matic injuries due to accidents repeatedly aroused our attention to make a further evaluation of their underlying disease. Through a series of examinations and review of their medical records, some related underlying lesion were identified.

Case Studies: We report three cases that met the above criteria including: 1) brain tumor (311395-1); 2) epilepsy (2537552-0); and 3) alcoholic cirrhosis of the liver (736597-4). All of the patients suffered from trauma repeatedly (at least five times in one year, as chart record) during their daily work.

Discussion: Due to lack of insight and treatment, these patients were highly vulnerable to accidents in their daily work. Further consultations of each related special ward including social worker was arranged. Besides, their families were notified to take care of the patient, because their underlying disease increased the risk of recurrent trauma.

Conclusion: The result emphasizes the importance to evaluate trauma patients thoroughly, from head-to-heel and for previous problems before they are discharge from Emergency Department. Recurrent trauma could be prevented if the underlying factors could be identified and controlled effectively.

Keywords: assessments; coexisting diseases; emergency department; evaluation; records, medical; recurrent traumatic injuries; serial examinations; trauma

General Session VII

Preparedness for Disaster-II

Monday, 10 May, 14:30–16:00 hours

Chair: ***Zhang Hong-Qi, Ikuhiro Sakata***

G-32

Changes in the Disaster Medical System in Korea — The Changes after the Recent Major Urban Disasters

Chul Gyu Moon, MD; Sung Hyuk Choi, MD; Jun Dong Moon, MD; Sung Woo Lee, MD; Yun Sik Hong, MD

Department of Emergency Medicine, Korea University Hospital, Seoul, Korea

The rapid industrialization of Korea in the recent years has introduced high-rise, residential buildings and mass transportation systems, which gave rise to the possibility of large-scale, man-made disasters. In actuality, a number of such disasters already have occurred, particularly in large urban areas, causing massive numbers of human casualties. As a result, the existing disaster management plan in Korea has been modified considerably. This paper will describe large-scale disasters in metropolitan areas that involved human casualties and the changes in the disaster plans of Korea that resulted.

The existing disaster plans allocated jurisdiction for disaster management to various organizations or administrative authorities. The lack of coordination in the managing authorities adversely affected the efforts for rescue and treatment of the injured persons, and created obstacles for timely disaster reports and the adoption of efficient disaster management measures.

Under the revised disaster management plan, administrative authorities are given jurisdiction over disaster management. A disaster management center ("Disaster Center") is to be established directly under the control of the central government, and is empowered to declare a disaster area. Disaster reports are to be made only to fire stations, so that the reporting can be channeled through a uniform system. An emergency rescue headquarters is to be established under the direct control of the head of the local government. The Disaster Center is responsible for disaster management, rescue, and compensation, while the Disaster Prevention Committee is responsible for providing administrative assistance and other professional advice. The new plan mandates compulsory disaster prevention drills at least twice each year. Hopefully, the new plan will prove to be adequate for prevention and management of urban disasters in the future; however, it will be also necessary for each urban area to prepare a disaster management program that addresses problems that are uniquely its own.

Table 1—Recent urban disasters in Korea

Disaster	Date (d/m/y)	Casualties		Authority with Jurisdiction
		Dead	Injured	
Jupo Train Derailment	28/03/93	78	128	Train and Rail Authority
Airline Accident	26/07/93	66	44	Airline company
Ferry Capsize	10/10/93	292	67	Local Organizations
Collapse of Sungsoo Bridge	21/10/94	48	17	Local Organizations
Fire on Vessel	24/10/94	29	30	Local Organizations
Explosion of City Gas Tank	07/12/94	4	73	Korea Gas Safety Authority
Gas Explosion in Subway Construction Site	28//04/95	101	201	Korea Gas Safety Authority
Collapse of Sampoong Department Store	29/06/95	501	932	Local Organizations, Ministry of Construction and Transportation
Fire at a Technology School	21/08/95	37	16	Local Organizations

Keywords: disaster; disaster center; disaster medical system; disaster management plan; industrialization; jurisdictions; metropolitan areas; multicasualty incident; Korea; planning; plans; preparedness; responsibilities

G-33

Survey of State Level Catastrophic Casualty Management Plans in the United States of America

Nancy J. Bowen, DrPH; Ernesto A. Pretto, MD, MPH

University of Pittsburgh, Safar Center for Resuscitation Research, Pittsburgh, Pennsylvania USA

Introduction: In the United States, the Federal Government legislates that each of the 50 State Governments have an emergency operation plan that includes an emergency health and medical component. It is not known to what extent these emergency health and medical plans are designed to manage large numbers of critically-injured casualties following a catastrophic event. In this survey, we evaluated state level catastrophic casualty plans according to minimal criteria.

Methods: A telephone survey of State Emergency Med-

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