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# IOM Report: The Future of Emergency Care in the United States Health System

Institute of Medicine

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If one were to judge solely from popular TV shows, the nation's emergency care system is in fine shape. Its doctors, nurses, and ambulance personnel are dedicated and competent professionals who save lives with their expertise and state-of-the-art equipment and can always be trusted to come through in a crunch. And, indeed, there is a great deal of truth to this picture: Our emergency and trauma care system has made tremendous strides over the past few decades, and today it manages to save many lives that just ten or twenty years ago would have been inevitably lost.

But underneath the surface, a national crisis in emergency care has been brewing and is now beginning to come into full view. Emergency departments (EDs) across the country are overcrowded. Ambulances are turned away, and patients, once they are admitted, may wait in hallways for hours or even days before inpatient beds open up for them. Often the specialists that patients need to see are not available. And the system that transports patients to the hospitals is fragmented and inconsistent in the level of quality it provides.

It was against this backdrop that the Institute of Medicine's Committee on the Future of Emergency Care in the United States Health System convened in September 2003 to examine the state of emergency care in this country. Charged with creating a vision for the future of emergency care, the committee has responded by publishing a series of three reports that look at hospital-based emergency and trauma care, at prehospital emergency medical services (EMS), and at the special challenge of providing emergency care for children. The Future of Emergency Care series includes: *Hospital-Based Emergency Care: At the Breaking Point*; *Emergency Medical Services At the Crossroads*; and *Emergency Care for Children: Growing Pains*. In these three volumes, the committee has identified what it believes are the most important issues facing the nation's emergency care system and has made a series of recommendations for how best to deal with those issues.

## OVERCROWDING

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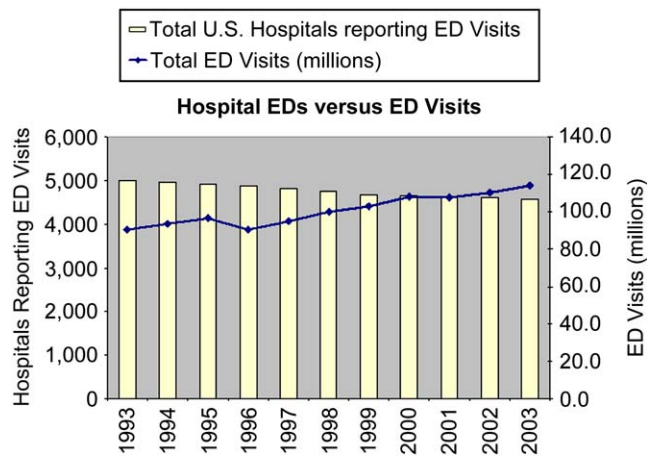
The emergency care system in the United States is in many ways a victim of its own success. Not only has the hospital ED become the place that Americans turn to first when they have an illness or injury that demands immediate attention, but it has been given an increasing

number of other responsibilities as well. EDs today provide much of the medical care for patients without medical insurance. Insured patients increasingly turn to the ED during times when their physician is unavailable, such as evenings and weekends, and they are often sent to the ED for tests and procedures that their physician can't easily perform in the office. In some rural communities, the hospital ED may be the main source of health care for a large percentage of residents. EDs also play a key role in public health surveillance and in disaster preparation and response.

The number of patients visiting EDs has been growing rapidly. There were 113.9 million ED visits in 2003, for example, up from 90.3 million a decade earlier. At the same time, the number of facilities available to deal with these visits has been declining. Between 1993 and 2003, the total number of hospitals in the United States decreased by 703, the number of hospital beds dropped by 198,000, and the number of EDs fell by 425 (Figure 1).

The result has been serious overcrowding. If the beds in a hospital are filled, patients cannot be transferred from the ED to inpatient units. This can lead to the practice of "boarding" patients—holding them in the ED, often in beds in hallways, until an inpatient bed becomes available. It is not uncommon for patients in some busy EDs to be boarded for 48 hours or more. These patients have limited privacy, receive less timely services, and do not have the benefit of expertise and equipment specific to their condition that they would get within the inpatient department.

