

A survey of emergency medicine in 36 countries

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ABSTRACT

Objective: To assess the current level of development of emergency medicine (EM) systems in the world.

Design: Survey of EM professionals from 36 countries during a 90-day period from Aug. 25 to Nov. 24, 1998.

Participants: Thirty-six EM professionals from 36 countries and 6 continents completed the survey. Thirty-five (97%) were physicians, of whom 25 (69%) gave presentations at 1 of 4 international EM conferences during the study period. Three potential participants from 3 countries were excluded because of language barriers. Five additional participants from 5 other countries did not respond within the study period and were excluded.

Measurements: Respondents completed a 103-question questionnaire about the presence of EM specialty, academic, patient care, information and management systems and the factors influencing the future of EM in their countries.

Results: The overall response rate was 88%. Nearly all respondents (97%) stated that their countries had hospital-based emergency departments (EDs). More than 80% of respondents reported that their countries have emergency medical services (EMS), national EMS activation phone numbers and ED systems for pediatric emergency care. More than 70% stated that their countries had national EM organizations, EM research, ED systems for patient transfer and peer review and emergency physician (EP) training in Advanced Cardiac Life Support (ACLS) and the ability to perform rapid sequence intubation. More than 60% reported ED systems for trauma care and triage and EP training in Advanced Trauma Life Support (ATLS) and the ability to perform thrombolysis for acute myocardial infarction. Fifty percent reported EM residency training programs, official recognition of EM as an independent specialty, and EM journals.

Conclusions: Basic emergency medicine components now exist in the majority of countries surveyed. These include many specialty, academic, patient care and administrative systems. The foundation for further EM development is widely established throughout the world.

RÉSUMÉ

Objectif : Évaluer le niveau actuel de développement des systèmes de médecine d'urgence (MU) dans le monde.

Conception : Sondage auprès de professionnels de MU dans 36 pays différents au cours d'une période de 90 jours, soit du 25 août au 24 novembre 1998.

Participants : Trente-six professionnels de MU provenant de 36 pays sur six continents répondirent au sondage. Trente-cinq d'entre eux (97 %) étaient des médecins, dont 25 (69 %) firent des présentations lors de l'une des quatre conférences internationales de médecine d'urgence au cours de la

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période d'étude. Trois participants potentiels de trois pays furent exclus en raison de barrières linguistiques. Cinq participants de cinq autres pays ne répondirent pas dans les délais prescrits pas la période d'étude et furent donc exclus.

Mesures : Les participants répondirent à un questionnaire comportant 103 questions sur la présence de systèmes pour la spécialité de MU, son enseignement, les soins aux patients, l'information et la prise en charge et sur les facteurs influençant l'avenir de la MU dans leur pays.

Résultats : Le taux global de réponse fut de 88 %. La presque totalité des participants (97 %) indiquèrent que leur pays était doté de départements d'urgence (DU) rattachés à des hôpitaux. Plus de 80 % des participants signalèrent que leur pays était doté de services médicaux d'urgence (SMU), d'un numéro de téléphone national pour alerter ces SMU, et de systèmes au DU pour les soins d'urgence pédiatriques. Plus de 70 % des participants déclarèrent que leur pays disposait d'un organisme national de MU, de recherche en MU, de systèmes au DU pour le transfert des patients et d'une formation des médecins d'urgence (MU) en soins avancés en réanimation cardiaque (SARC) de même que de la possibilité d'effectuer des intubations en séquence rapide. Plus de 60 % des participants indiquèrent la présence de systèmes au DU pour les soins de traumatologie et le triage, la formation des MU en soins avancés en traumatologie (SAT) ainsi que la possibilité de procéder à la thrombolyse dans les cas d'infarctus du myocarde. Cinquante pour cent des participants signalèrent la présence de programmes de résidence en MU, de la reconnaissance officielle de la MU en tant que spécialité distincte et de revues de MU.

Conclusions : Les composantes de base de la médecine d'urgence existent maintenant dans la majorité des pays ayant répondu au sondage. Ces composantes comprennent de nombreux systèmes de spécialités, d'enseignement, de soins aux patients et d'administration. La base pour le développement futur de la MU est bien établie à travers le monde.

