Hot Topics in International Emergency Medicine

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In 1996, Christopher J.L. Murray of the Harvard School of Public Health and Alan D. Lopez of the World Health published a document entitled "The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020" [1]. After cataloguing information from 1990 regarding death and epidemiologic data on 107 major causes of death, they projected death and disability burden expressed in a newly coined term—disability-adjusted life years (DALYs)—for 2020 [2]. DALYs are the "sum of years of life lost because of premature mortality and years of life lived with disability, adjusted for the severity of disability" [2]. The term has developed a literature of controversy but is frequently used to express burden of disease. (The derivation is more fully explained in note #7 of reference [2]).

Many of the infectious disease scourges of ages past were found to be losing their position to disorders of developed, mechanized economies. For example, the report projected diarrheal diseases to drop from the second position to ninth, whereas road crashes would move up from ninth to third (Table 1). These projections have major implications for the international role of emergency medicine (EM) in the coming years. Murray and Lopez's
Table 1
Burden of disease: top 10 plus significant others, 1990 and projection for 2020

<table>
<thead>
<tr>
<th>Condition</th>
<th>1990 DALYs rank</th>
<th>1990 DALYs (%)</th>
<th>2020 DALYs rank (projected)</th>
<th>2020 DALYs (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower respiratory infections</td>
<td>1</td>
<td>8.2</td>
<td>6</td>
<td>3.1</td>
</tr>
<tr>
<td>Diarrheal diseases</td>
<td>2</td>
<td>7.2</td>
<td>9</td>
<td>2.7</td>
</tr>
<tr>
<td>Perinatal conditions</td>
<td>3</td>
<td>6.7</td>
<td>11</td>
<td>2.5</td>
</tr>
<tr>
<td>Unipolar depressive disorders</td>
<td>4</td>
<td>3.7</td>
<td>2</td>
<td>5.7</td>
</tr>
<tr>
<td>Ischemic heart disease</td>
<td>5</td>
<td>3.4</td>
<td>1</td>
<td>5.9</td>
</tr>
<tr>
<td>Cerebrovascular disease</td>
<td>6</td>
<td>2.8</td>
<td>4</td>
<td>4.4</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>7</td>
<td>2.8</td>
<td>7</td>
<td>3.1</td>
</tr>
<tr>
<td>Measles</td>
<td>8</td>
<td>2.6</td>
<td>25</td>
<td>1.1</td>
</tr>
<tr>
<td>Road traffic crashes</td>
<td>9</td>
<td>2.5</td>
<td>3</td>
<td>5.1</td>
</tr>
<tr>
<td>Malaria</td>
<td>11</td>
<td>2.3</td>
<td>24</td>
<td>1.1</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>12</td>
<td>2.1</td>
<td>5</td>
<td>4.1</td>
</tr>
<tr>
<td>War</td>
<td>16</td>
<td>1.5</td>
<td>8</td>
<td>3.0</td>
</tr>
<tr>
<td>Self-inflicted injury</td>
<td>17</td>
<td>1.4</td>
<td>14</td>
<td>1.9</td>
</tr>
<tr>
<td>Violence</td>
<td>19</td>
<td>1.3</td>
<td>12</td>
<td>2.3</td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>28</td>
<td>0.8</td>
<td>10</td>
<td>2.6</td>
</tr>
</tbody>
</table>

Abbreviation: DALY, disability-adjusted life year.

Reflection on a number of the topics presented here may lead the reader to believe that this is the domain of public health. Some view the role of EM physicians (EMPs) more narrowly, putting forth the argument that the focus of international EM should be limited to assisting interested groups in other countries with development of their own acute care capabilities. However, shortcomings of a nation’s public health system may lead to problems that are ultimately managed in the emergency care setting. When
existing in an open-access medical system, a local acute care facility provides a wide-angle lens into the medical and social pathology of the community it serves. EMPs are likely to be in a better position to comprehend this than providers from other specialties. In the fuller sense of societal responsibility, the care of the acutely ill or injured—and the public health determinants that lead to these conditions—lie firmly within the EMP's practice domain.

Injury severity patterns within a population are frequently represented graphically by a triangle with death or severe disability at the top and with larger tiers further down representing less severe injury or less intense care needs (Fig. 1). Although a percentage of acutely ill and injured citizens presents directly to primary care physicians or specialists, the more open access to a well-reputed emergency health service becomes, the more the public will use the resource. Any physician who has practiced EM in the United States since the 1970s can attest to the marketing phenomenon of "offer a useful and convenient service and customers will not be lacking."

One fundamental hot topic related to involvement of United States EMPs in international health care has to do with the unique medical perspective that characterizes EM as a specialty in the United States model. This is the concept of a practice based in the breadth of medicine dictated by an open-door policy with a special capacity to recognize and manage acutely evolving pathology. From evaluation and management of pharyngitis with attendant treatment decisions to resuscitation of trauma victims with rapid-sequence intubation and emergency thoracotomy, there is no other specialty that embodies this breadth of knowledge and skills. Relatively few practice environments within the domain of emergency health services around the world embody this fundamental description that characterizes Emergency Medicine in the United States [8,9].

The following topics have been drawn from Murray and Lopez's Global Burden of Disease (GBD) projections for 2020 from conditions and issues...
cited by conference presenters from various countries [9] and from topics treated in the literature [10]. This article serves as a brief introduction to the issues and literature around these topics. All of the topics treated here are under active discussion in the world medical literature. Although another article addresses more directly areas of future research focus, the topics presented here are fertile ground for developing the body of knowledge with regard to the likely benefit of applying EM principles to them.

