

Emergency Medicine in Japan

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There have been few reports published in English on emergency medicine (EM) in Japan; the main reason for this is that the concept of EM was different in Japan from that in western countries. In the 1960s, legislation was passed in Japan that implemented emergency medical services, and emergency hospitals were designated by the government. There were no emergency medicine specialists, and so surgeons/physicians without specialist training in emergency medicine provided care to emergency patients (the multispecialist-type model). The Japanese Association for Acute Medicine (JAAM), an academic society for emergency physicians, was founded in 1973. In its pioneering days, this association focused mostly on trauma/burn care and also influenced policymaking. In 1977, the government built emergency medical service centers (the ICU-type model) and reorganized all emergency medical facilities into three levels. With the aging of society, the number of non-trauma patients presenting at hospitals, especially in the elderly population, has increased and has resulted in some cases of refusal by hospitals to accept emergency patients. A new postgraduate medical education curriculum was legislated in 2004 that mandated EM training for all postgraduates and encouraged reinforcement of emergency departments in teaching hospitals. The JAAM established a committee to promote the ER-type model of EM in 2003. By 2007, more than 150 JAAM-affiliated hospitals had implemented this type of EM. In conclusion, emergency medicine in Japan is currently based on a mixture of three models: the multispecialist-type, the ICU-type and the ER-type models. (Keio J Med 59 (4) : 131–139, December 2010)

Keywords: emergency medicine, emergency medical service center, ER-type, emergency medical service, emergency medical care

Introduction

Emergency care is defined as the evaluation and treatment of patients with unexpected illnesses or injuries. It has formed a core part of patient care since the birth of medicine in ancient times. Along the way, the development of prehospital medicine has promoted the advance of professional emergency care, e.g. ancestor of emergency medicine. During the Napoleonic Wars of the early 19th century, Dr. Dominique Jean Larrey used a horse-driven ambulance, whereby a group of surgeons provided care to injured soldiers on the battlefield. As automobiles became more common, victims were also transported by automobiles; this led to the establishment of ambulances carrying emergency medical technicians.

Hospitals began to be equipped with an emergency room for emergency visits, with the subsequent establishment, in modern societies, of emergency departments staffed by emergency physicians.

As medicine advanced in quality and became more specialized, emergency care also developed into one of the specialties: this process led to the birth of emergency medicine in the 1970s. The Anglo-American model evolved in the US and Canada and focused on patient care in the emergency department. The Franco-German model evolved in Europe and focused on prehospital stabilization and transportation to hospitals. The model of emergency medical care varies from country to country because emergency medicine and the emergency medical system are affected by the social culture, and because



Fig. 1 The first ambulance in Tokyo City; one of six donated by a citizen in 1935.³

emergency medicine is a relatively young field in all countries.^{1,2}

Birth of Emergency Medical Services and Emergency Medicine in Japan

In Japan, the concept of prehospital medicine preceded the introduction of emergency medicine. The government introduced a German-style army in the 1870s, with military surgeons and army medics whose work was limited to the battlefield. Other than that, there was no specifically established professional medical service for emergency care. The 1930s was the decade in which automobiles became popular in Tokyo and other urban areas, including Yokohama and Nagoya. The rapid development of industries resulted in an increase in traffic accidents and trauma victims. It was at this time that the concept of using automobiles to transport victims to hospitals was born. In 1935, a rich volunteer donated six ambulances to Tokyo city (**Fig. 1**).³ After initial controversies about whether the Police or Fire Department should administer ambulance services, the Fire Department was assigned the responsibility for prehospital transportation of victims. At the same time, the dial 119 service was introduced as an emergency telephone service for Tokyo. Soon thereafter, 119 became the national

emergency access number and the Fire Department assumed responsibility for prehospital transportation of victims nationwide. This was the birth of the emergency medical service (EMS) in Japan. It has been reported that the ambulance service was first developed in Yokohama in 1933, even prior to implementation of the service in Tokyo, the national capital.⁴

