

Chapter

1

Fifty Years of Transformation of Acute and Emergency Care

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In his landmark 1979 piece which defined a specialty, Peter Rosen, MD, called emergency medicine “an unaccountably late development in modern medicine.” Rosen strongly argued for a specialty defined not by an organ system or a particular patient population, but by “initial care . . . of life threat[s].”¹ This fundamental notion is now reflected in the American College of Emergency Physicians’ (ACEP) definition of emergency medicine as “the medical specialty dedicated to the diagnosis and treatment of unforeseen illness or injury, including the initial evaluation, diagnosis, treatment, coordination of care among multiple providers, and disposition of any patient requiring expeditious medical, surgical, or psychiatric care.”² Though the framing of a physician’s expertise in terms of a phase of care was without precedent 50 years ago, today we understand it implicitly.

The Ancestor to the Emergency Physician

In his book, *Anyone, Anything, Anytime: A History of Emergency Medicine*, Brian Zink, MD, deems the primary care physician (previously, a general practitioner) “the ancestor to the emergency physician.”³ To be sure, an early twentieth-century primary care physician had a similar scope of practice to a modern emergency physician: internal medicine, minor surgical care, obstetrics, pediatrics, and psychiatry. Prior to World War II, fully three-quarters of American physicians identified themselves as primary care physicians. However, this umbrella term belied significant heterogeneity in training. Early 1900s primary care physicians were likely to have gone straight into independent clinical practice after completing medical school, which at the time involved primarily “book” work. Those who trained after the Flexner Report of 1910 (which stands as the foundation of American medical training curricula to this day) were more likely to have had at least 1 year of post-graduate internship.

The standardization and organization called for by the Flexner Report, coupled with the growth in medical knowledge, accelerated a trend toward specialization. Organization of specialty societies and boards – the American College of Surgeons in 1913 and the American Board of Ophthalmology in 1916 – followed, and many hospitals began to require post medical school training and certification prior to credentialing. The diverse group of primary care physicians would not unify into the American Academy of General Practice until 1947.

By this point, the healthcare landscape had changed significantly. Specialists, on account of their training and credentialing, had better access to hospitals and performed more of the medical school teaching, and patients came to expect the standard of care provided by a specialist. By 1966, only 31 percent of physicians were primary care physicians.³ As their scope of practice narrowed, primary care physicians had to see more patients per day. This made it difficult to maintain the always-available philosophy that had defined them for

decades. In addition, the aforementioned explosion of medical knowledge made mastery of a diverse range of subjects increasingly difficult.

The Growing Role of the Hospital and the Crisis of the Emergency Room

A similar transformation was occurring in the location that Americans received healthcare. In the post–World War II era, the United States completed its transition from home care to hospital care. The Hill-Burton Act of 1946 fueled a postwar spending binge on hospital growth with the number of US hospitals increasing 21 percent between 1946 and 1965. In addition, the growth in medical knowledge and technology altered the public’s perception of hospitals from a place of convalescence to a place of cure.³ Sophisticated new technologies, such as radiographs, were expensive, leading to their concentration in hospitals, which had the capital to purchase them and the volume to use them profitably. For similar reasons, specialists concentrated in hospitals as well. Many physicians moved their practice locations to the area around the hospital for their own and their patients’ convenience. As Zink argues, these changes catalyzed a paradigm shift from primary care physician-centered healthcare to system-centered healthcare.³

Use of the emergency room (ER) became common at this time as well. (N.B. The term “ER,” as it was called at the time, is specifically used to contrast it with the more modern “emergency department”). From 1954 to 1965, US ER visits tripled in just over a decade. A number of factors contributed to this sudden growth. Demographic changes in the United States were chief among these. Increased population during the Baby Boom years led to increased demand for medical care overall.⁴ In addition, suburban sprawl made it more difficult for a traditional primary care physician to perform house call. As office-based practice became more routine and scheduled, it became more difficult for providers to leave time for acute or unscheduled patients. Primary care physicians also followed the general population emigration from cities, leaving the burden of care to the ERs of public hospitals and urban academic medical centers.³ In fact, the change was so significant that it was presciently noted in 1957 that “Americans came to . . . take for granted that hospitals have emergency service at all hours where any problem, surgical, medical, or psychiatric can be treated. . . . In time, the hospital emergency service may find its scope extended to meet any general medical and surgical problems, which the patient, at least, will deem urgent.”³