Selected "hot topics"

Access

Access is of fundamental importance in all societies in terms of dictating the societal role of EM and emergency health services. Concomitant with, though not necessarily causally related to, the current and future population fluxes noted previously, economic studies suggest that economic inequality is increasing globally and internally in many countries [11]. In many countries, the division of health care resource availability is directly linked to an individual's economic resources because there is minimal public sector health care. This means that certain care is not available to some sectors of the population [12]. The World Bank and other international funding agencies are attempting to address problems of health inequity [13]. When working with various groups from other countries interested in developing EM capacity, this topic can become a difficult point of conversation depending on the practice base of the local contact—that is, whether they practice in a public or private facility. Virtually no developing country has any equivalent to the US Emergency Medical Treatment and Active Labor Act or "anti-dumping" law [14,15].

Issues of access have the attention of industry and health policy researchers. At the annual meeting of the World Economic Forum, Shekhar Gupta, Editor-in-Chief of The Indian Express, worried that economic growth in developing countries that developed more "elites" with increased use of high-technology private hospitals may have a devastating effect on the public health care sector [16].

Unintentional injuries

Emerging evidence over the end of the 20th and beginning of the 21st centuries revealed that injuries exert some of the highest tolls on societies at all levels of economic development. In response, the WHO developed a "Department of Injuries and Violence Prevention" in 2000 [17]. Although this publication is directed at the specialty of EM, based on the public health principles outlined in the article by Razzak et al elsewhere in this issue, the discussion here treats concepts from pre- and post-event cells of the Haddon matrix [18].
Road crashes

As societies around the world develop, road traffic volume increases first along a curve similar to that of the economic development with largely collective motorized transport and then more exponentially as the individual purchasing power of larger numbers of the population allows the purchase of personal motorized transport. Increasing international trade has also disproportionately added to the burden of road traffic because it involves larger vehicles driven under time pressures [19]. Globally, over 1.2 million people died in road traffic crashes in 2000, making this the ninth leading cause of death (and the eighth leading cause of disability in 2000) and is predicted to be third by 2020 [20]. Public works and safety policy, which are necessary for safe motorized transport, have not kept pace with the number of vehicles on the road. This topic first began to draw the attention of public health professionals in the late 1980s, although the GBD report solidified the economic commitment to address this issue.

Throughout the developing world, pedestrians are the most at risk, and motor vehicle passengers are the second most affected [21,22]. This is in contrast to the developed world, where the majority of crash victims are drivers. An editorial in the British Medical Journal likened the problem of road crash injuries to a "war on the roads" in reference to the competing groups seeking a place on the roadways of the developing world [23]. In cities of rapidly urbanizing areas of Southeast Asia, city streets can frequently have the appearance of a sea of mopeds, motorcycles, and three-wheel taxis with a minimum of traffic control devices to regulate the flow. Pedestrians desiring to cross such roads frequently must step off the curb and begin to slowly advance, trusting the drivers to veer around them as they advance across the roadway. In a visit to Cho Ray Hospital in Ho Chi Minh City in 1997, one author (LKA) was told of an average of 12 craniotomies per night from motorbike crashes. Without CT to guide the surgeons, clinical evaluation or a coin toss decided the side for placement of an initial burr hole. At the time of that visit, the 36-bed ICU had 28 beds occupied with motor vehicle-related head injury victims, 11 fresh post-operatively from the previous night.

Developing mass transit systems are generally not well-regulated domains, particularly in terms of long-distance or inter-urban transit. In the vast majority of developing economies, inter-urban mass transit infrastructure components consist of privately owned, nonregulated vehicles ranging from pick-up trucks to multipassenger vans and buses. Although some vehicles are designed to carry multiple passengers (eg, buses and minivans), capacity limits are frequently ignored, vehicle maintenance is variable in frequency and quality, and drivers are poorly trained on their responsibility for passenger safety. These vehicles operate on intercity roadways that span the spectrum from controlled access multi-lane thoroughfares to rutted multi-user lanes. Each of these elements brings an additional risk of crash.
Odero et al [24], in a study of traffic injuries in Kenya, noted that 75% of the casualties were economically active young adults and that the majority of victims were pedestrians and passengers, frequently in communal transit vehicles. Additionally, they noted that a number of factors influence the incidence of crashes, from flagrant disregard for traffic laws by drivers of common transport vehicles to limited capacity for intervention and for monitoring of any interventions undertaken.

Societal structural issues are among the root causes of high crash rates in many developing countries. In October 2003, an Indonesian bus carrying schoolgirls home from a study trip to Bali was struck head-on by a truck in the wrong lane and then by a minivan from behind. Fifty-four people, mostly schoolchildren, were burned to death. BBC Jakarta correspondent Rachel Harvey commented on the frequency of crashes, the poor condition of the roads, and the poor control of driver license issuance (particularly that they can be bought without any testing), implying a variety of issues from un-engaged public agencies to corruption [25].