While ambulances were pressed into service in Tokyo and other big cities in the 1930s, there were no dramatic improvements in ambulance or emergency medical services for an extended period thereafter because Japan was involved in wars with China, followed by wars with the Allied Countries in World War II. The Fire Department of each city trained for disaster preparedness during the war to deal with fires resulting from air raids. After the war and the restoration of the Japanese economy, the number of ambulances gradually increased and the ambulance transportation service became more developed across the country. However, the ambulance service was not a service officially provided by the government until 1963, when legislation was passed mandating that the Fire Headquarters of each city, town and village should offer ambulance services to transport emergency patients to hospitals. In 1963, the numbers of ambulance dispatches and transportations were fewer than 200,000 annually; however, these figures increased steadily year

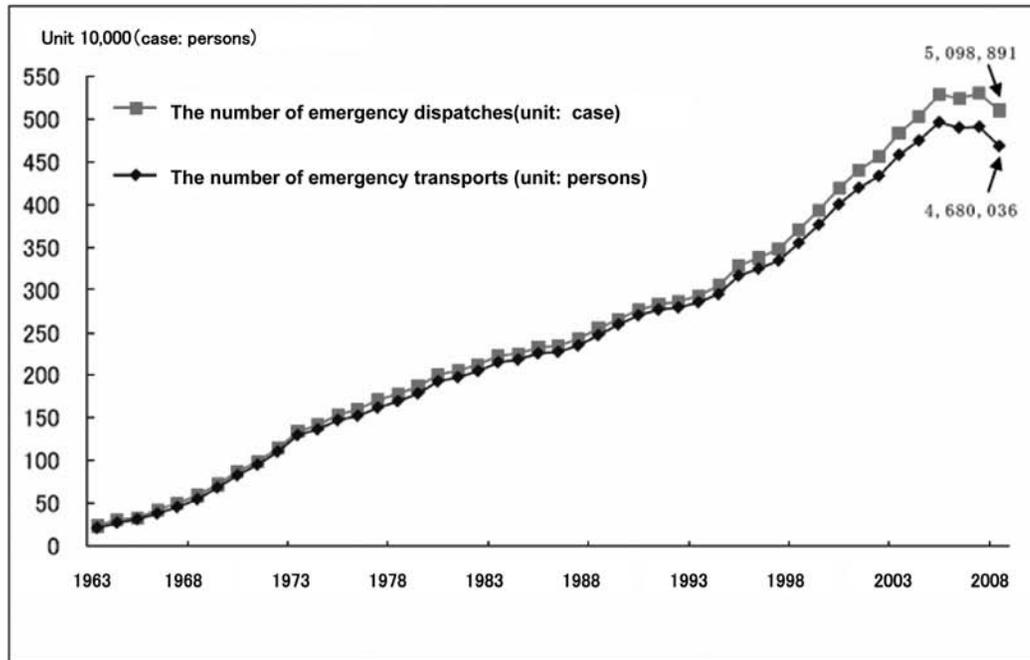


Fig. 2 Annual number of emergency dispatches and transportations in Japan.⁵

by year to exceed 5,000,000; they reached a plateau in 2008 (Fig. 2).⁵

Japan became progressively more motorized and this motorization increased the number of accident victims. In 1961, deaths by traffic accidents within 24 hours of injury exceeded 10,000, and newspapers reported the situation as a “traffic war.” In 1964, the government authorized prefectures to monetarily reward hospitals for remaining open at night and on holidays, and some clinics and hospitals started to operate after normal working hours. Although these designated emergency facilities were registered with the government, the requirements for recognition were very loose and were rarely enforced. emergency medicine was still not a specialty, and surgeons/physicians without specialized training provided care to emergency patients (multispecialist-type model). Quality assurance of emergency care was still not established.

Japanese Association for Acute Medicine

The Japanese Association for Acute Medicine (JAAM), founded in 1973, was the first medical association for emergency medicine in Japan. Improvement of care for critical trauma patients in traffic accidents was the main motive for its establishment.^{6,7} Accordingly, JAAM members initially comprised surgeons (80%), anesthesiologists (10%), and internists (5%). The name of the association did not include the words “emergency

