

## **REVIEWS**

**Anderson P, Petrino R, Halpern P, Tintinalli J. The globalization of emergency medicine and its importance for public health. Bull World Health Organ. 2006; 84(10):835-9.**

*Emergency medicine has an important role to play in improving public health around the world, if only policy makers will recognize it.*

**Summary:** The globalization of emergency medicine (EM) plays an essential role in public health. Key components of EM delivery systems include public education on basic first aid and when to seek EM care, pre-hospital access through a universal telephone line and care-providing transporters, and, ultimately, an emergency department (ED) facility. EDs must be staffed by those who have the knowledge to provide a wide range of emergency care and necessary primary prevention interventions. EDs can be also a key source of epidemiological data, clinical research, broad training, and disaster response. EM is still not currently recognized in many countries, causing little incentive for talented individuals to practice EM, lack of knowledge on the role of EM, and lack of fulfillment of the roles of EM as described. To overcome these challenges, policy-makers and health organizations are encouraged to promote the development and monitoring of EM care systems.

**Comment:** The evolution and expansion of EM has a significant impact on public health, as this review describes. To encourage the expansion of EM through academic and public policy promotion, the basic principles of EM care systems and the impact of those systems on public health need to be understood by those in positions to develop such systems. The article does not discuss resource limitations in developing countries, another key challenge in creating functional EM care systems.

**Brennan RJ, Sondorp E. Humanitarian aid: some political realities. BMJ. 2006; 333(7573):817-8.**

*The task of providing humanitarian relief has become increasingly politicized, with unfortunate consequences for those most in need.*

**Summary:** In this comment piece, the authors review some of the political obstacles to providing humanitarian relief work. Focusing on the World Health Organization Eastern Mediterranean Region (EMRO), which has contributed around 60% of the world's refugee population and hosts the majority of the world's refugees, the authors highlight three problem domains faced by the humanitarian community: interagency coordination, documentation of humanitarian need, and security for aid workers. The authors cite the difficulty of dealing with organizations such as Hezbollah that may perform positive social functions as well as participate in activities shunned by the majority of the humanitarian community. They present the difficulties in gathering and presenting data posed by lack of host country government cooperation to grant access (as in Darfur) and government discrediting of data that is not politically comfortable (as by the U.S. and U.K. in relation to Iraqi casualties from the ongoing Iraq war). The third disturbing trend presented is the increasing violence directed specifically toward humanitarian workers and organizations, such as the killing of aid workers in

Afghanistan and Sudan. The authors make a call for humanitarian workers to maintain their professionalism and to hold policy makers accountable for decisions that adversely affect populations.

**Comment:** While this is only a short review of the problems facing humanitarian relief efforts in the WHO Eastern Mediterranean Region, it draws significant attention to the problem. Due to the increased violence noted in the world today, greater efforts are needed to provide adequate and efficient humanitarian aid to those in need. While the authors did comment on the political obstacles to providing humanitarian aid in war-torn countries, their review unfortunately failed to discuss potential solutions.

**Burke DS, Epstein JM, Cummings DA, et al. Individual-based computational modeling of smallpox epidemic control strategies. Acad Emerg Med. 2006; 13:1142-9.**

*Computer modeling suggests that even our worst nightmare—a smallpox epidemic—can be contained using standard outbreak control methods.*

**Summary:** This article describes a mathematical model developed to simulate eight response scenarios based on the introduction of ten smallpox cases into a simulated 6,000-person town and the introduction of 500 smallpox cases into a simulated 50,000-person city. Social interactions including subsequent virus transmission and control are simulated in distinct units such as homes, workplaces, schools, and hospitals and with realistic values agreed on by an advisory group of experts on smallpox and historical outbreak data from Europe from 1950 to 1971. The results of all eight response scenarios in both towns showed that contact tracing and vaccination of household, workplace, and school contacts, along with prompt reactive vaccination of hospital workers and isolation of diagnosed cases, could contain both epidemic scales.

**Comment:** In the post-9/11 era, the concern for possible bioterrorism has spurred much interest and research in the mathematical modeling of epidemic transmission and control. The model described by Burke et al. in this article was first presented at the *Academic Emergency Medicine Consensus Conference*, “Establishing the Science of Surge,” in May 2006. It is of particular interest to the IEM community because of the level of complexity of the model created to simulate virus transmission and control and the conclusion that contact tracing, vaccination of contacts and hospital workers, and isolation of cases could contain an epidemic of the type and scale described in the model.

**Burkle FM Jr. Population-based triage management in response to surge-capacity requirements during a large-scale bioevent disaster. Acad Emerg Med. 2006; 13:1118-29.**

*We may need to adjust our traditional methods of triage when faced with a bioterrorist event.*

**Summary:** Traditional triage methods for mass-casualty events stratify patients based primarily on severity. For mass-casualty events due to biological agents, such triage methods do not take

into account exposure, duration, or infectiousness and, therefore, are not optimized to prevent secondary transmission. This article reviews current mass casualty triage systems, pointing out deficits in them for evaluating biological disasters. Drawing on these deficits, the author presents a population-based triage system designed to take these factors into account by dividing the population into **S**usceptible but not exposed, **E**xposed but not yet infectious, **I**nfectious, **R**emoved by death or recovery, and protected by **V**accination or prophylactic medication (**SEIRV** methodology). Attention is drawn to the need to recognize phases of progression and adaptability of a triage tool as a bioevent evolves.