The Kenyan matatu present a dramatic example of the issues surrounding emerging mass transit systems. Matatu is a term applied to a variety of communal transport vehicles that operate local and long-distance routes in Kenya. An entire culture has developed around the “matatu experience” [26]. Most are gaudily decorated with a variety of largely western images and frequently dubbed with death motif names such as “The Ticket to Hell” and “Death in Your Face.” The basic operation involves two young men, a driver and a hawker/fare collector, who load as many people as possible into the vehicle and drive as fast as possible via road, sidewalk, or roadway median to the next point requested by passengers or to the next passenger pickup site. Matatus are routinely involved in multi-casualty crashes; death tolls over 25 per crash are not uncommon [27]. Responding to pressure and financial assistance from numerous international agencies, the government has instituted laws regarding safety inspections, load limits, speed limits, and driver qualifications [28]. Many of these laws are inconsistently enforced, leading to a general apathy toward changing this deadly mix [29].

First responders to most crashes, as with most “disasters,” are passers-by [30]. A formal prehospital provider system is generally nonexistent, particularly outside urban centers [31]. In locations where an emergency medical system (EMS) exists, the training of personnel is variable. Arreola-Risa et al [32], working in Latin America, found that the greatest mortality in traffic crashes in the region studied was in the prehospital setting (Fig. 2). Subsequent Pre-Hospital Trauma Life Support (PHTLS) training for ambulance personnel improved mortality in the prehospital-to-ED care period [33].

Despite available research results that indicate likely methods to reduce crash-related morbidity and mortality, sometimes policy decisions are made for reasons unrelated to public safety. This occurred in Delhi, India when, in 2002, a court decision mandated that buses be outfitted with CNG engines.
This decision resulted in an increased fare for large urban buses, decreased use, and the public turning to smaller, less expensive private vans. This led to a net increase in vehicles on the already crowded roads of Delhi [34].

Other unintentional injuries

Other unintentional injuries have been identified as a significant source of morbidity. These injuries are similar in emerging and developed economies, although some characteristics differ. This article highlights some areas with particular issues.

Occupational injuries. At the XVIth World Congress on Occupational Safety and Health at Work in Vienna, Austria in May 2000, The International Labor Organization reported that over 2 million people die yearly from work-related injury and disease [35]. Additionally, there are estimated to be 500 to 2000 injuries for every death [36].

Often, developing countries have poor regulation of work conditions coupled with poor education of workers and managers on various risks. After public outrage after the reporting of deaths of several workers in a leather bag manufacturer in the basement of a private home from aplastic anemia due to benzene exposure, new laws were instituted; however, no worker education campaigns were developed [37]. In Tauccamarca, a remote village in the Peruvian Andes, 24 of the village's 48 children died after drinking organophosphate pesticide-contaminated powdered milk at school lunch [38].

Even for local manufacturers operating under contractual relationships with corporations based in developed countries, conditions frequently are not
as diligently monitored as at installations in developed economies. A consortium of United States universities hired a large international consulting agency to evaluate working conditions in factories that manufacture their logo clothing. For quality assurance, a second consultant was enlisted to monitor the original monitors. The oversight consultant cited the primary evaluators for not recording many unsafe workplace conditions [39].

Emergency health care providers play an invaluable role in the early identification and control of occupational hazards. Frequently, particularly in low- and medium-income countries, open-access community health services are the primary medical resource for injured or ill workers. Education of providers in such community health facilities in the principles of EM will likely significantly improve community worker health.

As the global work force develops, occupations in developing economies begin to match those of the developed economies. Although agriculture, manufacturing, and assembly installations remain a mainstay of developing economies, service-sector installations such as call centers and data management centers have become a significant source of employment worldwide. Emergency health care provider recognition of the link between occupations and diseases will likely improve patient outcome by, at the least, recommending avoidance of the damaging activity. Recognition of such associations may also allow for early identification of community trends. Frequently, workers feel under pressure not to take time of to recover from injuries for fear of losing the job, which exacerbates the condition until the worker is unable to pursue gainful employment.

Special mention should be made of the risks in the agricultural sector. Globally, agricultural workers have one of the highest sector-specific injury and death rates [40,41]. This is particularly true in developing economies, with more use of poorly maintained equipment and less stringent control of toxic pesticides and herbicides [42,43]. Additionally, around the world more children are injured and killed in agricultural incidents than in any other single occupational sector.

Nonoccupational unintentional injuries. The epidemiology of nonoccupational unintentional injuries in low- and middle-income countries demonstrates clear age stratification. Persons younger than 30 years of age have a high incidence of drowning and fire-related injuries [44]. Burns from open-fire cooking and heating in the developing world represent a high-incidence, preventable injury suffered largely by children [45-47]. Children between 5 and 14 years of age also suffer a high burden from falls.

In many parts of the world, venomous bites are a significant risk, particularly since antivenin production has been significantly decreased globally and access may be seriously limited [48]. There are thousands of snake and scorpion envenomations yearly in various developing countries [49], and much antidote therapy likely wasted due to injudicious use by poorly informed practitioners [50].
Intentional injuries

Interpersonal violence in settings apart from war or armed conflict is quickly becoming a major burden on societies around the world. This is neither to say nor deny that the overall incidence of violence is increasing, but rather that, in the paradigm of health-related burden, interpersonal violence and linked issues are accounting for a higher percentage of death and disability than in the past. Murray and Lopez [1] predicted violence to become the twelfth leading cause of DALYs by 2020. The burden of violence has captured the attention of the business community and international health advocates, with the World Economic Forum devoting a workshop session to discussing it at their 2003 annual meeting in Davos, Switzerland [51]. WHO statistics for 2000 suggest that over 1.6 million people die annually of intentional injuries, with approximately 500,000 deaths from interpersonal (noncombat) violence and over 800,000 from self-inflicted injuries [52].

