The Evolution of Emergency Medicine
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Recipient of the 2008 James D. Mills Award

Dr. James Mills was, in a large part, responsible for the emergence of the specialty of emergency medicine. Similarly, Dr. R Adams Cowley developed a modern university trauma center and a statewide trauma system for the State of Maryland.

In this manuscript, I will outline three specific evolutionary achievements in the delivery of emergency care and trauma, followed by caveats on what prevents an emergency and trauma system from achieving optimal goals and maintaining them.

First, I will review the emergence of the specialty of emergency medicine under the guidance of Dr. James Mills, and outline the steps he took to establish the specialty in acute care hospitals. Second, I will discuss the heroic career of Dr. R Adams Cowley, a cardiothoracic surgeon who took some of the principles of cardiac resuscitation and surgery and rapid military evacuation of the wounded from the battlefield, and applied them to the resuscitation and transport of the severely injured trauma patient to a fully prepared and equipped trauma center and created an organized approach to trauma care in Maryland. Third, I will provide an overview of the subsequent development of a comprehensive emergency medical system in the Commonwealth of Virginia. Finally, I will emphasize what stops good public health policy regarding emergency medical and trauma care, and some of the changes that must be made to ensure that the Commonwealth of Virginia and other states provide optimal care for their citizens through their emergency medical care and trauma systems.

EMERGENCE OF THE SPECIALTY OF EMERGENCY MEDICINE: THE CONTRIBUTIONS OF DR. JAMES D. MILLS

Dr. James D. Mills, a general practitioner, saw the need for a physician with medical knowledge focused on medical emergencies and resuscitation dedicated to the hospital emergency room. He left his general practice and formed a full-time emergency practice group.

Dr. Mills’ training and experience prepared him for a leadership role in medicine. He served as a line officer in the Navy for four years (1941-1945) during World War II before entering medical school at the Washington University. His military service to our country became a life-defining experience. His additional three years of service in the Navy as a physician (1950–1953) showed him an organized approach to emergency care that was not available to the injured civilian, confirming that the chances for survival would be better in a combat zone than on the average city street. Because the military had a coordinated system of emergency care, he watched how skilled emergency medical teams changed a catastrophic injury into a life-transforming opportunity. After leaving the Navy at age 36, he started a practice in family medicine in Alexandria, Virginia, and
was very involved in community service, becoming a member of the Board of Directors of Alexandria Community Health Center in 1956, a position he held for the next 18 years.

Within seven years after starting his practice, Jim was a recognized medical leader. He was elected President of the Medical Staff of Alexandria Hospital in 1961, which provided him with a unique overview of the entire hospital’s healthcare delivery system. The dissatisfaction expressed by the patients treated in the hospital’s Emergency department caught his attention.3 “The public has come to look upon the emergency department as the community medical center where any man may come with any complaint, at any hour of the day or night, and expect prompt and courteous attention his due.”

His emergency department was staffed then by rotating interns, residents, and nurses, with the backing of the attending staff. As attrition and turnover of the resident staff increased over time there were efforts made to supplant this service with various models. “One solution was to call the medical staff to serve in rotation. This was met with less than enthusiasm by doctors who had put in more than 60 hours a week in our practice.”

In 1961, Jim then identified a different solution for this healthcare problem: staff Emergency departments with physicians trained and credentialed in Emergency Medicine. Jim enlisted the help of three powerful problem-solvers who would make a revolutionary change in medicine. He and three of his physician colleagues, actively engaged in private practice, agreed to relinquish their practice and become full-time emergency department physicians. He recruited physicians in family medicine who were respected as doctors, who had taken on leadership roles in the hospital, and who were his close personal friends. It is remarkable that these pioneers in emergency medicine (Jim Mills, John McDade, Chalmers Loughridge, and William Weaver) remained together in Emergency Medical practice for their entire professional careers.

In 1963, Jim reported the 15 months’ experience of his Emergency Medical coverage plan in the Virginia Medical Monthly.3 He indicated that, “The doctors of the emergency department continue to enjoy the cordial relations with their confreres they had in private practice. The staff members of the several services have been most helpful in their essential backing of the emergency department. The doctors of the community have learned that the service can help them with their patients during busy office hours, evenings off, or nights, with the assurance that their own doctor-patient relationship will be preserved…the 12-month patient load has increased 14% over the previous year.”