Despite this, the ER remained an afterthought in the priorities of many hospitals. At the time, emergency medicine as a specialty did not yet exist. In many settings, physicians who had been censured or could not meet credentialing requirements were placed there. Former criminals, alcoholics, and foreign medical graduates trying to learn English were common. In academic settings, the most junior of housestaff cared for ED patients, frequently with no supervision. In a 1956 survey of hospitals, 71 percent staffed their ER with house officers.³ A mere 21 percent used private physicians, typically a rotating call schedule of all of the hospital’s practitioners, including even those that did not normally treat medical or surgical patients, such as psychiatrists or pathologists.⁵ Greater than half of ambulance transports were provided by funeral directors or morticians because their vehicles allowed for horizontal transport of patients.

However, the pressing needs of ER patients led to calls for improved emergency care. In 1958, the *New England Journal of Medicine* published an article titled “The ER and the

Changing Pattern of Medical Care,” which detailed historical data on ER use at Hartford Hospital and called for staffing of ERs with “professional personnel of adequate training and mature judgment.”⁶ An accompanying editorial boldly declared “the experience and judgment of the physician who directs [emergency] care is the indispensable sine qua non.”⁷

Thus, a gap was emerging. Both patients and the system demanded a new age specialty-trained physician with content and technical expertise across multiple fields, but who was also a throwback to the primary care physician’s ethical obligation to provide care to whomever and whenever it was needed.

The Alexandria Plan

Into this gap stepped Dr. James Mills. In 1961, Dr. Mills was a primary care physician working in Alexandria, VA. He had an affiliation with Alexandria Hospital, which faced many of the challenges detailed above – rising patient volumes and lack of consistent and appropriately trained staff for its ER. ER nurses would triage patients, and then call on housestaff or private physicians (who frequently, in turn, called housestaff) to see patients. But Alexandria Hospital had many unfilled internship slots, and a pilot to staff the ER with medical students had failed.

Dr. Mills decided that he personally would leave his practice behind and work full time in the ER. He convinced one other primary care physician and two internists to join him. They contracted with the hospital to work 12-hour shifts, 5 days on and 5 days off. Their experiment was incredibly successful. ER volume doubled within 5 years, and both private practice physicians and patients were increasingly satisfied with the care provided.

A similar pattern emerged in Pontiac, MI. There, a group of approximately 30 physicians from various specialties contracted to provide care in the emergency room. Each worked 16–32 hours per month. The Pontiac group was quite successful financially, and the participating providers soon found they could make a higher hourly salary in the ER than in their other practices. This was no doubt a strong impetus for the development of emergency medicine as a specialty.

From Emergency Room to Emergency Department

Dr. Mills’s contract with Alexandria Hospital specified work in the “emergency department” as opposed to the “emergency room.” This seemingly trivial change in language was suggestive of the organizational transformation that emergency medicine would undergo over the next several decades.

In 1968, eight physicians from Michigan founded the American College of Emergency Physicians. ACEP’s logo, which still exists today, was designed by the son of one of the founders.⁸ It depicts a large square made of 64 smaller squares, which represented the organization of American medicine. One square, however, is missing, representing the lack of emergency medicine in this framework. Just a year later, the first emergency medicine national meeting, the ACEP Scientific Assembly, was held in Denver, CO. The College had a strong early focus on the finances of emergency medicine. Many practitioners were nervous about leaving their stable practices behind for the ED, and the College fought for reimbursement for EPs as specialists.

