DISASTER AND HUMANITARIAN RESPONSE

Cairns KL, Woodruff BA, Myatt M, Bartlett, L, Goldberg H, Roberts L. Cross-sectional survey methods to assess retrospectively mortality in humanitarian emergencies. Disasters. 2009; 33(4):503-21.

Statistical assessment of humanitarian emergencies is a difficult task, as records are often incomplete or do not exist at all. Several retrospective methods can be used in such situations.

Summary: In humanitarian emergencies, proper documentation and statistical data gathering are often challenging tasks and at times, traditional epidemiological methods are not applicable. This paper describes different methods to retrospectively assess mortality in disaster situations. Even though direct patient care is of highest priority during humanitarian crises, statistics do matter in the aftermath, as they may help to identify and to analyze triggers or to document the true extent of wars, ethnic conflicts, or other humanitarian emergencies. In addition to crude mortality rates, age- and sex-specific mortality assessments are relevant to measuring the impact of a humanitarian crisis on the different strata of a society, and to identify the most vulnerable groups. Population migration due to natural disasters, conflict, or war can break down family units, making traditional methods of mortality measurement difficulty due to recall biases. Simple interviews with survivors have been shown to lead to erroneous estimates (up to 40% incorrect) when compared to prospectively assessed data. More effective mortality rate assessments can be achieved by gathering additional epidemiological data, such as conducting household census surveys. This information can be used within statistical models to reach more accurate estimates of true mortality rates. Such models include typical demographic results from other humanitarian crises as a substitute for data that can not be feasibly assessed retrospectively. The authors also highlight the importance of adequate assessment planning and interviewer training. These efforts are crucial for determining accurate mortality rates but are often neglected due to financial or logistical issues. For example, infant mortality rates are usually more accurate

if the mothers are interviewed, as they are more likely to exactly recall their children than other family members.

Comment: This article focuses on mortality rate assessments of humanitarian emergencies, which is an important element of crisis analysis. Understanding the characteristics of death in such situations and identifying risk factors is crucial for the development of preventive strategies for future disasters and may play an important role in the legal aftermath of armed conflicts. In addition, immediate response activities and mitigation programs during the ongoing emergency also heavily depend on such background information. As prospective data gathering is often impossible in such situations due to scarce resources or safety concerns, retrospective assessments can play a vital role in theses analyses. Even though current methods have been improved, they still need to rely on assumptions and data from different humanitarian emergency situations. This fact should not be forgotten when these data are used to undertake certain measures or to draw certain conclusions. Nevertheless, when keeping these limitations in mind, the methods described in this article represent important tools for the assessment of humanitarian emergencies. Profound knowledge of these academic tools is important for all medical professionals involved in international emergency medicine (IEM) –they are the practitioners who not only simultaneously apply these methods but also rely on the results for decision making and planning during humanitarian emergencies.

By Tom Becker, MD

Cavey AM, Spector JM, Ehrhardt D, et al. Mississippi's infectious disease hotline: a surveillance and education model for future disasters. Prehospital and Disaster Medicine 2009; 24(1):11-17.

A telephone hotline may be a useful tool for helping shelter staff and public health authorities identify acute infectious diseases early before they progress to an outbreak.

Summary: This article describes the development and use of a novel infectious disease surveillance system, a telephone "hotline," implemented in shelters housing evacuees from areas ravaged by Hurricane Katrina. First, the authors provide background on the public health crisis that followed Hurricane Katrina, highlighting the specific characteristics of the situation that made the telephone hotline approach compelling: large numbers of evacuees with a large potential for infectious disease outbreaks; uncertainty among shelter staff and residents regarding action plans in the case of a potential outbreak; and lack of training in public health, infectious disease, or disease reporting among shelter staff. The authors go on to describe the intervention itself, which included an assessment of the baseline status of the shelters, the development of laminated posters with reportable symptoms, and the creation of a toll-free hotline with around-the-clock staffing by trained professionals. Finally, the authors report on the outcomes of their intervention: a total of 43 shelters participated in the program, with a census of 3,250 evacuees. Ninety-three potential patients were identified in 29 calls from 13 shelters. Of these, 37 had URI symptoms (40% of total cases), 15 had diarrhea (16%), 6 had fever (6.5%), and 2 had bloody diarrhea (2%). The 33 remaining cases (35%) were categorized as "other" symptoms, including a case of varicella that resulted in the identification of two other cases within the same shelter, and two pregnant patients being moved. Thirty-four (37%) of these patients were referred to a local doctor or hospital for further medical attention. The number of calls to the hotline greatly decreased after the first 10 days following implementation, as shelters began closing and local health service delivery improved.

Comment: This study describes a novel approach to rectifying a public health problem: identifying and acting on potential infectious disease outbreaks and making medical expertise available despite a lack of local resources. The authors also describe aspects of a good public health surveillance system, which include simplicity, flexibility, data quality, and acceptability. This is a useful guideline for the development of future tools, and is applicable to the world of IEM in that it allowed for immediate feedback and education for local staff unfamiliar with the diseases, which could provide critical assistance in treating patients with acute illness. Limitations of this intervention include information bias, the possibility of shelter staff confusing this intervention with emergency medical services, and its focus on emergent symptoms.

By Lisa Arvold, MD

Centers for Disease Control and Prevention (CDC). Impact of new WHO growth standards on the prevalence of acute malnutrition and operations of feeding programs - Darfur, Sudan, 2005-2007. MMWR Weekly Rep. 2009; 58(21):591-4.

The new World Health Organization (WHO) growth standards may improve recognition of acute malnutrition when compared with the old WHO/CDC/National Center for Health Statistics (NCHS) reference, but at a significantly increased cost to humanitarian actors, and without clear evidence that it will improve outcomes in undernourished children.

Summary: Previously, the diagnosis of global acute malnutrition (GAM) and severe acute malnutrition (SAM) was made by comparing the weight of a child to the WHO/CDC/NCHS reference population, which was based on a predominantly formula-fed cohort of American children. In 2006, the WHO released a new reference population standard based on mostly breast-fed children living in favorable conditions in six areas around the world. In order to compare the effects of the new WHO reference standard to the old reference standard on the diagnosis of acute malnutrition in children during a humanitarian crisis, the CDC undertook a retrospective analysis of anthropometric data for children aged 6-59 months from Darfur, Sudan.

The CDC analyzed data obtained from three annual cross-sectional nutritional surveys conducted from 2005-2007 by the United Nations Children's Fund (UNICEF), the World Food Program, and CDC. In accordance with current WHO guidelines, the authors compared the Z-scores (number of standard deviations from the weight of an individual child to the reference mean weight, for a given height and sex) for children included in these surveys to both the old WHO/CDC/NCHS reference standard, and the new WHO reference standard, to determine the prevalence of malnutrition and eligibility for admission to a therapeutic feeding center. The data indicate that the use of the new WHO standards would have increased the prevalence of GAM on average by 14% and SAM by 100%. Admissions to feeding programs would have increased by 56% for moderately malnourished children and by 260% for severely malnourished children, equaling approximately 23,200 more children eligible for therapeutic feeding programs, which would increase operating expenses by an estimated $4.7 million.

