

ical Services Directors in the 50 states in the U.S. was conducted. Each director was asked if their state had a catastrophic casualty management plan to manage large numbers of severely injured casualties following a catastrophic event. States that indicated they had a plan were requested to send us the plan. Plans received were reviewed to determine whether they indeed were catastrophic casualty management plans. Those plans that met this first criterion were evaluated further on five additional criteria: 1) whether the plan was based on a hazard-risk analysis; 2) whether the plan was based on vulnerability analysis studies; 3) had the plan been integrated into the larger context of the state emergency operations plan; 4) had mutual-aid agreements been established; and 5) whether contacts for material and personnel resources specifically for disaster response had been identified.

Results: Twenty-eight states participated in the survey. Seven State Directors indicated that they did not have a catastrophic casualty management plan. Nine indicated they would send their plan, but no plan was received. Twelve states 12/21(57%) submitted their plans. No plan met all six of the established minimal criteria for a catastrophic casualty management plan. Only 5/12 (20%) met the first criterion. Of the five plans, none included resource lists of EMS materials or personnel, one (1/5, 20%) documented vulnerability analysis, two (2/5, 40%) were based on hazard risk analysis, two (2/5, 40%) described mutual-aid agreements with neighboring states, three (3/5, 60%) plans implied that the casualty disaster/catastrophic plan was integrated into a state emergency operations plan. Of the six criteria reviewed in the five plans, 2/5 (40%) were entitled, disaster/catastrophic casualty management plans, but did not meet the other five criteria. One plan, (1/5, 20%) met three criteria, and two plans (2/5, 40%) met four criteria.

Conclusion: Further study of non-responding states needs to be conducted. Based on this survey of state catastrophic casualty management plans, no state met the minimal established criteria.

Keywords: casualty management plans; criteria; plans; United States

G-34

Medical Aspects of the Montserrat Volcanic Crisis, 1995-98

Peter J. Baxter, MD

University of Cambridge Clinical School,
Addenbrooke's Trust Hospital, Cambridge, England

Introduction: Activity at the Soufriere Hills volcano, Montserrat, West Indies, began in July 1995 after a repose of 400 years. A hazard evaluation conducted by scientists in 1987 had been ignored by planners, but it had shown that the entire southern half of the island (11 by 16 km), where most of the population (c. 12,000) lived, could be devastated by lava dome eruptions.

Purpose: To describe key precedents from this eruption for medical and emergency planners in future eruptions

at volcanoes, especially on volcanic islands.

Methods: Compilation of observations made during the crisis by the author whilst working in collaboration with officials, local physicians, the Pan-American Health Organization (PAHO), and scientists at the Montserrat Volcano Observatory.

Results: Important precedents included incorporation of human injury data in risk mapping, acceptance of wearing of hard hats to protect against fall-out, identification of silicosis risk from ash as a population criterion for evacuation, air monitoring for volcanic gas pollution, and risk assessment for evacuation decision-making. Planning and decision-making directed towards minimising the numbers of casualties was a priority over mass casualty planning, which relied on helicopter and medical support from Guadeloupe. Risk assessment conducted with volcano scientists was an essential tool for medical planning.

Conclusion: Protecting a population against injury from the effects of explosions, pyroclastic flows, gases, fallout, and the respiratory effects of volcanic ash (silicosis, asthma) ultimately has to be by evacuation of the population from affected areas. Educating the population about risk and involving them in decision-making is a constant need in volcanic crises. Deaths and injuries are almost inevitable in major volcanic eruptions, and the causes reflect social and individual factors, as well as limitations in scientific forecasts and warnings. Mitigation must be the primary aim of disaster planning.

Keywords: ash; asthma; evacuation; forecasts; gases; lava dome; mitigation; Montserrat; planning; protection; pyroclastic flows; risk analysis; risk mapping; silicosis; volcano, eruption of; warning

G-35

Neurosurgical Interventions in Emergencies and Disasters

Ahmed Ammar, MB, ChB, DM Sc, FACS, FICS

Department of Neurosurgery, King Fahd University Hospital, Al Khobar, Saudi, Arabia

Introduction: International studies document that in cases of disasters, head and neck injuries are responsible for the death of 70% of the victims of multiple trauma-induced injuries. The statistics also indicate that 70% of these victims suffer different degrees of head and spinal injuries. In these victims, neurosurgical intervention should be immediate, rapid, and effective.