Around this time, the University of Cincinnati was also approved by the American Medical Association to start a 2-year emergency medicine training program. Still wary of

the young specialty, it was formally approved under family practice with a certification of advanced training in emergency medicine. Nonetheless, in 1972, Bruce Janiak, MD, became the first residency-trained emergency physician in the United States.

From the outset, there was disagreement among the ACEP members about specialty status. Some even advocated for becoming a sub-section of the American Academy of General Practice. However, after rejecting this thought, the College began to pursue a path toward specialty certification. A number of things would be required: codifying the scope of practice, developing initial training and continuing education programs, creating academic departments, writing an exam, and defining a body of research.³ Formal recognition of the specialty would soon follow.

In 1975, the AMA approved a section on emergency medicine and established training standards for residencies. In 1979, emergency medicine was recognized as the 23rd medical specialty approved by the American Board of Medical Specialties, and the American Board of Emergency Medicine (ABEM) was granted administrative rights to provide board certification. The first test was offered the following year. The format of the ABEM oral examination was unique at the time, and the rigor of the certification process was important for the young specialty. Originally, ABEM was a “conjoint” board with representatives from other so-called “parent” specialties. This led to interesting challenges. In one discussion about how much training emergency medicine residents should have in other specialties, the seven specialties on the board created a training program 13 years in length.³ However, only a decade later, ABEM would become its own, primary board.

Thus, emergency medicine became a formal part of the house of medicine. Prior to Dr. Janiak, no emergency physician had been trained as such; all were converts who pioneered a new practice. But having learned from the experience of primary care physicians, early emergency physicians quickly recognized the need for and codified a formal structure of training, credentialing, and practice. This was fortunate, as a number of external factors would drastically increase the need for emergency physicians in the years to come.

Outside Influences

Parallel to these developments, there was growing recognition of the importance of acute illness in society. In 1966, the National Academy of Sciences released a landmark report titled “Accidental Death and Disability: The Neglected Disease of Modern Society,” which bemoaned this “epidemic” and the relative “public apathy” with which it was being confronted.⁹ In particular, the group was concerned about the paucity of attention paid to trauma in comparison to cardiovascular disease or cancer. This report catalyzed the development of a national emergency phone number (911), pre-hospital services, and regional emergency care networks. The year 1965 had seen the inauguration of Medicare and Medicaid, which brought millions of elderly and indigent patients, many of whom had been underserved or completely without medical care, back to the frontlines. This placed additional pressure on generalists and specialists alike, and made it even more difficult to expect them to cover both scheduled and unscheduled care. Furthermore, relatively little attention had been paid at the national level to ensuring there were sufficient providers for this influx of patients. Many turned to the ED.

The Vietnam War also profoundly impacted the development of emergency medicine. In Vietnam, mortality rates plummeted compared to prior wars as a system of rapid triage

and evacuation to definitive care was implemented. Advances in intravenous fluids, blood product administration, and antibiotics were also brought back to civilian practice.

Hospitals also continued to grow in size and complexity. Perhaps ironically, the more complex and organizationally detailed they became, the more patients came to the ED for care. As Zink wrote, “Hospitals had become little fiefdoms . . . [and] presenting to the ED at a hospital complex was the simplest and most convenient way to gain entry into a system that could seem imposing and confusing from the outside.” The ED became the “default point of contact . . . for millions of urban people.”³ Medicare and Medicaid also allowed hospitals to make money on patients that had previously been charity care. Accordingly, the ED became an increasing point of emphasis, and hospitals desired high-quality emergency physicians. In addition, many private physicians were happy to have less work on nights, weekends, and holidays, and to have a source to refer their acute patients at other times.

Growing a Specialty

The 1980s would see explosive growth in emergency medicine education and training. Following the University of Cincinnati program, dozens of other emergency medicine residencies were started. The American College of Graduate Medical Education approved the requirements for EM residencies in 1982. Originally, a preliminary internship year followed by 24 months of emergency medicine was required, though this was later changed to 36 months of emergency medicine. In 1989, the path to board certification was closed for non-residency trained emergency physicians. Less than 30 years after Dr. Mills started the Alexandria plan, every new board certified emergency physician in the United States would be residency trained.