Key words: emergency medical services, emergency medicine, international health, survey

Introduction

Although multiple reports on the status of emergency medicine (EM) in individual countries have been published in recent years, little information is available comparing EM systems globally.¹⁻⁴ It is difficult to gather information from countries with diverse geographic, political, cultural, linguistic, historical and medical environments, but it is important to do so as a first step toward understanding the development of our specialty around the world.

Describing the status of EM systems worldwide provides a baseline for comparing EM among countries and defines a benchmark against which future development can be measured. It also provides a context for comparing EM by nation groupings (e.g., those with similar geography, population, economic productivity, political systems or cultural composition). It may also help to guide intervention efforts and to allocate limited resources in developing countries. Such information could play a role in the future establishment of international standards of emergency care.

Our objective was to describe the components of EM systems in as many countries as possible, including specialty, academic, patient care, information and management systems.

Methods

A survey of 36 EM professionals from 36 countries was performed by one of the authors (J.L.A.), during the 3 months from Aug. 25 to Nov. 24, 1998. Survey subjects met the following criteria: 1) a medical professional working in an EM-related field; 2) attended 1 of 4 international EM conferences during the study period (30) or referred into the survey by a previous respondent (6); and 3) able to communicate in English.

Direct one-on-one interviews were conducted with 27 delegates attending 1 of 4 consecutive international EM conferences held during 1998. These conferences included the 4th Pan-European Conference on Emergency Medical Systems (Opatija, Croatia, Aug. 25-29), the 4th Asian-Pacific Conference on Disaster Medicine (Sapporo, Japan, Sept. 2-4), the Emergency Medicine and Prehospital Care Conference (Johannesburg, South Africa, Oct. 7-9) and the American College of Emergency Physicians Scientific Assembly (San Diego, Calif., Oct. 11-14). Potential interviewees were identified from rosters of the conference participants made available by conference organizers. Direct interviews were conducted with a laptop computer screen facing the subject so that the questions could be read in English as they were simultaneously being

read aloud in English. Responses were entered immediately by the author in the presence of the respondents to assure correct interpretation and data entry.

Email surveys were conducted with 3 attendees after the conference and with the 6 others who were referred into the study. Participants were asked 95 questions about the existence of various EM specialty, academic, patient care, information and management systems and 8 questions about the future of EM in their countries. When available, the respondents' answers were corroborated by a review of the international EM literature.⁵⁻³⁵

This study was exempt from institutional board review. Respondents provided their consent to participate in the survey at the time their participation was solicited.

Table 1. Professional or academic positions of the 36 study participants

Country	Professional or academic position
Australia	Director of EM department
Austria	EMS instructor; director, EMS quality assurance
Brazil	Director of EM department
Canada	Past-president, national EM society
China	Director of EM department
Costa Rica	President, national EM society
Croatia	EMS physician
Czech Republic	EMS physician; editor of EM journal
Finland	Director of EMS agency
Germany	EMS physician; professor of anesthesiology
Hong Kong (SAR)	Consultant in A&E
India	Director of A&E department
Indonesia	Director of national disaster medicine agency
Italy	Director of EM department
Japan	Director of EM department
Kenya	Director of EMS agency
Latvia	Director of EMS agency
Malaysia	Director of EM department
Namibia	Emergency physician
New Zealand	Emergency physician
Pakistan	Director of trauma surgery
Peru	Assistant director of EM department
Philippines	Director of trauma surgery
Singapore	Consultant in A&E
Slovenia	EMS physician; government advisor on EM
Spain	Director of EM department
South Africa	Director of trauma surgery
South Korea	Director of EM department
Switzerland	Director of EM department
Taiwan	Assistant professor of EM
Thailand	Director of disaster medicine department
Tunisia	Director of EM department
Turkey	President, national EM society
United Kingdom	Consultant in A&E
United States	Assistant clinical professor of EM
Zimbabwe	Physician in casualty unit

Note: All but one participant (from Austria) had an MD degree.
EM = emergency medicine, EMS = emergency medical services, A&E = accident and emergency.

Results

Table 1 lists the professional or academic positions held by survey participants at the time of the study. Twenty-five survey respondents (69%) gave presentations on EM topics at one of the conferences. Three potential participants, from Bangladesh, Bosnia and Herzegovina, and Bulgaria were initially identified but excluded because of language barriers. Five potential participants, from Argentina, France, Israel, Poland and Russia were surveyed but did not respond within the study period and were excluded. The overall study response rate was 88%.

