

potential only can be realized fully if implementations are based on a solid understanding of the key factors that determine the usefulness of such systems.

Objective: To provide a framework for analyzing and evaluating the key factors involved in the design of ICT-based systems for coordination and control of disaster response.

Methods: A prototype system for gathering and sharing emergency medical information was implemented using hand-held computers and a wireless network. Based on experiences with this system, a framework was developed for the design of ICT systems for coordination and control, providing: (1) definition of indicators of the effectiveness of information sharing enabled by a technological solution; (2) classification of the types of information to be shared during disaster response; (3) classification of mechanisms for information sharing (including traditional mechanisms); and (4) assessments of which methods are best suited to which types of information.

Basic level, ICT-based information-sharing ensures that individual data items are delivered to everyone involved, but does not process the data into information. More advanced systems can collate information (e.g., produce reports indicating how many persons are suffering from a particular condition). With derived level information-sharing, the ICT system can perform possibly complex computations to calculate higher-level measures and indicators based on combinations of basic data items.

This presentation will discuss how derived level information-sharing can be linked to the concept of indicators of function and basic societal functions (BSF), as defined in the Utstein Style.

Conclusions: Information and communications technology-based systems have a key role in supporting effective coordination and control in disaster response. The framework presented here can act as a common reference for the design and assessment of such systems.

Keywords: control; coordination; disaster; information and communications technology; information-sharing; response

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Disaster Triage Tools—An Evidence-Based Review

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Introduction: Triage is the key principle guiding the ethical allocation of limited healthcare personnel and resources during a disaster incident. Disaster triage is based on the utilitarian concept of producing the “greatest good for the greatest number” by ensuring that limited medical resources are expended in a way that benefits the maximum number of patients. Several tools for primary disaster triage exist. Despite broad support for these triage algorithms, little research has been done to evaluate evidence to support the validity, reliability, or accuracy of these tools.

Methods: A strategy was developed for PubMed® and modified for use in the other electronic databases. The strategy used text words such as disaster triage, emergency triage, and mass-casualty incident triage. The electronic searches were conducted in April 2004, with an updated

search of PubMed in October 2004, and no restrictions based on publication date were used. Team members also searched the literature by hand to ensure comprehensiveness and reviewed the reference lists of relevant reviews, reference papers, and eligible articles. A total of 43 articles meeting these criteria were reviewed.

Results: Through an iterative, summative process, five primary triage systems were identified in the literature: (1) North American Treaty Organization (NATO); (2) Triage Sieve; (3) Simple Triage and Rapid Transport (START) triage; (4) JumpStart; and (5) CareFlight Triage.

No standardized nomenclature or terms between triage approaches exist. All triage methods used physiological criteria. There are two papers in the peer-reviewed literature that attempt to evaluate these mass-casualty triage tools. Sensitivities and specificities of each system have been reported retrospectively under simulated disaster scenarios. No prospective study has been published in a real or simulated disaster.

Conclusion: Using an evidence-based approach, no single standard triage criteria was identified. Triage systems have not been validated for disaster/critical event use. Specific subjects from the literature such as physiological criteria likely form a basis of consensus that should be validated and polished. While there are advantages to various published triage systems, no overwhelming evidence exists to support one system over another. There is poor strength of evidence to support any triage process. Currently there are criteria being developed to study triage systems more objectively.

Keywords: approach; criteria; disaster; review; triage

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Applicability and Usefulness of Hospital Preparedness for Emergencies (HOPE) Course in Southeast Asia

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Objective: In the last several years, there has been an increased interest in disaster preparedness and response. Based on this interest, a course, Hospital Preparedness for Emergencies (HOPE), was created for five countries in Southeast Asia: Bangladesh, India, Indonesia, Nepal, and the Philippines. Initially, the course was taught to the most experienced hospital/administration personnel in their respective countries. The purpose of this study was to describe the: (1) background of participants; (2) course; and (3) applicability of the course to participants.

Methods: A team of international experts developed a four-day course covering 30 topics and exercises. Participants, who were hospital administrators and senior hospital health officials, were surveyed pre- and post-course regarding background and applicability of course to work setting. To date, the course has been held in Indonesia, Nepal, and the Philippines.

