Lessons Learned From International Emergency Medicine Development

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In recent years, emergency physicians (EPs) have increasingly reached beyond their national borders to influence how emergency medicine (EM) is practiced in other countries [1,2]. International EM may be defined as the area of EM that is concerned with the development and delivery of emergency medical care in the world [1]. A critical aspect of international EM has been the multivalent exchange of information between EPs, organizations, and institutions in countries in which EM is mature and their counterparts in countries in which emergency medical care is underdeveloped or developing. A result of this exchange has been the widespread development of multiple components of emergency medical care delivery systems across the world, including EMS systems, hospital-based emergency departments (EDs), undergraduate and postgraduate systems of education and training in EM, and the medical specialty of EM.

This article describes the major lessons learned from international EM development efforts over the past decade. These lessons learned are organized into four sections that correspond to the following areas of international EM development: (1) general approach to international EM development, (2) international comparisons of EM delivery systems, (3) international development of the specialty model of EM, and (4) international EM education and training.

These lessons learned include observations about the recent development of EM in the world, recommendations for effective international EM
development activities, and caveats that may help participants in international EM avoid commonly encountered pitfalls. They represent many person-years of personal and institutional experience in international EM. Although some of these lessons learned may seem like “common sense,” they are worth restating because they remain recurring challenges to effective international EM development. Understanding these lessons learned may help those involved in international EM focus their efforts, rationally allocate their resources, and successfully advance EM in countries they seek to assist.

General approach to international emergency medicine development

International EM development requires a systems approach [1,3-5]. Virtually all emergency medical care delivery systems are comprised of administrative, operational, logistical, planning, and financial subsystems [3,4]. Each subsystem may be further divided into multiple components, any of which may merit international EM development efforts. For example, planning subsystems include education, training, information sharing, record keeping, and research components. Only by identifying the subsystems and components of emergency medical care delivery systems in countries can participants in international EM development understand how a given project or program fits into the greater whole of the emergency medical care delivery system they seek to assist. As a corollary, international EM development projects that overemphasize one component generally fail to improve the performance of the system as a whole. For example, upgrading EMS equipment (logistics) without providing relevant training (planning) or medical control (operations) is unlikely to improve emergency medical care delivery.

International EM development should address the needs of patients with medical emergencies. The goal of international EM is to optimize the delivery of emergency medical care to patients with emergency medical needs throughout the world [5]. This patient-centered perspective is fundamental to international EM and underlies all successful strategies and interventions. Accordingly, participants in international EM should remain focused on the universal requirements of patients rather than on differences between EM practitioners or EM delivery systems.

International EM development should target the needs of populations served by emergency medical care delivery systems. Population needs are best identified through the performance of a baseline needs analysis [5-7]. Large-scale international EM developmental projects require a comprehensive needs analysis that incorporates information about the political, social, and cultural environment; burden of disease and injury; population structure; population distribution; health care system structure and capacity; medical economics; and perceived needs of key emergency care system stakeholders in the geographic area served [8,9]. For example, a cost-
benefit analysis of developing an EMS system in Kuala Lumpur that meets United States standards (eg, the delivery of a defibrillator to 85% of patients in cardiac arrest within 6 minutes of notification) found that only four neurologically intact lives would be saved per year at the cost of $2.5 million US per year [10]. The major reason for this projection is the youthful age structure in Kuala Lumpur, in which there is expected to be only 120 sudden arrhythmic deaths per year in a city of 1.1 million. Even basic international EM interventions, such as education and training programs, require consideration of the emergency medical needs of the population served by those who are being taught or trained. For example, many developing countries have experienced an increasing burden of injury in recent years, suggesting the need for education and training in trauma care [11-14].

International EM development programs and projects should engage all key stakeholders in the delivery of emergency medical care in the geographic area served [4-7]. Individual stakeholders in emergency medical care delivery include the public, physicians, nurses, hospital administrators, prehospital medical personnel, public health officials, and politicians. Organizational stakeholders include hospitals, universities, governments (local to national), EMS agencies, fire services, police services, professional organizations (eg, medical specialty organizations, nursing organizations), nongovernmental organizations (eg, Red Cross or Red Crescent societies), and international development organizations. Local stakeholders understand local needs best, including the underlying agenda for EM development; the identity of other key stakeholders; and the range of political, economic, social, and cultural factors that affect development.