**Comment:** With the recent severe acute respiratory syndrome (SARS) epidemic, the concern for a potential influenza H5N1 outbreak or a bioterrorism attack, a re-assessment of triage management in response to surge-capacity requirements during a large-scale bioevent disaster is appropriate. The article provides an excellent review of mass casualty triage principles and the differences with a bioevent. One interesting focus of the guideline is to identify among the susceptible population those that are unlikely to be infected but may still require psychiatric care due to fear, poor resilience, or a lack of coping skills, thus removing some of the burden of these patients from the population requiring medical management.

**Coghlan B, Brennan RJ, Ngoy P, et al. Mortality in the Democratic Republic of Congo: a nationwide survey. Lancet. 2006; 367(9504):44-51.**

*The International Rescue Committee has proven that collecting high-quality morbidity and mortality data during humanitarian emergencies may be difficult, but not impossible.*

**Summary:** The Democratic Republic of Congo continues to struggle in the wake of a six-year conflict that destabilized much of central Africa and has led to millions of excess deaths over the past decade. In order to determine the ongoing need for humanitarian intervention, the authors conducted a three-stage, cluster based survey of 19,500 households in the Democratic Republic of Congo during the summer of 2004, following up on prior studies. Their study demonstrated a death rate significantly higher than expected, with an estimated 38,000 preventable deaths occurring every month. Most of these deaths were due to secondary effects of the war rather than direct violence. Mortality data was also compared to figures collected earlier in the conflict, during the late 1990s. Most deaths were due to non-traumatic, preventable, and easily treated disorders. The crude mortality rate was noted to be 76% higher in any province that had experienced a single violent death. Although the authors suggest that improving 1) food availability, 2) access to clean water, 3) immunizations, 4) bed nets, and 5) case management of common diseases might yield the most cost-effective results, their primary premise is the contribution of the ongoing lack of security to increased mortality.

**Comment:** The International Rescue Committee completed a very difficult study to re-evaluate mortality data in the Democratic Republic of Congo, visiting 19,500 households amid often unsafe circumstances. The results clearly demonstrate the linkage between security issues and population health despite their omission of the most unsafe portions of the country from the analysis. This nation is in desperate need of basic medical support during the ongoing political

and military conflict. High quality epidemiologic studies such as this one can draw important international attention and aid to countries experiencing humanitarian emergencies.

**Dib, JE, Naderi S, Sheridan IA, Alagappan K. Analysis and applicability of the Dutch EMS system into countries developing EMS systems. J Emerg Med. 2006; 30(1):111-5.**

*Going Dutch: Amsterdam's EMS system may provide important lessons for other cities.*

**Summary:** For this descriptive report, the authors collected dispatch and organizational data for the city of Amsterdam and conducted informal surveys in four of the seven Amsterdam ambulance systems over a one year period. During the course of the year-long study, approximately 165,000 calls were received; of these, 65,000 were deemed non-emergent and no ambulance was dispatched, 60,000 were for inter-facility transportation, and the other 40,000 were true emergency runs. Ambulance teams consisted of a basic life support (BLS) driver and an advanced life support (ALS) nurse with three years of additional critical care and emergency medical training. Ambulance nurses are authorized to treat and release patients. Principal points of the article include the fact that all scene runs involve highly skilled practitioners and that early triage allows for fewer low-yield runs. The authors point out that no study has been performed of the clinical outcomes of patients either released at the scene or for whom a decision was made by dispatch to not send an ambulance.

**Comment:** This paper summarizes data from only a subset of Amsterdam's EMS systems. Although it fails to truly evaluate the system, it succeeds as a descriptive analysis of an alternative EMS model. Future investigations that produce comparative and outcome analyses would be quite useful for large cities around the globe developing their own EMS systems.

**DiMaggio C, Galea S. The behavioral consequences of terrorism: a meta-analysis. Acad Emerg Med. 2006; 13:559-66.**

*Post-traumatic stress disorder (PTSD) is common following terrorist attacks—knowing who is at risk may help front-line providers triage survivors to appropriate psychiatric care.*

**Summary:** An understanding of the behavioral and psychiatric effects of terrorist actions can guide the provision of effective public health interventions designed to avert persistent, wide spread psychological trauma. The authors conduct a synthesis of quantitative studies of the mental health effects, post traumatic stress disorder (PTSD) in particular, resulting from terrorist incidents. An extensive search produced 113 studies eligible for inclusion in the meta-analysis, of which 61 addressed PTSD. Using a random effects model, results were analyzed for overall mean effect size, heterogeneity of mean effect size, and evaluation of the relationship of effect size to moderator variables. Analysis indicated that the prevalence of PTSD in directly affected populations after a terrorist event varies between 12 and 16%. Further analysis revealed a statistically significant 25% decline in PTSD prevalence over the course of the following year. Survivors and rescue workers had a higher prevalence of PTSD than the general population. Prior psychiatric history and female gender were also associated with the development of PTSD.

**Comment:** Knowledge of patient characteristics that are associated with development of PTSD after terrorist incidents may help front-line providers more effectively identify and triage patients in need of further psychiatric follow-up. This article delineates some of the effects of terrorist incidents on the psychological health of the target populations and helps to identify individuals and groups at increased risk of developing psychological sequelae. The summary prevalence rates conceal immense variability as some of the included studies grouped survivors, rescuers, and local populations. Nevertheless, the authors ameliorate some of the inherent problems of meta-analyses by presenting well-defined search and inclusion criteria and a priori variable definition.