medicine,” which was expressed instead as “acute medicine.” The concept of emergency care in Japan was different from that in western countries, in that it focused on critical trauma care.⁸ Because JAAM was the first established professional association of emergency physicians in Japan, its establishment had a great impact on policymaking by bureaucrats in the government. Membership of the association gradually increased as emergency medicine became increasingly well established in Japan, the membership of which now exceeds 10,000 (Fig. 3). The JAAM set up a specialty board in the 1980s. However, not all members of JAAM are emergency physicians; many members are involved in other specialties too. As of 2010, JAAM had only 3,035 board-certified emergency physicians, described officially as “acute care physicians” (<http://www.jaam.jp/index.htm>), which represented only 1.15% of all Japanese physicians (263,540 in number) in 2006. However, a nationwide survey performed by the Ministry of Health, Labor and Welfare indicated that there were only 1,693 emergency physicians in Japan in 2006 (http://www.mhlw.go.jp/toukei/youran/indexyk_2_2.html). This difference suggests that not all of the board-certified emergency physicians or acute care physicians practice emergency medicine, and/or that not all practicing emergency physicians are board-certified in emergency medicine. It is speculated that approximately 3,000 doctors, including residents, have dedicated themselves to the practice of emergency medicine in Japan. This number is

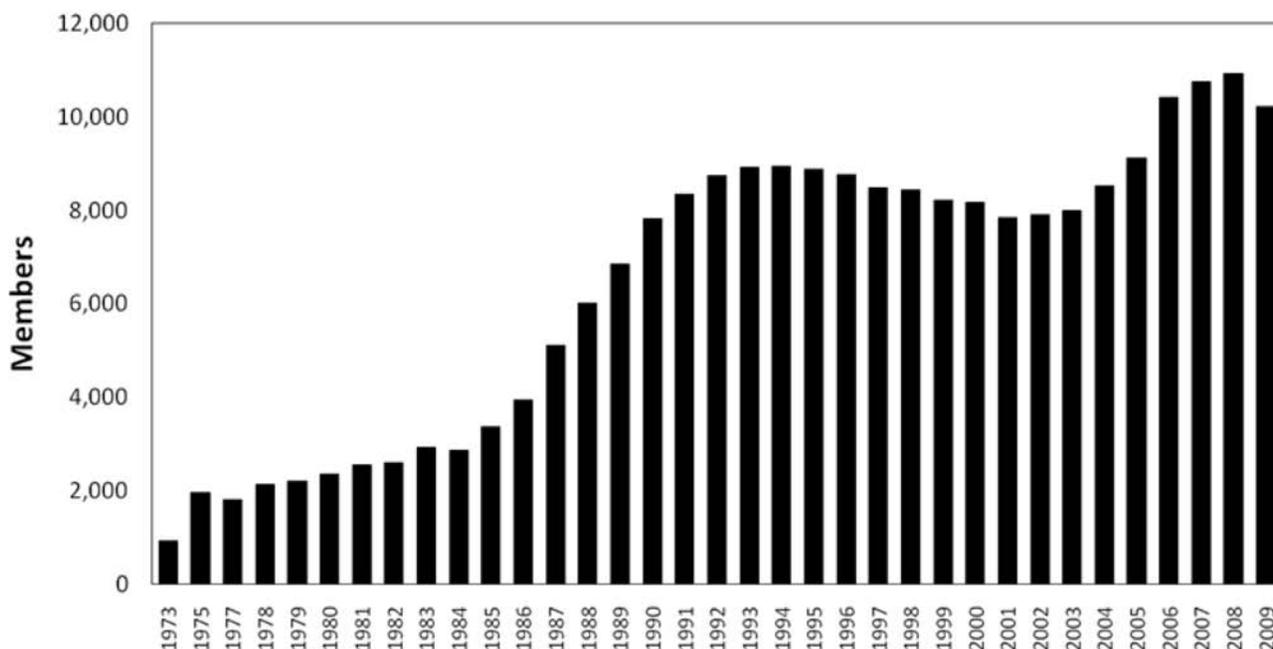


Fig. 3 Number of members of the Japanese Association for Acute Medicine.
Source: Japanese Association for Acute Medicine.

smaller than that reported from other countries, e.g., 40,000 emergency physicians in the US, and may reflect a problem in the practice of emergency medicine in Japan.⁹