Comment: This study demonstrates some of the issues surrounding measurement of childhood malnutrition in a humanitarian context. Transitioning to the new WHO growth standards will greatly increase the number of children diagnosed with global and severe acute malnutrition, admissions to feeding programs, and costs of program operations. It should be noted, however, that the results of this study are subject to the usual biases associated with collecting accurate data in an active conflict zone, where access to the survey population may be limited due to lack of security and qualified survey personnel. For now, humanitarian non-governmental organizations (NGOs) and researchers alike should follow the CDC's advice and report malnutrition statistics based on both the old and new reference population standards, which will allow for valid comparisons across time.

By Sandeep Johar, DO

Chaffee M. Willingness of health care personnel to work in a disaster: an integrative review of the literature. Disaster Medicine & Public Health Preparedness. 2009; 3:42-56.

The willingness of health care personnel to respond in the aftermath of a disaster is influenced by several important factors that health care leadership should address in their disaster planning activities.

Summary: In effort to better understand what influences health care workers' willingness to report to work in a disaster setting, Dr. Chaffee reviewed 27 studies published between 1991 and 2007. After outlining her literature search strategy, inclusion criteria, screening process, and evaluation methods, she goes on to summarize the highlights from each study and to offer a synthesis of the collective data. Type of disaster, concern for family and loved ones, and personal safety are the most frequently cited factors influencing willingness to work. Concern for pets, sense of duty, availability of personal protective equipment, concern for basic needs, and length of response also influence willingness to work following a disaster, though these factors are cited less frequently.

Comment: Health care providers play an essential role in the "surge response" needed to effectively respond to a disaster, and this review provides new insight into how to optimize this response. The review effectively summarizes the highlights of each included study, and describes specific actions that health care leadership can take to encourage health care providers to respond in the aftermath of a disaster. It should be noted, however, that the review includes studies with both qualitative and quantitative measures, as well as peer-reviewed and non-peer-reviewed literature. In addition, the majority of the data were published following the September 11, 2001 terrorist attack, potentially limiting its generalizability to other disaster settings.

By Daniel J. Millikan, MD

Dara SI, Farmer JC. Preparedness lessons from modern disasters and wars. Critical Care Clinics. 2009; 25(1):47-65, vii.

A summary and review of recent disasters with lessons learned and suggestions for future disasters and critical care planning.

Summary: The goal of the authors is "to review a cross-section of representative disasters that illustrate recurring, important themes related to critical care and hospital disaster response."

Eight disasters are reviewed and summarized focusing upon current relevance and critical care lessons.

The authors identified common themes among the reviewed disasters:

- Psychosocial care: Chernobyl, Oklahoma City bombing
- Identification of injured persons: Chernobyl
- General and intentsive care unit (ICU) triage: Chernobyl, Bhopal, September 11, 2001, outbreak of SARS, Hurricane Katrina
- Mass casualty/disaster emergency response plan: Bhopal, outbreak of SARS, Hurricane Katrina
- First responder/clinician protective measures: Chernobyl, Bhopal, September 11, 2001, outbreak of SARS
- Communication/collaboration: Oklahoma City bombing, September 11, 2001, Hurricane Katrina, Operation Iraqi Freedom, and Operation Enduring Freedom
- Provider identification & training: September 11, 2001, Asian tsunami
- Portable care: Asian tsunami, Operation Iraqi Freedom, and Operation Enduring Freedom

The authors conclude by making the following observations in disaster settings:

1. ICUs are neglected during disaster planning.
2. People with chronic illness will decompensate during a disaster.
3. Critical care demand will be greater than supply.
4. In disasters people will take on responsibilities that they are not used to including in the ICU.
5. Provider safety and protection is important.
6. Disasters often cause sub-optimal care.

Comment: The authors have undertaken an ambitious and interesting topic, highlighting important aspects of disaster medicine. Through the review of eight disasters, the authors discuss

the subsequent challenges and propose solutions. The inclusion criteria in this article are unclear, limiting the generalizability of findings and recommendations. For example, disasters concerning ethnic violence and famine were not well represented. Other recent disasters (i.e., Cyclone Nargis, and the 2008 China earthquake) were cited in the article but not reviewed. Half of the disasters presented in this review involved U.S. engagement, and likely contribute to the U.S.-centric approach.

The introduction primes the reader for a strong critical care perspective, but this perspective waxes and wanes. The article lacks depth in the identification and description of lessons learned, which could provide the reader with much more depth into situation on the ground. The authors' undertaking is commendable and important to the field of IEM. Defining and narrowing the focus could make for a more robust article.

By Charles Henry Washington, MD, MPH

Janneck L, Cooper N, Frehywot S, Mowafi H, Hein K. Human Resources in Humanitarian Health Working Group Report. Prehospital and Disaster Medicine. 2009; 24(Suppl 2):s184–93.

Task shifting could quicken humanitarian relief efforts and provides long-term perspectives for crisis-affected regions and local health workers.

Summary: This paper summarizes the positions of the Human Resources in Humanitarian Health (HRHH) Working Group on *task shifting* as a potential measure to increase the efficiency of humanitarian relief efforts in crisis and disaster settings. Broadly speaking, the term task shifting is used to describe the process of shifting certain tasks from highly trained health professionals to less highly trained health workers. This concept could increase the efficiency of the health care workforce in the setting of a global shortage of health workers, which disproportionately affects the poorest countries. Task shifting has been applied in non-crisis

settings, predominantly in the setting of HIV/AIDS treatment, and helped to improve health indicators. The use of task shifting in humanitarian crisis situations has the potential to provide direct health care, and more efficiently implement public health interventions for a larger number of affected people compared to existing disaster response strategies. During the acute phase of a humanitarian emergency, enabling local health care personnel or able persons to not only acquire advanced skills, but also assume more responsibility, opens up strategies for NGOs as they plan on how to withdraw from an affected area. With this approach, skilled local staff have the potential to continue providing sufficient long-term health services and public health activities, either within development organizations or for local public health agencies. Task shifting does not aim at diminshing the role of highly trained health workers, as they are vital to mentor and supervise the less highly trained. A standardized training that imparts certain core compentencies to humanitarian field workers could be beneficial and may facilitate inter-agency cooperation, but thus far such core compentencies have not been defined. Dealing with the regulatory framework for education and practice of task shifting seems to be challenging, as many stakeholders on different levels will have to be brought into agreement. The authors point out that such deliberations need to be finalized before a crisis situation occurs to allow a timely and sufficient humanitarian response. Traditionally, many less highly trained health workers either volunteer or only receive small financial compensation. Their increased knowledge and responsibility should be rewarded with higher and fair salaries to ensure that good care is provided and to prevent further "brain drain" from the affected regions. The authors conclude that the concept of task shifting is vital to reach the United Nations Millennium Development Goals, and that this argument will be important to persuade donors and policy-makers.

