

## Management of Mass Casualties in Disasters

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With a population of 1.3 billion, China is the largest developing country in the world. The geography and natural conditions vary from province to province. Natural disasters occur frequently. According to statistics from the National Security Bureau, in 2002 natural disasters in China caused an estimated 139,400 deaths.

Earthquakes are major natural events in China. Some parts of China are located in very active earthquake zones. Statistics show that over the past 100 years, there were 25 major earthquakes killing a total of 1.2 million people. Approximately 30% of all earthquakes worldwide occur in China.

Deaths due to traffic crashes also are a major public health issue in China. With 2.2% of the total number of automobile drivers in the world, China has an average of 1,131 traffic crashes daily, with an average of 299 deaths. Currently, China has 14,350,000 kilometers of highway, but the number of automobile crashes increases by approximately 9% per year. Although the economic development of coastal provinces of China is of great importance to the country's overall development, the statistics from the China Disaster Reducing Committee, which covers coastal provinces from north to south, showed disasters in these areas constituted a very serious public health problem. The economic loss caused by such calamities is about [US]\$18,000 per square meter of the coastal area. The main events are earthquakes, floods, droughts, and typhoons.

It is essential that a sound policy for disaster management be established, as well as measures to minimize the pain and suffering caused by disasters. Plans on how to prevent human-made disasters have been developed through reinforcement of hazard management skills in the area at risk. Every area must establish a disaster committee in charge of building computer information systems, disaster alarm systems, and disaster evaluation systems. Also, it is necessary to strengthen the education of the general population, particularly in training the public in prevention measures.

**Keywords:** earthquakes; disasters; human-made; management; natural; preparedness; prevention; road traffic crashes

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## Disaster Medical Response Issues and Lessons from Civil Emergency Exercises in Singapore

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**Introduction:** Disasters and mass-casualty incidents (MCIs) are infrequent events in Singapore. However, recent terrorist-induced, low-intensity conflicts (LICs) emphasized the importance of planning and preparedness in consequence management of mass casualties from both conventional and chemical, biological, nuclear, radiologic, or explosive (CBNRE) incidents. Field exercises have been used to promote better preparedness in a multi-agency,

multi-disciplinary response and to validate contingency plans for a civil emergency.

**Methods:** A retrospective review of major civil emergency exercises (n = 26) over a six-year period (1997–2002) was conducted.

**Results:** Major recurring lessons of relevance to the medical response included (1) exercise preparation and simulation; (2) exercise methodology/activation; (3) communication procedures; (4) site organization; (5) casualty evacuation; (6) command and control of medical operations; (7) multi-agency operation and collaboration; (8) identification of training needs; and (9) defusing of medical responders.

**Conclusion:** The results of this study will help to promote better exercise preparation and to focus on deficient areas.

**Keywords:** mass-casualty incident (MCI); planning; preparedness; Singapore

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## Involving General Practitioners in an Australian Territory's Medical Emergency Response

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On Saturday, 18 January 2003, bushfires, which had been burning for over a week in the surrounding forests, broke containment lines and entered the Australian Capital Territory (ACT). Remarkably, only four human lives were lost. The injury toll was much higher, with people suffering burns, smoke inhalation, broken limbs, cuts, bruising, and other traumatic injuries. More than 500 homes were destroyed.

A "State of Emergency" was called at 15:00 hours—the first time a State of Emergency ever had been declared in the ACT. The power supply in many areas failed and communication was problematic, even via mobile phone. The Emergency Services Bureau building and both of the hospitals in the Territory with emergency facilities were threatened by the fires.

Evacuation Centers were established quickly and, for some people, this is where they first received first aid from volunteers from the St John's Ambulance Service and general practitioners (GPs). The ACT has >300 GPs and a population of >320,000 persons. Because the fires occurred during a summer weekend during school holidays, many ACT residents, including GPs, were outside of the Territory. Many of the remaining GPs wanted to help in whatever way they could. What was not known at the time, was the best way for GPs to help and how they fit, if at all, in the ACT's Health Emergency Management Sub-Plan (a Sub-Plan of the ACT Emergency Plan).

During the crisis, the GP Advisor to ACT Health and the ACT Division of General Practice took a lead role in coordinating GPs. This approach proved extremely beneficial and, after the event, ACT Health and other stakeholders convened to consider how to formally incorporate general practice in the emergency response. This is a first in Australia.