When the American Medical Association highlighted the Alexandria plan in their news bulletin, national attention focused on this new health professional, the full-time emergency medical physician. His innovation was a giant step ahead of the previous staffing either with interns and residents or rotating staff members of the attending staff.

With the need and efficiency for around-the-clock skilled professional care in the emergency department demonstrated, the next step in the evolution of this new medical specialty was the specialized training of physicians whose career choice was in
emergency medicine; in other words, residencies in emergency medicine that would provide trained and board certified physicians for staffing emergency departments throughout the USA and other countries.

The following is the history of how this evolved. Dr. John G. Wiegenstein in Michigan became aware that some physicians, like James D. Mills in Virginia had started to practice solely in emergency departments. Others in Pontiac, Michigan were contracting to provide emergency department coverage with part-time physician help. A physician, Dr. Eugene Nakfoor, informed Wiegenstein that he wanted to form an emergency medicine group to provide staffing at St. Lawrence Hospital in Michigan. The two went on to visit Dr. John Rupke who had set up an Alexandria type plan in western Michigan. Wiegenstein was well aware of the need for education to provide emergency care and sought out training in emergency medical services and courses in critical care and trauma. In 1968, Wiegenstein, Rupke and six other emergency physicians from Michigan met in Lansing and formed the first national emergency medical organization, The American College of Emergency Physicians. Wiegenstein was elected as the first Chairman of The American College of Emergency Physicians. Before the inauguration of this organization, he wisely invited Dr. James D. Mills to be a member of the Board of Directors.

As emergency medicine began to develop as a discrete specialty, there was a need to train the physicians who were converting themselves to this new practice. The first emergency medicine residency was founded at the University of Cincinnati in 1970. As President of The American College of Emergency Physicians from 1971 to 1973, Jim Mills championed the development of certifying boards in emergency medicine. He served on the Board of Directors from 1976 until 1988, and was appointed as President of the Board in 1986. Within 28 years, Jim Mills was able to realize his professional dream: a modern emergency department whose certified and well-trained emergency medical physicians expeditiously and effectively treated their patients with courtesy and compassion.

The American College of Emergency Physicians today represents more than 26,000 emergency physicians and is the largest and most influential organization representing the specialty. The history of The American College of Emergency Physicians is inextricably linked with the development and recognition and specialty of emergency medicine in the United States. The American College of Emergency Physicians is headquartered in Dallas and has 53 chapters representing each state, the District of Columbia, Puerto Rico and physicians employed by the military and other government agencies. Today, there are 216 residency training programs including those at the University of Virginia Health Sciences Center, Eastern Virginia Medical School and the Medical College of Virginia.

By 1978, as a result of his pioneering efforts, 30 university programs offered formal residency training programs in emergency medicine. The graduates of these programs entered active practice of emergency medicine and were in great demand to upgrade the quality of emergency service.
Jim Mills recognized that the part time coverage of hospital’s emergency departments with interns and residents in training, often with little attending supervision, did not provide the emergency patients with optimal health care and patients and their families were dissatisfied with the service. He foresaw that a new healthcare professional was necessary, and was willing, with a few of his colleagues, to commit themselves to developing and concentrating their knowledge in all types of emergency medical problems to become those new professionals, providing a new service for their hospital community. In mid career, Jim Mills, changed professions to show the need for a new health care specialist and modeled that innovative concept. Not only did he model it, he made the effort to describe his experience with this concept in medical literature. Other health care professionals recognized that this new concept made sense and looked to Jim for guidance on how to establish similar programs for their hospitals. Jim carried the torch for emergency medicine as a specialty and aided its incorporation into the University academic teaching programs and helped to create a national organization to accredit the new specialists and focus on setting national standards.

Jim planted the seed from which a new specialty grew. On April 25, 1989, he succumbed to an unusually aggressive myelogenous leukemia, leaving the specialty of emergency medicine as a legacy for us all.