Table 2 lists the per capita gross domestic product, life expectancy and population in the countries represented in the survey.³⁶⁻³⁸ The estimated total population of the countries surveyed is 3.9 billion, representing about 66% of the total world population (5.9 billion).^{36,38}

Table 2. Per capita gross domestic product (GDP), life expectancy and population in the 36 countries³⁶⁻³⁸

Country	Per capita GDP	Life expectancy, yr	Population (million)
United States	28,600	76	274.0
Hong Kong (SAR)	26,000	79	6.7
Canada	25,000	79	30.5
Australia	23,600	80	18.5
Japan	22,700	80	126.2
Switzerland	22,600	79	7.3
Singapore	21,200	78	3.5
United Kingdom	20,400	77	58.6
Germany	20,400	77	82.1
Austria	19,700	77	8.1
Italy	19,600	78	57.3
Finland	19,000	77	5.1
New Zealand	18,500	78	3.8
Spain	15,300	78	39.6
Taiwan	14,700	77	21.7
South Korea	14,200	74	46.1
Slovenia	12,300	75	2.0
Czech Republic	11,100	74	10.3
Malaysia	10,750	70	21.4
Thailand	7,700	69	60.3
Brazil	6,300	64	165.8
Turkey	6,100	73	64.4
Costa Rica	5,500	76	3.8
Tunisia	5,400	73	9.3
South Africa	4,800	73	39.4
Croatia	4,300	74	4.7
Peru	3,800	70	24.8
Latvia	3,800	67	2.4
Indonesia	3,770	62	206.3
Namibia	3,700	41	1.7
China	2,800	70	1225.7
Philippines	2,600	66	72.9
Zimbabwe	2,340	39	11.4
Pakistan	2,300	59	148.1
India	1,600	63	982.2
Kenya	1,400	48	29.0
Total			3875.0

National EM organizations were identified in 28 (78%) of the 36 countries (Tables 3, 4). Of these, 15 were established in the past 10 years. Recognition of EM as an independent medical specialty was reported in 18 countries (Table 3). Official recognizing bodies included national medical associations, colleges of medicine and government ministries of health. Board certification or similar credentialing for EPs was reported by 13 countries (36%), 9 of these had established board certification in the past 10 years.

Academic systems

Emergency medicine is taught in the medical schools of 30 countries (83%) (Table 3). In 20 countries (56%), EPs teach EM. EM is taught through clinical rotations for medical students in 29 countries (81%) and by formal lecture in 27 (75%). EM residency programs (or equivalent) are present in 18 countries, and at least 10 of these countries established their residency training programs within the past decade. Programs ranged in length from 3 years (Peru,

Table 3. Emergency medicine specialty and academic systems in the 36 study countries

Country	National organization	Specialty status	Board certification	Medical education	Residency training	Fellowship	Research	Journal	National database
US	x	x	x	x	x	x	x	x	
HK (SAR)	x	x	x	x	x		x	x	
Canada	x	x	x	x	x	x	x	x	
Australia	x	x	x	x	x		x	x	
Japan	x		x	x			x	x	
Switzerland	x			x			x		
Singapore	x	x	x	x	x	x	x		x
UK	x	x	x	x	x	x	x	x	x
Germany	x			x			x	x	
Austria	x			x			x		x
Italy	x	x		x	x		x	x	
Finland	x			x			x		
New Zealand	x	x	x	x	x		x	x	x
Spain	x			x			x	x	
Taiwan	x	x	x	x	x		x	x	
South Korea	x	x	x	x	x		x	x	
Slovenia	x			x			x		x
Czech Rep.	x			x				x	
Malaysia	x	x		x	x		x		
Thailand				x					
Brazil	x			x	x		x	x	
Turkey	x	x		x	x		x		
Costa Rica	x	x		x	x		x		
Tunisia	x			x			x		
South Africa				x			x	x	
Croatia	x	x							
Peru		x	x	x	x		x		
Latvia	x	x	x		x				
Indonesia	x			*			x		x
Namibia									
China	x	x		x	x		x	x	
Philippines	x	x	x	x	x		x	x	
Zimbabwe									
Pakistan									
India				x					
Kenya				x					
Total	28	18	13	30	18	4	27	17	6
Percentage	78	50	36	83	50	11	75	47	17

US = United States; HK = Hong Kong; UK = United Kingdom
 * Indeterminate response

Taiwan, US) to 6 years (Hong Kong, Italy). Only 4 respondents (11%) reported EM fellowships (Canada, Singapore, UK, US), which included pediatric EM, research and epidemiology, trauma, toxicology, cardiac care and emergency medical services (EMS).