Three Levels of Classification of Emergency Facilities

Although legislation mandating the ambulance service and registration of designated emergency facilities was passed nationwide in 1963, the hospital environment for the care of critical patients was not necessarily appropriate. In 1977, the government established the concept of building emergency medical service centers as tertiary emergency medical facilities in each region of the nation, serving a population of about a million each.¹⁰ Simultaneously, approximately 6,000 medical facilities were reorganized into three levels: primary, secondary and tertiary facilities. Primary-care facilities refer to clinics without beds that are assigned to treat low-acuity patients who can be safely discharged home. Only walk-in patients visit primary-care facilities, and only during nights and holidays. Secondary-care facilities are assigned to provide care for moderate-acuity patients who require admission to a regular inpatient bed. Both walk-in patients and ambulance-transported patients are treated at secondary-care facilities. Tertiary-care facilities are emergency medical service centers assigned to provide care for high-acuity patients who require admission to the intensive care unit or emergency surgery. In 2010, there were 605 primary-care, 4,169 secondary-care and 220 tertiary-care facilities in Japan. The basic concept

underlying such a three-level classification was that if a patient visiting a primary-care facility was judged to need in-hospital care, he/she was referred to a secondary-care facility, and if he/she was further judged to need tertiary care, he/she was sent to a tertiary-care facility. In reality, however, walk-in patients often directly visited secondary-care facilities without first visiting primary-care facilities, and ambulance teams often transported victims directly to tertiary-care facilities. Therefore, the three-level organization of emergency care facilities works well if prehospital triage of emergency patients by emergency medical technicians or citizens at the scene is well established; however, such triage is not always easy, especially for non-trauma patients and the elderly.¹¹

Emergency Medical Service Center

An emergency medical service center exists as a part of any major hospital in most urban areas; such centers are accredited by the government and receive grant money for their services. Most have 10 to 30 ICU beds and staffing ranges from several doctors to more than 30 doctors per center; however the focus remains on burn care and traffic accident trauma as the most prestigious services. Indications for admission to emergency medical service centers are deteriorating vital signs, as judged by emergency medical technicians. Thus, only the most critical patients are admitted and the admission rate is close to 100%. The number of admissions ranges from 500 to more than 1,000 per tertiary center annually. The

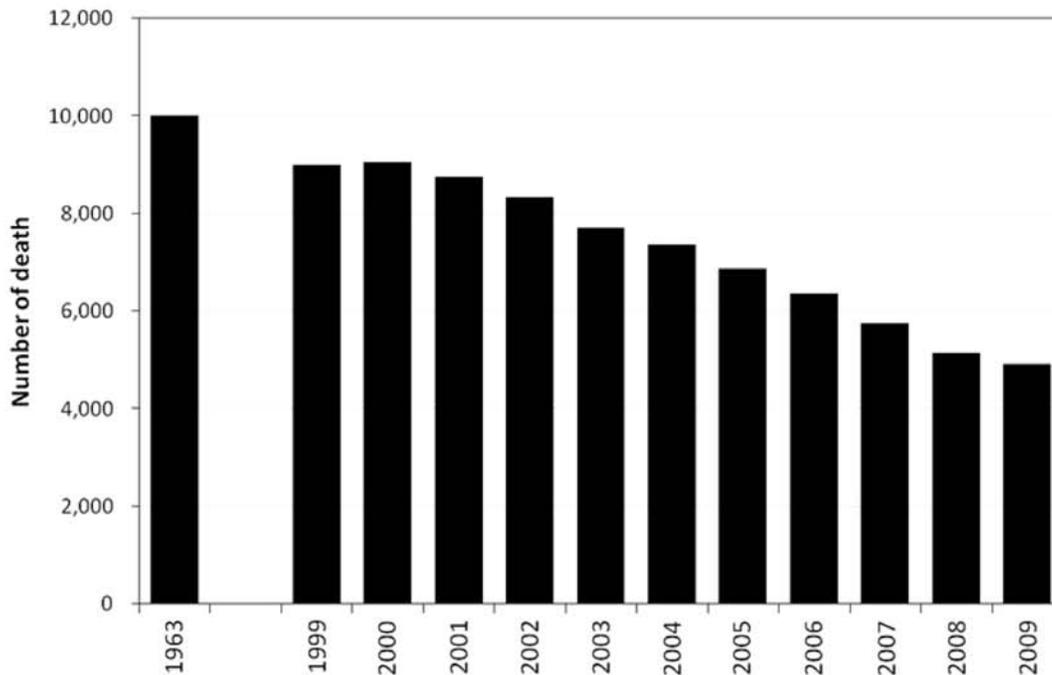


Fig. 4 Annual number of deaths within 24 hours of a traffic accident.
Source: National Police Agency (<http://www.npa.go.jp/toukei/index.htm>).