Special techniques to shorten the time to diagnosis and surgery should be used. In periods of mass casualties, the time of intervention is a very important factor for the final outcome. A special neurosurgical triage based on the degree of brain and spinal injuries has been used: rapid CT-Scan with 10–15 mm cuts allows completion of scanning the head in 1–2 minutes. Special surgical techniques for craniotomies or craniectomies and laminectomies allowing exposing the brain or the spinal cord in maximum 15–30 minutes have been used.

Results: This protocol for Neurosurgical Triage to reduce intracranial pressure, diagnosis, and surgical techniques has been used several times and have been

proven successful.

Conclusion: In cases of emergencies and disasters, the routine neurosurgical practice must be altered to cope with the situation and accommodate as many patients as possible.

Keywords: disasters; head injuries; multiple casualty incidents; neck injuries; neurosurgical triage; neurosurgery; triage

G-36

Developing an Earthquake Strategic Plan for British Columbia

M. Wayne Greene

Disaster Preparedness Resources Centre, University of British Columbia, Vancouver, BC, Canada

Western Canada, like most countries on the "Ring of Fire", is at great risk to earthquakes. The destructive power and consequences are so great that many countries feel unable to address prevention activities. Countries, their provinces (states), and their communities must examine how to minimize the effects of such catastrophic events. Emergency planners recognize that effective prevention activities require community involvement with support from provincial and federal governments. There are many professions, agencies, and industries that are interested in becoming partners and contributors to plans and solutions. The Province of British Columbia (BC) has developed a significant capacity to respond to major events such as forest fires and seasonal flooding. However, a strategic plan for earthquake preparedness that would span a 10–15 year period has been lacking, and therefore, only ad hoc activities have been accomplished.

In the fall of 1998, the BC Government undertook the development of a framework for a Provincial Earthquake Preparedness Strategic Plan using a process developed by the UBC Disaster Preparedness Resources Centre. Sixty-five leaders of key interest groups spent two days putting together a framework document. The document identified the five goals listed below. Each goal had several "objectives" that would contribute to accomplishing the goal. In turn, each objective was supported by specific "activities" that would result in the accomplishment of the objective.

Strategic Goal * Objectives * Activities

Strategic Goals:

- Increase British Columbian's personal, family and community preparedness for an earthquake;
- Improve emergency response and recovery;
- Improve the seismic safety of public and private building and infrastructure;
- Improve essential geoscience information; and
- Assess earthquake risk and vulnerabilities.

Five multidisciplinary teams contributed to the project, each assigned to a goal. These teams developed the objectives and the activities. They also identified the lead agency, time required to do the activity, and the approximate cost to accomplish the activity.

In this presentation, the author will outline the unique symposium format used with multidisciplinary

groups, and will give examples of the objectives and activities developed by the teams.

Keywords: British Columbia; Canada; earthquakes; goals; objectives; plans; preparedness; prevention; safety

G-37

Community-Based Disaster Medical and Health Support to Formal Emergency Medical Services

Eric W. Williams

Executive Administrator- Medical Displan Victoria, Fitzroy, Victoria, Australia

When incidents occur that produce casualties and damage to communities, the response to controlling the outcome always is in the hands of the community leaders and its people. It is the community overall that ultimately pays the price for such events.

Community emergency services such as Police, Fire, Ambulance, and Rescue Services, are structured within the community to deal with the day-to-day activities and requirements to preserve the way of life of its citizens and properties. Preplanning to support these emergency services when required in times of major emergency, is the sensible way of being able to afford the best outcome for response to incidents that overwhelm local resources. This is true particularly for medical and health response to emergencies.

This paper outlines the actions that a community can take to provide responders trained in Disaster Medicine, who can assist the formal Emergency Medical Services in communities, and so assist in providing overall medical control and mass casualty management.

Keywords: communities; disaster; Disaster Medicine; emergency medical services; health support; mass casualties; medical control; medical support; preplanning; response

Panel Discussion I

Coordinating Efforts Against Anti-Personnel Landmines

Monday, 10 May, 15:10–17:20 hours

Chair: *Ronald D. Stewart, Katubiko Sugimoto*

PN1-1

Mine Victims Assistance: Prehospital Care Training

Dr. Pierre Bwale

World Health Organization/PVI Unit, Geneva, Switzerland

Introduction: Landmines still are one of the most fearsome weapons that continue to kill many innocent victims several years after they have been implemented and accidentally are set-off by their victims: Most of the victims are poor peasants, innocent children, and women unaware about war. Unfortunately, they have to undergo all the social and economic consequences related to landmines such as death, loss of limbs, and/or other disabilities. Otherwise, members of the community cannot access their fertilised lands and produce their food