Comment: This article deals with two topics of great importance for IEM: providing timely, safe, and organized care for people affected by disasters and humanitarian crises, as well as opening up a long-term perspective for the affected regions, their people, and the local health workers. It shows the potential benefits of the task shifting approach, and details the individual elements of this concept, as well as possible ways to reach them. On the other hand, this approach has not been used widely in the acute crisis setting thus far, and therefore its efficacy remains to be shown. The regulatory challenges, with many countries and stakeholders with diverse backgrounds and interests involved, could be difficult to handle in the absence of an international institutional oversight. Nonetheless, the idea is promising and further research and implementation efforts are warranted and should be encouraged.

By Tom Becker, MD

Kahn CA, Schultz CH, Miller KT, Anderson CL. Does START triage work? An outcomes assessment after a disaster. Annals of Emergency Medicine. 2009; 54(3):424-30.

The START triage system prioritizes transport of the most critical patients to the area hospitals first; however, it incorporates a substantial amount of over-triage.

Summary: In this 2009 retrospective analysis from a train crash disaster in 2002, the authors performed the first outcomes assessment to examine the effectiveness of START (simple triage and rapid treatment) triage. Their hypothesis was that START achieves at least 90% sensitivity and specificity for each triage level and ensures that the most critical patients are transported first to area hospitals. In order to examine whether assigned START triage levels matched patients' actual clinical status, a review of patient field triage categories and scene times was first performed. The authors then examined 148 medical records from all 14 receiving hospitals, and determined victim arrival times and correct triage categories. Field and outcomes-based triage categories were then

compared. Of the records reviewed, 79 patients were over-triaged, three were under-triaged, and 66 patients' outcomes matched their triage level. Red was 100% sensitive and green was 89.3% specific. The Obuchowski statistic was 0.81, meaning that victims from a higher-acuity outcome group had an 81% chance of assignment to a higher-acuity triage category. This analysis reveals poor agreement between START triage levels and a priori outcomes criteria for each level. START ensures acceptable levels of under-triage, but incorporates a substantial amount of over-triage. This study had several limitations; most notably, the study methodology could not discern whether errors in assignment of triage categories resulted from failure of the triage algorithm as a tool, or failure of emergency personnel to apply it correctly.

Comment: Each year, disasters affect more than 255 million people worldwide. It is critical that mass casualty triage algorithms produce accurate and reliable outcomes. Mistriage risks exacerbating disaster morbidity and mortality while sub optimally utilizing resources. The START triage system has been widely used in the United States since the 1980s; an analysis of this triage system is long overdue. The ideal screening test has a sensitivity of 100%. One could argue that despite having a substantial amount of over triage, START does in fact have 100% sensitivity and is therefore an acceptable triage system. However over triage can result in overburdening the local health care structures and result in poor outcomes. It is unclear based on this study if it is the START algorithm itself that is problematic, or if it is the application of triage system by in the field practitioners. Due to this, very few conclusions can be drawn about the START triage system. Further outcomes-based assessments of mass casualty triage are imperative for further development of triage systems and assessing their effectiveness.

By Gabrielle Andrea Jacquet, MD

Lin JY, Anderson-Shaw L. Rationing of resources: ethical issues in disasters and epidemic situations. Prehospital and Disaster Medicine. 2009; 24:215.

As hospitals develop plans to deal with pandemic situations it is important to create transparent clinical guidelines to effectively allocate limited resources.

Summary: How to allocate resources to maximize the overall good when medical and human resources are stretched thin is a difficult dilemma health care providers face during epidemics and disasters. The recent 2009 H1N1 influenza pandemic has brought this issue forward as pandemic planning and response has become a reality. This original research paper introduces a decision-making model to answer the question, "How does one decide which patient will be placed on a mechanical ventilator when the need exceeds availability?" The model is based on the utilitarian principles of beneficence and justice. It includes recommendations for the creation of a multidisciplinary Pandemic Triage Committee and phased allocation of resources, specifically ventilators. The level of care provided for a patient, including need for mechanical ventilation, is decided based on the dynamic Critical Care Triage Tool, which incorporates the Sequential Organ Failure Assessment (SOFA) score, an objective critical care scoring system predictive of mortality. After initial assessment and scoring, reassessments are made at 48 hours and 120 hours to determine if a patient qualifies to continue on mechanical ventilation. To keep the decision-making process open and transparent, key patient information including diagnosis, SOFA score, and involvement of other services such as social work are summarized on a one page Critical Care Assessment Checklist. In cases where patients do not qualify for critical care, a palliative care protocol and appeals process by family members or clinical providers is also in place. Early family engagement in the decision-making protocol is important to minimize

conflict or misinterpretation. Such resource-allocation tools should be adapted to individual institutions, and further discussion on the model encouraged throughout health care institutions.

Comment: While health care providers often play many roles in patient care, during an epidemic or pandemic they might face the challenge of balancing individual health care needs versus the greater good of the public and community. This study proactively develops ethically based protocols to address the allocation of potentially scare resources during an epidemic or pandemic. Based on well-established ethical principles of utilitarianism, the model removes individual decision-making and uses a set algorithm and committee to aid in resource allocation. This research and protocol is an excellent resource for hospitals to develop a pandemic or disaster protocol to determine limited critical care resource allocation in an objective, transparent, and effective manner. It is important to tailor the protocols to the individual country and hospital needs – but such decision-making tools are an essential part of effective pandemic response, and need to be further developed and discussed.

By Maya Arii, MD

Mataria A, Giacaman R, Stefanini A, Naidoo N, Kowal P, Chatterji S. The quality of life of Palestinians living in chronic conflict: assessment and determinants. European Journal of Health. 2009; 10: 93-101.

This study used a modified version of the WHOQoL-Bref quality of life assessment to evaluate the quality of life (QoL) and its determinants, of Palestinians living in conditions of chronic conflict.

Summary: Through a multi-stage cluster sample design, the authors selected 1,023 adults from two regions of the occupied Palestinian territory (OPT) in the West Bank and Gaza. The Palestinian Central Bureau of Statistics conducted face-to-face interviews over a three-week period at the end of 2005, administering the modified quality of life (QoL) assessment. This instrument consists of 26

questions that measure the broad domains of physical health, psychological health, social relationships, and environment. The authors included an additional 96 questions that were intended to identify potential determinants of QoL related to the specific context of chronic emergency and prolonged conflict. The authors then conducted descriptive univariate and bivariate analyses so that item distributions and inter-group variations could be understood. Using the algorithm proposed by the WHOQoL team, they estimated four domain-specific scores (physical, psychological, social, and environmental). After the raw data had been obtained, the results from the Palestinian Quality of Life (PQoL) were compared with age- and sex-standardized data from the WHO International Field.