**Kayongo M, Rubardt M, Butera J, Abdullah M, Mboninyibuka D, Madili M. Making EmOC a reality--CARE's experiences in areas of high maternal mortality in Africa. *Int J Gynaecol Obstet.* 2006; 92(3):308-19.**

*Emergency Obstetric Care (EmOC) can save lives, even in resource poor settings.*

**Summary:** In 2000, a series of interventions was commenced by the CARE/AMDD (Averting Maternal Death and Disability) program in Rwanda, Ethiopia, and Tanzania. These interventions included a needs assessment followed by infrastructure and equipment upgrades, review of EmOC procedures and guidelines, training of key staff and emergency response teams, improved record keeping, quality improvement protocols, data collection and team building. Case fatality rates were halved in all three countries during the study period. There were also improvements in EmOC resource utilization at the study hospitals, notably for obstetric complications and the overall proportion of births at EmOC facilities. Additionally, there was an increase in the number of caesarian sections performed, although still not to the degree recommended by the WHO. Overall, Ethiopia had the poorest EmOC initially and experienced the smallest response to the study interventions. All three countries have continued these efforts to improve EmOC and decrease maternal mortality. The authors conclude that an integrated and comprehensive package of interventions as well as a coordinated effort from all involved partners are required to strengthen EmOC in these resource poor settings.

**Comment:** This study essentially identifies a wide ranging set of interventions undertaken to comprehensively address lack of access to EmOC. The authors measured a decrease in case fatality rate over the four year study period, as well as improvements in EmOC resource utilization across the different sites. While this effect could be a result of other interventions not related to CARE/AMDD or simply to improvement over time, the significant and broad interventions undertaken are likely responsible for the majority of the improvements noted at the project sites. Additionally, no mention is made to potential changes in the economic, political or security characteristics of the catchment areas of the study sites during the intervention period. Despite these limitations, broad and comprehensive interventions, such as those included in this project, can impact access to EmOC as well as maternal and infant mortality in resource limited settings.

**Kupper TE, Schraut B, Rieke B, Hemmerling AV, Schoffl V, Steffgen J. Drugs and drug administration in extreme environments. J Travel Med. 2006; 13(1):35-47.**

*Packing a travel medicine kit? Make sure your drugs will hold up in extreme environments.*

**Summary:** The authors created a list of 25 frequently used pharmaceutical agents found commonly in European (and North American) emergency kits, and performed a literature search to determine the stability of these agents in extreme environments (high or low temperatures situations) and their suitability for administration via alternative routes (sublingual/buccal, oral ampule, tracheal). To supplement the published literature, the authors also requested unpublished data from the pharmaceutical industry. In some circumstances, incomplete and unverified data were the best available.

**Comment:** This is an excellent summary of available information on drug stability and administration after exposure to extreme temperatures. The limited availability of this information makes this summary a useful reference for those carrying drugs in harsh environments.

**Kwak YH, Shin SD, Kim KS, Kwon WY, Suh GJ. Experience of a Korean disaster medical assistance team in Sri Lanka after the South Asia tsunami. J Korean Med Sci. 2006; 21(1):143-50.**

*DMATs can be successful in the wake of a tsunami, but effective triage systems and close collaboration with local authorities are critical.*

**Summary:** A Korean Disaster Medical Assistance Team (DMAT) arrived in Sri Lanka on January 2<sup>nd</sup>, 2005, seven days after the South Asian Tsunami. The team was comprised of three EPs, two surgeons, a pediatrician, a dermatologist, and three general physicians as well as a pharmacist, three nurses and a small support staff. The study was a retrospective review of logs kept during the one week mission. A total of 2,807 patients visited the temporary field clinics yielding 3,186 chief complaints, 3,231 medical examinations, and 3,259 diagnoses. The vast majority of complaints were medical in nature (82.4%) although there were significant numbers of injured individuals (17.6%). The most common complaints were respiratory (33%) and orthopedic (21.9%). As has been seen in prior natural disasters, the proportion of injured patients declined with time while the numbers of patients with medical complaints increased. Ninety-two percent of all conditions were minor enough to be treated in a single visit, while 6.4% of all patients were referred to local hospitals for further care.

**Comment:** Although this study is a descriptive retrospective analysis of the records of a single DMAT, it is important in that it is the first description of the activities of a DMAT in response to a tsunami. While the DMAT arrived a week after the tsunami, the report and analysis is helpful to teams planning for the sub-acute phase after a natural disaster of this kind. One limitation of this work is the lack of patient follow-up or mortality data, which is difficult to obtain in the

setting of a complex emergency such as the South Asian Tsunami. Additionally, lack of knowledge of the baseline health characteristics of the population served by the DMAT prevents the distinction between tsunami-associated morbidity and mortality and local baseline medical need. The article does, however, present a detailed analysis of medical interventions by the group during deployment.

**Leather A, Ismail EA, Ali R, et al. Working together to rebuild health care in post-conflict Somaliland. Lancet. 2006; 368(9541):1119-25.**

*Effective partnerships can help improve health capacity in post-conflict regions.*

**Summary:** Health indicators for Somaliland are some of the worst in the world. There is a chronic shortage of qualified health professionals, poor governance, and few resources to finance the health service. United Kingdom health professionals recognized the problems with health care in Somaliland and set up a partnership named KTSP (Kings College Hospital, Tropical Health and Education Trust, and Somaliland Partnership) to aid in rebuilding health system capacity nationwide. KTSP assisted with staff training, helped to create treatment protocols, and improved the delivery of medical care. KTSP sent lecturers and tutors to aid in teaching at a new medical school and helped train a diverse range of health professionals, including nurses, laboratory technicians, microbiologists, radiography technicians, and midwives. A new curriculum for health officer education was designed through KTSP collaboration and approved by the Ministry of Health and Labor. The new curriculum included assessment techniques (end-of-course examinations, questionnaires, and audits of physical and structural changes in Somaliland). In addition, KTSP provided aid for rebuilding health system capacity and providing accessible health care to local communities, including free care to the poorest people.