International EM development programs and projects should be sustainable [5,6]. Sustainability is achieved by early and ongoing involvement and co-ownership by key local stakeholders. Participants in international EM should avoid becoming involved in the business of exporting EM systems. There have been many instances of entire EMS systems or EDs being exported in the "lock, stock and barrel" from one country to another [4]. In general, these "turn-key" projects have failed unless accompanied by the early involvement, participation, and co-ownership of the local community and long-term, ongoing follow-up by the program initiators.

International EM development programs and projects should produce one or more "deliverable." In international EM, deliverables usually include needs assessments, capacity assessments, specific plans, program evaluations, educational curricula, training courses, and on-site teaching [6,15-21]. Less often, they include specific materials, such as facilities, vehicles, equipment, supplies, and pharmaceuticals. The credibility and success of any international EM development program or project are measured in terms of its deliverables. The production of deliverables is what distinguishes international EM from medical tourism.

International EM programs and projects should be feasible or achievable within the limits of available resources [6]. A key to international
development success is to promise less than what can be delivered and to deliver more than what was promised. Accordingly, participants in international EM development should avoid creating false or unreasonable expectations about the benefits of their programs and projects.

Little financial support exists for international EM development. One of the greatest obstacles to making a career out of international EM development work is that there has been no great financial support obtainable in this field of endeavor. Part of the reason for the financial difficulty is that EM development has not been a high priority for the various international medical development communities. For example, the World Health Organization, the Pan-American Health Organization, the International Red Cross, and CARE International have concentrated their efforts and financial resources on public health, infectious diseases, and disaster relief and have largely ignored EM development. To some extent, this has been due to the preponderance of staff in these organizations coming from countries that do not have well-developed EM. However, in the last several years, relatively large funds from the World Bank have become available for EM system development. Perhaps the best example of a United States institution that has been successful at obtaining extramural funding is the Center for International Emergency, Disaster, and Refugee Studies at the John Hopkins School of Medicine in Baltimore, Maryland. Most other American university-based EPs actively working in international EM development have been able to get substantial portions of their international expenses covered from host country funds.

Altruism and humanitarianism are the driving forces for involvement in international EM. Although there is little financial gain to be had from participation in international EM, richly satisfying humanistic rewards await those who participate in successful international EM development [22,23]. EM personnel in other countries are usually appreciative of efforts expended by physicians from outside countries on their behalf. One of the most rewarding aspects of international EM development work is the receptiveness, attentiveness, and appreciation by the recipients of the information or materials provided. Many of these individuals are interested in initiating and maintaining long-term correspondence links, which frequently evolve into life-long friendships.

International comparisons of emergency medicine delivery systems

No standard, internationally harmonized nomenclature exists to describe many of the core components of emergency medical systems. Terms like "emergency physician" or "emergency medicine" are subject to different interpretations in different parts of the world. An EP in Germany may be an anesthesiologist who provides prehospital emergency medical care a few times per month [24]. An EP in Turkey may be an EM-residency trained,
board-eligible EP who provides emergency medical care in a hospital-based ED as a full-time profession [25]. An EP in Japan may be a surgeon with further residency-level training in EM who concentrates on the provision of in-hospital emergency surgical care in a specialized emergency center as a full-time profession [26].

Insufficient information is available to characterize emergency medical care systems in many countries [27]. Although numerous reviews have been published describing the status of EM in other countries, few have analyzed emergency medical care delivery from a systems perspective [1,3,28-33]. Without information about the context of emergency medical delivery systems, comparison of outcomes is nearly impossible. For example, extrapolating the 12 deaths in the 1995 Tokyo Subway sarin attack to other countries is problematic unless one takes into account information about the operational components of Japanese EMS at the time, such as the fact that Japanese paramedics were legally proscribed from intubating victims or providing parenteral atropine [34,35].