EM quickly became a competitive choice among American medical students. The educational philosophy was also unique. During the foundational years, leaders in the specialty debated whether training programs in emergency medicine should have 24-hour supervision by faculty.¹⁰ This question was especially pertinent, given the then routine staffing of ERs with housestaff only. The decision was made that EM faculty should always be present, a defining characteristic of EM in American academic medical centers that distinguished it from virtually every other specialty. Peter Rosen, a founding pioneer of the specialty, further defined the educational mission in “The Biology of Emergency Medicine,” calling for the need for the right patient pathology, the right faculty, and the right number of residents.¹

In 1986, Congress formalized the ED’s role as the safety net of American healthcare with its passage of the Emergency Medical Treatment and Active Labor Act (EMTALA). EMTALA requires EDs to provide appropriate evaluation and medical stabilizing treatment for any person seeking care with an emergency medical condition. Technically, the law applies only to hospitals accepting federal payer sources, but this pertains to virtually every hospital in the United States. Written to prohibit “dumping” of patients based on payer status, EMTALA guaranteed a rudimentary level of universal access to the ED for all patients in the United States.

Emergency Medicine Internationally

Internationally, emergency medicine has developed most quickly in the British Commonwealth. In the United Kingdom, it is frequently known as Accident and Emergency (A+E),

and developed during a similar time period. Maurice Ellis served as the first “casualty consultant” in 1952. The British Association for Accident and Emergency Medicine was founded in 1967, and the first certification exam took place in 1983. A similar path toward specialty certification occurred, as an Intercollegiate Board, analogous to ABEM’s conjoint board, was founded in 1991. In 2006, the boards merged to become a joint College of Emergency Medicine, which was designated the Royal College of Emergency Medicine in 2015, of which there are over 5,000 members today.¹¹ The Canadian Association of Emergency Physicians and the Australasian College for Emergency Medicine were founded several years later. Both serve similar functions in their respective countries.

The above organizations all collaborated in the founding of the International Federation for Emergency Medicine (IFEM) in 1989. IFEM works to promote emergency medicine as a recognized specialty in countries around the world, helping to shepherd them through the above process.

Emergency medicine has been slower to emerge in the developing world. Traditionally, global health has focused on prevention of illness, maternal and child health, and treatment of childhood diseases.¹² This focus, while important, has failed to produce comprehensive and timely healthcare systems that are capable of caring for emergencies. Nevertheless, there is certainly unmet need. In fact, seven of the top fifteen causes of death and six of the top fifteen causes of disability in developing countries have evidence that early intervention improves outcomes.¹³ In addition to their primary mission, EDs can also play important roles augmenting public health and primary prevention efforts, including vaccine administration, training of clinical personnel in high volume areas, referral for treatment and secondary prevention, and disaster care.¹⁴

All emergency medical systems must have certain components, including a need for public education about recognition of illness and accessing the system, communication about patients and a means for transporting them, triage, and training of medical personnel in the principles of emergency medicine. However, while minimum standards must be created, local communities should define the particular illnesses to be targeted and interventions to be offered.¹³ By way of example, an economic analysis of a hypothetical emergency medical response system for cardiac arrest in Kuala Lumpur, Malaysia, showed that it would cost approximately \$2.5 million to produce four neurologically intact survivors of cardiac arrest.¹⁵ The high cost is principally a result of Kuala Lumpur’s young population, illustrating the need for local determination (rather than wholesale import) of the menu of emergency services.