Results: Of all participants, 66% (29–71%) are part of a disaster response team for their area, and 41% (14–61%) have attended a preparedness course in the past. The num-

ber of participants that have worked with emergency government organizations is 55% (39–61%). A total of 59% (51–68%) of the material was new to them, while 74% (69–91%) of the material was applicable to their work setting.

Conclusion: Even for experienced hospital personnel, a majority of the HOPE course material was new and applicable in their current work setting. There is great country-dependant variability in regards to prior emergency response work and hospital preparedness participation.

Keywords: assessment; education; disaster management; hospital; preparedness; Southeast Asia

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Free Papers—Theme 16: Public Health 2

Food Security and Anthropometry following One Year of Food Assistance in Palestinian Territories

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Objective: After the 2002 study revealed a high prevalence of global acute and chronic malnutrition (GAM and GCM, both defined as <-2 z-score) in the Gaza Strip, a massive food assistance effort took place. One year later, the current study was conducted to assess whether that effort has led to any improvements, and gauge how well assistance was targeted. The study concluded that the major problems with food access in the West Bank and Gaza Strip were financial, rather than physical, and could be quantified and linked to anthropometric measurements. **Methods:** A random sample of 2,486 households was selected using a two-stage design stratified by urban, non-urban, and refugee camp households and weighted by population between the West Bank and Gaza Strip. Weight, height, and age of the members of the households were measured. There were a total of 3,089 children, ages 6–59 months. Household respondents also were surveyed regarding the level of food assistance and quantifiable indicators of food security and household coping mechanisms, which could be cross-tabulated with the prevalence of GAM (weight for height ratio) and GCM (height for age ratio).

Results: The short-term indicator of GAM was 3.1% in the West Bank and 3.9% in the Gaza Strip, both of which had improved since 2002. The long-term indicator of GCM was 9.2% in the West Bank, statistically up from 2002, and 12.7% in Gaza Strip, statistically down from 2002. Level of employment was the major indicator of food insecurity, while decreasing household food consumption and buying food on credit were the major coping strategies.

Physical barriers, such as curfews and checkpoints, were not factors for food access. Households with employment <20 hours per week were statistically more likely to have

children with GAM and GCM (chi square = 5.25, $p \leq 0.025$, and chi square = 15.3, $p \leq 0.001$, respectively). Households decreasing food consumption more than once per week were more likely to have children with GCM (chi square = 6.84, $p \leq 0.05$). Food assistance was not well targeted: 52.8% of West Bank households with employment of <20 hours per week were not receiving food assistance, compared to 26.6% of similar Gaza Strip households; 69.7% of West Bank and 19.8% of Gaza Strip households which decreased food consumption more than once per week were without food assistance; a nearly similar percentage of households who purchased food on credit more than once per week did not receive food assistance. There was a statistically non-significant trend for GAM and GCM to occur in households receiving food assistance.

Conclusions: Financial access to food and subsequent coping strategies during a chronic conflict affects the nutritional status of preschool children. Linking nutritional and food security indicators can guide food assistance programming.

Keywords: anthropometry; assistance; food; food security; Gaza Strip; malnutrition; West Bank

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Disaster Intervention: Long-Term Follow-Up in Armenia

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A devastating earthquake struck Armenia on 07 December 1988, killing 50,000 people and leaving 500,000 homeless. Disaster intervention and humanitarian aid from around the world during the first two years followed a traditional course of providing acute medical care, shelter, and reconstruction. The shifting world political scene, with the crumbling of the Soviet Union (of which Armenia was a member at the time), created a familiar situation for the country. Once again, it was at the crossroads of international politics for various reasons. First, it was at war with neighboring Azerbaijan over Nagorno-Karabagh, an historic Armenian enclave; second, it experienced a material blockage of humanitarian aid by neighboring Turkey; and third, Armenia was caught in the middle of controversy about transporting oil from the Caspian Sea to the Mediterranean Sea. These successive traumas led to a program of continuing long-term disaster intervention by diasporan Armenians from around the world after the initial wave of help for the earthquake was over.

This presentation describes how the initial mental health team from the United States provided crisis intervention, training, and research that later developed into a model for delivering mental health services to the entire country. The time-limited model of crisis intervention developed in the earthquake zone in Armenia is described, and the authors explain how it was adapted to treat victims following the World Trade Center attack in New York City on 11 September 2001. The results of two current studies in Armenia will be discussed. One study includes follow-up data on long-term benefits of the brief crisis interven-