

EDUCATIONAL ADVANCES

Planning Recommendations for International Emergency Medicine and Out-of-hospital Care System Development

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Abstract. **Objectives:** To present suggestions on planning for development of emergency medicine (EM) and out-of-hospital care in countries that are in an early phase of this process, and to provide basic background information for planners not already familiar with EM. **Methods:** The techniques and programs used by the authors and others in assisting in EM development in other countries to date are described. **Conclusions:** Some aspects of EM system development have applicability to most countries, but other aspects must be decided by planners based on

country-specific factors. Because of the very recent initiation of many EM system development efforts in other countries, to the authors' knowledge there have not yet been extensive evaluative reports of the efficacy of these efforts. Further studies are needed on the relative effectiveness and cost-benefit of different EM development efforts. **Key words:** emergency medicine development; international emergency medicine; system development; EMS systems. *ACADEMIC EMERGENCY MEDICINE* 2000; 7:911-917

THE specialty of emergency medicine (EM) is only now beginning to develop in a number of countries throughout the world, and in fact is a relatively new specialty even in countries where it is currently well established. For countries considering developing EM and for those just starting this process, to our knowledge there have not been previously published planning recommendations

on how this could be facilitated at the national level.

The goal of this article is to present general recommendations for development planning for the specialty of EM¹ that would be applicable to any country considering, or having already started, this specialty. We suggest sequential steps that can be considered by planners interested in developing EM and out-of-hospital care [or emergency medical services (EMS) systems] within any country. Our intended audience includes policy makers, government officials, and educators who may not necessarily already be familiar with EM as a specialty.

Our suggestions are based on our collective experience involving assistance with EM system development in more than 20 countries. We acknowledge and emphasize that the content of this article is based solely on our experience, and the results of our development efforts to date have not been validated by published research studies. However, we hope that this paper will be useful in assisting and facilitating EM development in other countries and make the initial process easier and quicker for those involved. We also hope that this article will help planners avoid some of the mistakes and pitfalls that occurred during EM development in

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countries where the specialty is now well established. Our interest in EM system development stems from a desire to promote optimum emergency patient care and quality EM clinical training programs, and not from a desire to promote any particular medical or cultural system. Not all of the features or considerations mentioned here will be applicable to, or adoptable by, all countries.

Many of our recommendations are general and based on opinion and experience rather than scientific data. However, it has been our impression that these general concepts have not always been well understood by many persons interested in EM development in other countries. Failure to appreciate some of these general concepts has resulted in delayed, erratic, or incomplete EM development in some places.

BACKGROUND AND DEVELOPMENT GOALS

We believe that EM, both as a specialty and as a core component of a national health care system, has a great deal to offer the people of any country. Even in “developing” countries that have limited financial resources, we believe that EM can serve a vital function. This is because of the epidemiologic transition ongoing in many developing countries, characterized by increasing urbanization and centralization of the population, with associated increases in incidence of cardiac disease and trauma from vehicular collisions.²⁻⁴ Current EM training encompasses in-depth management of these types of problems. In addition, most countries are experiencing a rapid increase in the number of elder patients, who require emergency health care services at higher rates than younger patients.⁵⁻⁷

Many EM practitioners in well-established EM systems believe that the system of clinical care they provide results in improved public health and greater efficiency of patient care. However, there is limited published scientific evidence supporting these contentions. A major difficulty in proving the efficacy of EM system development in many countries is the lack of epidemiologic data collection systems.

The four major areas to consider in EM system development include:

1. Establishment of clinical emergency departments (EDs); in most systems these would be based in hospitals.
2. Development of EM specialist training (such as development of residency programs for physicians and defined training programs for other emergency health care personnel).
3. Creation of out-of-hospital care and transport systems.

4. Development of academic and leadership aspects of EM.

Emergency medicine development for a particular country might be considered to proceed most efficiently when progressing from numbers 1 through 4 above, though creation of the academic and teaching infrastructure should be considered early in the process. Just as for hospital-based EM, the overall efficacy and cost-benefit of advanced out-of-hospital care or EMS systems have been difficult to conclusively or scientifically demonstrate. This is why we think that EMS system development should generally follow, or be secondary to, development of hospital-based EM. The general EM development sequence can also be conceptualized as: 1) building emergency care capacity and infrastructure, followed by 2) training and clinical care standardization, and finally 3) leadership development.