**Comment:** The ultimate objective of this program was to rebuild health capacity in Somaliland. Through team building, professional collaboration, and development of problem-solving and leadership skills, this partnership between the U.K. and Somaliland has vastly improved health care in this war-torn country. This model can be instituted in other war-torn areas where health care is lacking due to limited internal and external support. The authors did an excellent job going into detail about the problems facing Somaliland and the solutions which were used to improve health care in the war torn country. Though this article was directed at rebuilding the general health care delivery system, some of the insights and techniques will likely be adaptable to initiatives focused on emergency care capacity development.

**Lee VJ, Low E. Coordination and resource maximization during disaster relief efforts. Pre-hospital Disaster Med. 2006; 21(1):s8-12.**

*While international health care providers are often necessary in the aftermath of a natural disaster, it is important to get both the right type and number of providers to the scene quickly.*

**Summary:** The earthquake and tsunami on December 26, 2004 in Southeast Asia left more than 280,000 people dead and more than 500,000 injured. Medical care after the crisis was provided

by national and international relief organizations. The authors examine the staffing patterns present after the tsunami in the coastal fishing town of Meulaboh, Indonesia—a town with a pre-event population of 80,000 and a post-event population of 45,000. This cross sectional study obtained data on staffing patterns from daily hospital meetings and registered international relief organizations. Prior to the tsunami there were 14 doctors (two of whom were surgeons) and 120 nurses at the town's only civilian hospital. The tsunami produced an immediate shortage of doctors and nurses, leading to an influx of international health care personnel. By the third week following the tsunami there were 21 surgeons performing 10 surgeries daily and approximately 20 non-surgical doctors handling 350 to 700 outpatient visits per day. Some surgeons were redeployed to outpatient clinic activity. However, at three weeks post-tsunami, there were less than 70 nurses and nursing aides available. Three of eight hospital wards remained closed after the tsunami secondary to the nursing shortage even though patients awaited admission. Particular attention was also drawn to the lack of public health workers for surveillance, vaccination, and education.

**Comment:** The swell of support, monetary and clinical, following the tsunami of Southeast Asia has helped mitigate the effects of such a massive disaster. This study showed that staffing by clinicians after the tsunami continued to increase four weeks after the event, likely due to the time necessary to coordinate relief teams and the difficulty entering the area immediately after the event. The authors showed that surgical staffing was adequate by the second week following the event, but that nursing levels did not reach pre-event levels one month after the tsunami even though patient flow markedly increased. The surgical response (particularly general, orthopedic and plastic surgeons) was initially appropriate and later overstaffed, while the need for general and emergency physicians and the necessary nursing care were not met after the disaster. The allocation of adequate nursing staff (preferably with appropriate language and cultural experience) needs to be a center-piece of pre-disaster planning and post-disaster relief efforts. This study was limited by not accounting for local Indonesian relief organizations working outside the hospital.

**Levy-Bruhl D. [Role of antiviral drugs in containing pandemic influenza. Contribution of recent modeling exercises synthesis prepared by the InVS/Inserm "epidemiology" group - November 2005]. Med Mal Infect. 2006; 36(9):449-53. <Original Article in French>**  
*Mathematical modeling suggests that stockpiling antivirals such as oseltamivir may be a cost-effective means of containing a future influenza pandemic.*

**Summary:** The efficacy of proposed strategies for controlling future influenza pandemics remains uncertain, particularly that of stockpiling oseltamivir, an antiviral medication. The authors review several studies that employ mathematical modeling to assess the potential role of antivirals in the treatment of infected individuals and the containment of a nascent influenza pandemic. The authors are guided by several overarching questions: Are antivirals capable of eradicating or containing a pandemic; or, in the case of eradication failure, are they capable of reducing morbidity and mortality? Does stockpiling antiviral treatments have a favorable cost-benefit ratio? Based on modeling that incorporates the intrinsic rate of viral reproduction, the proportion of the population susceptible to infection, and the intergenerational interval, the

authors conclude that ring antiviral prophylaxis around the initial cases, in conjunction with social distancing measures, has the potential to halt a pandemic. This conclusion requires that viral transmissibility is limited, control measures are implemented widely and immediately, and screening for identification of the virus and its resistance patterns are effective. They conclude that stockpiling antivirals is a practical investment.

**Comment:** Because EDs, as the first point of contact for index cases, are likely to figure centrally in strategies to eradicate or contain influenza pandemics, it is imperative that practitioners are familiar with eradication strategies. This article outlines the results of several studies that validate the efficacy of proposed ring antiviral prophylaxis. The authors clearly describe the theoretical basis of antiviral-based containment strategies and the mathematical modeling undertaken to explore their efficacy. The article also summarizes the limitations of completing similar modeling during an outbreak, including the difficulty of understanding the transmission characteristics of an influenza virus at the decisive moment in a nascent pandemic.