Insufficient data are available to directly compare the outcomes of emergency medical care between most countries. Even when outcomes are reported, they often stem from a single hospital or district, undermining their ability to represent the entire country [31,36-40]. In addition, even in countries where EM is mature, a paucity of evidence is available to support many of the clinical interventions that are accepted as the standard of care. For example, from 1985 to 1998, only 54 randomized controlled trials concerning EMS were published in the medical literature, of which only a minority were relevant to everyday prehospital emergency medical care [41].

Countries vary widely in geographic scale and population size, making comparisons between countries tantamount to comparing apples with oranges. For example, most European countries are comparable to a single state in the United States, whereas Singapore or Hong Kong are comparable to New York City or Los Angeles. Even if system descriptors and outcomes data were available, realities related to geographic scale and population size often confound the practical relevance of comparing countries.

Geographic EM model descriptors, such as "Anglo-American" or "Franco-German," tend to oversimplify the complex realities of emergency care delivery systems in a rapidly changing world and serve as lightning rods for unnecessary controversy in international EM [1,3,4,28,31,42-46]. A more objective approach is to use labels that identify emergency medical care delivery systems according to their key components, such as the type of practitioner providing emergency care. For example, the specialty model of EM refers to those systems in which hospital-based EM is delivered by physicians recognized within their health care system as being specialized in EM [3]. The multidisciplinary model of EM refers to those systems in which hospital-based EM is delivered by a collection of physicians from multiple medical specialties, such as anesthesiology, internal medicine,
obstetrics-gynecology, pediatrics, and surgery [3,46,47]. In-hospital models should be viewed as distinct from prehospital models of emergency care delivery, which also may be categorized according to the dominant type of practitioner, ranging from emergency medical technicians to nurses and physicians. Prehospital emergency care delivery systems may be further categorized according to unique operational strategies, such as medical control (physicians directly or indirectly supervise physician extenders) and medical regulation (physicians coordinate the distribution of patients to hospitals).

Baseline emergency medical capabilities in some countries may be more advanced than expected. For example, EPs in South Korea and Taiwan routinely performed diagnostic ultrasonography long before their counterparts in the United States [29,48]. EPs in Japan perform upper GI tract endoscopy, echocardiography, and trauma surgery [26]. Until recently, a portable CT scanner was deployed in the trauma resuscitation area of the major hospital in Qatar. In international EM education, naive assumptions about health care system capabilities can be embarrassing. For example, an American lecturer speaking at a hospital in Jordan outlined the use of secondary CT studies in patients with suspected cervical spine trauma. After the audience patiently listened to his presentation, the speaker asked what their practice was. A Jordanian physician replied, “Well, we just get a stat magnetic resonance imaging scan, since we have easy 24-hour access to this modality.”

The United States is not the only country helping to develop EM in other countries. EPs and academic institutions in Australia, Canada, Hong Kong, Singapore, Taiwan, the United Kingdom, and others have made significant contributions to promoting the specialty model of EM in the world. Regional centers of excellence in EM exist in other countries in Asia, Europe, the Middle East, and Latin America [49]. These centers have emerged as valuable regional models, and their personnel serve as regional experts for EM development in neighboring countries. For example, the Department of Emergency Medicine at Hamad Medical Corporation in Qatar launched the Pan-Arab Association of Emergency Medicine in 2002, founded The Middle Eastern Journal of Emergency Medicine in 2001, and held two successful international EM conferences in 2002 and 2004. As another example, France has influenced the organization of prehospital emergency care in many African and Latin American nations, with the dissemination of its Service d’Aide Medecale Urgente system [32].

The United States system of emergency care is not perfect, and not all of its elements should be advocated for adoption by other countries. Aspects of the United States emergency medical care system that are not suitable for other countries include its use of oversized and expensive ambulances, its over-reliance on aeromedical transportation, and its dependence on EDs as medical safety nets for American society in lieu of providing universal access to primary health care for all of its citizens. On the other hand, aspects of
the United States emergency medical care system that are worthy of international promotion include its emphasis on the medical specialty of EM, its overall organization, and its approach to the education and training of EM personnel.