A total of 1,008 adults consented to participate (98.5% response rate). For all locations, the social domain scored the highest, followed by physical, psychological, and environmental domains. In contrast, 42% of respondents ranked the physical domain as the most important factor affecting their QoL, compared to only 4% for the social domain. Significant differences existed between men and women for all except the physical domain ($P < 0.01$). A significant negative association existed between age and all domain scores ($P < 0.01$ for three of the domains, and $P < 0.10$ for the environmental domain). Years of schooling were positively associated with the overall WHOQoL score, and with the physical and psychological domain scores ($P<0.01$ for the domain-specific scores, and $P < 0.10$ for the overall WHOQoL score). Low distress levels correlated with better overall WHOQoL scores. Better financial status correlated with higher domain scores for all except the environmental domain ($P < 0.01$). Higher levels of freedom of expression were associated with higher scores for all domains except the environmental domain ($P < 0.01$). Fear level was significantly associated only with the environment-specific domain score ($P < 0.01$).

When compared with the pooled results obtained from the WHO International Field Trial of the WHOQoL-Bref, results from the Palestinian study indicates a lower QoL for a Palestinian

resident in the OPT. Men and women reported differences in the overall and domain-specific QoL scores, and there was a significant trend for higher QoL domain sores for women in the samples.

Comment: This study offers a new perspective on how to comprehensively assess the human costs of chronic conflicts. It also uses a validated tool modified for the setting. This allows for comparison to other settings, and provides a means to look at the specific determinates of conflict that affect quality of life. The study did not specifically look at quality of life determinates related to political context, which limits its ability to draw conclusions related to the direct political environment on QoL. This study was also cross sectional, and therefore no causality links can be made. Despite these limitations, this study looks to have a deeper understanding of QoL determinants needed to fully delineate the effects of entrenched conflict on the well-being of people in the OPT. Attempts to measure the social suffering of populations stricken by complex emergencies should be part of an overall approach that places the demand for rights and justice at the center of public health.

By Gabrielle Andrea Jacquet, MD

McQueen KA, Magee W, Crabtree T, Romano C, Burkle FM Jr. Application of outcome measures in international humanitarian aid: comparing indices through retrospective analysis of corrective surgical care cases. Prehospital & Disaster Medicine. 2009; 24(1):39-46.

Operation Smile International demonstrates that it is possible to collect and report surgical outcomes data from their humanitarian missions, and that they have achieved quality similar to that seen in developed countries.

Summary: Studies have shown that the number of unintentional and intentional injuries is rising in many developing countries, where injury now accounts for more than 50% of all mortality. Despite this fact, outcomes and measures of effectiveness are rarely measured in this field. In this retrospective review of electronic medical record data collected by Operational Smile

International during 2005 and 2006, the outcomes and complications of 8,151 surgical interventions were evaluated. All surgical cases were reviewed for patient characteristics (age, sex, hematocrit, weight), priority of the surgery, and complications. The overall complication rate was about 1%, with 61% related to the surgery (more common in patients receiving a combined palate and lip procedure), 30% related to anesthesia (more common in children less than one year of age), and 9% to an allergic reaction, fever, seizure, or death after discharge. Although this study was limited to a single organization, the study shows that data collection and analysis are possible in developing countries, and that complication rates comparable to those seen in developed countries are achievable in such settings.

Comment: This study demonstrates that it is possible to assess the quality and effectiveness of surgical interventions in developing countries. This is one of the first examples of a humanitarian aid organization reporting on outcomes of its surgical interventions. Although the variety of data recorded was somewhat limited and they were unable to assess late complications, this study shows that documenting outcomes is possible for similar organizations. The humanitarian community should encourage all similar missions to record data and outcomes to ensure ongoing improvement in the quality of care provided.

By Cheryl Lynn Horton, MD

Richards AK, Banek K, Mullany LC, et al. Cross-border malaria control for internally displaced persons: observational results from a pilot programme in eastern Burma/Myanmar. Tropical Medicine & International Health. 2009; 14(5):512-21.

An intensive malaria intervention program can significantly reduce malaria infection in a small population, providing a successful model for potential widespread application.

Summary: This is a report of an observational pilot study to investigate the feasibility of a community-based malaria control program implemented in eastern Burma/Myanmar. The program was initiated in 2003 in seven villages of internally displaced Karen, and expanded the following year to include three more villages. Intervention consisted of early diagnosis of falciparum malaria by routinely testing febrile patients with the Paracheck-Pf rapid diagnostic test (RDT), and observed treatment of confirmed cases with mefloquine and artesunate. Febrile patients who tested negative received chloroquine for possible Plasmodium vivax. Long-lasting insecticide-treated nets and educational messages were distributed to the study population. Bi-annual screening of the entire population of each village was performed using RDT in order to reduce the number of asymptomatic carriers. These data were used to quantify the prevalence and incidence of the falciparum parasitemia, which are the reported primary and secondary outcomes respectively. The authors also surveyed the population to evaluate mosquito net use and malaria knowledge. The prevalence decreased most dramatically in the first year after the villages initiated the program, from a mean of 8.4% to 3.1% in original villages, and 7.3% to 0.8% in additional villages. The decline continued the following year reaching a mean of 1.1% in original villages at the end of the two-year pilot period. The annual incidence of falciparum dropped from 232 to 70 cases per thousand per year. The authors found that 89.7% of household members reported sleeping under the mosquito net, compared to 0% before initiation of the program. These results may be limited by failure to screen the entire population, by seasonal variability in malaria transmission since testing was not completed during identical months each year, and by incomplete data from one village resulting in its exclusion from incidence calculation.

Comment: The World Malaria Report released by the WHO in 2009 called for greater than 80% intervention coverage by the end of 2010. Given that this intensive intervention resulted in a dramatic reduction in falciparum parasitemia in the study population, it could serve as a model for ongoing malaria programming. Although the authors describe an effective model for malaria control, they do not report the resources, such as cost or staffing, required for its implementation. Such fiscal data would be critical to consider the program for broad scale-up.

By Nichole Bosson, MD

Wen J, Shi YK, Li YP, et al. Risk factors of earthquake inpatient death: a case control study. Critical Care. 2009; 13(1):R24

Identifying the determinants of inpatient mortality after an earthquake can help identify particularly vulnerable patients and better direct appropriate care.

Summary: The authors aim to identify the determinants of inpatient mortality in the immediate five months after the Sichuan, China earthquake of 2008 by conducting a retrospective, hospital based, case control study comparing survivors and non-survivors among inpatients of the tertiary hospital center, West China Hospital. A survivor to death case ratio of 4:1, matching for sex and age, was chosen with a total of 36 cases and 144 controls. The fatality rate among the earthquake victims that made it to the hospital was 1.32%. Multivariate conditional logistic regression analysis revealed that patients with severe traumatic brain injury (TBI) were 253 times as likely as those without TBI to die during their inpatient stay (adjusted OR = 253.3, 95% CI = 8.9 to 7,208.6) while patients with multiple system organ failure (MSOF) were approximately 87 times as likely (adjusted OR = 87.8, 95% CI = 3.9 to 1,928.3). Having an existing major disease (adjusted OR = 14.9, 95% CI = 1.9 to 119.0) or having an acute infection (adjusted OR = 13.7, 95% CI = 1.8 to 103.7) significantly increased the risks of earthquake-related death. Although

the study has several limitations, including the absence of sample size calculations and the lack of analysis of time between injury and treatment, on-scene deaths, and management prior to transfer from local hospitals, the investigation suggests that patients with co-morbidities and those suffering from TBI, MSOF, or acute infections are particularly vulnerable to earthquake-related death. Further studies to aid in triage and appropriate management of inpatients in the settings of earthquakes or other natural disasters are warranted.