**Macfarlane C, Joffe AL, Naidoo S. Training of disaster managers at a masters degree level: from emergency care to managerial control. Emerg Med Australas. 2006; 18(5-6):451-6.**  
*Disaster training programs are beginning to recognize that it takes more than clinical excellence to manage public health needs in the wake of a major disaster.*

**Summary:** This descriptive report outlines a new degree program that addresses the need for more cross-disciplinary managers in the setting of acute and ongoing international disasters. The authors address the fact that often, by the time international aid arrives, the focus has shifted away from triaging and treating patients to coordinating resources and supplies. The Masters of Public Health program at the University of Witwaterstrand, South Africa was developed in response to both acute and continuing disasters in Africa. The disaster management component encompasses a variety of multi-disciplinary topics: medical emergency management, hospital disaster preparedness, public health management, environmental impacts, and water/sanitation. The purpose is to develop disaster managers who can efficiently and effectively participate and lead in disasters such as the Indonesian Tsunami and the New Orleans flood.

**Comment:** The challenges and logistics of disasters draw diverse groups of relief organizations and special interests. It is important to understand the great need in international emergency medicine for physicians who can function outside the scope of clinical medicine. The emergency medicine background in triage, disaster, pre-hospital training, and general medicine make it poised to take a leadership role in disaster management. This report offers a useful summary of relevant content topics necessary for those who wish to function in a disaster response managerial role.

**Maitland K, Berkley JA, Shebbe M, Peshu N, English M, Newton CR. Children with severe malnutrition: can those at highest risk of death be identified with the WHO protocol? PLoS Med. 2006; 3(12):e500.**

*The current WHO guidelines for triage and treatment of children with severe malnutrition may be missing the mark, with devastating consequences.*

**Summary:** The World Health Organization (WHO) defines a mortality rate of over 20% in children with severe malnutrition as unacceptable, and recommends strict adherence to international consensus treatment guidelines, which should result in a case fatality rate less than 5%. The authors evaluated the WHO “danger signs” of malnutrition, including lethargy, hypothermia, and hypoglycemia, as appropriate triage criteria for identifying children at high risk of death within the first 48 hours of admission in a cohort of 920 children at Kilifi District Hospital, Kenya. They found the WHO “danger signs” to be poor predictors of mortality, although four other clinical features were strongly associated with early death, including bradycardia, weak pulse volume, capillary refill time (CRT) >2 seconds, and impaired level of consciousness. Triage criteria, based on these results, were established to identify malnourished children at high, moderate, and low risk of early death. In addition, the authors note that even with strict adherence to the WHO recommended treatment guidelines, 19% of the severely malnourished children in their study died. The authors recognized the need for further validation of their results, as well as clinical trials on the most effective therapies.

**Comment:** Early identification of severe malnutrition allows for prioritization of treatment and surveillance. A data-driven system of triage allowing early aggressive intervention has the potential to reduce pediatric mortality in high-risk malnourished populations. EPs are often involved in initial triage and stabilization, and would benefit from a honed set of criteria for risk stratifying malnourished children. This study effectively challenges the WHO proposal that failure to decrease pediatric mortality from malnutrition using current guidelines is due to lack of capacity, training, or consumable resources. There appears to be a more complex etiology for failure rates that needs to be better understood.

**Malik ZU, Hanif MS, Tariq M, et al. Mass casualty management after a suicidal terrorist attack on a religious procession in Quetta, Pakistan. J Coll Physicians Surg Pak. 2006; 16(4):253-6.**

*Hospitals can better prepare for terrorist attacks with appropriate triage systems and reserves of both supplies and personnel.*

**Summary:** The authors present a case report of the management in a military hospital of 161 casualties following a terrorist attack on March 2, 2004 in Quetta, Pakistan. A terrorist attack on a religious procession that included an explosion and gun fire created a multitude of blast injuries, gun shot wounds and splinter injuries. The hospital received 161 casualties, 20 of whom were brought in dead, and the remaining 141 were admitted. The first patients arrived 20 minutes after the information about the event was received by the hospital. Patients were triaged to a priority level of I to IV with priority I patients further triaged by a trauma index score. 22.7% of casualties were priority I (with the majority of these gun shot wounds), 14.7 % of cases were priority II, and 50.3% of cases were priority III (with the majority of these due to splinter injuries). The reported mortality rate for all patients (n = 141) was 4%. The mortality rate of Priority I patients was 15.5%. Thirty percent of the local medical reserve store was used during

this incident. It was presumed that patients suffering primary blast injury did not survive transport and thus the majority of blast injuries noted were from secondary and tertiary blast effects causing splinter injury.

**Comment:** The authors present a case report of rapid and efficient management of mass casualty following a terrorist attack that produced largely gun shot wounds and splinter injuries. The authors unfortunately did not provide information concerning the pre-hospital triage, care, and transport of the casualties, although the transport of 20 dead patients to the hospital certainly consumed valuable resources. The use of their trauma index score to triage critical patients appears effective in prioritizing operating room staff and time.

**Miller KE, Omidian P, Quraishy AS, et al. The Afghan symptom checklist: a culturally grounded approach to mental health assessment in a conflict zone. Am J Orthopsychiatry. 2006; 76(4):423-33.**

*The stress response to conflict and disasters varies greatly across cultures, and it is vital that we appropriately adapt the tools we use to measure psychological trauma.*

**Summary:** The field of trauma psychiatry has largely been based upon the assumption that a universal human response to psychological trauma exists in the form of the traditionally defined post traumatic stress disorder (PTSD) symptom complex. Growing evidence however, suggests that manifestations of psychological distress occurring in other cultures may differ widely from those criteria currently promoted to identify PTSD. This article describes the methodology for developing a culturally grounded psychiatric assessment tool in a conflict setting that takes into account local idioms of distress. Forty narrative interviews were collected in which the interviewees were asked to think about and describe in detail familiar stories of suffering or loss that had affected people they knew. The researchers then identified the most commonly mentioned indicators of distress and assessed how frequently each indicator occurred. From the initial narratives, the 22 item Afghan Symptom Checklist (ASCL) was constructed to identify symptoms of psychological distress. The ASCL was administered to 324 adults and the results were highly correlated with those obtained by the administration of the War Experience Scale, a previously validated measure of war-related experiences of violence and loss. Women scored significantly higher on the ASCL when compared to men as did widows when compared to married women, suggesting a higher incidence of psychological distress in these groups. The full project, including training, instrument development, and data collection, took fifteen days to complete.