International development of specialty model of emergency medicine

The specialty model of EM has rapidly expanded over the past three decades to become the most widely adopted model of EM practice in the world [3,28]. In the specialty model of EM, in-hospital emergency medical care is delivered by physicians who have received specialty-level training in the provision of emergency medical care to populations with undifferentiated illness and injury. Those involved in international EM should understand how the specialty model of EM benefits health care systems. First, patients presenting to hospitals with medical emergencies receive emergency medical care from physicians with a predictably high level of competency in managing acute medical and surgical conditions. Second, health care systems only have to provide one group of physicians for the management of patients with all types of emergency medical conditions 24 hours per day, 7 days per week. Third, recognition of EM as a medical specialty serves as a motivation to attract students and retain practitioners, subsequently providing the necessary leadership and manpower to improve the operational, administrative, logistical, and information-sharing aspects of emergency health care delivery. Finally, academic recognition of EM as a medical specialty helps to provide EM specialty leaders and sufficient numbers of EM specialists, who can then improve EM research, education, and training. Founded in 1989, the International Federation of Emergency Medicine is comprised of the national EM professional societies in 19 countries that have adopted the specialty model of EM. The authors believe that proponents of international EM should seek to promote the specialty model of EM.

The super-specialty model of EM offers many of the benefits of the specialty model of EM for health care systems. In the super-specialty model of EM, in-hospital emergency medical care is delivered by EPs who have completed specialty-level training in another specialty first and then further training in EM. Countries using this approach include Belgium, Israel, Japan, and Jordan. The super-specialty model of EM has helped health care systems rapidly produce EPs in the absence of formal residency training programs in EM. On the other hand, after reaching this plateau, the super-specialty model of EM typically limits further EM development. A major reason for this is that EPs often remain clinically and academically focused on their original specialty because their original specialty receives greater clinical or academic recognition than EM. In addition, without equivalent clinical and academic recognition for EM, physicians are less likely to enter
or remain in EM in sufficient numbers to advance the delivery of emergency medical care in the operational, administrative, logistical, and academic areas described previously.

Tragic events, such as the sudden death of a prominent citizen or large-scale disasters, may stimulate and promote the development of EM in a country. For example, the rapid development of EM in Turkey arose from the mishandling of the cardiac arrest of the Turkish president in 1993. As another example, the Nsam fire disaster in Yaounde, Cameroon in 1998, which killed 229 people after two tanker trains collided at a fuel storage facility, spurred the government to lay down the foundation for the development of EM as a medical specialty in Cameroon [50]. In a similar manner, the 2003 Bam earthquake seems to have provided the impetus for the Iranian government to further advance EM in Iran. EPs interested in EM development should recognize that the periods after national tragedies in many countries may provide windows of opportunity during which governments re-examine their health care systems and during which dramatic improvements in emergency medical care systems are possible.

EM typically evolves step-wise in a country. In an oft-repeated developmental sequence, a cadre of interested physicians establishes the first clinical ED in their country [1]. Next they organize their country's first EM residency training program or EM organization. Along the way, they often start improving various administrative, operational, and logistical systems of emergency medical care delivery inside (ie, EDs) and outside of hospitals (ie, EMS). Frequently, they establish an EM journal. Finally, through their efforts, EM is recognized as an independent medical specialty in their country's health care system. Understanding the incremental nature of EM development (and the most likely route to achieving specialty recognition) helps participants in international EM prioritize their efforts, allocate limited resources, and avoid "reinventing the wheel" in countries where EM is immature.

EM development often takes place unevenly and asynchronously in a country [1,28]. A common result is the existence of developing or mature EM delivery systems in some cities or regions and underdeveloped EM delivery systems in others. The distribution of more mature EM subsystems or their components does not always follow expected political or demographic patterns. EM often begins to mature first in cities where local pioneers have taken the developmental lead and not necessarily in a country's capital or most populous city. For example, the first EM residency training programs in Brazil, Italy, and Turkey were established in Porto Allegre, Turin, and Izmir, respectively [32,51-53]. This underscores the importance of identifying and collaborating with local champions of EM development.

