

many hospitals have introduced “Good Practices” after coping with a regional disaster. The purpose of this report is to introduce these practices with the expectation that they might contribute to the improvement of hospital disaster preparedness. **Methods:** The disaster preparedness for 20 disaster hospitals involved in regional disasters was investigated. First, an “Investigation Sheet” was distributed to each hospital; this sheet was designed to measure the state of the hospital’s facilities. Second, each hospital was questioned about their “Good Practices”.

Results: Based on this investigation, the following components of “Good Practice” were shown: (1) isolated buildings that were seismically retrofitted; (2) water supply system and equipment designed to collect rainwater; (3) electrical supply system derived from a plural transformer substation and co-generation system with gas; and (4) sofas in the reception area that can be converted into beds can be used to receive patients.

Conclusions: In many hospitals, compared to ordinary medical services, lower priority tends to be given to the disaster preparedness. Nevertheless, in several hospitals, particularly those located in areas previously affected by disasters, “Good Practices” are in place for their safety and resilience for unpredicted events. It is important that this information is collected and widely disseminated to all hospitals.

Keywords: disaster; good practice; hospital; resilience; safe hospital; safety

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Safe Hospital Program in Sweden

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Introduction: Robustness, safety, and security are important to prepare healthcare facilities to respond to different situations. The healthcare sector responds to different kind of disasters, and must function even in case of a failure in critical infrastructure.

Methods: During the last 20 years (the last two years in cooperation with the Swedish Civil Contingencies Agency), the National Board of Health and Welfare has conducted a program on safe hospitals. The program has focused on:

1. Prospective planning process;
2. Robust facilities;
3. Maintenance of critical infrastructure;
4. Facility protection of dangerous substances; and
5. Technical facilities for crisis management.

The program has been formulated into guidelines and recommendations known as “The Robust Hospital”, also available in English. Special recommendations also have been formed regarding hospital protection against dangerous substances and crisis management.

Results: A majority of Swedish hospitals have followed these programs. Data and experiences will be presented, including the experience from a major electrical supply failure at a major hospital in Stockholm.

Conclusions: A systematic work program based on risk and vulnerability analysis, clearly addressed to those in charge of healthcare services, combined with a structured follow-up program can contribute to robust hospital facilities.

Keywords: program; robust; safe hospital; Sweden

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The Robust Hospital

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Introduction: Sweden has many years of experience with robust hospitals. The Swedish Civil Contingencies Agency and the Swedish National Board of Health and Welfare have provided development work and support to hospitals and their political principals.

Objective: The aim of this study is to disseminate knowledge, experience, and bases of evaluation for improving functional safety in providing health care, thereby securing patient safety and security even amidst large civil emergencies.

Methods: With a realistic threat assessment, analyses of operational needs and vulnerabilities can furnish the basis for general investment and prioritizing strategies for optimally pursuing appropriate and functionally secure healthcare provision despite obstacles, interruptions, and extraordinary conditions. The analyses include technical risk and vulnerability assessments of such external services as electricity, information, water, sewage, and heating.

All serious events are monitored and evaluated continuously, such as the eastern Canadian ice storm of January 1998.

Results: Expert guidance and occasional financial support for technical stand-by systems have considerably improved the physical-plant robustness of Swedish hospitals in recent years.

In addition to ongoing support for the county councils, the authorities also have published a knowledge overview, “The Robust Hospital”, soon available in English.

Conclusions: Official support to the Swedish County Councils, by utilizing experienced expert advice, has improved the functional safety of Swedish health care to a number of threats including interruption or disturbances to technical services and to fire, hazardous substances, extreme weather, and terrorism.

Like other social functions, healthcare provision remains vulnerable, albeit less so now.

Keywords: preparedness; robust hospital; safe hospital; Sweden

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Best Practices of Hospital Security Planning for Emergency Preparedness

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Introduction: As the frequency of disasters increases, so does the realization of the need for appropriate security measures as they apply to healthcare systems impacted by a disaster. This presentation will emphasize the role of security in the hospital environment during disasters while comparing three international systems: Canadian, Israeli, and the United States. Hospital security systems are described in the context of their national emergency response requirements, surge capacity planning, health coverage, and hospital types. Emergency preparedness systems are explained as they relate to incident management, emergency response for patient surge capacity, and evacuation or

sheltering in place activities. Mass-casualty incident (MCI) preparedness systems also are compared by discussing alert systems, patient routing to hospitals (from an MCI scene) and within hospitals (emergency department flow), staffing, triage, patient identification, tracking and discharge, volunteer tracking, and overall security systems adaptability and flexibility.