Interpersonal violence is a health issue with which EM has an intimate relationship. In the United States, EM has taken a lead role in the struggle to decrease the burden of violence with initiatives aimed to decrease the toll from violent acts and to stem the incidence of violent acts through awareness and community outreach programs. Many of the principles and methodologies have international applicability [53,54].

Domestic violence

Domestic violence is another type of intentional injury that is among the hot topics for EMs that they address frequently in continuing medical education settings or in community awareness campaigns. The plight of women in a variety of settings has been gaining increased global attention over the past decade. The World Bank published a “Discussion Paper” in 1994 that cataloged many of the issues for individual women and the societies in which they live [55]. Over the subsequent years, various agencies have published reports on increasing the overall understanding of this phenomenon. Among these, Heise [56] provided an excellent “state of the art” summary of work in the domain. She covered formal research and catalogued many of the local programs developed to increase awareness.

The construct of domestic violence includes other forms of aggression besides physical blows, particularly psychologic and sexual [57]. It is difficult to obtain adequate data and to initiate awareness programs regarding culturally institutionalized or sanctioned forms of physical and psychologic aggression.

Wisner et al [58] found that a group of United States women who were victims of intimate partner violence in a managed care setting consumed more health care resources than control subjects. They present a review of indirect health problems associated with intimate partner violence (migraine headaches, chronic musculoskeletal pain, depression) that are associated with a greater consumption of health care resources and disability.
Child abuse

Although child abuse is not a hot topic in the sense of being high on the global burden list, socio-culturally and ethically, child abuse in all forms must be on the agenda of developing emergency health services throughout the world. With poverty and lack of indigent primary health care services in many low and middle income countries, many children around the world have contact with the health care system only at a time of crisis (ie, in an EM setting).

After an extensive evaluation of the dimensions of child abuse worldwide, the WHO arrived at the following definition of child abuse:

All forms of physical or emotional ill-treatment, sexual abuse, neglect or negligent treatment or commercial or other exploitation resulting in actual or potential harm to the child's health, survival, development or dignity in the context of a relationship of responsibility, trust, or power [59].

Despite a consensus of experts leading to the above definition, corporeal punishment by parents and teachers is an accepted practice in many cultures, as Segal [60] found in a survey of middle-class parents in India.

In its many forms, child abuse is thought to be at least as prevalent globally as in the United States [61,62]. Discussion of childhood sexual abuse is considered a significant taboo in many cultures, although researchers are beginning to develop an epidemiologic picture. Jumaian [63], in a survey of a convenience sample of 100 male university students in Jordan, found an incidence of 27%, which was felt to be low by the author due to the social taboos of discussing child abuse.

Child abuse not only includes acts of commission but also acts of omission, as in the case of a 4-year-old boy with acute lymphocytic leukemia in remission in Turkey whose parents signed him out of one university hospital due to their understanding that the disease was incurable. In this case, for reasons not elucidated in the report, despite established laws allowing physicians to ensure that a child receives needed treatment, the university hospital team had discharged the child "at the parents' insistence" [64]. At the initial presentation and after having been removed from the hospital by his parents, the child presented to hospitals with symptoms of acute severe illness that were likely to have been through the ED portal.

Because the acute physical and psychologic manifestations of child abuse that lead to presentation for acute health care are not always specific to abuse or neglect, the abusive situation may not be discovered. Education of emergent health care providers in the recognition of patterns and awareness of the problem is likely to have a positive effect on the long-term outcomes for victims and for the local society.

Self-inflicted injuries

Suicide and other self-inflicted injuries have risen to become one of the top 15 causes of death and disability. Suicide is already one of the leading causes
of death internationally, with nearly 8 million attributed deaths in the WHO Global Violence and Health report of 2002 [45]. Like practitioners in the United States, providers worldwide need to increase their index of suspicion of subtle signs of self-inflicted trauma, indicator behavior, and risks.

Rates vary widely among countries, although the general consensus suggests that the actual rates are much higher than reported. Amowitz et al [65] described that among a population living under a repressive regime followed by war, a 5% to 7% suicide attempt rate was found, which was much higher than previously reported.

The chosen method of suicide varies around the world, but two trends are evident. First, in the less-developed, more agrarian countries, pesticide ingestion is a major method of suicide attempt [66]. This presents a significant problem for treating physicians. Many developing countries have little regulation of pesticide sale or use. Thus, it is easy for the average citizen to have access to high-concentration chemicals [67]. The second major trend involves the use of psychotropic medication overdoses in lower age groups [68,69].

Acute toxicologic management skills give EM physicians an ideal position to help systems develop poison control and patient management capacity.

War, low-level conflict, and terrorism

Regardless of the name given to armed conflict based on any number of rationales, from territorial to natural resource control to economic to liberation from oppression, the presence of conflict in a society develops a destabilizing effect that reaches into the health domain far beyond the immediate conflict casualties (Box 1). Postconflict redevelopment frequently finds problems, including devastated infrastructure and disrupted staffing capabilities due to loss of personnel and potential persistent tensions when the conflict was a form of civil war [70].

Noninfectious diseases

As progress is made in improving infant and child mortality globally, the numbers of people living long enough to develop chronic diseases increases, shifting the preventive and therapeutic paradigms of global health initiatives. The following categories are not meant to be exclusive; rather, they are representative because they have also been identified as significant future sources of societal health burden.