EM is emerging as an urban medical specialty for much of the world. A major impetus for EM development is the rapid urbanization occurring throughout the world. For example, the number of mega-cities (cities with
10 million inhabitants or more) has increased from five in 1975 to 20 in 2003 [54]. Accordingly, the specialty of EM demonstrates its greatest value to health care systems through its provision to urban populations 24 hours per day, 7 days per week. Because the demand for more advanced emergency medical care has been concentrated in cities in other countries, substantive international EM development has often taken place in the urban areas of countries first.

Successful long-term EM development depends on obtaining high-level government and academic support. Many of the EM pioneers in other countries have relatively junior positions and not a great deal of political strength or leverage. Educating higher-level university faculty in the other specialties, university chancellors or deans, ministry of health officials, and even politicians regarding the importance of supporting EM development is a critical function of participants in international EM. For EM development to successfully proceed, active support by these high-level people is required.

The breadth and depth of EM in countries where EM is mature may not be fully appreciated by key decision-makers in countries where EM is underdeveloped or developing. Concepts of what EM encompasses are different in other parts of the world. When communicating with government officials and academicians in other countries, it is important to make certain that they understand and appreciate the breadth and depth of EM in countries where it is most developed, such as Australia, Canada, the United Kingdom, and the United States. When meeting with these individuals, it useful to provide them with a pre-prepared concept paper or white paper that explains the specialty model of EM and its major benefits. It is also important to understand the barriers to hospital-based EM development in other countries, including the lack of government political or financial support, the lack of support from other physicians in other medical specialties, or the lack of support from physicians involved in providing emergency medical care.

Pushing for official recognition of EM as an independent specialty can be problematic if there is little EM system structure in place. In some countries where EM was declared an officially recognized specialty before there were any residency training programs or before there were well-organized clinical EDs, there have been difficulties in the relationship between EM "pioneers" and the government. In a few countries there was threatened withdrawal of recognition of the specialty based on realization that there did not exist much training or clinical structure to the specialty. This indicates the importance of helping with system structure development in countries where the specialty is new or not recognized and then pushing the government and other specialties for official recognition once some structure is in place.

Competition between different specialty professional organizations in a country may impede EM development in countries in which EM is underdeveloped or developing. In some nations, more than one organization may seek to develop aspects of EM. Because the major barriers to EM
development typically are a lack of government support and opposition from other medical specialties, it is essential that different emergency medicine-focused organizations work cooperatively and coordinate their efforts in the interest of achieving the ultimate goal: the development of high-quality emergency medical services through the development of a recognized specialty of EM. In countries in which EM is struggling for specialty recognition, it is important that a single unified organization exist to advocate for EM development. A useful function of international EM consultants is to mediate disputes or differences between physicians in other countries and to encourage the unification of the specialty of EM under the aegis of a single organization.

International emergency medicine education and training

The need for EM education and training is a common denominator across the world that affects all countries, regardless of the local level of EM development. This commonality arises from the fact that people everywhere have unexpected, unscheduled, and undifferentiated medical emergencies 24 hours a day. Accordingly, the universal need for competent practitioners of EM elevates education and training to a paramount position among all international EM development activities. As a result, EPs from different countries who passionately debate whether physicians or paramedics should be deployed on ambulances will find much greater agreement about which competencies these physicians or paramedics on ambulances should have.

EM operational issues are similar throughout the world. Most countries have similar ED caseload distributions, similar baseline approaches to clinical EM care, and similar social problems, such as ED overcrowding [55,56]. EM faculty members in other countries have the same concerns regarding resident and faculty wellness. This common international EM experience helps drive the need for the exchange of information and ideas on improving patient care and other EM operations. A corollary to this is that information exchange is always two way. As a result, EPs from either side of the development equation can learn from their colleagues in other countries.