CLINICAL ED DEVELOPMENT

One of the first steps in developing EM is to establish facilities specifically devoted to the provision of emergency health care services (EDs).⁸ The most common type of emergency health care facility used in well-established EM systems is having the ED be part of, and physically located within, a multiservice hospital. Under some circumstances, however, it may certainly be appropriate to develop freestanding emergency care facilities, such as those currently operating in China and Croatia.⁹ A somewhat different but workable arrangement is to have the ED encompass an intensive care unit for prolonged care of critical cases (this has been successfully used in Belgium).

Designated emergency physicians (EPs) should have administrative responsibility for the patient care rendered in the ED. Defined training for the nurses and patient care technicians who work in the ED is important for helping ensure a teamwork approach to patient care. Efficiency is aided by having support services, especially radiology and the medical laboratory, in close proximity to the ED (or within the ED itself). The amounts and types of equipment to maintain in the ED will vary widely according to local epidemiology and hospital resources. Obvious minimum equipment requirements for most EDs would include: basic physical exam items (otoscope, ophthalmoscope, stethoscope, etc.), endotracheal intubation and ventilation and wound suturing equipment, cardiac monitor, defibrillator, splinting and spine immobilization materials, and medications for acute cardiorespiratory emergencies.

The ED should have in place a “triage” system to assess patients presenting for care. This system should determine the rapidity and priority for pa-

tients to receive emergency care when the capacity of the facility to see patients without delay is compromised by the number or severity of patients. The triage system should ensure that patients are not seen solely according to the order in which they present to the ED (as is the case now in many facilities), but are evaluated for case severity and need for emergent "out-of-order" treatment. There should be pre-established arrangements for referral of patients to other health care facilities and for admission of patients to the hospital. The ED personnel should coordinate ED patient care with that rendered by other medical specialties. Once an out-of-hospital care system is developed, the ED should also have communication facilities linking it to the out-of-hospital care system and to other health care facilities.

EMERGENCY HEALTH CARE PERSONNEL TRAINING

The first step in development of emergency health care personnel training is to designate specific faculty at the main teaching medical centers to be the "core" faculty to develop EM. In most situations these core faculty should be physicians with interest in EM development and clinical emergency health care experience. It is most helpful if these physicians understand the scope of EM and have developed their knowledge and skills to encompass broad-based EM practice.¹⁰ It is also important that these core faculty have the responsibility, autonomy, and authority necessary to effectively serve as advocates for emergency patients, and be able to settle interdisciplinary disagreements in the ED.

For most countries, we believe that an appropriate long-term goal would be to develop EM residency training programs to ensure a continuous supply of properly trained EPs for the future. For any country, planning should include determining the total number of EPs needed to adequately staff the country's emergency health care facilities and at what rate these physicians will need to be replaced due to retirement, and other factors.¹¹⁻¹³ The current ratio of EPs in the United States relative to the general population is about 1 to 10,000.¹¹ As an example, if the same EP-to-population ratio were used for a country of 1 million inhabitants, the country would require 100 EPs at any one time. If these EPs all stayed in practice for 25 years, then an average of 4 of them would need to be replaced each year, so the residency program for that country should graduate 4 EPs per year to meet this need. In countries just starting EM, however, and where there is a need to more rapidly staff new EDs with qualified physicians, it may be necessary to plan to train a larger number

of EPs for the first few years and then later reduce the number trained per year. Other countries may need to use much different EP-to-population ratios, however, based on differences in demographics, epidemiology, and ED utilization rates. For example, if EPs are also to be used to staff ambulances as well as EDs, then the ratio of EPs to population will need to be higher.

Early EM development experience in some countries has been that at least 2 (4 or 5 would be a preferable minimum) core faculty need to be designated at each hospital that wishes to develop an EM residency training program. These initial core faculty would be responsible for supervising clinical care in the ED and for developing the EM training programs.

The EM core faculty should define the core curriculum and accumulate the required didactic teaching materials. The faculty should decide on the structure of the residency program (number of years of training, distribution of training experiences on other medical services, etc.) and on selection criteria for applicants to the program. They should select the initial group of physician trainees (this may include physicians who are already in practice) and decide on the evaluation methods to be used to assess the trainee's successful completion of the program. While local faculty initiative and program design are important, to ensure uniformity and reliability of training programs, coordination and standardization of program structure at the national level would eventually be useful. The EM core faculty can also be responsible for providing more time-limited training for resident physicians from other specialties and nonphysician personnel in the ED.