approval criteria set by the government are related to the staffing pattern and the presence of a surgical operating theater and ICU beds, indicating that the principal mission of these centers is trauma/critical care service dedicated to emergency patients (ICU-type model). Although accurate data are still to be collected, 2–4% of all ambulance transports comprise visits to emergency medical service centers. When noncritical patients visit an emergency medical center attached to a hospital, they are guided to a separate emergency room where doctors belonging to other specialties provide care.

Emergency medical service centers in Japan may resemble the trauma centers found in the US; however, patients are not limited to trauma/burn patients, but also include non-trauma patients. Since the 1980s, social changes have resulted in a shift of the population of emergency patients visiting emergency medical service centers. The number of deaths resulting from traffic accidents within 24 hours after injury has been decreasing since the days of the “traffic war,” probably because of improvements in automobiles and anti-drunk-driving campaigns (**Fig. 4**) (<http://www.npa.go.jp/toukei/index.htm>). Most likely because of the aging of society, the number of non-trauma patients transported by ambulance has increased markedly (**Fig. 5**).⁵ As of 2008, the elderly population has accounted for almost half of all emergency patients transported in ambulances (**Fig. 6**). Accordingly, many critical non-trauma patients were

also transported to emergency medical service centers and the government advised that the staffing of centers should include physicians specialized in cardiology and neurology. At present, emergency medical service centers provide multispecialty ICUs for both trauma and non-trauma emergency patients.

Multispecialist-type Model in the 2000s

Even after the deployment of emergency medical service centers, the majority of ambulance transportations were to secondary-care emergency hospitals. Emergency medical care in secondary-care facilities is generally provided by on-call physicians on a rotation basis or by intern-level physicians. Secondary- and tertiary-care facilities may have on-duty physicians staffing the emergency department (ED) during some hours of the day. This ED staffing pattern is generally based on a multispecialist-type model with specialist physicians providing different services and a nurse or intern directing patients to whichever service seems most appropriate based on the presenting complaint.

With advances in medicine, the goals of emergency medical care have become broader, based on accumulated clinical evidence, e.g., primary coronary intervention for ST-elevation acute myocardial infarction, early goal-directed therapy for sepsis, advanced trauma life support for major trauma, and application of clinical guidelines

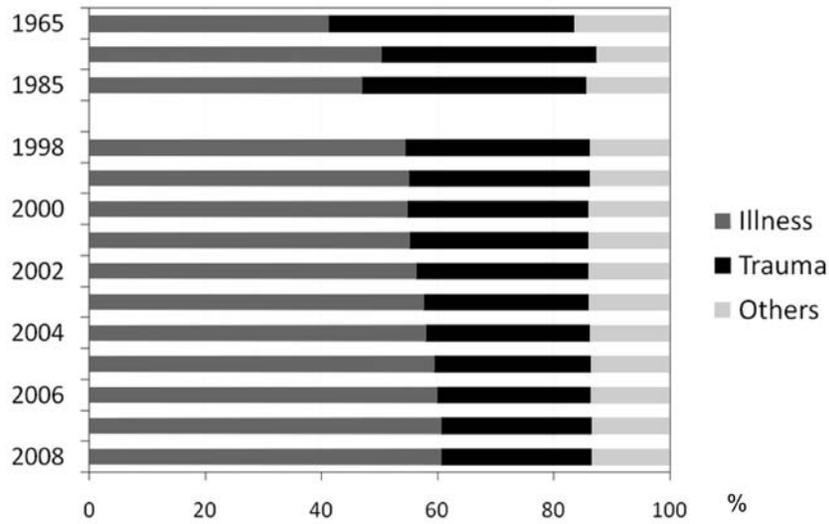


Fig. 5 Annual percentages of transported emergency patients with illness, trauma and other conditions.⁵