Comment: This study reaffirms the multi-factorial nature of earthquake-related death. Despite the challenges and limitations posed by the very nature of the disaster, it is interesting that infection and pre-existing disease emerged along with TBI and MSOF as major contributing factors to earthquake-related mortality among inpatients. The collection of information about morbidity and mortality from the initial local hospitals as well as the duration of stay and determinants of transfer would have added an important dimension to the study. Identifying the risk factors for death and the characteristics of particularly vulnerable populations among earthquake victims are goals worthy of pursuit. The authors recommend further investigation with larger sample sizes to further clarify the macro- and micro-level factors that determine vulnerability among inpatients affected by natural disaster.

By Carlos A. A. Torres, MD, MPH

Yang C, Yang J, Luo X, Gong P. Use of mobile phones in an emergency reporting system for infectious disease surveillance after the Sichuan earthquake in China. Bulletin of the World Heath Organization. 2009; 87:619-23.

Mobile phones may serve as a tool of infectious disease surveillance systems in areas lacking landline-based infrastructure, or those affected by natural disasters.

Summary: Quick detection and rapid response for infectious disease outbreaks within disaster areas is critical to reduce the risk of an epidemic. On May 12, 2008, an earthquake with magnitude of 8.0 struck Sichuan Province, China, in which 80,000 people were killed and 5 million were left homeless. The aim of this study was to determine the effectiveness of mobile phones for infectious disease surveillance after the catastrophe. As part of this cross sectional study, the Chinese CDC delivered 495 light-powered mobile phones to local health-care agencies 6 days after the earthquake to compensate for the loss of a landline-based infectious disease reporting system that monitors the incidence of 38 infectious diseases. After a steep decline in reported cases during the initial six days after the earthquake, reported cases returned to pre-quake levels with mobile phone reports accounting for 53.9% of all reports made. A significant increase in the incidence of diarrheal disease was detected after the quake. The authors admit that the interpretation of incidence is difficult to determine in this setting; however, they contend that a mobile phone reporting system for infectious disease in a disaster setting may serve as a valuable back-up system to aid in the detection of disease outbreaks. The authors recommend incorporating a mobile phone disease surveillance system into emergency preparation programs, using mobile phones with GPS to allow for accurate tracking of index cases and clusters, and restricting phone use appropriately during disasters.

Comment: This study demonstrated the usefulness of mobile phones for infectious surveillance system recovery in the acute phase of the Sichuan province earthquake of 2008. Although comparisons of the accuracy between pre- and post-disaster surveillance are not possible given the limited scope of the study, mobile phones may successfully be substituted for landline-based surveillance systems, which are more vulnerable to large-scale natural disasters. Mobile phones

offer a viable alternative to landline-based systems provided that the network remains functional in the affected area, and phone line capacity is not overwhelmed. The use of mobile devices for disease surveillance may offer countries with poor infrastructure a lower cost alternative, while in developed nations where infrastructure is damaged by natural disasters, mobile devices may offer a viable back-up system to those already in place.

By Takashi Nagata, MD

EMERGENCY CARE IN RESOURCE-LIMITED SETTINGS

Antai D, Antai J. Collective violence and attitude of women toward intimate partner violence: evidence from the Niger delta. BMC International Health and Human Rights 2009; 9:e12. Available at: http://www.biomedcentral.com/1472-698X/9/12. Accessed Oct 14, 2010.

In addition to the usual risk factors for intimate partner violence such as poverty and lack of education, women living in an active conflict zone may have a higher tolerance of, and therefore be at greater risk for, intimate partner violence.

Summary: Nigeria's Niger Delta region has experienced collective violence for over 25 years; the authors of this study hypothesize that this has resulted in women of the Niger Delta region becoming more tolerant toward intimate partner violence (IPV) than women in other parts of Nigeria. They conducted a representative probability sampling of households in Nigeria to investigate women's attitudes toward IPV in the Niger Delta in comparison to other parts of Nigeria. A two-stage cluster sampling was performed, resulting in 7,864 total households, with 771 located in the Niger Delta. A standardized survey was administered to women between ages 15-49 years through face-to-face interviews. Respondents were given six situations and asked whether any of the situations would warrant violence from a partner. Overall, the authors found that 47% of women in the Niger Delta accepted IPV in at least one situation, compared to 42%

of women in the rest of Nigeria. The authors also used logistic regression analysis to identify specific variables correlated with the acceptance of IPV among women in the Niger Delta. Women who had full or partial autonomy in household decisions regarding cooking, as well as women who had access to television, were less likely to tolerate IPV. Rural residence, poverty, and, interestingly enough, access to newspapers and radio were independently associated with higher odds of women tolerating IPV.

Comment: Statistics on IPV are often difficult to collect due to the inherent sensitivity of the topic and the risks that disclosure poses to victims. This study takes a slightly different approach by examining attitudes towards IPV in women as opposed to actual acts. The results reiterate many of the well-known risk factors associated with IPV in women around the world, including poverty, rural residence, lack of education, and lack of autonomy in household decision-making, although the conflicting results regarding the role of media should be explored further in future research. While this cross-sectional survey cannot show causation, the authors do report the interesting finding that living in an active conflict zone such as the Niger Delta appears to be associated with greater acceptance of IPV among women. The authors offer some theories why conflict might change attitudes regarding IPV (including cognitive dissonance theory and ecological theory). However, as the authors point out, ensuring that women around the world are treated as equal members of society will ultimately have the greatest impact on reducing the tolerance of, and prevalence of, intimate partner violence.

By Aditi Joshi, MD

Becker JU, Theodosis C, Jacob ST, Wira CR, Groce NE. Surviving sepsis in low-income and middle-income countries: new directions for care and research. Lancet Infect Disease. 2009; 9:577-82.

Improving sepsis care in low- and middle-income countries requires prioritization of sepsis education, and research into cost-effective diagnostic and management strategies.

Summary: This article from the Personal View section of Lancet Infectious Disease discusses sepsis diagnosis and management in resource-limited, low- and middle-income countries (LMICs). The authors draw on published and unpublished data in their assertion that recent advances in sepsis care enjoyed by high-income countries (HICs) have been largely unrealized by LMICs. Acknowledging that highly invasive, technology-dependent interventions are unrealistic in LMICs, the group offers recommendations about how sepsis care might be improved in resource limited settings. In particular, the authors point to the importance of sepsis education and emergency medical systems development, early antibiotics tailored to local pathogens and resistance patterns, cost-effective laboratory testing, and feasible resuscitation and monitoring strategies. They conclude with a suggested prioritization schedule for advancing research and improving sepsis care in LMICs.

