the quakes.

**Results:** The scores for medical indicators, public health indicators, impact on the health care system, preparedness, and deficiency in response capacity are as follows

Site	Medical Indicators Score	Public Health Indicators Score	Impact on Healthcare System Score
Kobe	75	34	17
Tottori	6	2	8
Chi-Chi	48	17	6

Site	Preparedness Score	Response Capacity Deficiency Score
Kobe	48	41
Tottori	57	4
Chi-Chi	12	9

The overall average scores were 43.0 in Kobe, 15.4 in Tottori and 18.4 in Chi-Chi.

**Conclusions:** The immediate medical response to the disaster was the poorest in the Great Hanshin Earthquake in Kobe. Disaster preparedness was poorer in Japan than in Taiwan, with no obvious progress made in disaster preparedness in Japan since the Great Hanshin Quake. The Utstein Template is one of the best tools to be used as a "common language" for comparison of medical responses during disasters. Precise data collection, however, requires much time and effort, and bias by its analyst cannot be avoided. More concrete criteria for each indicator could increase the reliability of this scoring system and help more researchers use this Template.

**Keywords:** comparison; Chi-Chi; Kobe; earthquakes; severity scores; Utstein Template; Tottori

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### Chemical-Biological-Radiological-Nuclear (CBRN) Analytical Framework Based upon the "Guidelines for Emergency Response in the Utstein Style," Developed by the World Association of Disaster and Emergency Medicine

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There is increased national concern regarding the potential use of weapons of mass destruction (WMD) or terrorist attacks using chemical, biological, radiological and nuclear (CBRN) hazards. Such "human-caused" events present a special challenge in disaster management in their unpredictability and potential for large-scale damage.

This paper proposes a conceptual framework that allows a rigorous approach to medical preparedness and response to CBRN events. The CBRN analytical framework, derived by applying CBRN analytical tools to the WADEM "Utstein Template and Guidelines (Health Disaster Management: Guidelines for Evaluation and Research in the Utstein Style: Executive Summary)", Task Force on Quality Control of Disaster Management), establishes an analytical relationship between a stated CBRN threat and the range of potential impacts posed by this threat. It addresses the importance of using a formal method with standardized terminology in order to "attenuate or eliminate the damage from a disaster."

An effective medical response will mitigate the damage (loss of life) from a disaster; the challenge for the emergency planner is to know – ahead of time – which type of medical response will be required by the actual event. The CBRN analytical framework allows one to define the scope of the required medical capabilities that will allow a comprehensive and integrated medical response to a broad range of possible CBRN events.

Further, this shift from a "threat" to a "capability-based" perspective allows the development of medical planning factors that estimate the maximum credible events, the damage from these events, and the requirements for medical treatment of these events. The CBRN analytical framework, its definitions and estimates, may serve as an adequate template for medical CBRN planning and response.

**Keywords:** chemical biological radiological and nuclear, disaster, Utstein template, weapons of mass destruction

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### The Use of Qualitative and Quantitative Methodologies for the Evaluation of Emergency Medicine in Post-conflict Serbia

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**Objective:** Due to the complexity of health system reform in the post-conflict/post-disaster setting, attempts to restructure health services are fraught with pitfalls that often are unanticipated because of inadequate preliminary assessments. A multi-modal assessment—involving quantitative and qualitative methodologies—may provide a more robust mechanism to identify key programmatic priorities and critical barriers for appropriate and sustainable