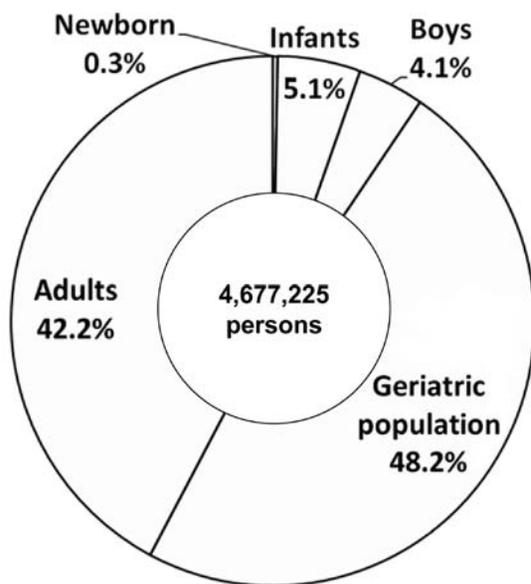


Fig. 6 Age groups of emergency patients transported by ambulance in 2008.⁵

for various disease/injuries. Thus, the practice of modern emergency care mandates special postgraduate training for physicians. It is not necessarily easy for non-emergency specialists, who may participate in the practice by rotation, to have the chance to train. When emergency patients with variable symptoms visit the emergency room, the specialty of the physician may not be appropriate for the disease/injury of the patient. Further, physicians are also challenged by the rapidly changing medico-legal environment. Even though their intent is to treat the patients to the best of their ability, there have

been instances of some physicians being taken to criminal courts as a result of unfavorable outcomes.¹² Recently, some non-emergency specialists have tended to opt out of emergency care. Some surgeons may not wish to care for critical-care trauma patients and some physicians may not want to care for elderly patients or patients with poisoning, for example. Pediatric and pregnant patients have also been the focus of *taraimawashi* (the serial rejection of a patient by several hospitals), as described later.

Selection of an Emergency Hospital for Acceptance of Patients

Because there are more emergency hospitals in Japan than in western countries, the number of patients visiting these hospitals is smaller and the resources for emergency care are limited in each hospital.^{13,14} Many secondary-care emergency hospitals may not be able to deliver appropriate emergency care for all types of medical/surgical emergencies. Accordingly, the selection of appropriate hospitals to which to transport emergency patients is a critical issue. This selection may need the skill of differential diagnosis and is considered the responsibility of emergency medical technicians, although it may be difficult even for physicians at the scene. Most secondary-care emergency hospitals are staffed by non-emergency specialists at night or on holidays and their specialties may not be appropriate for a given patient. This may account for many refusals by emergency hospitals to accept some patients.

Taraimawashi

Article 19 of the Medical Practitioners Law of Japan states that physicians cannot refuse to care for patients if

Table 1 Incidences of refusal to accept emergency patients by emergency hospitals in 2007 and 2008¹⁶

	2007		2008	
	Number of emergency patients refused	Percentage of total emergency patients	Number of emergency patients refused	Percentage of total emergency patients
Critical patients	14387	3.9	14732	3.6
Obstetric patients	1984	4.8	749	4.6
Pediatric patients	8905	2.8	9146	2.8

Refusal is defined as the ambulance team reporting more than four calls or more than 30 minutes of telephone communication before acceptance of emergency patients by emergency hospitals. The risk of refusal was high for critical, obstetric and pediatric patients.