The United States and United Kingdom have required a minimum of two years of full-time training in the ED for certification as an EM specialist.¹⁴ This minimum training time requirement has been adopted by the European Society for Emergency Medicine.¹⁵ This two-year training in the ED is in addition to a minimum of one-year training involving experience in other medical services, such as internal medicine, pediatrics, or surgery.

OUT-OF-HOSPITAL CARE SYSTEM DEVELOPMENT

In most countries, developing out-of-hospital care (EMS) systems is more complex and expensive than is developing hospital-based EDs. As mentioned above, the cost-effectiveness of advanced (and thereby expensive) EMS systems has yet not been definitively demonstrated. Because of these considerations, we believe that development of a country's EMS system should generally follow the establishment of hospital-based EDs. Regions in

some countries have made the mistake of developing an advanced out-of-hospital care system where there are not well-developed emergency health care receiving facilities to which to deliver the patients. There is no real benefit in having highly trained out-of-hospital care personnel if the receiving hospitals do not have personnel and facilities capable of rendering further or more definitive emergency care. However, in areas where trained EPs directly provide out-of-hospital care, the capabilities of the receiving EDs may appropriately be more limited than in other systems. This, however, would not obviate the priority for rapid transport of patients who need definitive hospital-based care (such as major trauma victims who need emergent surgery). Use of public transport or police or fire units may be required in regions that do not yet have the finances or support infrastructure for development of an ambulance-based out-of-hospital system. We believe EM development efforts in any country should encompass and coordinate both hospital-based EM and out-of-hospital care (or EMS). This is because of the overlap of personnel and training programs for both, as well as the importance of provision of continuity of care for patients receiving both out-of-hospital and in-hospital care.

It is important that EPs have administrative control over the medical policies and training of out-of-hospital care personnel. One realistic and usually affordable initial goal for an out-of-hospital care system would be to require all ambulance drivers and attendants to be trained to a level equivalent to the U.S. emergency medical technician–ambulance or emergency medical technician–basic (EMT-A or EMT-B, representing 100 to 180 hours of formal training). This type of training may also be useful initially in out-of-hospital systems using physicians as direct out-of-hospital care providers.

Care provided by out-of-hospital personnel, including physicians, should be reviewed by supervisory EPs and the Ministry of Health or other designated government body. Physicians providing out-of-hospital care may not need to be trained to the equivalent level as that of a hospital-based EP, but it would be reasonable to have a minimum requirement that they successfully complete specific emergency care courses relevant to local epidemiology.

The types of patient transport vehicles and required equipment should be decided by the supervisory EPs and government body. Communication systems coordination, patient care protocols, and interaction with other services (such as fire, police, or military) need to be pre-established. Of note is that out-of-hospital care system development in some developing countries may be limited by re-

gional infrastructure problems (lack of roads, lack of communications facilities, etc.). Improving these infrastructure components by the government may be necessary to fully implement the out-of-hospital care system. Education of the public regarding the proper use of out-of-hospital care services should be undertaken once the system is organized. It would also be helpful to establish public education programs for injury and illness prevention.

EM ACADEMIC AND LEADERSHIP DEVELOPMENT

In only a few countries to date has EM been recognized as an independent medical specialty, with equivalent stature and responsibilities as the more traditional specialties. However, because of the initially limited number of EPs in a country just starting the specialty, it may be most practical or politically necessary to temporarily designate the specialty to be subsidiary to, or as a division of, one of the traditional specialties. For example, in Jordan, EM started as a subspecialty under family practice, but it was planned and committed to becoming an independent specialty once a sufficient number of fully-trained EPs were available.¹⁶

Within any country, there are many advantages for the EPs to have EM develop status as a discrete specialty or subspecialty, but these must be initially balanced by concern about the possible negative consequences of creating polarization or political barriers with the other medical specialties. We believe that well-established EM can significantly aid and support the other medical specialties. Presence of EPs allows other medical specialists to concentrate on their areas of expertise and interest, and can free them from the time and work burden of having to maintain continuous physical presence within the hospital.

As EM develops within a country, it is important for EPs to have administrative control over all patient care rendered within the ED. Physicians from other medical specialties should be able to perform patient care within the ED, but having the clinical policies within the facility set by EPs allows better advocacy and care coordination for ED patients.