**Comment:** Assessing the mental health of the population in a conflict zone is essential to determine what resources need to be dedicated to psychiatric care. Allopathic medicine has promoted a model of psychiatric symptoms that may not accurately reflect the predominant manner in which people from other cultures experience psychological distress as a result of traumatic exposures. The goal of this paper was not to look specifically at what idioms were used commonly by Afghans, but to demonstrate a methodology for designing a mental health assessment tool that could conceivably be employed in any foreign setting. The authors concede that such an assessment does not invalidate the usefulness of the PTSD model in these situations

but suggest that such a culturally based tool will focus assessments of mental health on features of personal experience that are more in line with individuals own way of perceiving grief and loss. Practitioners of international emergency medicine are often placed in situations where there is little familiarity with the cultural context and may benefit from the described methodology in rapidly formulating a way of measuring psychological distress in a community.

**Mock C, Nguyen S, Quansah R, Arreola-Risa C, Viradia R, Joshipura M. Evaluation of Trauma Care capabilities in four countries using the WHO-IATSIC Guidelines for Essential Trauma Care. World J Surg. 2006; 30(6):946-56.**

*Trauma systems in the developing world are far from perfect, but even small changes could improve the way millions of trauma victims are cared for each year around the world.*

**Summary:** Trauma is a leading cause of death and disability worldwide, with high rates of preventable trauma deaths in low- and middle-income countries. Four such countries' trauma systems were studied to identify priorities in strengthening trauma care capabilities. Questionnaires, checklists, and open-ended questions were used to interview key staff at each facility at clinics, small hospitals, and large hospitals in Ghana, Vietnam, India, and Mexico. Aspects of physical resources and staffing were scored. Areas of challenge include inadequate medical and nurse staffing, and shortages of oxygen, fluids, medications, reagents for lab tests, and other basic equipment. More sophisticated equipment was often in need of repairs. In addition, challenges were identified in the mismatch of human and physical resources, infection control of health care workers, and inadequate trauma registries/quality improvement despite adequate medical records. Major recommendations include the need for regular in-service training, improved procurement and placement of essential supplies, improved monitoring of equipment, and use of quality improvement programs.

**Comment:** Despite being a leading cause of morbidity and mortality in the developing world, trauma systems are often disorganized and under-funded. This article suggests specific areas that could be improved. Some of these areas are within the capabilities of currently limited resources, while others demand increased funding and education. Those responsible for trauma systems in developing countries may use this knowledge to implement changes within current resource constraints as well as recognize what to prioritize as resources grow.

**Molyneux E, Ahmad S, Robertson A. Improved triage and emergency care for children reduces inpatient mortality in a resource-constrained setting. Bull World Health Organ. 2006; 84(4):314-9.**

*A new triage tool for pediatric patients in resource-poor settings may help save children's lives without costing an arm and a leg.*

**Summary:** Many hospitals in resource poor settings combine preventive and emergent care in the same location, but do not have a formal triage system in place. This observational case report provides information about the operation and associated mortality data of a pediatric outpatient

clinic before and after structural reorganization of the clinic and formal triage training of the staff. The focus of this study is the “Under Fives Clinic” a pediatric outpatient walk-in clinic and emergency unit at the Queen Elizabeth Central Hospital, a 1,100 bed government teaching and referral hospital in Blantyre, Malawi. The clinic initially provided immunization services and care for acute and chronic medical problems in the same location. This arrangement provided for lower staffing costs, but there was no triage system in place, no observation area, no staff trained in emergency care, and a long delay in transferring patients to the wards. An intervention included physical restructuring of the clinic to provide for a central waiting area, a front triage desk, a resuscitation room, and separate clinical areas. Meanwhile staffing changes included increasing nurse staffing from two to five and training staff in emergency triage assessment and treatment (ETAT) based on the Pediatric Advanced Life Support (PALS) course. Inpatient mortality was reduced from 10-18% prior to the changes to 6-8% after the triage system was in place. The proportion of deaths occurring within 24 hours of arrival decreased from 36% prior to the changes to 12.6% after the noted changes.

**Comment:** The training of staff in formalized triage and emergency care in an acute care outpatient clinic and ED appears to be an effective method to reduce mortality in a resource poor setting, although this study did not report whether or not the mortality difference was statistically significant. It should be noted that funds from outside grants were used for the reconstruction of the clinic and the increased staffing. The addition of an observational unit and malnutrition unit can provide cost savings by decreasing admissions. Clinics associated with a tertiary care center may benefit from ETAT training and the creation of a formal triage system, though this is less likely to apply to the many primary care clinics worldwide that must continue the important job of vaccination and preventive care with limited referral capacity for acutely ill patients.