Cardiovascular

Economic advancement has been linked to an increase in all forms of cardiovascular disease (CVD), primarily through adoption of lifestyle factors such as diet and physical activity [74]. The GBD report predicts that ischemic heart disease will rank first in death and disability by 2020, with stroke ranking in the top five. The WHO undertook an extensive epidemiologic project, dubbed MONICA, in the late 1970s to assess the impact of
Box 1. Conflict terminology

, Interstate war—Interstate conflicts, subclassified by the number of deaths per encounter or per year
, Civil war—Intra-state conflict in which one party is the "official" government and the other an organized group intent on overthrow of the "official" government civil war if (a) military action was involved, (b) the national government at the time was actively involved, (c) effective resistance (as measured by the ratio of fatalities of the weaker to the stronger forces) occurred on both sides, and (d) at least 1000 battle deaths resulted during the civil war [71]
, Armed conflict—Contested incompatibility that concerns government and/or territory where the use of armed force between two parties, of which at least one is the government of a state, results in at least 25 battle-related deaths. (1) Use of armed force: The use of arms to promote the parties' general position in the conflict, resulting in deaths. (1.1) Arms: Any material means (eg, manufactured weapons but also sticks, stones, fire, water, etc.). (2) 25 deaths: A minimum of 25 battle-related deaths per year and per incompatibility. (3) Party: A government of a state or any opposition organization or alliance of opposition organizations. (3.1) Government: The party controlling the capital of the state [72].
, Low-level conflict—This term is generally used to refer to conflict not meeting criterion #2 of Armed conflict [73]
, Asymmetric conflict—Only one of the parties is armed. Terrorism is the quintessential asymmetric conflict.

An intensity variable is coded in three categories for each of the above categories. 1. Minor: More than 25 battle-related deaths per year for every year in the period. 2. Intermediate: More than 25 battle-related deaths per year and a total conflict history of more than 1000 battle-related deaths. 3. War: More than 1000 battle-related deaths per year for every year in the period.

cardiovascular disease [75]. From this and related studies it has become apparent that the CVD burden is falling in developed economies as it is rising in developing economies where the majority of the world’s population lives. Realizing that preventive efforts will not eradicate this disease, the WHO has established agendas for improving cost-effective management of CVD [54].

Increasingly, the approach to cardiovascular resuscitation is becoming the product of an international effort. The American Heart Association (AHA) Advanced Cardiac Life Support (ACLS) guidelines published in 2000 incorporated major contributions from collaborative sessions with the
European Resuscitation Council (ERC). Through the International Liaison Committee on Resuscitation, other collaborators from Southern Africa, Australia, and Latin America have participated with the ERC and the AHA in developing resuscitation guidelines [76].

Countries around the world have developed programs to promote awareness of appropriate response for people suffering signs of acute cardiovascular events. Some have developed home-grown programs, whereas others are teaching licensed versions of ACLS. The AHA has affiliations with several universities that send teams to various countries to teach ACLS instructor courses (G. Murphy, M. Biros, personal communication, 2002).

The increasing prevalence of cardiovascular disease within emerging economies results in many new cases of acute coronary syndromes and various conditions attributed to it (eg, congestive heart failure, arrhythmias, etc). The evolving field of acute chest pain syndrome management is in large part initiated in the ED setting where these patients present. Because the response in the ED to a patient’s complaint of chest pain has significant consequences, United States EMPs are an invaluable resource to their international colleagues working to develop their own chest pain syndrome evaluation paradigm.

Respiratory illness

Lower respiratory tract infections account for a large percentage of deaths, particularly among the impoverished, medically disenfranchised populations around the world. Increasing urbanization has been associated with an increase in chronic obstructive pulmonary disease and asthma. Acute episodes requiring medical intervention cannot be eradicated with prevention programs. Cost-effective treatment methods for acute episodes are necessary to reduce the burden.

Mental health

Unipolar depression is predicted to rise to become the second leading cause of global burden of disease from its current position as fourth. Associated disorders, such as alcohol overuse and dependence, are also on the rise. This shift has caught the attention of the economic leaders of the world manifest in its selection as the focus of a workshop at the 2001 Global Economic Forum annual meeting [77].

In a study over 14 countries, Simon et al [78] found that over two thirds of patients meeting criteria for major depression presented with only somatic complaints. Of particular relevance to EM is their finding that patients without a primary care physician were nearly twice as likely to present with only somatic complaints. Rapid, accurate assessment of the patient with psychologic derangement and somatization is a daily task for most EMPs in the United States.

The WHO has promoted the development of mental health disorder recognition and services through research and training projects [79].
Mohit [80] presented a summary of development activities in the Eastern Mediterranean and Central Asia regions.

Health care systems issues

Many programs designed to improve the health of people in developing economies have been orchestrated by agencies based in developed economies [81]. A number of systems issues have often hampered health policy development in countries at all levels of economic development. For example, Varvasovszky [82], in an analysis of stakeholders in alcohol policy in Hungary, found fragmentation and a lack of explicit, agreed-upon goals. As in developed economies, shortcomings in creating sound health policy in developing countries are likely to have more of a deleterious impact among the most vulnerable individuals within a population.

Emergency medicine systems development

One of the fundamental contributions that EMPs can make is to relate current concepts of EMS as developed in North America and adapt this model for use in other countries. The United States model of EMS is undergoing great scrutiny at the time of this writing in an effort to improve efficiency and efficacy on local, regional, and national levels.