Comment: Infectious disease remains an important cause of worldwide mortality, and the burden is particularly strong in LMICs. That sepsis is frequently the final common pathway in these deaths, and that attention to sepsis care has resulted in significant mortality reductions in HICs not yet seen by LMICs, emphasizes the importance of this subject to international emergency medicine. The authors do well to acknowledge that attempts to extend sepsis care as it is practiced in HICs to more resource-limited settings could potentially divert valuable resources from public health measures with proven benefits. Instead of calling for blanket adoption of early goal-directed therapy and ICU level care as practiced in HICs, they responsibly

advocate for investments in sepsis education, and research into low-cost, high-yield diagnostic and treatment strategies. If any criticism can be found of this thoughtful piece it is that several of the key assertions of the article (i.e. sepsis mortality has not changed in LMICs) rely on unpublished data available exclusively to the authorship group. That said, their assertions make sense and the ultimate recommendations are consistent with practice known to improve outcomes in other settings.

By Daniel J. Millikan, MD

Fournier P, Dumont A, Tourigny C, Dunkley G, Drame S. Improved access to comprehensive emergency obstetric care and its effect on institutional maternal mortality in rural Mali. Bulliten of the World Health Organization. 2009; 87(1):30-8.

A national program that aimed to improve obstetric emergency services in Mali can decrease mortality among patients with hemorrhagic complications

Summary: The authors designed this original research study to measure the effects of a national emergency obstetrics program in rural Mali on the risk of maternal death. The authors prospectively studied the effects of the program using a pre-intervention historical control of the same population one year prior to intervention, the intervention period, and then two following 12 month periods. The intervention, which aimed to improve access and quality of emergency obstetrical care, consisted of improving radio communication and transportation, a community cost-sharing program, and improved training for clinical providers. The authors reported an increased rate of major obstetric interventions from 0.13%, to 0.21%, to 0.46% during post-intervention periods. In women treated for an obstetrical emergency, mortality dropped by half. Mothers with hemorrhage where most likely to benefit with a reduced odds of mortality (OR 0.37, 95% CI = 0.17 to 0.79). Limitations of the study were due in large part to the use of "historical" pre-intervention controls and the lack of randomization, resulting in the inability to

control for any non-intervention effects of improvements within the health care system. Furthermore, the study design does not readily identify which of the three aspects of their intervention played the most important role.

Comment: This study provides a strong analysis of the effects of a targeted program to improve emergency service provision in rural sub-Saharan Africa—specifically Mali. The intervention is particularly relevant to the field of IEM, because the authors simultaneously address challenges of patient referral and transport, clinician training, and financing using rigorous methods of measurement and analysis. The program itself is commendable given the strategy to improve patient transport, clinician skills, and community funding. The study design also provides the ability to follow some of the intervention areas for the two years following the intervention, giving an often overlooked insight into the sustainability of the program. This prospective study design was able to measure the mortality effects of a national intervention program, but lacks the strengths of a randomized controlled trial. The study is prone to over-stating the effect by attributing improvements in outcomes to the intervention rather than non-intervention changes such as the concurrent elimination of charges for cesarean deliveries. Future analysis to understand which interventions (e.g., improved communications, medical training, increased community funds) most influenced the decreased odds in institutional maternal mortality will assist future obstetrics programs in improving access and quality of emergency obstetrical care.

By Kevin Lunney, MD

Kiboneka A, Nyatia RJ, Nabiryo C, et al. Combination antiretroviral therapy in population affected by conflict: outcomes from large cohort in northern Uganda. BMJ. 2009; 338:b201.

The provision of combination anti-retroviral therapy in HIV patients affected by conflict and displacement is feasible and can be very successful.

Summary: Combination anti-retroviral therapy for HIV is an important aspect of providing care to displaced populations. Little research has been done to examine the feasibility and outcomes of displaced populations requiring HIV therapy. This prospective study by Kiboneka et al. looked at the clinical outcomes of HIV-positive patients receiving anti-retroviral therapy in conflict-affected displaced populations in northern Uganda. The AIDS Support Organization (TASO) has been providing antiretroviral therapy in Uganda since 2004. In 2005, TASO also began a home therapy program using a main clinic and establishing a mobile team that could follow patients closely in their communities. In the conflict-affected Northern Gulu district, displaced people were living both in the surrounding communities as well as in a government-run camp for internally displaced persons. HIV patients in this area who met WHO stage 3 or 4 illness or a CD4 count below 200 cells/microL qualified for inclusion. The main outcome of the study was to examine all causes of mortality. The study enrolled 1,625 patients, with 14% living in the official government camp. The median CD4 count was 157, with 63% of individuals in WHO class 2 defined illness. Adherence was measured, with over 92% of patients with 95% or greater adherence. A total of 69 patients died during follow-up, and the mortality incidence rate was 3.48, with no deaths related to violence.

Comment: This study concluded that HIV therapy outcomes in conflict-displaced populations were similar to those in comparable individuals living in peaceful and other low-income regions of Uganda. The strategies implemented by TASO were felt to contribute to beneficial outcomes in this population and to reduce mortality rates, and reduce the number of people lost to follow-up. While this research is important step in demonstrating that HIV combination anti-retroviral

therapy can be successfully administered in displaced populations, only 14% of the study population was residing in a camp for displaced people. The conflict-affected population was also not looked at during acute or immediate post-migration, but after camp establishment and the conflict had become more stable. There currently is a lack of dedicated programs and policies for HIV in conflict-stricken areas of Africa. This research demonstrates the feasibility and importance of HIV programming in conflict-affected populations, and the need for continued research and work in this area.

By Tomislav Jelic, MD

Ly F, Caumes E, Ndaw CA, Ndiaye B, Mahe A. Ivermectin versus benzyl benzoate applied once or twice to treat human scabies in Dakar, Senegal: a randomized controlled trial. Bulletin of the World Health Organization. 2009; 87(6):424-30.

Researchers demonstrate that topical benzyl benzoate is more effective than oral ivermectin at curing human scabies in Dakar, Senegal.

Summary: Researchers at the *Institut d'Hygiene Sociale* in Dakar, Senegal set out to compare the effectiveness of oral ivermectin and two different modalities of topical benzyl benzoate for treating scabies. The authors performed a randomized, controlled, non-blinded trial to compare three scabies treatments: one 24 hour application of 12.5% benzyl benzoate (BB1), two 24 hour applications of 12.5% benzyl benzoate separated by 24 hours (BB2), or a single oral dose of 150-200 ug/kg of ivermectin taken on an empty stomach (IV). Sixty-eight patients were randomized to the BB1 group, 48 to the BB2 group, and 65 to the IV group. The authors performed statistical analysis using Stata 8.0 software, an intention-to-treat analysis, a per-protocol analysis, comparison among the different treatment arms with a chi-squared test and a calculation of odds ratios with corresponding 95% confidence intervals, and a multi-variate analysis. Cure rates at days 14 and 28 were analyzed in each treatment group. Cure was defined as the absence of

itching and the disappearance of skin lesions. Only eight patients clinically worsened at day seven, and they were all in the IV group. The cure rates were the following: in the BB1 group, 37 (54.4%) at day 14, and 52 (76.5%) at day 28; in the BB2 group, 33 (68.8%) at day 14, and 46 (95.8%) at day 28; in the IV group, 16 (24.6%) at day 14, and 28 (43.1%) at day 28. The differences among cure rates were statistically significant on both day 14 and day 28 with a p value $< 10^{-6}$ and a p value $< 10^{-5}$ respectively. Per-protocol analysis that excluded patients who were poorly compliant, lost to follow-up, or took less than the appropriate dose of ivermectin also demonstrated the significantly superiority of topical benzyl benzoate treatment to oral ivermectin (chi-square = 24.3, $p < 10^{-5}$). The authors conclude that topical benzyl benzoate was clearly more effective than oral ivermectin for treating scabies in a Senegalese community.