Another consequence of overcrowding has been a striking increase in the number of ambulance diversions. Once considered a safety valve to be used only in the most extreme circumstances, such diversions are now commonplace. Half a million times each year—an average of once every minute—an ambulance carrying an emergency patient is diverted from an ED that is full and sent to one that is farther away. In 2004, according to the American Hospital Association (AHA), nearly half of all hospitals—and close to 70 percent of urban hospitals—diverted patients at some point during the year. Each diversion adds precious minutes to the time before a patient can be wheeled into an ED and be seen by a doctor, and these delays may in fact mean the difference between life and death for some patients. Moreover, the delays increase the time that ambulances are unavailable for other patients.



**Figure 1. Hospital EDs versus ED visits.** Source: AHA Hospital Statistics and National Hospital Ambulatory Medical Care Survey (NHAMCS).

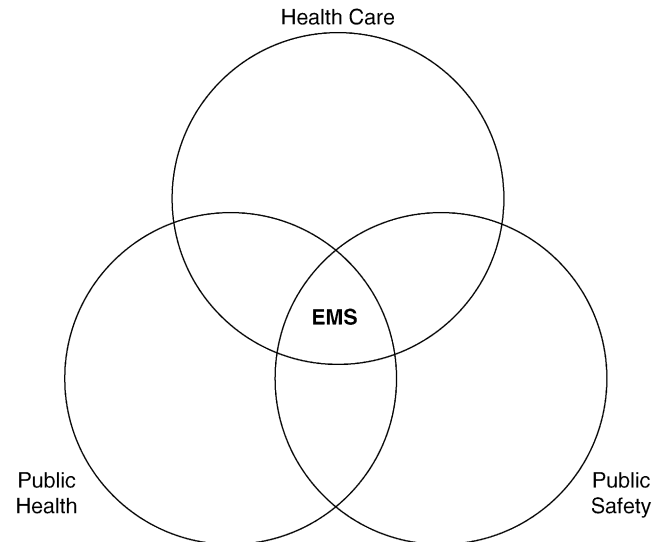
## FRAGMENTATION

The modern emergency care system is a relatively new innovation. In the 1950s, for instance, emergency medicine was not a recognized specialty, and hospital emergency rooms were generally staffed by internists or primary care physicians, most of them young and inexperienced. There were no paramedics as such—EMS offered little more than first aid, and the local ambulance service often consisted of just a hearse and a mortician.

Since then the emergency care system has developed rapidly. The “emergency room” has become the “emergency department,” and it is now frequently staffed with specialists trained in emergency medicine. Many ambulances employ specialized equipment and EMS personnel trained to stabilize patients and keep them alive until they reach the hospital. But the organization and delivery of these services has lagged behind their technical capabilities, limiting communication and cohesion among the various components of the system. As a result, today’s emergency care system is highly fragmented and variable.

A single population center may have many different EMS agencies—some volunteer, some paid, some based in fire departments, others operated by hospitals or private companies—and these agencies do not always interact with one another effectively (Figure 2). EMS workers often cannot even communicate with police and fire departments because they lack compatible communications equipment or operate on different frequencies. Furthermore, EMS agencies in one jurisdiction are often unable to communicate with those in adjoining areas.

There is a similar lack of coordination between EDs and the EMS services that deliver their patients. Few systems around the country coordinate the regional flow of emergency patients to hospitals and trauma centers effectively, because most fail to take into account such things as the levels of crowding and the differing sets of medical expertise available at each hospital. Indeed, in most cases, the only time an ED passes along information concerning its status to EMS agencies is when it formally goes on diversion status and refuses to take further deliveries of patients. As a result, the regional



**Figure 2. The overlapping roles and responsibilities of EMS.**

flow of patients is managed poorly and individual patients may have to be taken to facilities that are not optimal given their medical needs.