To be sure, international emergency medicine faces stiff challenges: lack of first aid training among the lay public, poorly developed transportation systems, and lack of formal education in emergency medicine all compound already existing financial and infrastructure constraints. As a temporizing measure, IFEM created a curriculum in basic emergency medicine for international medical students, laying out the basic principles of emergency care that physicians of every specialty should know.¹⁶ Success stories do exist, however. Botswana recently recognized emergency medicine as a specialty, and created a residency-style training program and research center.¹⁷

Acute and Emergency Care: The ED and Beyond

Having evolved from one room “ERs,” the modern ED is a sprawling and complex place. The ED is the de facto point of entry into the hospital for virtually all patients. Patients

present of their own accord, many are referred by outside providers, and ambulances also transport patients. EDs may incorporate many different areas to help “stream” patients by complaint and acuity. Low-acuity, urgent complaints may be handled in a fast-track area. Specialized rooms exist for the care of specific patient populations, such as gynecology, otolaryngology, or psychiatry. A high acuity or resuscitation area allows for the treatment of the most acute patients, and can provide many of the services of an Intensive Care Unit or Operating Room. In addition, space is needed for the many ancillary services that ED patients need quick access to, including radiology (plain radiographs, computerized tomography (CT), ultrasound, and potentially MRI), laboratory analyses, case management, and security. Easy access to an ambulance bay and helipad are generally needed.

Though it is still the most common, the hospital ED is far from the only location to receive acute and emergency care patients. Urgent care centers and retail clinics have become well-established alternatives for lower acuity, unscheduled care. More recently, freestanding emergency departments and telemedicine have also entered the acute care space.

Urgent care centers developed as a means to provide unscheduled care to lower acuity patients. There are almost 7,000 such centers in the United States.¹⁸ Urgent care represents a niche market – patients generally do not have access to or are unable to get a timely appointment with their primary care physician for an unscheduled illness, but their illnesses are not emergent or they wish to avoid the costs and times associated with an ED. Most urgent care centers perform basic testing, such as a dipstick urinalysis or plain radiographs. They are most frequently staffed by family physicians followed by emergency physicians. Charges seen by the patient are significantly lower than most EDs.¹⁹ While urgent care centers have considerably longer hours than most physicians’ offices, most are not open 24 hours per day.

Retail clinics are a variation on the urgent care model. These are clinics located in, and typically affiliated with, stores, pharmacies, or supermarkets. Most are staffed with physician assistants or nurse practitioners. Approximately 2,000 exist in the United States. They treat routine illnesses, such as upper respiratory infections, and also offer health screenings and vaccinations. Unscheduled visits and extended hours are the norm. In contrast to most of the rest of the US healthcare landscape, prices are generally fixed and visible in advance.²⁰ In addition, for care within the scope of practice of retail clinics, costs tend to be lower than comparable care in a primary care physician’s office, urgent care, or ED. Up to 90 percent of patients report that they were very or somewhat satisfied with the quality of their care, and the National Committee for Quality Assurance has found several retail clinics to be among the highest performers in quality metrics pertaining to primary care and urgent care. However, it is unclear if the convenience of retail clinics simply adds additional encounters to the healthcare system rather than replacing them with lower cost substitutes.²⁰ In addition, care coordination and continuity of care with a patient’s physician is very limited.

In the last few years, the United States has seen the proliferation of freestanding emergency departments (FSED). These are physically separate from acute-care hospitals, though they may be affiliated with such. They seek to fill the gap between the traditional ED and urgent care. Generally, FSEDs provide many services that might be available only in an ED, such as CT scans or electrocardiography, and are staffed with emergency physicians, but also provide the proximity and convenience traditionally associated with an urgent care center. There is significant state-to-state variation in the regulations governing FSEDs with

respect to credentialing, payment, and accessibility. Of concern though is their concentration in areas with a favorable payer mix, and not in those areas where healthcare resources are scarce.²¹

Telemedicine can take two forms. The first is real-time patient management with collaboration between two providers. High-fidelity video and audio equipment are used to help the provider at a distance obtain information as if he/she were at the bedside. This type of telemedicine is frequently used in rural or remote areas to obtain consultation with higher levels of care or specialists, such as trauma surgeons or a stroke team. Another opportunity is for a virtual patient-provider encounter without an office visit. Fees are generally lower than an in-person visit, but it takes less time and gives the clinician freedom to work from a location of his/her choosing. One study based on this premise examined the laceration treatment decisions of emergency physicians who were given a medical history and four mobile phone pictures of the laceration. The same EP then examined the patient directly. There was agreement about treatment decision in 87 percent of patients.²² While quite innovative, lack of consistent reimbursement for telemedicine applications remains a challenge, however.