THE EMERGENCE OF AN ORGANIZED APPROACH TO CIVILIAN TRAUMA CARE: THE CONTRIBUTIONS OF DR. R ADAMS COWLEY

In their book, “Shock Trauma”, two acclaimed journalists, Jon Franklin and Alan Doelp, told the whole story of how Dr. R Adams Cowley a professor and Chairman of Cardiothoracic Surgery at the University of Maryland, saw how poorly trauma victims received care in the state of Maryland and sought to do something about it. He started with getting a US Army grant to study shock, and why patients die from shock. The Army funded a two patient critical care unit where intense monitoring and research was done on patients in shock referred to the unit by doctors who could offer no other options for these patients. With the initial successes, Cowley applied for Federal funding to expand the clinical research unit to include 16 ICU beds, two operating rooms, a floor for hyperbaric chambers to treat advanced shock, and research laboratories.

With the matching funds from the State of Maryland, Cowley acquired Medevac Helicopters, manned by the Maryland State Police, to rapidly bring trauma patients from the scene of the accident (bypassing urban traffic gridlocks) to the operating rooms at the Shock Trauma Center. Ill equipped and inadequately staffed emergency departments with little or no support from hospital’s surgical specialists were bypassed to a trauma center staffed by surgical specialists and anesthesiologists, interested and specially trained in traumatic injury, immediately available to treat the patient. These basic concepts would revolutionize how trauma care would be delivered in Maryland and other states.

Who was Dr. R Adams Cowley, known affectionately as “R A.”, and how did he get interested in this huge public health problem; Traumatic injury? Raised in rural northern Utah on a ranch, RA. was familiar with the impact of traumatic injury on working
families and the community. This led him to pursue a career in medicine. He did his undergraduate studies at the University of Utah in Salt Lake City (1936-1940), and his medical education at the University of Maryland School of Medicine (1940-1944) and supported his family during those years by working in his off hours.

He began his surgical residency in 1945 at the University of Maryland and was interrupted in 1946 by military service, which had considerable influence on his surgical career. As Chief of Surgery for a field hospital, he was sent to Europe soon after World War II ended. R A.’s military service became a life-defining experience. He soon discovered that there was an abundance of surgical opportunities in the war’s aftermath with civilians being assaulted and injured throughout Europe. In 1946, he worked under virtual wartime conditions in the operating rooms of his hospital in Mourmalon, France. As he gained experience, he became Chief of General Surgery of the 98th General Hospital in Munich, Germany. R A. repeatedly witnessed the military emergency medical system’s ability to change a catastrophic accidental injury into a life-transforming opportunity. Cowley acknowledged his debt to the Army, which had introduced him to the field of trauma, a subject that would be the focus of his entire professional career at the University of Maryland where he became a skilled cardiothoracic surgeon.

After the war he joined the faculty at the University of Maryland and initially pursued a career in open heart surgery, made possible by the cardiopulmonary bypass machines invented by Gibbons, DeWall and Lillehei. Patients who were dying of shock and heart failure could survive a surgical intervention with the support of these life support devices. It was an exciting time for the pioneering surgeons in adult and congenital heart surgery. Some of the brightest surgical talents in the USA were attracted to this field.

However, the memories of his military experience and observation about trauma led Dr. Cowley to pursue a second career: trauma care and the development of trauma systems of care. Even though cardiothoracic trauma is relatively rare in civilian populations, R A. saw a sharp contrast between trauma care in the military hospitals to that provided in civilian hospitals in the United States and even in his own university hospital. Most noticeable was the delays in care provided to the trauma patient bleeding to death. Emergency medical technicians (EMT) were trained to “stabilize” patients at the scene of the accident, similar to patients with heart attacks. EMT’s treating trauma patients with external bleeding can most often control bleeding with compression dressings and tourniquets, but they cannot stop or control internal bleeding. These patients bleeding internally need immediate surgery to stop bleeding. Emergency departments at most hospitals are staffed by non-surgeons. On nights and weekends, the surgeons and anesthesiologists need to be called in from home to do emergency surgery. The delay and lack of experience and preparation can be fatal.

Reflecting on RA.’s military career, Franklin and Doelp reminded their readers of the sharp contrast in care between an emergency department with no trauma experienced surgical team immediately available and that of a trauma center, where all the resources are immediately available to save a life. They made a memorable comment about Cowley’s disdain for emergency department care of the trauma patient. “The God’s truth
is that most emergency rooms are awful. I get into trouble every time I say that and some miserable [individual] quotes me in the newspaper, but it’s true. Even today you live or die depending on where you have your accident, because in most places they take you to the nearest hospital.” Cowley’s disdain for the incompetence of emergency department care of trauma patients was deep and abiding. After being trained as an open heart surgeon, he knew that the lives of trauma patients could only be saved in an operating room in a shock trauma center. RA. had clearly identified a goal for his life, “I want to save the lives of injured Americans.”