Practitioners and policy makers from around the world are eagerly seeking insight into the concepts and practices of the United States EM system. EMPs in the United States intending to work with international counterparts involved in EM systems development should understand the historic, social, political, and legal forces that have molded EM in the United States to better educate providers from other health systems at various points of evolution.

Concepts such as triage techniques, team operation techniques, patient satisfaction, patient flow, best practices, and others have been and continue to be actively studied. For example, the Robert Wood Johnson Foundation has funded a national study, called "Urgent Matters," on developing best practices concepts to decrease overcrowding [83].

Problems of overcrowding coupled with delay in care are present globally [84], although the forces leading to the problem are dependent on local cultural factors. In some settings, the wait and ED stay times have been found to be short compared with United States experiences without apparent negative impact on outcomes [10]. The National Center for Health Statistics of the Centers for Disease Control published a preliminary report showing an increase in ED visits concomitant with a decreasing number of EDs in the United States [85].

Disaster preparedness

Whether in the developing or developed economies, disaster preparedness has become a planning and development focus topic. Although the post-Cold
War era of the last decade of the 20th century saw a significant increase in the sophistication and complexity of disaster relief operations, the attacks on the World Trade Center on September 11, 2001, marked the onset of an international awareness to disaster preparedness with increased research into societal reactions to catastrophic events [86]. Earlier events, particularly the crisis in Rwanda in the mid-1990s, made the point that emergency medical response to such natural and human-induced crises requires specialized focus [87-91].

Health care continuing medical education/quality assurance

Physicians around the world are eager to have quality continuing educational updates in their fields. Many medical school or hospital libraries around the world have limited resources. It is not uncommon to find hospital libraries whose collections consist of sporadically collected, outdated publications and textbooks at times donated by visitors and expatriates from North America and elsewhere. This distancing from up-to-date literature sets up a one-sided system of information imperialism because data are available to large funding agencies (such as the World Bank) and program generators (USAID, United Nations, WHO) but are not as available to the stakeholders. This is often referred to as the North-South separation [92].

Some facilities have been able to obtain low-bandwidth Internet access with personal computers. However, access to timely, usable medical information is limited because on-line subscriptions to journals are costly [93]. A few medical journals have followed the lead of the British Medical Journal to offer their content free of charge via the Internet, whereas others offer content free on-line after varying periods. Additionally, several international journal groups have developed in different parts of the world [94], and projects are evolving to provide databases of or access points to free full-text medical literature (eg, see Free Medical Journals.com, sponsored by pharmaceutical donations at www.freemedicaljournals.com and Highwire, a division of the Stanford University Libraries, at www.highwire.stanford.edu/about). With the relatively low overhead necessary to develop an on-line journal, several new ventures have emerged as regional offerings, although the editorial review process for most of these e-journals is not always clear (eg, see Human Resources Development Journal published by the Thai Ministry of Health at www.moph.go.th/ops/hrdj/).

Distance learning and collaborative ventures using the Internet are actively being explored. The European Masters in Disaster Medicine (http://www.dismedmaster.com) is offered with a combination of on-site and Internet-based coursework. Some United States schools of public health offer on-line MPH degree programs. Other resources offer noncredit courses or reference resources, such as the "Super Course" at the University of Pittsburgh (http://www.pitt.edu/_super1/index1.htm), which primarily has courses in epidemiology.
One of the largest international partnership projects during the 1990s involved a series of partnerships between various United States medical schools and sites in New Independent States and Central and Eastern Europe supported by a series of cooperative agreements with USAID. Through this effort, 15 EMS training centers were established in 12 countries. In 2000, more than 8000 persons received training in these centers. More information is available through the web site of the coordinating organization, American International Health Alliance [95].

Hospital accreditation and Continuous Quality Improvement (CQI) movements

Chaos is a mainstay of EM, and EMPs are, if nothing else, chaos managers. To bring order requires discipline, planning, and teams with shared visions at the theoretical level that translate into mutually agreed upon protocols at the operational level.

Smith and Gonzalez [96], in their article on international EM fellowships, describe four basic areas of focus for international emergency medicine: public health projects, clinical experience, education, and research. To those, we add a fifth: delivery systems management.

Two of the six proposed Ethical Principals for Everyone in Health care [97] produced by the Tavistock Group [98] are system management based. Although the “care of the individual is at the center of health care, the whole system needs to work to improve the health of populations.” However under-funded and rudimentary, there is a health care system in every country of the world. There is almost always some blend of publicly and privately supported activities. Portions of it may be overseen by the Ministries of Health, Defense, Civil Defense, or Transport. These Ministries may not be well integrated and usually, by nature of their differing areas of responsibility, have conflicting requirements. The resulting disconnects can be frustrating and mirror some of the jurisdictional disconnects seen in the United States delivery system between federal, state, and private oversight bodies, such as Centers for Medicare & Medicaid Services, State Departments of Public Health, and the Joint Commission on Accreditation of Health care Organizations (JCAHO).