EM research was reported in 27 countries (75%), basic science research in 22 (61%) and clinical EM research in 26

(72%). Seventeen respondents (47%) reported that their country had at least one EM journal (Table 5). Six (17%) reported that their country had a national EM database (Austria, Indonesia, New Zealand, Singapore, Slovenia, UK).

Patient care systems

EMS systems were reported in 32 countries (89%). The estimated percentage of patients presenting to hospitals with medical emergencies who arrived by EMS, ranged from 2% (Tunisia) to "almost all" (Germany). A national emergency phone number for public activation of EMS was identified in 31 countries (86%). Most European Union countries reported using "112", Japan, Korea and Taiwan use "119", and the US and Canada use "911". EMS activation numbers elsewhere in the world varied greatly.

Hospital-based EDs were reported in 35 countries (97%), of which 26 (72%) had independent department status within the hospital. In 19 countries (53%), the ED director may be, but was not necessarily, an EP.

EM residents provided some emergency care in 17 countries (47%) (Table 6), as did residents from other specialties in 33 countries (92%). EPs provided emergency care in 27 countries (75%), and in 30 countries (83%) other specialists also provided emergency care. The same physician provided emergency care to both medical and surgical patients in 31 countries

Table 4. National emergency medicine (EM) organizations identified in 28 (76%) of the 36 study countries

Country	EM organization
US	American College of Emergency Physicians, American Academy of Emergency Medicine, Society of Academic Emergency Medicine, National Association of EMS Physicians
HK (SAR)	Hong Kong College of Emergency Medicine
Canada	Canadian Association of Emergency Physicians
Australia	Australasian College for Emergency Medicine
Japan	Japanese Association for Acute Medicine
Switzerland	Schweizerische Gessellschaft fur Norgall und Rettungsmedizin
Singapore	Society for Emergency Medicine in Singapore
UK	British Association for Accident and Emergency Medicine, Faculty of Accident and Emergency Medicine
Germany	Arbeitsgemeinschaft der Notarzte
Austria	Austrian Association for Emergency and Disaster Medicine
Italy	Societa Italiana Medici di Pronto Soccorso, Associazione Nazionale dei Medici d'Urgenza, Federazione Italiana di Medicina d'Urgenza e Pronto Soccorso
Finland	Finish Society for Intensive Care: Group for Prehospital Care
NZ	Australasian College for Emergency Medicine, New Zealand Faculty
Spain	Society of Spanish Emergency Medicine
Taiwan	Society of Emergency Medicine, Taiwan, ROC
S. Korea	Korean Society of Emergency Medicine
Slovenia	Association of Emergency Medicine of Slovenia
Czech Rep.	Association of Prehospital Emergency Care
Malaysia	Malaysian Association for Traumatology and Emergency Medicine
Brazil	Brazilian Society for Integral Care and Trauma
Turkey	Emergency Medicine Association of Turkey
Costa Rica	Comision Nacional de Emergencias
Tunisia	Association Tunisian Reanimation
Croatia	Croatian Association of Emergency Medicine
Latvia	Latvian Emergency Medicine and Disaster Medicine Association
Indonesia	Bakornas PB/National Coordinating Board of Disaster Management
China	Chinese Association of Emergency Medicine
Philippines	Philippine College of Emergency Medicine and Acute Care