Comment: Scabies is an international public health problem with complications including streptococcal superinfection, septicemia, and acute glomerulonephritis. The strengths of this study design are its well-defined inclusion criteria, previously validated basis for the diagnosis and cure of scabies, and the randomization of subjects to specific treatment. The authors also clearly performed a per-protocol analysis, which is important to evaluate for patient compliance, a multi-variate analysis, and an intention-to-treat analysis. The study was lacking in that it was performed in a population previously treated with ivermectin, which could have created previous resistance to the drug. Also, a large number of cases were children, and it has been suggested that ivermectin is less effective in children. In addition, over half of the cases were relatively more severe, and it is possible that ivermectin is more effective in less severe cases. Compared to the previous literature, the cure rates the authors found in Dakar, Senegal differed distinctly. The previous studies, however, defined the diagnosis of scabies, analyzed the data and defined a cure

noticeably different than this study. With as many as 300 million cases per year, it is important for the emergency physician to be adept at scabies diagnosis and treatment. This paper, in the context of previous literature and text, does well to further one's understanding of scabies internationally.

By Joshua Jauregui, MD

Macharia WM, Njeru EK, Muli-Musiime F, Nantulya V. Severe road traffic injuries in Kenya, quality of care and access. African Health Sciences. 2009; 9(2):118-24.

Road traffic injuries disproportionately affect young men from poor backgrounds; improved access to health care and first aid training may decrease casualties.

Summary: This cross-sectional survey aims to determine access and quality of health care for road traffic injury casualties in Kenya. The study used a questionnaire to survey hospitalized patients from 1997-98 regarding the circumstances surrounding their accidents. The study included the major hospitals within each of the provinces, and then used sampling to select additional hospitals. One province was excluded due to inaccessibility. Of the 310 casualties interviewed, 72.3% were treated in public hospitals, and unknown lay individuals transported 76.5% to care. Half of the patients reached a health care facility within 30 minutes of the crash, and two-thirds were provided medical care within an hour. Of the 48 facilities surveyed, only 40% self-reported being adequately prepared for a road traffic injury emergency. Limitations of the study include sample bias and recall bias. The manuscript highlights the need to improve the safety of the public transport system and train the general public in first aid.

Comments: Road traffic injuries are a major health problem in the developing world. This article further delineates the characteristics of persons who sustain injuries significant enough to

require admission to a hospital. Unfortunately, as the sampling in this study was not random, the findings may not be generalizable to all of Kenya or other parts of the world. Despite its limitations, the study supports the findings of similar studies conducted in other developing countries.

By Erika Schroeder, MD

Mwaniki MK, Nokes DJ, Ignas J, et al. Emergency triage assessment for hypoxaemia in neonates and young children in a Kenyan hospital: an observational study. Bulletin of the World Health Organization. 2009; 87(4):263-70.

In a large sample of pediatric patients studied over four years, hypoxemia was found with high prevalence in three different age groups and in children with many final diagnoses other than lower respiratory tract infection (LRTI).

Summary: This study prospectively recorded the prevalence of hypoxemia (SaO2 < 90%) using pulse oximetry in 15,401 pediatric patients without known cardiac disease or asthma referred to the Kilifi District Hospital, located in a malaria endemic region, over four years. The authors analyzed the data by grouping the study population first into three distinct age groups (neonates, young infants, and older children) and then by WHO Clinical Syndrome of Pneumonia (CSoP). A discharge diagnosis was recorded for each participant and clinical signs were recorded prospectively for three years, and validated during the fourth year. The study found 8% (n = 991) of older children (≥ 60 days), 5.3% (n = 693) of young infants (7-59 days), and 19% (n = 206) of neonates to be hypoxemic. LRTI was not the most common discharge diagnosis in hypoxemic older children and neonates. When the authors classified participants according to WHO CSoP and calculated the prevalence of hypoxemia, it was consistently found in children who had a final diagnosis other than LRTI. Other diagnoses commonly found, whether patients were classified by age or WHO CSoP, were malaria, malnutrition, gasteroenteritis, neonatal sepsis,

birth asphyxia, and prematurity. The authors found clinical indicators of hypoxemia such as lower chest wall indrawing, nasal flaring, and central cyanosis to be poor predictors of actual hypoxemia. Even the authors' most sensitive rules missed 5% to 15% of hypoxemic children depending on age.

Comment: The strengths of this study include its large sample size and analysis both by age group and WHO CSoP classification. The results argue strongly that clinicians should consider diagnoses other than LRTI in hypoxemic children in the developing world in any age or WHO CSoP classification, and that clinical rules for diagnosing hypoxemia are not adequately sensitive to be used in practice. The majority of participants (86%) in the study were older children, who were more likely to have malaria, as the study occurred in a malaria endemic region. Although clinical signs continue to be poor predictors of hypoxemia, this study did support the clinical signs outlined in current WHO "Cough and Difficult Breathing," and "Triage and Emergency Condition" guidelines for patients 60 days of age or older.

By Kimberly Pringle, MD

Reda AA, Vandeweerd JM, Syre TR, Egata G. HIV/AIDS and exposure of healthcare workers to body fluids in Ethiopia: attitudes toward universal precautions. J Hospital Infections. 2009; 71(2):163-9.

Despite interest in learning more, health care workers in eastern Ethiopia suboptimally use universal precautions, and are commonly exposed to potentially pathogenic bodily fluids.

Summary: This prospective study surveyed health care workers in eastern Ethiopia on exposure to blood and bodily fluids, as well as attitudes towards universal precautions. After piloting the questionnaire, 511 health care workers in 19 clinical settings were surveyed, and 349 (64.6%) valid questionnaires were returned. Among respondents, 99 (30.0%) reported splashes to the

mouth in the last year, and 96 (29.1%) reported having incurred a needlestick injury. Only 160 (48.5%) reported usually washing hands before and after patient contact. One hundred thirty-seven (41.5%) reported practicing two-handed needle recapping. Only 106 (31.0%) felt that their hospital environment was conducive to applying universal precautions. Nevertheless, 312 (94.5%) stated that universal precautions are effective in prevention of occupational exposures, and 315 (95.5%) were interested in learning more about universal precautions.