To reduce this second potential source of chaos, all of the health care stakeholders have to reach consensus on a core group of respected guidelines. JCAHO, which domestically has a blended regulation and accreditation role, internationally plays a more purely accrediting role, offering "standards" that cover the full range of health care delivery from home to home, including Medical Transport (EMS), Hospital, Care Continuum (nursing home, hospice, post hospitalization), and Primary Care. The original concept was developed by surgeons when, on November 15, 1912, the Third Clinical Congress of Surgeons of North America passed a resolution that called for "...standardization of hospital equipment and hospital work..."
Using a set of internationally developed and tested cross-cultural "maximum achievable" standards encourages development of common processes, albeit adapted to local custom and law. The result is a shared operational language, smoother processes and flow, and the development of a system for reducing variation. Variation reduction and process control translates in the health care arena to improved quality of care and quality of outcomes. This enhances indicator comparability, allowing for better benchmarking and improving the quality of studies and research.

There are three major reasons for international health care organizations to pursue Joint Commission accreditation; and most have some individual blend of the three. The first, as Deming [100], Juran [101], and Shewhart [102] have shown in industrial settings, reducing variation improves quality. The medical literature tells us the "right" way to care for patients; the accreditation process ensures that there is a rational process to investigate, interpret, and implement policies and processes based on such best practices; but perhaps even more importantly, the accreditation process ensures that the "right" way, once chosen, is well done. (It does not necessarily make sense, for example, to design processes to get AMI patients to the cardiac cath lab promptly if the hospital’s catheterization complication rates are high.) The second reason is financial: to earn more (by attracting more patients or by being able to charge more for perceived higher quality) or to reduce costs through increased efficiencies. The third reason is pride: The goal to be the best is an important staff motivator.

The concept of using a set of standards as a ruler by which to measure oneself or a checklist to ensure that all bases have been covered appeals to a broad audience from Denmark [99], to India [103], to Slovakia [104], to Zambia [105].

EM providers are uniquely qualified to participate in international health. The environment forces the development of multi-tasking skills, working as a team player, and a broad understanding of fragmented pieces of the delivery system. To be attractive as a consultant in the delivery systems management arena, one needs to have a high-level exposure to operations and a clear understanding of the inherently conflicting goals of the clinician (who is charged with mobilizing all available resources for his or her individual patient) and the manager (who is charged with mobilizing all available resources for the maximum number of patients, which may mean not giving too much to any one patient).

The next requirement is an awareness of and sensitivity to cultural differences, where there are few absolute rights and wrongs. In the rapid decision environment of EM, it is often difficult to be a listener or a coach rather than a judge and a fixer, but most potential international partners are not interested in being judged, and the ones that perceive a need for a fix usually want to be taught how to develop the fix themselves rather than being told the specifics of a fix by a foreigner.
Finally, one has to continuously augment the level of contribution, technique, or approach, as Davis [106] points out in his review of a focused international study. Good ideas spread quickly and rapidly move from novel to routine. Continuing education and exposure to the fields critical. There are a number of ways to maintain contact, but most take creative effort and funding to avoid adding a third source of chaos, that of one's own maintenance needs—food, shelter, transportation, interpreting, and even health care.

The laws of chemistry and physics mandate that reducing entropy requires energy. Appropriate public health measures reduce some of the chaos that is inherent in the daily delivery of health care. Adhering to mutually agreed-upon standards reduces variation and its resulting source of chaos. Health care workers can work in organized teams and systems to minimize their intrusiveness. A sense of impatience and appetite for more and better hopefully will result in continuous improvement. Taken together, this will result in higher quality for more patients, with better outcomes, at less expense. Designing a study that can document these operational, financial, and quality of life savings is virtually impossible in a fluid world environment; where change is constant, there are multiple confounding variables, and no one wants to be in the control group that avoids process improvement. That fact creates another international health challenge and further evidence of the room for all five disciplines: public health projects, clinical care, education, research, and system management.

Human resources in emergency health care

One of the most valuable factors physicians practicing EM in developed economies can bring to emerging ones is the mindset of EM practice. Tools for training aspects of the EM mindset exist in the form of "packaged" courses such as PHTLS, ACLS, and ATLS. Some teaching points in these courses are not applicable to developing economies. In many cultures, health care is delivered by a variety of traditional health personnel who may or may not have any formal training, particularly in emergency medical concepts. Bilateral exchanges for training personnel in clinical, administrative and research techniques are critical to the development of international emergency health services as recognized by the Fogarty Center for International Health in a Program Announcement in 2004 [107]. The reader is directed elsewhere in this issue for more discussion on health systems issues.

Other high-priority topics

Space does not allow a more detailed discussion of more topics; however, relevant literature is easily accessible with a computer, a hospital library account, and some creative entry of search terms coupled with scouring bibliographies of sources retrieved. A few additional topics do, however, bear mentioning.
Based on presentations at the 2003 Mediterranean conference on EM in Sitges, Spain, one of the active topics for a number of countries, particularly in the Balkans and Eastern Europe, is the issue of limiting the purview of EM to the prehospital arena [9]. An additional issue is that of using physicians as members of a standard ambulance crew. The implication on health services provision is significant.

EM has taken a leadership role in the medical aspects of disaster and mass casualty response planning in the United States. When one takes into account natural and human-made disasters, one sees that a disproportionate number occurs in developing economies. The reader is directed to the article on Humanitarian Assistance elsewhere in this issue for further detail on this topic.

The greater availability to the general public in developing countries of highly toxic chemicals, whether for cleaning or agriculture, presents a dual problem. The public is frequently poorly informed regarding the risks, and the medical community frequently does not have a strong sense of the latest treatment issues. Regional poison control centers do not exist in the majority of the world, and electronic resources are frequently expensive. This is an area of great need.