requested. There is no punishment, however, if this law is violated. In reality, emergency hospitals decline to accept patients because of limitations in resources, e.g., no available hospital beds or the absence of specialists appropriate for the patient's symptoms. There is no law in Japan corresponding to the Emergency Medical Treatment and Active Labor Act (EMTALA) of the USA, which may punish hospitals if a patient is declined at an emergency department for screening and stabilization.¹⁵ *Taraimawashi*, or rotating around, is Japanese slang indicating the pitiable situation in which a request for the admission of an emergency patient is rejected by one hospital after another. As a result, the patient's transport to the hospital may be critically delayed. It is not uncommon for readers of newspapers to come across articles such as this: "An 89-year-old woman called an ambulance and was judged as not being critically ill initially. The ambulance team requested hospital for the patient acceptance about 30 times over a period of 2 hours, during which the patient's condition worsened and finally the patient had to be transported to a tertiary emergency medical service center. She died the following day" (Yomiuri Shinbun, Dec 28th, 2008). The Ministries of Internal Affairs and Communications reported that 3 to 4% of critical patients needed more than 30 minutes of telephone communication or more than four requests by the ambulance team for hospital admission in 2007 and 2008 (**Table 1**).¹⁶ *Taraimawashi* is more frequent in urban areas, where there are many hospitals, but also many patients. The risk of *taraimawashi* is high among geriatric, pediatric, obstetric, and homeless patients.¹⁶

New Postgraduate Medical Education System

There has been no internship in postgraduate medical education since 1966 in Japan. A student directly becomes a specialist without clinical training in other fields, including emergency medicine. This deficiency in general training may result in unfavorable events in emergency care and has been criticized for many years. A committee of the Ministry of Health, Labor and Welfare constituted to deliberate on postgraduate medical

education requested the government to mandate general care training, including emergency medicine, for all postgraduate physicians. In the new postgraduate education system, legislated and implemented in 2004, all postgraduates are obliged to have a rotation in internal medicine for 6 months, in surgery for 3 months, and in emergency medicine for 1 to 3 months in PGY-1. The period of emergency medicine training was extended to 3 months in 2010. The system also incorporated computer matching of medical students and teaching hospitals. The computer-based matching motivates medical students to select teaching hospitals. Many hospitals are obliged to improve their emergency department in order to offer students the opportunity of emergency medicine training.¹³

There have been controversies about the validity of the new postgraduate medical education system. Some criticized it because many residents would be concentrated in big cities, as most teaching hospitals are located in these cities. This may result in a shortage of physicians in smaller cities or rural areas. From the viewpoint of training in emergency medicine, the postgraduate education system is welcome, because it should improve the quality of emergency care nationwide if it is appropriately implemented. There is also the issue of emergency medicine education; a lack of teachers or an adequate curriculum for training in emergency medicine.¹² Non-emergency medicine specialists cannot train physicians in all aspects of emergency medicine, even if they are sufficiently able to teach emergency care in their own specialty. Emergency medicine includes a large body of knowledge for emergencies in all specialties. There are only an estimated 3,000 emergency physicians in Japan and not all are working in teaching hospitals and not all may be appropriate teachers of emergency medicine. Although the common citizen hopes that all postgraduates learn emergency care as primary care, most emergency physicians work for emergency medical service centers and their jobs may not be focused on emergency medicine.

ER-type Emergency Medicine

The emphasis of emergency care delivery in Japan has been on the most critically ill or injured. The system was developed to better utilize resources and emergency medical technicians by triaging the patients to different facilities, depending on the severity of their condition. It has been recognized that seemingly low-acuity patients may sometimes turn out to have serious conditions. Thus, it may be reasonable to introduce US-style emergency medicine, in which the emergency physician cares for all types of emergency patients. Their fundamental job is screening/stabilization of patients in the emergency department; in addition, they may teach emergency medicine to postgraduates by involving them in emergency care. Some Japanese hospitals fundamentally adopted the US-style model in the 1990s, even if there were slight differences. A section of JAAM has been working on developing and promoting the “ER-type” or the US/UK/Australian/Canadian-style emergency medicine system in Japan since 2003.¹⁷

The committee named the US-style model the “ER-type” model after the popular TV drama *ER* to make the model familiar to the common citizen. The committee also defined the model as that in which the emergency physician provides care as the “first doctor” for emergency patients with different degrees of acuity and with different organ involvement, irrespective of the patients’ age and sex. A 4 year residency training program has been established with a curriculum similar to that of the US program; half of the period is devoted to emergency medicine and the other half to rotations in other specialties. In a questionnaire survey conducted in 2007, questionnaires were sent to JAAM-affiliated emergency hospitals to determine whether they had adopted the ER-type model^{17,18}; 283 of 420 JAAM-affiliated hospitals responded to the questionnaire survey.¹⁸ The ER-type model was adopted at 150 hospitals, and 82 of these implemented the system 24/7 (Fig. 7). The ER-type model was also applied for PGY-1 emergency medicine training at 139 hospitals.¹⁹ The number of staff members of the emergency departments at these hospitals was small and the mode value was only 1–3 physicians (Fig. 8). A residency training program was in place at 68 hospitals. It is estimated that the number of emergency physicians dedicated to the ER-type model was more than 400, and there were more than a 100 residents in the respondent hospitals. The ER-type emergency medical care system was adopted more frequently at emergency hospitals without an attached emergency medical service center, probably because of the limitation of human resources and focus of service of each hospital.