The government, through the Ministry of Health or other suitable agency, can be instrumental in assisting the development of EM. The EPs should be allowed to develop their own specialist training programs and certifications. The Ministry of Health should designate a government official to be responsible for overseeing and coordinating emergency health care policies nationwide and appropriately support this person. The Ministry of Health, with EP input, should also set the training standards for nonphysician out-of-hospital and ED

personnel. Also, regulations should be set regarding operations and equipment of out-of-hospital care vehicles. The government (within the constraints of resources and geography) should provide support for development of the other infrastructure components (roads, communications facilities, interaction with other public service personnel, such as fire and police, etc.) that would be needed by emergency health care personnel for optimization of the emergency health care system.

The EM development process can be aided by early formation of a national society of EPs. At an initial meeting, leaders of the national society could be elected and operational guidelines for the society adopted. The society could have as one of its major activities the promotion of development of EM within the country, as well as serving as a primary body for advocacy for emergency patients. The society's activities could include developing ongoing EM education courses and a specialty certification examination, deciding on time-limited criteria (other than completion of a residency program) for eligibility to take the certification exam, producing communications (such as a newsletter) for updating its members, and fostering interaction with EPs from other countries. As a later goal, the society could support development of a specialty journal in EM for the country and could provide consultation on training for other emergency health care personnel.

Emergency medicine development components that could be considered of key importance for all countries, and the components that are modifiable based on local concerns, are summarized in Table 1.

FUNDING SOURCES FOR DEVELOPMENT OF EM

In general, expensive investments are not required to initiate EM training programs, and much of the infrastructure for a good EM system is already in place in many countries.^{2,17} We believe that emergency health care ought to be available to all members of a country's population. Governmental support, including financial support, is necessary to ensure this. Establishing an effective EM system might then enable the national health care system to reduce health care expenditures by reducing unnecessary (and expensive) hospital admissions.¹⁰ As part of the planning process to develop EM, detailed analyses of the development costs will need to be done so early financing can be arranged and ensured.¹⁸

The initial EM core faculty could be selected from physicians who are already in practice and would usually already be salaried by the hospitals.

TABLE 1. Emergency Medicine (EM) Development Components: General vs Local Applicability*

Components Important for All Countries	Components Varying Based on Local Factors
Public access to emergency care	ED equipment
Designated EDs	EPs staffing ambulances
Core EM faculty	Extent of training for EMS personnel
Defined EP training (core curriculum)	Ambulance equipment
Coordination of out-of-hospital and in-hospital emergency care	EM specialty vs subspecialty designation
Defined training for non-EP personnel	Type of financing
National EP organization for advocacy	Focused EM courses
Governmental support	In- vs out-of-country training
Public education programs	Number of EPs per unit population
Eventual outcomes studies	Recertification methods

*ED = emergency department; EP = emergency physician; EMS = emergency medical services.

Supplementary training for these EPs could be arranged using the following resources:

1. Purchasing or receiving donated written and electronic educational materials that are already used in existing well-established EM training programs (e.g., a large volume of didactic material is now downloadable free from the Internet).
2. Attending courses or conferences in countries with well-established EM.¹⁹
3. Attending observational fellowships in countries with established EM.^{20,21}
4. Having experienced EM faculty from other countries provide bedside and didactic teaching.²²
5. Completing postgraduate EM residency training in an established program.

Financing for EM residency programs could use the same arrangements as currently support other existing residency programs. In some countries, this would be from patient care revenues generated by the ED and/or from financial support by universities or the government. If health insurance is available and used within the country, this should have provisions for coverage of ED visits.

Training costs for out-of-hospital care personnel in most countries ought to be relatively small, as a large number of nonphysician out-of-hospital personnel can be trained by a small cadre of instructors.

There are a number of options for funding sources to finance the government's obligations to oversee and regulate EM and out-of-hospital care. Methods such as licensing fees, taxes on gasoline or alcohol, per-capita tax surcharges, and/or import, entry, or exit fees have been successfully used.

Operations of a national EM society or profes-

sional organization could be supported by dues payments from members, as well as solicitations from private foundations or the Ministry of Health. Subscription fees for the society's newsletter or journal or other educational materials could also be collected. Continuing medical education programs in EM could be financed by fees paid by the participants and administered through medical schools.