One way in which EMPs can assist their colleagues from developing countries is by providing grand round lectures, particularly with administrative decision-makers present. As in the United States, administrative and government officials may not be well informed regarding some of the hot topic issues. By presenting EM principles and the associated systems implications and needs with cross-cultural sensitivity, visiting experts can have a profoundly positive impact.

Additional resources

The following resources are provided as a set of readings and references that should be helpful to the reader new to international emergency medicine and international public health. The list is by no means exhaustive.
We have tried whenever possible to find Internet-based versions of documents to help facilitate access to the material. As anyone who has performed Internet searches has experienced, sites change their architecture from time to time and links become invalid. Frequently this does not mean that the material is no longer available, though. It is often helpful to go to the base URL and look for a search option within the site.


This text, originally published in 1989 was reworked and published on the Internet in 2000 by the Center of Excellence-Disaster Management and
Humanitarian Assistance at the Tripler Army Medical Center in Hawaii. Dr. Auf der Heide initially developed this book as he was seeking information on triage in disaster response and realized that the domain of disaster response encompassed many overlapping disciplines from medicine to city services to sociology/psychology to meteorology. A pioneering work at the time of original publication, the online version has been updated and continues to offer an excellent "point of departure" or "base" for anyone interested or involved in the domain of disaster planning and response. The original book was used as a training manual in a number of mostly Pacific Rim countries.


This comprehensive report chronicles the extent of this issue on a global scale and presents a variety of clear discussions of how to approach decreasing this burden with practical suggestions and examples. It would easily serve as a basis for a training program for international EM personnel on the topic.

Human Rights Watch (hrw.org/campaigns/crp/promises/labor.html)

This NGO has published several reports on various forms of child abuse.


This "manual" is the product of a collaboration among a number of humanitarian NGOs, the Red Cross, and the Red Crescent. One of the most important parts of this document is the "Humanitarian Charter," drawn up as a synthesis of legal and ethical principles surrounding fundamental needs and rights of persons. Although this charter was developed primarily to address humanitarian relief operations in the face of armed conflict, a reading of the charter and some of the supporting documents cited in the notes should help any health care professional providing direct care or consultation on development of health services to develop their own guiding principles. The visitor must always reflect on differences between personal perceptions of "reality" and local culture before attempting to "impose" his or her own paradigm.

INASP (International Network for the Availability of Scientific Publications). (www.inasp.info)

Quoted from the "information" page of INASP's website: "INASP is a cooperative network of partners. Its mission is to enhance the flow of
information within and between countries, especially those with less developed systems of publication and dissemination. INASP was established in 1992 by the International Council for Science (ICSU), as a programme of the Committee for the Dissemination of Scientific Information (CDSI).” (www.inasp.info/info/inasp.html. Accessed 22 March, 2004.)

MegaCity TaskForce (www.megacities.uni-koeln.de/index.htm)

This is the site for a “union” of scientists interested in the issues surrounding “megacities” of the future. Various issues are addressed, from logistical supply questions to sanitation and concern about disasters. Many of the evolving “megacities” are particularly vulnerable to natural disasters from earthquakes to storms, not to mention the issues of potential man-made incidents such as chemical leaks.

Me´decins sans Frontie`res (www.msf.org/source/refbooks/index.htm)

The venerable NGO of healthcare support in a variety of locations has published several references primarily directed at the delivery of health care in remote, often hostile settings. These are all available as Adobe pdf files.

Poverty and health. The World Bank (www.worldbank.org/poverty/health/)

The World Bank’s home page on Poverty, Health, Nutrition, and Population. Its purpose is to introduce work in these areas recently undertaken or currently under way at the World Bank in the hope that the information will prove useful to policy makers and analysts outside and within the Bank.


Dr. Noji offers a good overview set of chapters that introduce the reader to the various issues of concern in any disaster situation, from application of epidemiologic methods to management of the physical environment for survivors to mental health aspects. The remainder of the book provides as collection of chapters with background information on the basics of various types or sources of disasters, divided into geophysical, meteorologic, and human induced.

Health action in crises—World Health Organization (www.who.int/disasters/whatsnew.cfm)

Web site with background information on crises and various aspects related to the health sector. The site contains historical information and current updates on ongoing crises.
TOXBASE (www.megacities.uni-koeln.de/index.htm)

This is a toxicology reference database run by the UK National Health Service that requires a subscription fee, but on their home page they mention potential reciprocal agreements with poison control centers in other countries.

World Health Report. WHO. (www.who.int/whr)

Each year the WHO publishes a report with a different theme. These are excellent summaries of the topics with particular reference to the WHO’s efforts in the area. The 2002 report is a good summary of the global implication of several selected major health risk factors. All chapters are well referenced from recent literature. Each report is accompanied by a "statistical annex" that includes updated tables of burden of disease data for deaths and DALYs.

Road traffic information

- The Victoria Transport Policy Institute—Private institute in Canada that evaluates and comments on variety of transportation safety issues. (www.vtpi.org)
- International Road Traffic and Accident Database (IRTAD)—Data-bases of Organisation for Economic Co-operation and Development (OECD) member country traffic incidents and statistics. (www.bast.de/htdocs/fachthemen/irtad/english/irtadlan.htm)
- Global Road Traffic Safety Partnership—Organization of university representatives, industry, and public sector agencies seeking solutions to traffic issues. (www.grsroadsafety.org/)

References