Table 5. EM journals identified in 17 of 36 study countries

Country	Title of journal
US	<i>Annals of Emergency Medicine, The American Journal of Emergency Medicine, Academic Emergency Medicine, The Journal of Emergency Medicine, Prehospital Emergency Care</i>
HK (SAR)	<i>Hong Kong Journal of Emergency Medicine</i>
Canada	<i>Canadian Journal of Emergency Medicine</i>
Australia	<i>Emergency Medicine</i>
Japan	<i>Journal of the Japanese Association for Acute Medicine</i>
UK	<i>Journal of Accident and Emergency Medicine, Pre-Hospital Immediate Care</i>
Germany	<i>Der Notarzt</i>
Italy	<i>Pronto Soccorso Nuovo</i>
NZ	<i>Emergency Medicine</i>
Spain	<i>Emergencias</i>
Taiwan	<i>Journal of Critical Care and Emergency Medicine</i>
S. Korea	<i>Journal of the Korean Society of Emergency Medicine</i>
Czech Rep.	<i>The Journal of Medical Emergency Care</i>
Brazil	<i>Brazilian Journal for Trauma and Emergency Medicine</i>
S. Africa	<i>Journal of Trauma and Emergency Medicine</i>
China	<i>The Chinese Journal of Emergency Medicine</i>
Philippines	<i>Lifeline/Philippine Journal of Emergency Medicine</i>

(86%). Medical and surgical care was integrated into one physical area within the EDs of 24 respondents (67%).

Formal systems for pediatric emergency care were identified in the EDs of 29 respondents (81%). The presence of interfacility transfer was reported in 27 (75%), trauma care in 25 (69%), triage in 24 (67%) and toxicological emer-

gency care in 20 (56%). Systems for psychiatric emergency care were reported by 23 of 35 respondents; 22 of 35 reported systems for obstetric and gynecologic emergency care.

At least some of the physicians who provided emergency care had Advanced Cardiac Life Support (ACLS) training in 28 countries (78%) and Advanced Trauma Life Support

Table 6. Emergency patient care systems in the 36 study countries

Country	ED care provided by		Services provided in ED				EPs trained in or perform					
	EM resident	EP	Triage	Trauma	Toxicology	Pediatric	ACLS	ATLS	RSI	Thrombolysis		
										MI	CVA	US
US	x	x	x	x	x	x	x	x	x	x	x	x
HK (SAR)	x	x	x	x			x	x	x	x		x
Canada	x	x	x	x	x	x	x	x	x	x	x	x
Australia	x	x	x	x	x	x	x	x	x	x		x
Japan		x	x	x	x	x			x	x		x
Switzerland		x	x	x	x	x	x	x		x	x	x
Singapore	x	x	x	x	x	x	x	x	x	x		
UK	x	x	x	x	x	x	x	x	x	x		
Germany					x	x	x	x	x	x		
Austria			x		x				x	x		
Italy	x	x	x	x	x	x	x	x	x	x		
Finland					x	x			x	x		
NZ	x	x	x	x		x	x	x	x	x		x
Spain		x	x	x	x	x	x	x	x	x		
Taiwan	x	x	x	x	x	x	x	x	x			x
S. Korea	x	x	x	x		x	x	x	x	x		x
Slovenia		x		x		x	x	x	x	x		
Czech Rep.		x			x	x			x			
Malaysia	x	x	x	x		x	x	x	x			
Thailand		x	x	x		x	x	x				
Brazil	x	x		x	x	x	x	x	x	x		
Turkey	x	x	x	x	x	x			x	x		
Costa Rica	x	x	x	x	x	x	x	x	x	x		
Tunisia		x	x		x	x	x		x	x		
S. Africa			x	x	x	x	x	x	x	x		
Croatia						x	x					
Peru	x	x	x	x	x	x	x	x				
Latvia			x	x		x	x		x	x		
Indonesia		x		x		x		x				
Namibia		x					x	x	x			
China	x	x					x		x	x	x	
Philippines	x	x	x	x		x	x	x				
Zimbabwe												
Pakistan												
India		x		x		x	x	x		x		
Kenya			x				x		x			
Total	17	27	24	25	20	29	28	24	27	24	4	9
Percentage	47	75	67	69	56	81	78	67	75	67	12	25

ED = emergency department, EM = emergency medicine, EP = emergency physician, ACLS = Advanced Cardiac Life Support; ATLS = Advanced Trauma Life Support; RSI = rapid sequence intubation; MI = myocardial infarction; CVA = cerebrovascular accident; US = ultrasonography.
 Note: Emergency medical services (EMS) systems were reported for all countries except Malaysia, Peru, Pakistan and Kenya. All countries except Pakistan had a hospital-based ED.