HOW COUNTRIES WITH WELL-ESTABLISHED EM CAN ASSIST IN THE DEVELOPMENT OF THE SPECIALTY ELSEWHERE

A large number of written and electronic EM educational materials have already been prepared. For EPs fluent in English, these materials can be directly used for initial didactic training. Translation and suitable cultural modification of these materials would be necessary for other EM core faculty. Any of the several large multiauthor textbooks on EM could be used as the basis for a core curriculum for resident training. The list of required core curriculum topics for U.S. EM residency programs could be reviewed to identify additional topics requiring coverage.²³ Subscription by EPs to any one of the more than 12 U.S., five U.K., one Australian, one Hong Kong, and one European EM journals (among others) would provide ongoing updated education.²⁴ A reference list of articles describing various national EM development situations is available and allows comparisons of different development methods successfully used in different countries.²⁵ The *Annals of Emergency Medicine* continues to publish a series of articles describing the status of EM in different countries, and these articles demonstrate a number of different successful development approaches.

There are a large number of well-established short-duration training courses on various EM topics that could be attended by physicians from other countries. Usually, proficiency in English would be needed by the participants for these courses. These courses can provide didactic training in specific aspects of EM, but should not be construed to constitute the equivalent of EM residency training. These courses can be used by EM core faculty to "fill in" gaps in their knowledge or experience, as well as to provide nuclei for further course development within their own residency programs. It may be possible also for EM faculty based in countries with well-established EM to conduct these courses in other countries. This approach (sending instructors to other countries to conduct the courses) is often less expensive than bringing course attendees to the United States for training.

A list of these courses is available from the authors. Again, it should be emphasized that these "merit badge courses" should not substitute for the broader and more in-depth training of EM residency programs, but these courses can be useful in the very early phases of EM development (and then later can be superseded by full residency training).

A number of academic institutions offer the opportunity for physicians from other countries to undertake an "observational" EM fellowship of one month to one year. This type of fellowship program involves the physician observing in the ED and attending teaching conferences and other academic activities.¹⁹ In some situations, medical licensing requirements do not allow persons from other countries in these fellowship programs to perform direct patient care. However, several of these programs currently operating have found that the fellows (on the basis of post-program surveys) think that the experience has helped them to be better EM teaching faculty.²⁶ Generally, these programs require that the salary and living expenses for the person doing the fellowship be funded from the home country.

It may also be possible for some physicians from other countries to undertake full EM residency training in countries with well-established EM residency programs. The disadvantages of this approach are that the physician would have to be fluent in English and would require a three- or four-year time commitment to training outside his or her home country. This approach, however, has been successfully used by some countries, for example, Iceland. Unfortunately, the U.S. government is placing more restrictions on the numbers of physicians from other countries who can train in U.S. residency programs. In addition, the availability of positions for physicians from other countries in the U.S. EM residencies is limited because of the numbers of the U.S. applicant pool for these programs.

Attendance by physicians and other health care personnel from other countries at the major well-established national or international EM conferences could be helpful at providing them didactic education, as well as developing their contacts with EM faculty. The annual conferences of the U.S. nursing organizations might also be valuable for nurses from other countries.

Establishing affiliations with and active memberships in the three main U.S.-based organizations involved in international EM development (Emergency International, SAEM International Interest Group, and ACEP International EM Section) also would facilitate networking internationally.

LIMITATIONS AND FUTURE QUESTIONS

This article does not represent a scientific study and is based on our opinions and experience and not on published research studies. The efficacy of our opinions on EM development methods has not been substantiated scientifically. We are interested in performing outcome studies on EM system development efforts, but have not yet been able to do this. Factors limiting efficacy assessments include the lack of epidemiologic data collection systems, the very recent initiation of EM system development, the concurrent epidemiologic transitions, limitations of research funding and facilities, and the changes in government systems that have occurred in many of the countries in which we have worked.

Further studies are needed to assess the effectiveness of different methods of EM system development.

CONCLUSIONS

The planned development of the specialty of EM is important for any country to consider. This development involves securing funding, establishing EDs, designating core faculty, establishing emergency health care training programs, and arranging for governmental support and supervision of the emergency health care system. Developmental planning for the specialty can be used to attempt more rapid, efficient, and complete provision of quality emergency health care for any country.

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