Acute and Emergency Care: Transformed but Still in Need of Innovation

Today, there are approximately 40,000 practicing emergency physicians in the United States, almost 1 in 25 physicians. There are approximately 200 residency programs (allopathic and osteopathic) graduating 2,000 new EPs annually. There are 130 million U.S. ED visits per year. It would seem ironic to the founders of the specialty, so worried that their efforts would be thwarted by private physicians afraid to lose their patients, that 80 percent of patients who called their family physician about a new medical complaint were directed to the ED.²³

There are clear hallmarks of success over the last three decades. A national 911 program, with sophisticated emergency medical services, places emergency care within minutes of most Americans. Air medical transport, combined with regional care networks, can rapidly move patients to higher levels of care. Morbidity and mortality for devastating acute illnesses – myocardial infarction, stroke, and trauma, to name a few – have plummeted.

This is not to say, however, that improvements are not necessary. In fact, ACEP's 2014 rating of the US emergency care system was a woeful "D+." In categories that included Access to Emergency Care, Quality and Patient Safety Environment, Medical Liability Environment, Public Health and Injury Prevention, and Disaster Preparedness, no category scored better than a "C."²³ Access, operations, quality/safety, and cost issues plague many modern emergency departments, and threaten the substantial progress made over the last 50 years.

In some ways, EDs have been a victim of their own success, with growth in ED visits exceeding twice the growth in the US population.²³ Coupled with a decrease in acute care hospital beds, this growth has led to significant crowding in EDs and boarding of admitted patients. Increasingly, the ED and its patients are understood not to be the source of crowding, but its most recognizable victim as research demonstrates that crowding is a hospital and community-wide problem.^{24,25} Nevertheless, crowding has been associated with adverse outcomes, treatment delays, and increased rates of patients leaving prior to seeing a physician, and future innovations must address this vexing problem.^{26,27,28}

Simultaneously, the ED handles significant public health roles, and serves as the safety net of the healthcare system. Patients who are under- or uninsured, homeless, struggle with substance abuse, have high risk medical conditions, or even who simply are unable to see a primary care physician in a timely fashion utilize the ED. Because of the broad cross-section of society that uses the ED for some type of care, EDs are increasingly serving surveillance roles for HIV infection and substance abuse in addition to more traditional public health roles such as vaccination, secondary prevention, and diagnosis of chronic illness and referral for treatment. “Although the principal mission of EM is to care for patients with acute illness and injury, this is not its only mission and it is naïve to believe our role is strictly confined to the former. Since its inception as a recognized medical specialty . . . emergency practitioners have consistently provided preventive care services, many of which have become standard of care. We do . . . strongly advocate for performing preventive interventions that make the most sense in the context of available resources.”²⁹

Compounding these problems, there is renewed focused on the cost of medical care in many countries. In the United States, approximately 17 percent of Gross Domestic Product is spent on healthcare with little to no marginal improvement in outcomes over countries spending half that amount. Government and private payers are actively seeking alternative payment models that simultaneously reduce costs and deliver greater value. Many other countries, including the United Kingdom, have considerably more experience with the healthcare value equation and understand the need for cost-effective, evidence-based solutions. Nonetheless, they still face the perception that emergency care is costly and inefficient. Therefore, there is a need to clearly define the value of acute and emergency care, and describe case studies of innovative solutions that have enhanced this value through improved outcomes and decreased costs.

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