(ATLS) training in 24 (67%). EPs performed rapid sequence intubation (RSI) in 27 countries (75%). In countries where EPs utilized RSI, they had access to a variety of agents: succinylcholine (100%), nondepolarizing neuromuscular blockers (96%), midazolam (100%), ketamine (89%), thiopental (85%), fentanyl (81%), etomidate (73%) and propofol (73%). EPs initiated thrombolysis for myocardial infarction in 24 countries (67%), perform thrombolysis for acute ischemic

stroke in 4 countries (12%), and performed ultrasonographic examinations in 9 countries (25%). Ultrasonography was most often used by EPs for trauma ($n = 9$), abdominal pain ($n = 5$), cardiac ($n = 4$) and obstetric/gynecologic ($n = 3$) evaluations.

Table 7. EM management systems in the 36 study countries

Country*	Peer review	QA	Report variance follow-up		Risk management
			Lab	X-ray	
US	x	x	x	x	x
HK (SAR)	x	x	x	x	x
Canada	x	x	x	x	x
Australia	x	x	x	x	x
Japan	x				x
Switzerland		x	x	x	
Singapore	x	x	x	x	x
UK	x	x	x	x	x
Germany	x				
Austria	x				
Italy	x	x	x	x	
Finland	x				
NZ	x	x	x	x	x
Spain	x	x	x		
Taiwan	x	x	x	x	x
S. Korea	x	x			
Slovenia	x	x			
Czech Rep.					
Malaysia	x		x	x	
Thailand					
Brazil	x	x	x		x
Turkey					
Costa Rica	x	x	x		x
Tunisia	x	x			
S. Africa	x	x			
Croatia		x	x	x	x
Peru	x	*			
Latvia	x				
Indonesia	x	x			
Namibia					
China	x				
Philippines	x	x			
Zimbabwe	x				x
Pakistan					
India					
Kenya					
Total	27	20	15	12	13
Percentage	75	57	42	33	36

QA = quality assurance.
* Indeterminate response

Information and management systems

EPs had access to emergency patient medical records through a paper chart in 32 countries (89%) and an electronic chart in 20 countries (56%). Medical records were available within 30 minutes in the EDs of 21 respondents (58%). The estimated time to access medical records ranged from a "few minutes" (Finland, Latvia) to 3 hours (Croatia, Zimbabwe). EPs had access to the Internet in the EDs of 21 countries (58%), but only 9 (25%) had access while actually taking care of patients.

Respondents were surveyed about the existence of various management systems of EM in their respective EDs (Table 7). Formal systems for peer review were reported by 27 (75%). Systems for quality assurance were reported by 20 of 35 (57%); 18 of 35 (51%) reported systems for quality improvement. Systems for consumer satisfaction were cited by 18 (50%), risk management by 13 (36%), follow-up laboratory result variance by 15 (42%) and follow-up radiology result variance by 12 (33%). Only 13 (36%) reported ED systems for provision of cost-effective EM care.

Future of EM

Participants were asked to rate the obstacles to the future development of EM in their countries (Table 8). A lack of funding was felt to pose a moderate or great barrier in 28 countries (80%). Lack of infrastructure was seen as a moderate or great obstacle in 22 (63%); lack of government support a moderate or great obstacle in 20 (59%). A lack of public support was felt to pose little or no barrier to development in 21 countries (64%), whereas 23 of 34 participants (68%) felt that a lack of support from the physicians who practise EM posed little or no barrier.

Table 8. Participants' ratings of obstacles to the development of emergency medicine in their country

Obstacle, total no. of respondents	Rating, no (and %) of respondents			
	None	Little	Moderate	Great
Funding, 35	3 (9)	4 (11)	13 (37)	15 (43)
Infrastructure, 35	7 (20)	6 (17)	13 (37)	9 (26)
Government, 34	4 (12)	10 (29)	9 (26)	11 (32)
Hosp. admin., 34	5 (15)	11 (32)	11 (32)	7 (21)
Other MDs, 34	6 (17)	10 (29)	11 (32)	7 (21)
The public, 33	11 (34)	10 (30)	6 (18)	6 (18)
EPs, 34	14 (41)	9 (27)	8 (24)	3 (9)

Hosp. admin. = hospital administrator, EPs = emergency physicians.