Comment: Although limited in scope, this study highlights an opportunity for intervention to improve patient and health care worker safety. The World Health Organization has resources for prevention of needlestick injuries (http://www.who.int/occupational_health/activities/en/), but this study suggests that interventions focused on increasing basic use of universal precautions could reduce disease transmission and keep health care workers safe. In eastern Ethiopia, there is also room, given that only 31% of respondents felt that their hospital setting was conducive to applying universal precautions, to improve the infrastructure and environment within the health care setting in order to better support health care worker safety.

By Marlow Macht, MD, MPH

Shah SP, Epino H, Bukhman G,et al. Impact of the introduction of ultrasound services in a limited resource setting: rural Rwanda 2008. BMC International Health and Human Rights. 2009; 9:4.

Ultrasound skills can be taught to physicians in rural and underserved areas, making a significant impact on patient care and management plans.

Summary: Few studies have investigated the use of ultrasound in remote or rural environments. This study, carried out in two rural Rwandan hospitals in 2008 after a nine week ultrasound training program for interested physicians, investigated the types of patients with whom

ultrasound was used, the types of scans performed, the accuracy of scans performed by trainees, and the impact of ultrasound findings on patient management. Data sheets were generated that listed sex, age, indication for the exam, scan type, and the type of change in management instigated by the exam findings. Two hundred and forty-two patients were scanned in 10 weeks. Adult females were the most commonly scanned patients, 44% of whom were pregnant at the time of the ultrasound. Nineteen percent of patients were HIV positive, and 13% were TB positive. Importantly, initial patient management was changed in 43% of patients. This was generally a decision to perform a c-section, biopsy, or other minor surgery, but included other management changes such as medication adjustments and clinic referrals.

In the 11 weeks after the initial study, another 245 scans were perfomed by the clinicians who had originally undergone the ultrasound training course. A quality review of the images from those 11 weeks by an ultrasound fellowship-trained emergency physician who was blinded to the trainees interpretations found a 96% rate of concordance between the Rwandan physicians' interpretations of the images and that of the ultrasound-trained emergency physician. As the authors note, this program must be investigated further in the future to evaluate continuing use and accuracy.

Comment: In one of the first articles to document the sustainability of ultrasound training and use in a rural, resource-limited, hospital setting, the authors also demonstrated several other important issues. Among the most striking issue is that after several weeks of training, clinicians in these settings perform ultrasound as well as their US-based counterparts. This article also highlighted the frequency with which pregnancy related complaints present to these hospitals. Not only is ultrasound readily learned, it is used regularly and has a considerable impact on

practice patterns. Ultrasound technology is becoming smaller, more portable, cheaper, and more durable. These developments make it an ideal tool for use in remote and developing areas. This article documents the beginnings of what is certain to be a burgeoning field and a technology of tremendous benefit to both patient and practitioner alike.

By Edwin C. "Jack" Forrest, MD

EMERGENCY MEDICINE DEVELOPMENT

Hobgood C, Anantharaman V, Bandiera G, et al. International Federation for Emergency Medicine Model Curriculum for medical student education in emergency medicine. Israeli J of Emergency Medicine. 2009; 9(2):30-35.

An effort by the International Federation for Emergency Medicine (IFEM) to create an international model curriculum in emergency medicine for medical students.

Summary: With more than 50 countries now incorporating EM training into their core medical student curriculum, the IFEM believes there is a need for a global standard of training. The organization suggests a longitudinal education framework over four years of schooling. The authors, a group of emergency physicians and health professionals from the United States, Australia, Asia, and Europe are described as experts in IEM. Their target population is students in both developing nations without an existing EM curriculum, and countries that wish to further expand their existing EM training programs. The suggested curriculum is expansive, ranging from basic life support, to timely stroke care, and the acute management of myocardial infarction. In addition to refining students' clinical skills, they suggest training in time management, EM research, and legal aspects of care. An example curriculum is proposed that includes didactic and skills training with metrics of performance indicators and outcome measures. In its entirety the paper acts as a mission statement for the IFEM and suggests that it

will be active in not only establishing curriculum guidelines, but also in further developing and keeping these educational directives current.

Comment: Most emergency physicians will agree that creating a core EM curriculum in medical schools is a necessary first step towards establishing and solidifying EM as a global specialty. Every medical student should graduate with a sound basis in evaluating and stabilizing the acutely ill regardless of which specialty they pursue. The IFEM paper is successful in creating an exhaustive subject list for topics to be covered by educators worldwide. However, the article is limited by its methodology in that the process of achieving consensus around key learning objectives, performance indicators, and outcome measures is unclear. Proposed standards for curriculum are also not defined.

Unfortunately, the article reads like the index of an EM textbook, with little guidance on how such didactic and clinical training should be orchestrated in resource-poor environments or countries new to EM. Further review and analysis of successful training models is also needed. For example, in Germany and Israel, medical students have learned from experienced providers in prehospital care and traumatology, respectively. Simulation training should also be considered as a novel training method to educate medical students internationally. IFEM has the potential to use these successful models in EM education to inspire and further refine their curriculum guidelines.

By Elizabeth Goldberg, MD

Wongyingsinn M, Songarj P, Assawinvinijkul T. A prospective observational study of tracheal intubation in an emergency department in a 2300-bed hospital of a developing country in a one-year period. Emerg Med J 2009 26: 604-608.

A single center demonstrates a high rate of intubation success over one year, with opportunities to lower complications by increasing the use of RSI.

Summary: This prospective observational study reviews one year of medical emergency department endotracheal intubations in Siriraj Hospital, an academic tertiary care center in Bangkok, Thailand. Data were self-reported by the intubating team on a standardized form, with review of ED logs by the authors. Standard airway management equipment and drugs for sedation and neuromuscular blockade were available. EM residents or EM staff physicians performed the intubations. Complications were defined as lost teeth, soft tissue injury, laryngospasm or bronchospasm, hypotension, esophageal intubation, single lung intubation, aspiration, hypoxia, arrhythmia, and cardiac arrest. Of 150,418 ED patients, 757 had an attempt at endotracheal intubation. Of these, 754 (99.6%) were successfully intubated, and 602 (79.5%) were successfully intubated on the first attempt. All intubations were oral. The three patients who could not be intubated had surgical airway management. In 581 non-cardiac arrest patients, 185 (31.8%) were given a sedative, and 16 (2.7%) were administered a neuromuscular blocking agent. Of all patients intubated, 285 (37.6%) patients experienced 341 complications, the majority of which were minor. Of the complications, 174 (51.0%) were soft-tissue injury. Five patients experienced cardiac arrest after intubation, of which four were successfully resuscitated.

Comment: The authors have carefully collected and analyzed data from a single institution, and highlighted successes and areas of potential improvement in airway management. The overall success rate is high, and compares favorably to similar studies in the developed world. The use of neuromuscular blockade is quite low, and this likely contributes to the high rate of soft tissue injury compared with other studies. This pattern also likely contributes to the rarity of surgical airway management. There are no data correlating neuromuscular blockade with improved

outcomes from intubation; however, practice in the developed world suggests it may be a helpful option. There also appears to be an opportunity to teach supraglottic airways and awake fiber-optic intubation techniques for selected cases. This study does not address trauma airway management.

By Marlow Macht, MD, MPH