**Moss WJ, Ramakrishnan M, Storms D, et al. Child health in complex emergencies. Bull World Health Organ. 2006; 84(1):58-64.**

*Children are not just small adults, and pediatric guidelines developed for use in stable environments may not work during disasters and emergencies.*

**Summary:** Health care interventions in complex emergencies differ in many ways from the routine development work performed in stable environments. The highest rates of mortality in refugee populations are in children less than five years old. The most common causes of death in this population are diarrheal disease, malaria, measles, respiratory infection, and malnutrition. Neonatal health, childhood trauma, and mental illness are responsible for further morbidity and mortality. Relief organizations surveyed had few guidelines developed specifically for the care of children in complex emergencies. Most relied on the formalized guidelines produced by the WHO IMCI (Integrated Management of Childhood Illness), UNICEF or Ministry of Health (MOH) for the diagnosis and treatment of conditions in complex emergencies. Organizations were least likely to have formal guidelines on the management of prematurity, neonatal asphyxia and infection, pediatric HIV, management and detection of tuberculosis, and pediatric trauma. The authors make the following conclusions based on their work: most organizations caring for children in complex emergencies use clinical guidelines; health care in complex emergencies is delivered by individuals with variable experience and knowledge; guidelines for the prevention

and management of child health problems in complex emergencies exist but are not easily accessible or comprehensive.

**Comment:** This document is a retrospective review and a convenience survey of the major international organizations providing relief in complex emergencies. The study is limited by the fact that many of the guidelines for the treatment of children in complex emergencies are not published. Additionally, while the list of included organizations is impressive, it is unclear whether all relevant aid groups were sampled. The authors additionally discussed the issue that the survey that they provided to the international organizations was completed usually by a single individual with potentially limited knowledge of the procedures, guidelines and past experience of the organization. Despite these issues, the central tenet of the publication—that there is a lack of guidelines for the diagnosis and management of pediatric health issues in complex emergency settings and that the development of these guidelines should be of primary importance—is indeed supported by this research.

**Nutrition Service of the World Food Program. Nutrition in emergencies: WFP experiences and challenges. Food Nutr Bull. 2006; 27(1):57-66.**

*Preventing malnutrition during emergencies requires more than just food, as the WFP experience demonstrates*

**Summary:** The baseline level of malnutrition in a population is an important determinant of mortality in humanitarian emergencies. The World Food Program (WFP) summarizes its experience, reviews available literature, and makes recommendations regarding the prevention and treatment of malnutrition in both acute and long-standing emergencies. Planning of the size and composition of rations was found to be dependent on local food preferences, demographic profile of the population, activity levels, climatic conditions, local coping capacity, and preexisting levels of malnutrition and disease load. Despite such planning, actual execution of providing calculated kilocalories per person per day and recommended protein, fat, and micronutrient content is often not achieved. Challenges identified were prompt delivery, ‘pipeline’ disruptions, and operational difficulties such as security concerns. Approaches to correcting malnutrition included targeted supplementary feeding, blanket supplementary feeding, therapeutic feeding, and micronutrient interventions. Future research areas will focus on more systematic nutritional analysis, timely and full delivery of rations, and sustaining nutrition benefits beyond the emergency.

**Comment:** The evolution of nutritional sciences coupled with studied experiences on the ground in response to emergencies by the WFP led to this review of established nutritional guidelines and expectations, challenges to implementation in the field, and areas of needed improvement and further research. This article provides an excellent review of the philosophical and operational principles involved in providing nutritional support to populations affected by humanitarian crises. Organizations committed to providing emergency aid can utilize the lessons learned to allocate food and non-food resources appropriately during humanitarian crises.

**Roudsari BS, Shadman M, Ghodsi M. Childhood trauma fatality and resource allocation in injury control programs in a developing country. BMC Public Health. 2006; 6:117.**

*Improving pediatric trauma mortality in developing countries requires attention to the particular timing and cause of death.*

**Summary:** Citing the generally accepted concept of a trimodal temporal distribution of trauma mortality, the authors undertook a retrospective analysis of traumatic deaths among children under 15 years old in Tehran, Iran over one year. Using data from the official government agency to which all deaths are reported, they identified 419 deaths in children under 15 years old due to trauma. Due to data limitations on the exact time of death in pre-hospital cases, the authors defined the three phases as pre-hospital, ED, and hospital. The authors reported that 6% of the 419 cases were either homicide or suicide. They did not exclude these from their data set and did not specify the mechanism of death for these cases. Of the remaining 394 victims, motor vehicle crash (MVC) injuries accounted for 211 (50%), burns 74 (18%), poisoning 24 (6%), and drowning 18 (4%). Overall 43% died in the pre-hospital setting, 20% in the ED, and 37% in hospital. The distributions were quite different among the four major causes, with over 80% of poisoning and drowning deaths occurring in the pre-hospital phase and 92% of burn deaths occurring in the hospital phase. 25% to 30% of MVCs and fall-related deaths occurred in the ED phase and approximately 40% occurred in the pre-hospital phase.

**Comment:** This study demonstrates some of the issues surrounding childhood trauma fatality in a developing country. Despite difficulties with the quality of records, this study supplies information useful for local planners. It also confirms prior studies of trauma death distribution in developing countries. The relatively high percentage of deaths in the ED in blunt trauma from falls and MVCs suggests an area for possible improvement in death rates through further analysis of ED trauma management. Unfortunately, one of the limitations of this data set was a lack of distinction among pre-hospital deaths between those dead at the scene and those dying during transport. As the authors point out, further studies of this sort will help planners most appropriately allocate limited resources.