Adding to the fragmentation is the fact that there is tremendous variability around the country in how emergency care is handled. Belying its apparent uniformity, there are actually more than six thousand 9-1-1 call centers around the country and depending on their location, they may be operated by the police department, the fire department, the city or county government, or some other entity. Moreover, there are no nationwide standards for the training and certification of EMS personnel—or even any national accreditation of the institutions that train them. There is no single agency in the federal government that oversees the emergency and trauma care system. Instead, responsibility for EMS services and for hospital-based emergency and trauma care is scattered among many different agencies and federal departments, including Health and Human Services, Transportation, and Homeland Security. Because responsibility for the system is so fractured, it has very little accountability. In fact, it can be difficult even to determine where system breakdowns occur or why.

## SHORTAGE OF ON-CALL SPECIALISTS

Emergency and trauma doctors can be called on to treat nearly any type of injury or illness, so it is important for them to be able to consult with specialists in various fields. Indeed, if a hospital offers specialist services to its inpatients—such as neurosurgery or vascular surgery—it must by law offer those services to ED patients as well.

It has become increasingly difficult, however, for EDs to find specialists who will agree to be on call for the ED, and the resulting shortage of on-call specialists in EDs has had dire and sometimes tragic results.

There are a variety of reasons for the shortage of on-call specialists. Many specialists find that they have difficulty getting paid for their ED services because many emergency and trauma patients are uninsured. Specialists are also deterred by the additional liability

risks of working in the ED. Many of the procedures performed in EDs are inherently risky and physicians rarely have an existing relationship with emergency patients. The result is that insurance premiums for doctors who serve as on-call specialists in the ED are much higher than for those who don't. Finally, many specialists find the demands of providing on-call services too disruptive to their private practices and their family life. After being in surgery all day, they have little desire to be called back into the hospital in the middle of the night, often without the assurance of payment for their services.

**LACK OF DISASTER PREPAREDNESS**

Any time a disaster strikes, whether it is a natural disaster, a disease outbreak, or a terrorist attack, EMS and hospital EDs are called on to take care of the ill and wounded. Unfortunately, the nation's emergency care system is very poorly prepared to handle such disasters.

The difficulties begin with the already-overcrowded nature of the system. With hospitals in many large cities operating at or near full capacity, even a multiple-car highway crash can create havoc in an ED. A major disaster with many casualties is something that many hospitals have limited capacity to handle.

Much of the problem, though, is due to a simple lack of funding. In 2002, for example, hospital grants from the Bioterrorism Hospital Preparedness Program were typically between \$5,000 and \$10,000—not enough to equip even one critical-care room. Emergency medical services are particularly underfunded. Although emergency service providers are a crucial part of the response to any disaster, they received only 4 percent of the \$3.38 billion distributed by the Homeland Security Department for emergency preparedness in 2002 and 2003 and only 5 percent of the funding from the Bioterrorism Hospital Preparedness Program (Figure 3). In general, of the billions of federal dollars being spent on disaster preparedness, only a tiny fraction is spent on medical preparedness, and much of that is focused on one of the least likely threats—bioterrorism.

Due to this lack of funding, few hospital and EMS personnel have received even minimal training in how to prepare for and respond to a disaster. Furthermore, they lack the equipment and supplies necessary to deal

with disasters. Few hospitals have negative-pressure units, for instance, which are crucial in isolating victims of airborne diseases, such as avian flu. Nor do many hospitals have the appropriate personal protective equipment to keep their staffs safe when dealing with an epidemic or other disaster.

**SHORTCOMINGS IN PEDIATRIC EMERGENCY CARE**

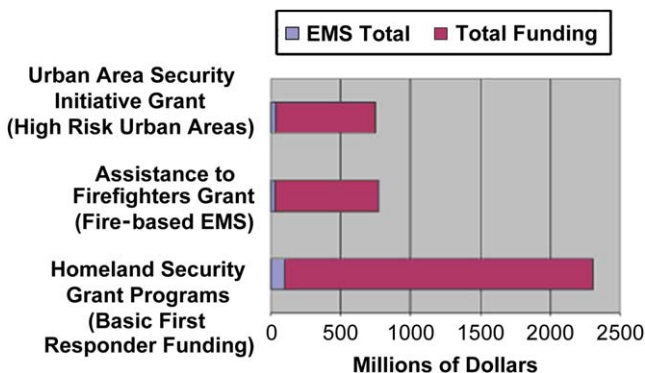
Children who are injured or ill have different medical needs than adults with the same problems. They have different heart rates, blood pressures, and respiratory rates, and these change as they grow. They often need equipment that is smaller than what is used for adults, and they require medication in much more carefully calculated doses. They have special emotional needs as well, often reacting very differently to an injury or illness than adults do. Unfortunately, although children make up 27 percent of all visits to the ED, many hospitals and EMS agencies are not well equipped to handle these patients (Figure 4).