Although the ER-type model has become more prevalent recently, details of the services provided at each hospital have not yet been studied. The ER-type model used in Japan is an adaptation of the US-style model to

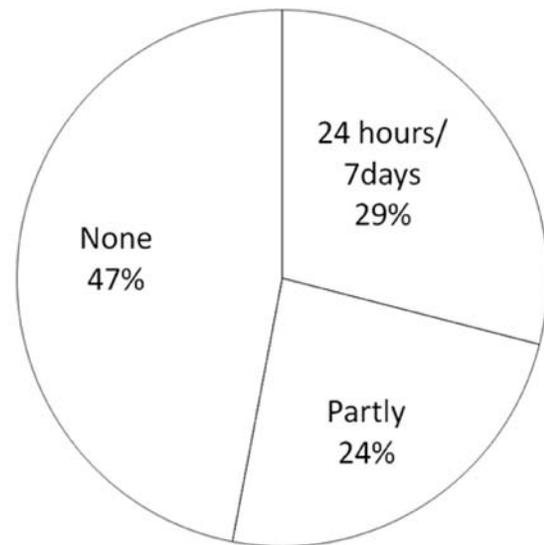


Fig. 7 Hospitals adopting the ER-type model. Of the 420 Japanese Association for Acute Medicine (JAAM)-affiliated hospitals, 283 responded to the questionnaire.²⁰

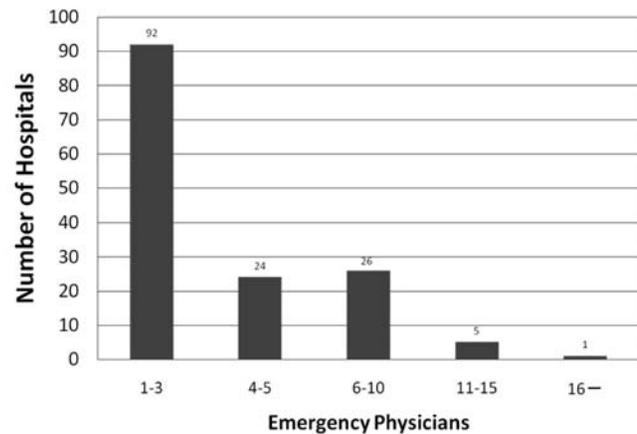


Fig. 8 Number of emergency physicians working for ER-type hospitals implementing the ER-type model.²⁰

Japanese society, and is not its equivalent. The ER-type model provides care of all patients transported by ambulance to the hospital, although some hospitals do not care for walk-in patients. The majority of the ER-type models care for some in-patients, e.g., postcardiac arrest, trauma, poisoning, geriatric patients and those with undifferentiated diagnosis. This difference between the ER-type in Japan and the US is probably related to the limitation of human resources and also the Japanese medical culture. Thus, the ER-type model is at an introductory stage in Japan.

Combination of the Three Models of Emergency Medicine

At present, emergency medical care in Japan is practiced based on three different models: multispecialist-type, ICU-type, and ER-type emergency medicine. The multispecialist-type model is the classically used model and provides for care of the majority of patients across the country, especially in cities far from metropolitan areas and in rural areas. ICU-type care for major trauma and critical patients is practiced in cities across the country. ER-type care is prevalent in big cities where many teaching hospitals are located. The future of emergency medicine in Japan depends on several factors, e.g., the number of emergency physicians, the type of training for emergency physicians, centralization of hospitals, urbanization of Japanese culture, and the aging of society. Whatever model is adopted, the common citizen clearly hopes that the safety net of the society should be well structured and the quality of emergency medical care should be assured.

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