Discussion

This survey describes the systems of EM in 36 countries, spanning 6 continents and comprising 66% of the world's population. A precise description of international EM systems would require reliable information from more respondents in more countries, but these data provide an important first "snapshot" of the current global status of EM.

What may surprise many is how developed EM now appears to be in much of the world. Throughout the world, many of the components of EM systems taken for granted in more advanced countries are in place in at least one centre in the majority of the countries surveyed. By determining the minimum presence of the various systems components of EM in countries, we gain our first organized glimpse of the status of EM in the world.

The most ubiquitous system for emergency patient care worldwide is the hospital-based ED (often with independent status within the hospital). The designation of a place in a hospital where the most acutely ill or injured patients are cared for appears to be a universal feature of emergency care.

Systems for prehospital emergency care exist worldwide as well. Of the countries surveyed, 89% had EMS systems and 86% had a national phone number through which the public accessed EMS. Despite this commonality, the actual phone number varied considerably from country to country. As globalization leads to increased public expectations from EM systems, it will be increasingly important for international health care policymakers to consider the merits of a "universal" phone number through which EMS can be activated worldwide.

Most respondents also reported that EDs in their countries had "formal" systems for the emergency care of children (81%) and trauma patients (69%) (Table 6). Formal systems for providing care to patients with toxicological emergencies were reported less often (56%). The factors underlying these differences are unclear and warrant further investigation.

Only 4 respondents reported that their countries had fellowship training in pediatric EM. Since pediatric EM will become an increasingly important concern as EM continues to develop worldwide, it will be helpful to understand how physicians providing emergency care to children are being trained throughout the world.

RSI appears widespread in the EP armamentarium for airway management (75%). In contrast, EP ultrasonography did is not used in many countries (25%) but was relatively common in more economically developed Asia, where surgeons have taken the lead in EM development (Japan, Hong Kong, South Korea and Taiwan). Although 67% of the countries surveyed reported that EPs could ini-

tiate thrombolysis for acute myocardial infarction, only 4 countries reported that EPs could initiate thrombolysis for acute ischemic stroke. For those seeking to promote this therapy on an international level, it may be worth investigating which factors underlie this apparent lack of acceptance, such as cost, unavailability of timely neuroimaging or therapeutic skepticism.

Educational systems for EM are well established in the countries surveyed. EM is taught in medical schools throughout the world (83%) and the time-honoured tradition of doctors in training seeing emergency patients existed in most countries surveyed (92%). The majority of respondents also reported that research in EM was performed in their countries. Half of the countries reported having EM residency training programs and EM journals. The majority of respondents also reported that at least some of the physicians who practise EM in their countries received training in ACLS (78%) and ATLS (67%).

What role does EM specialty recognition play in the development of EM? Whereas half of the countries reported official specialty recognition of EM, more than two-thirds reported the existence of advanced academic systems (EM research) and patient care systems (EMS, trauma care), suggesting that more mature systems do develop in some countries even in the absence of officially recognized EP specialists. As seen in the development of EM in the US,¹ the specialty status of EM may be as much a consequence of development as it is a cause of development.

The availability of patient medical records has been cited as an essential component in the development of emergency care systems.³⁹ Most respondents (89%) reported that EPs have access to paper medical records, and 56% reported access to electronic medical records in their EDs. Only 25% of the respondents reported that EPs had access to the Internet while taking care of patients, suggesting that online resources have yet to replace textbooks on the shelves of the world's EDs.

Although systems for quality assurance and quality improvement existed in the EDs of the majority of the respondents surveyed, EM databases were conspicuously underdeveloped throughout the world (17%). The development of national EM databases appears to remain a genuine frontier in the development of EM throughout the world.

What role does cost play in the development of EM in the world? On one hand, the respondents overall felt that a lack of funding was the greatest barrier to the development of EM in their countries. On the other hand, only 36% reported any system for providing cost-effective emergency care to their patients. It is also worth noting that in the 27 countries where EPs performed RSI, they had access to relative-

ly expensive induction agents (i.e., midazolam, etomidate, propofol) at rates comparable to less expensive agents (i.e., ketamine, thiopental, fentanyl). Although local costs may vary and percentage availability does not mean percentage utilized, access to more expensive medications also suggests that cost-containment was not yet considered a pressing issue in many countries. This has important implications for those involved in developing EM internationally. Although it is unlikely that those involved in international assistance can persuade government officials and health care financiers in other countries to fund emergency care systems at greater levels, they can readily introduce cost-sensitive and cost-effective approaches to emergency care to their colleagues in other countries.