One survey finds, for instance, that only 6 percent of U.S. EDs have all the supplies necessary for handling pediatric emergencies and only about half of the departments had even 85 percent of the essential supplies. Training is also an issue. Many EDs, particularly those in rural areas, rely on doctors and nurses without specialized pediatric training to handle pediatric patients. Many EMS agencies require little pediatric training of their personnel.

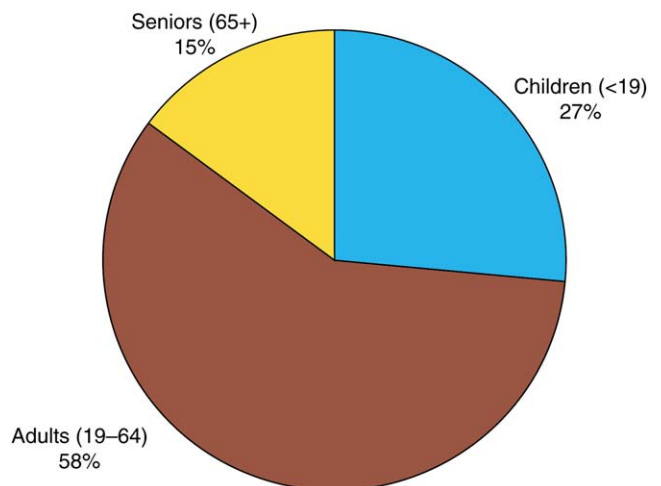
A number of large cities do have children's hospitals or hospitals with pediatric EDs that offer state-of-the-art treatment for children. However, the vast majority of ED visits by children are made instead to general hospitals, which are less likely to have pediatric expertise, equipment, and policies in place for the care of children.

**RECOMMENDATIONS**

To improve the nation's emergency care system and deal with the growing demands placed on it, the committee recommends a multi-pronged strategy. Together the three reports contain a number of recommendations,



**Figure 3.** EMS receives only 4% of first responder funding. Source: NYU Center for Catastrophe Preparedness and Response, 2005.



**Figure 4.** Emergency department visits by age. Source: 2002 NHAMCS, calculations by IOM staff.

but the main thrusts of the recommendations can be summarized by four basic themes:

### **Improving Hospital Efficiency and Patient Flow**

Tools developed from engineering and operations research have been successfully applied to a variety of businesses, from banking and airlines to manufacturing companies. These same tools have been shown to improve the flow of patients through hospitals, increasing the number of patients that can be treated while minimizing delays in their treatment and improving the quality of their care. For example, smoothing the peaks and valleys of patient admissions has the potential to eliminate bottlenecks, reduce crowding, improve patient care, and reduce cost. Another promising tool is the clinical decision unit, or 23-hour observation unit, which helps ED staff determine whether certain ED patients require admission. Hospitals should use these tools as a way of improving hospital efficiency and, in particular, reducing ED crowding.

At the same time hospitals should increase their use of information technologies with such things as dashboard systems that track and coordinate patient flow and communications systems that enable ED physicians to link to patients' records or providers. Such increased use of information technologies will not only lead to greater hospital efficiency but will increase safety and improve the quality of ED care.

Since there are few financial incentives for hospitals to reduce crowding, the Joint Commission on the Accreditation of Healthcare Organizations should put into place strong standards about ED crowding, boarding, and diversion. In particular, the practices of boarding and ambulance diversion should be eliminated except in the most extreme circumstances, such as a community mass-casualty event.

### **A Coordinated, Regionalized, Accountable System**

Many of the problems of today's emergency care system can be traced to its fragmented nature. The emergency care system of the future should be by contrast highly coordinated, regionalized, and accountable.