Modular training courses do not replace the need for full EM residency training programs in a country. Some countries tend to equate modular training courses, such as Advanced Trauma Life Support (ATLS) and Advanced Cardiac Life Support (ACLS), with full EM residency training. Although these courses can be useful in assisting the early development of the specialty and in improving the clinical skills of the core faculty and the first generation of residents, they can never substitute for full residency training. It is important that these modular courses be incorporated into longer, comprehensive education and training programs. A follow-up evaluation process is required to ensure that the clinical information presented in the courses is effectively applied in clinical practice.
To effectively teach in other countries, it is important to adjust the presentation and content of teaching materials that are used domestically. In general, jokes should be eliminated from this material because they often do not translate well and result in distraction and confusion in the audience when interspersed in lectures. Idioms and slang language usually should be carefully culled from presentations because this also can be a source of confusion. Before presentation, the material needs to be carefully reviewed to make sure there are no content areas that represent cultural conflicts or offenses. When presenting in English to audiences whose primary language is not English, speakers must remember to slow their normal speech rate down at least 25%. People with a moderate degree of language fluency can translate verbal information in their head at a rate about "one sentence behind" the speaker. Speakers presenting at a rapid rate of speech often find that the audience is able to translate half or less of their presentation. One effective technique when simultaneous translation is being used for a presentation session is for the speaker to pause at the end of each presented slide and wait until hearing the translator catches up before proceeding to the next slide or text paragraph.

Using physicians from other specialties to present at EM conferences often does not work out well. Many physicians in other countries where EM is new or just starting to develop do not understand the specialty of EM. When asked to present at EM teaching conferences, they often present the subject from the point of view of their specialty rather than from that of the generalist EP. Surgeons in particular tend to dwell upon surgical techniques that are irrelevant to EM. Although it may be politically important to include physicians from other specialties in EM conferences in countries where the specialty is starting to develop, these physicians should not be relied upon to provide core lectures in a conference.

International EM educators should provide consistent messages and information. Conflicting information or widely opposing opinions on EM development can be confusing for target audiences in other countries. EPs participating in international EM education and training activities should plan together ahead of time what messages they will convey so that this information is consistent and free of internal conflicts.

International EM education and training requires flexibility and patience. Many countries do not have the same cultural fixation on adhering to schedules as is typical in the United States [19]. Conference topics and times may need to be changed at the last minute, infrastructure problems from nonworking equipment to electricity outages may occur, and other scheduled lecturers may not show up. Because EPs are usually adept at working in unpredictable clinical environments, their flexibility makes them well suited for international EM development work [57].

A train-the-trainer approach helps maximize the impact of international EM education and training interventions [58]. Train-the-trainer approaches to education and training help leverage limited resources and create
sustainability, an essential ingredient of successful international EM interventions.

Multiple ways exist to exchange information about EM between countries [1,59]. A major mistake is to focus on one method of information exchange at the expense of others. Although traditional approaches to medical education, such as formal lectures or hands-on training sessions, continue to play an important role in international EM development, emerging methodologies, such as distance learning, are becoming increasingly relevant in an increasingly electronic world. The European Masters in Disaster Medicine, a Masters of Science level program in disaster medicine for physicians, combines a traditional 2-week training session in Italy with a 1-year Internet-based distance learning course in which instructors interact with students through a chat room and assignments that range from table-top exercises to a Master's thesis.

Changing clinical knowledge is not the same as changing clinical behavior. This knowledge-behavior gap is a key challenge for international EM education and training. Accordingly, international EM educators should focus on factors that affect behavior, such as accessibility, cost, quality, cultural values, and social norms. The bottom line is that international EM education and training should be practical so that any expected changes in clinical behavior can be readily adopted into daily clinical practice. There is some evidence that clinical training can change clinical behavior, thereby improving patient outcomes in other countries. For example in Trinidad and Tobago, trauma mortality rates decreased from 68% to 34% at Port of Spain General Hospital after 199 physicians received ATLS training there in the 1980s [60]. As another example, in Tartu, Estonia, out-of-hospital cardiac arrest survival rates increased from 8% to 26% after all ambulance staff in the Tartu EMS systems completed ACLS training and ACLS units were implemented there in the 1990s [61].

Summary

The lessons learned from development of EM around the world span several key areas including general development, systems comparisons, models of EM practice, and education and training. Neither definitive nor exhaustive, these lessons learned are intended to be viewed as signposts along the road traveled at this point in international EM development. It is hoped that future participants in international EM development can assimilate these lessons learned, adopt the most relevant ones, and add their own insight and wisdom to this growing list. Most importantly, it is hoped that by whichever path future development takes, we all reach the same destination of providing the best possible emergency medical care for the people of the world.
References