This paper will discuss ACT general practitioners' response during the emergency, and the now stated role for general practice in the ACT Health Emergency

Management Sub-Plan. The unique skills and role of GPs, as well as actual and potential issues will be considered.

**Keywords:** Australia; emergency; fire; general practitioners; response; territory

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### Designing a Scalable, Flexible, and Possibly Mobile Centre of Emergency Operations by Making Use of Recreational Parks and Extensive and Innovative Use of Ordinary, Steel, Shipping Containers

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The world, especially Hong Kong, suddenly faced the onslaught of the severe acute respiratory syndrome (SARS). Hong Kong encountered 299 deaths, financial and economic costs in the billions, and political turmoil.

Few countries, not even the United States, establish Emergency Operations Centres because it seems to be a waste of resources when nothing happens, since there are not many disasters and no one can predict when they may strike.

The Emergency Operations Centre is a flexible project, which attempts to make use of recreational camps in Hong Kong. This project is attempting to involve, mobilize, and equip these camps for emergency use in advance of the occurrence of an event. Ordinary technology cannot cope with the sudden onslaught of diseases, such as SARS.

The idea is to build a hospital near the campsites, which could be mobilized or activated within 24 hours. This hospital is maintained with the assistance of the management of the campsite, such as maintenance of lighting, heating, air-conditioning, computer possibilities, and other infrastructures. It will be maintained during “peaceful times” by a skeleton staff. The emergency team, which does not meet on a daily basis, will be organized and trained for mobilization on short notice.

The Emergency Operations Centre will be a flexible project which attempts to make use of recreational camps where the adjacent lands will be used for temporary storage of general purpose storage containers or special purpose containers. These containers will be stacked just like they are in a container port where cranes will be installed for stacking and moving the containers. These containers (always action ready) will be moved to designated areas to organize as field hospitals. If needed elsewhere, these containers can be shipped on container ships to remote areas for use in emergency relief.

All of them are stored remotely yet they are readily accessible. This paper will examine the extensive use of containers as building blocks.

**Keywords:** containers; emergency operation centre; flexibility; hospital; Hong Kong; recreation camp; severe acute respiratory syndrome (SARS)

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### Efficiency Analysis of Medical Support of Injured Patients during an Act of Terrorism with Hostage-Taking

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Recently, the establishment of the system for the provision of medical support during acts of terrorism has become one of the most important developments in Disaster Medicine, especially in Russia, where the frequency of such acts has more than doubled. This analysis of the medical support provided to >1,000 hostages in the concert hall is important for international organizations, participating in the provision of medical relief associated with acts of terrorism. Because of working conditions, such as the likelihood of the situation changing including the high probability of an explosion of the building, the psychological stress on the injured, and the use of special means during the event, the system used for the rendering of medical care consisted of two stages.

During the Prehospital Stage, rescuers and representatives of special services used antidotes and quickly carried the injured to the ground in front of the building where medical triage was conducted with the help of the Medical Distribution Team. The medical triage was conducted according to the following main categories: (1) those who needed emergency medical care (acute respiratory and cardio-vascular insufficiency, different levels of shock); (2) those who were transported by ambulance cars accompanied by a medical team; (3) those who didn't need emergency medical care and were evacuated by special buses accompanied by medical personnel; and (4) the dead who were sent to medico-legal expertise departments at the nearest medical institutions. These medical institutions were located no more than 20–25 minutes from the concert hall (Hospital of War Invalids with 300 beds, clinical hospital N13 with 1,200 beds).

Then, the injured patients were categorized upon their delivery to the Admission Departments of the receiving medical institutions. These categories were: (1) those who needed treatment in the resuscitation department (artificial pulmonary ventilation, complex anti-shock therapy); (2) those who needed intensive medical care (intensive care units); and (3) those who were sent to specialized hospitals departments for planned therapy and dynamic monitoring.

Overall, a total of 765 injured patients were delivered to the medical institutions for in-patient treatment, including 16.3% (128 patients) who were delivered to the Resuscitation Departments and Intensive Care Units. Skilled doctors and resuscitators of the leading medical institutions of Moscow supplemented the staffs of the resuscitation and intensive care units. This helped in the provision of efficient, specialized medical assistance.

Among the patients delivered to the medical institutions, only seven patients died during the treatment. More than 60% of the injured were discharged on the 6th or 7th days after the event, and the average treatment lasted 13–14 days.