It should be coordinated in the sense that, from the patient's point of view, delivery of emergency services should be seamless. To achieve this, the various components of the system—9-1-1 and dispatch, ambulances and EMS workers, hospital EDs and trauma centers, and the specialists supporting them—must be able to communicate continuously and coordinate their activities. When an ambulance picks up a patient, for example, the EMS personnel gather information on the patient, and the information is automatically passed on to the ED before the ambulance even arrives.

The system should be regionalized in the sense that neighboring hospitals, EMS, and other agencies work together as a unit to provide emergency care to everyone in that region. Patients should be taken to the optimal facility within the region based on their condition and the distances involved. In case of a stroke, for example, a patient might be better served by going to a hospital that is slightly farther away but that specializes in treatment of strokes.

Finally, the system should be accountable, which means that there must be ways of determining the per-

formance of the different components of the systems and reporting that performance to the public. This will demand the development of well-defined standards and of ways to measure performance against those standards.

The reports call for a series of ten demonstration sites to put these ideas into practice and test them to determine which strategies work best under various conditions.

Once under way, this coordinated, regionalized, and accountable system not only should address the problem of fragmentation of the nation's emergency care system, but it should also help the shortage of on-call specialists by routing patients to those hospitals with the appropriate specialists. To further increase the availability of specialists in EDs, the report also calls on Congress to find a way to mitigate the effect of medical malpractice suits on services provided to patients in the EDs.

Furthermore, the development of a coordinated, regionalized, accountable emergency and trauma care system is hindered by the way that responsibility for emergency care programs is spread out across different agencies of the federal government. The scattered nature of federal responsibility for emergency care makes it difficult for the public to identify a clear point of contact, limits the visibility necessary to secure and maintain funding, creates overlaps and gaps in program funding, and engenders confusion on key policy issues. The report calls for the creation of a lead federal agency that would consolidate many of the government programs that deal with emergency and trauma care.

### **Increased Resources**

Increased funding could help improve the nation's emergency care system in a number of ways. More research is needed, for instance, to determine the best ways to organize the delivery of emergency care services, particularly prehospital EMS. And, given that many closings of hospitals and EDs can be attributed to financial losses caused by the cost of emergency and trauma care, Congress should consider providing greater reimbursements to the large, safety-net hospitals and trauma centers that bear a disproportionate amount of the cost of taking care of uninsured patients.

An area in which greater funding is needed is disaster preparedness. To date, despite their importance in any response to disaster, the various parts of the emergency care system have received very little of the funds that Congress has dispensed for disaster preparedness. In part this is because the money tends to be funneled through public safety agencies that consider medical care to be a low priority. Congress should therefore make significantly more disaster-preparation funds available to the emergency system through dedicated funding.

### **Paying Attention to Children**

Finally, as these various improvements are made to the nation's emergency care system, it will be important to keep pediatric patients in mind in all aspects of emergency care. The needs of pediatric patients should be taken into account in developing standards and protocols for triage and transport of patients; in developing disaster plans; in training emergency care workers, to assure that they are competent and comfortable providing emergency care to children; and in conducting research

to determine which treatments and strategies are most effective with children in various emergency situations.

### **ACHIEVING THE VISION**

There is no “one size fits all” solution to building the best possible emergency care systems from state to state and region to region. In order to explore different approaches and see what works best in different situations, the committee recommends that Congress establish a 5-year demonstration program to provide funding for individual states to develop coordinated, regionalized, and accountable emergency-care systems in various parts of the country. Over time these projects will help identify “best practices” that can address the problems facing today’s emergency systems and point the way toward a future emergency care system that ensures high-quality, efficient and reliable care of all Americans.

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### **FOR MORE INFORMATION**

Copies of the Future of Emergency Care in the United States Health System reports are available from the National Academies Press, 500 Fifth Street, N.W., Lockbox 285, Washington, DC 20055; (800) 624-6242 or (202) 334-3313 (in the Washington metropolitan area); Internet, <http://www.nap.edu>. The full text of this report is available at <http://www.nap.edu>.

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