Methods: Researchers were hosted by Israeli emergency management experts and were provided with organizational overviews via slide presentations, extensive question-and-answer sessions, and tours of individual organizations. The comparative analysis was augmented by extensive literature reviews of the three national systems.

Conclusions: Adequate planning for sufficient security measures plays a vital role in healthcare mitigation planning as it applies toward MCIs. National systems can benefit from developing best practices that reflect a variety of approaches from differing international regions. While undeniable cultural and systematic differences are present among differing nations, the global healthcare security communities can benefit from developing best practices as an approach for security mitigation planning.

Keywords: emergency preparedness; healthcare; hospital; incident management; mass casualty incident; mitigation; prevention; regional; safe hospitals; security

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Risk Assessment for Healthcare Facilities: A Practical Tool

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Introduction: To be prepared to deal with emergencies, healthcare facilities must engage in a process with their community to determine specific risks and vulnerabilities. They also must prioritize planning activities to ensure that they are prepared for the highest risk events and the ones with the potential for greatest impact.

Methods: The emergency management, emergency medicine, and emergency response literature was systematically reviewed to identify models that have been proposed for assessment of hazards, risk and vulnerability in all settings. A model specific to healthcare settings was developed and pilot tested in an acute care hospital.

Results: No existing model was found in the literature that combines a quantifiable probability estimate and multiple components of impact for healthcare facilities into one formula. Also, no published models had been tested for usability or outcome. Using the concept of “risk = probability x impact”, a probability rating was developed for healthcare facilities. Impact was defined along three key domains: (1) human impact; (2) property impact; and (3) business impact. Risk was defined as “probability x sum of impact rating” in these domains. The risk rating for each type of threat was referenced to a matrix and determined to have one of sixteen possible categories, which were further divided into four levels of risk: (1) high; (2) moderate; (3) low; and (4) very

low. The model was pilot tested and was felt to be practical. **Conclusions:** The model was relevant and useful for facilities to identify and prioritize planning activities for emergencies.

Keywords: competencies; education; healthcare facilities; preparedness; risk assessment; training; vulnerabilities

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Earthquake Preparedness in Tehran

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Introduction: Iran is an earthquake-prone country. If an earthquake occurs in a large city like Tehran, the damage will be severe. Therefore, exercises and drills are needed to prepare the country.

Methods: A earthquake measuring 5.5 Richter was simulated in Sina hospital. The use of equipment, medical staff, and medication were measured.

Results: There was enough equipment, medication, and staff, but cooperation with police and fire officials was not good.

Discussion: Regardless of necessary material during a disaster, if there is not strong coordination, not all efforts would be useful.

Keywords: drill; earthquake; Iran; safe hospital

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Poster Presentations—Safe Medical Facilities

(S104) Longitudinal Expandable Shelter for Health Emergency Response during Disasters

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Introduction: During local emergencies, hospitals are the final destination of the rescue process. Therefore, effective health mobile structures must be inserted between hospitals and the place of the event in order to provide the best treatment (using appropriate and easy to use equipment) for safer and faster evacuation to hospitals.

Methods: A literature review national and international disaster medicine standards were the basis for this study to provide clinical, hygienic, and organizational needs to satisfy for the emergency structure design. Project requirements were obtained by analyzing the structural and clinical processes. The structure must be able to be installed on every type of ground, be resistant to every weather condition, and be transported easily and quickly. Technological equipment is obtained from clinical evaluation for patient stabilization.

Results: This structure is a Longitudinal Expandable Shelter (LES) for health emergency responses and is organized in three internal sub-areas. The possibility of expandability facilitates rapid transportation and easy deployment. The sub-organization provides three clinical areas: diagnostic, therapeutic and pre-evacuation monitoring.