**Tanon A, Eholie S, Binan Y, et al. [Medical emergencies related to HIV/AIDS in tropical zones: a prospective study in Cote d'Ivoire (1999-2000)]. Med Trop (Mars). 2006; 66(2):162-6. <Original Article in French>**

*When it comes to medical emergencies in the developing world, infectious diseases still come first, especially where HIV prevalence is high.*

**Summary:** This prospective, observational study aims to describe medical emergencies requiring admission to Treichville Hospital in Abidjan and to outline the impact of HIV infection among that cohort. All patients over 15 years old presenting to the medical or infectious services of the hospital and requiring immediate medical attention were enrolled in the study over 8 months in 1999, excluding surgical or gynecologic emergencies. A standardized survey of demographic information, medical history, symptoms and prior medical care was administered;

consent for HIV testing was obtained, and serologic screening for HIV in conjunction with a complete diagnostic work-up undertaken. Among the 400 patients enrolled, 312 (78%) tested positive for HIV. Most of the patients complained of chronic symptoms, especially protracted fever and chronic diarrhea, and had been previously evaluated and referred by satellite health centers. The most frequent chief complaints of HIV positive patients included: generalized decline (62%), fever (50%), diarrhea (39%), and cough (20%). Infectious diseases represented the majority of final diagnoses with gastrointestinal, pulmonary, and neurologic systems most frequently affected.

**Comment:** Practitioners working in high-HIV prevalence, resources-limited settings face many challenges in treating HIV-positive patients. This study describes the most common presenting complaints, physical signs, diagnostic findings, and final diagnoses of HIV-positive patients presenting to the medical and infectious disease services of a referral hospital in Cote D'Ivoire. The study offers an exhaustive description of common clinical presentations and a re-iteration of the need for aggressive evaluation of opportunistic infections among HIV-positive patients in resource limited areas.

**Wang LM, Chen YC, Tung SP, et al. The rationale of fever surveillance to identify patients with severe acute respiratory syndrome in Taiwan. *Emerg Med J.* 2006; 23(3):202-5.**

*During outbreaks such as the SARS epidemic, emergency departments can use multi-phase predictive scoring systems to identify and isolate potentially infectious cases.*

**Summary:** According to the WHO, more than 90% of the SARS cases reported in Taiwan in 2003 were correlated with hospital-based transmission. During the SARS outbreak, emergency departments were central in screening patients for SARS, placing these departments at greatest risk of exposure to new cases, and in a key position to control the outbreak. The authors propose establishing a predictive scoring system, divided into triage and screening phases, that is easily employed and effective in identifying SARS cases early in the course of the illness. Within one month during the SARS outbreak in Taiwan, the authors enrolled 484 adult patients that presented to the ED with a temperature  $>38.0^{\circ}\text{C}$ . The authors employed a two-stage assessment process. The first stage, or triage stage, was comprised of six questions regarding exposure history and common symptoms. The triage score, with a cut-point of one, had a sensitivity and specificity of 81.1% and 73.6%. The second stage, or screening stage, employed a scoring system based on lab and diagnostic tests, including leukocytosis, thrombocytopenia, lymphopenia, and an abnormal CXR. Using a cut-point of three resulted in a sensitivity of 95.5% and specificity of 87.2%.

**Comment:** In the face of a new infectious disease, about which mode and rate of transmission are largely unknown, EDs must have a means of effectively screening, triaging and isolating new cases to minimize hospital based transmission. Although this study has several limitations, including the lack of validation of the scoring system, it reaffirms the central role of emergency medical care services in primary and secondary surveillance. The article also addresses the need for triage systems to be adapted to various factors and offers a framework for establishing triage stations and mobile screening units in the event of an infectious outbreak. The study also outlines

a model for a two-tiered screening system that could be used during future outbreaks to minimize transmission to hospital personnel and patients while effectively identifying and isolating those who are infected.

**Yamada S, Gunatilake RP, Roytman TM, Gunatilake S, Fernando T, Fernando L. The Sri Lanka tsunami experience. *Disaster Manag Response*. 2006; 4(2):38-48.**

*Sri Lanka's experience during the tsunami may teach developing countries a great deal about weathering the next big storm.*

**Summary:** The 2004 Indian Ocean tsunami killed 31,000, displaced 440,000, and affected 1 to 2 million Sri Lankans. For this observational report, information about the Sri Lankan post-tsunami experience was collected through direct observation, interviews with key informants, and review of relevant documents. During the emergency phase, the number of deaths far exceeded those injured with the main morbidities consisting of near-drownings and traumatic injuries. The initial response was by local citizens and later facilitated by the government, the military and international agencies. Lack of coordination among responding agencies and poor record keeping were noted as being associated with duplication of services to some survivors and unnecessary services being provided to others. Problems with international donations of medications were typical with unfamiliar and outdated medications included. During the recovery/rehabilitation phase, infectious disease epidemics were avoided by ensuring clean water and vector control. The presence of an already strong public health system was felt to contribute to prevention of post disaster epidemics. Barriers to optimal relief efforts included lack of an incident command system, limited funding, and political conflicts. Reconstruction overall has been slow, with many victims residing in camps with no means to generate income.

**Comment:** Disasters of the magnitude of the Indian Ocean tsunami can overwhelm even the most well-planned and resource-rich health systems. Sri Lanka drew upon its well-developed community health infrastructure to care for those injured and its strong public health system to prevent disease outbreaks. Areas for improvement were identified as better coordination of rescue efforts, establishment of an emergency response structure, and increased training of health care personnel. This observational report adds to the international database of disaster knowledge.