Most of the respondents reported that their EDs did not have systems for risk management (64%), systems for follow-up radiology report variance (67%), or systems for following up laboratory report variance (58%), suggesting that EM malpractice was not a major concern in most of the world.

Overall, the respondents felt that the physicians practicing EM in their countries presented a smaller obstacle to the future development of EM than did hospital administrators and other physicians. They also felt that a lack of public support was a smaller barrier than a lack of government support. For those interested in international EM development, this underscores the need to educate government policymakers, hospital administrators and other physician specialists of the many benefits of improved EMS. It also suggests that in many countries, an appreciative public awaits the improved emergency medical care that an enthusiastic core of EPs hopes to provide.

This survey also begins to establish a methodology by which an international database of information about EM throughout the world can be accumulated. A more accurate description of the status of EM in the world awaits the consensus participation of experts and agencies in international EM and the establishment of definitions and constructs that are accepted worldwide. A definitive survey will require the application of more sophisticated and widespread survey and sampling techniques. It also awaits the availability of more efficient means of locating and communicating with local EM experts in even the most remote regions of the world.

Establishing such a database will have multiple obvious benefits and can be expanded multidirectionally to include all types of information about EM throughout the world, including workforce, cost and patient outcome data. This information will also be essential for future analysis and comparison of different systems of emergency care delivery, which in turn may assist the establishment of international standards of emergency medical care.

This study demonstrates that the development of EM as a specialty is an international phenomenon that transcends political, economic, cultural and geographic barriers. It also suggests that the overall development of EM may be more advanced in the world than intuitively expected from multiple recently published reports from individual countries.⁵⁻³⁵ Perhaps most importantly it suggests that the kernel for future EM development already exists worldwide.

This survey had a number of important limitations. Many of the terms used in the survey lack internationally accepted definitions. Even terms like “emergency physician” and “EMS” may be subject to different interpretations from country to country. To one respondent, a “system for trauma care” may mean that the physician on duty merely calls a surgeon, whereas to another it may mean a trauma team response according to American College of Surgeons criteria. Still, the significance of the respondent’s answers lies not in whether countries have equivalent systems, but in whether the respondent perceived that any system exists at all.

Another limitation was that this study only ascertained the minimum existence of each single system component of EM. No data were collected regarding the frequency of any of the components surveyed. For example, we were unable to report how often EPs served as ED directors or how frequently RSI was performed. Furthermore, the survey did not provide any information about where these system components were located or how they were distributed in a country. Importantly, this study did not report any information about the quality of emergency care provided in the countries studied, which depends instead on outcome data.

The inability to internally validate a single respondent’s responses by comparing them with other responses from the same country was another problem. In countries with regional EM variation, a single respondent could unknowingly misrepresent the status of EM elsewhere in the country. In addition, it is possible that some respondents might embellish their description of EM systems in a country to create a “better” appearance to the outside world.

Furthermore, because participants were primarily recruited from international EM conferences, potential participants from many underdeveloped and developing countries were not included in the study, owing to their financial inability to participate in international EM conferences. Finally, because of the need to communicate in English, the study may not adequately represent countries where English is not in common use. Despite this limitation, the study presents data from a large number of countries, including several that have not been previously reported in English language EM literature.

Conclusions

This survey offers a snapshot of the development of EM in the world today. The most common component of emergency medical care systems worldwide was the hospital-based ED. Almost as widespread were EMS systems, followed closely by the EP, often with specialized training (ACLS, ATLS) and the ability to perform life-saving procedures, such as RSI or thrombolysis. The specialty systems components of EM were also in place in many countries, including national EM specialty organizations, residency training, official specialty recognition and certification boards. Many academic systems of EM existed throughout the world, including medical education in EM, EM residency training, the performance of EM research, and the publication of EM journals. All of these systems components provide the foundation upon which EM can grow locally, regionally and internationally.

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