ORIGIN OF FIRST SHOCK TRAUMA CENTER

His concepts of trauma care began in the mid 1950s when his studies of shock in animals demonstrated the importance of immediate care. He focused on the trauma patient who had lost blood, suffering an extreme drop in blood pressure. When he took a quart of blood from a laboratory dog, Cowley caused the animal to develop shock. By returning the blood to the animal quickly, the animal would recover. If the animal remained in shock more than one hour, “the golden hour,” death came slowly and inevitably to all dogs. Dr. Cowley had developed a simple but revolutionary concept: he related the duration of shock directly to life expectancy. He concluded that the trauma team must restore the patient’s blood pressure within that “golden hour” to save the patient’s life.

Cowley built upon the classic foundation of Walter B. Cannon’s book, “Traumatic Shock”, published in 1923. Cannon’s experience grew out of his investigations as an investigator in combat surgery during the battles in France during World War I. His early clinical studies of shock in the trauma and critically ill patient were funded by an Army Research Development Contract, which later supported the development of Cowley’s two-room Clinical Shock Trauma Research Unit in 1961. Skeptics referred to it as the “death lab.” Franklin and Doelp celebrate the courageous attitudes of Cowley’s surgical residents who coordinated the care of the patients in this two bed Trauma Research Unit. “We were the black birds of the hospital, man,” commented Dr. David Boyd, one of Cowley’s residents. “Whenever we showed up on the wards, the nurses would dive for their charts to see who was in shock. Whenever we were around, someone was dying.”

Patients dying from all types of shock were transferred to this Research Unit only as a last resort. Death with dignity was still an unrecognized concept and the patient’s family was usually begging the physician to do anything. From the beginning, half the patients brought to the “death lab” did not die. These results made Cowley ecstatic. He realized the potential impact of his trauma care on the 50,000 people who were dying on the highways each year, more than 800 in his own state of Maryland. If he had a big enough trauma center, he knew he could save at least half of these lives.

In 1966, the Committee on Shock and the Committee on Trauma of the Division of Medical Sciences of the National Academy of Sciences/National Research Council wrote a white paper, Accidental Death and Disability: The Neglected Disease of Modern Society. This document was prepared after three years of deliberations and is considered to be the inaugural event in what was to become a sustained effort sponsored by
government to control accidental injury as a health problem.\textsuperscript{12} This publication outlined the enormous magnitude of the personal and financial losses due to accidental injury to include the tragedy of death among the young, the burden of disability and economic costs of billions of dollars. The authors emphasized that the scope of the problem was even more concerning because the public had developed an apathetic attitude toward trauma care.

Ignoring the public’s sentiment of indifference, the authors outline a broad program of action that included training, education, and research to improve the expertise and fund of knowledge available regarding treatment, in particular emergency medical care. The authors believed that there could be a cooperative effort between medical professionals and the lay public with the federal and state government providing guidance and allocating funds for these projects.

This revolutionary manuscript made recommendations for the care of seriously injured patients. It pointed out that optimal treatment must begin in the pre-hospital phase with ambulance services using established standards including vehicle construction and credentialing of fully trained ambulance attendants. It emphasized that radio communication technology was essential for a timely dispatch to call for help. It spoke to the need for the emergence of a new specialty of physicians with special training in immediate care, providing additional support to Jim Mills’ dream of having a specialty of emergency medicine.

This document asked that outside agencies with regulatory authority categorize hospital emergency and trauma capabilities. Four categories were described that varied from first aid facilities to fully capable trauma centers able to manage all trauma patients. The committee believed all hospitals and care providers should be held accountable for patient outcomes. The development of registries of valid and reliable data would ensure that information from autopsies would be available to examine the outcomes of care. Moreover, the report pointed out that investment in prevention of injury through sponsored research, public education, or government regulation would have enormous benefits in reducing health care costs. Most importantly, the paper pointed out that the budget for injury research was inadequate and it recommended the establishment of a National Institute of Trauma within the Public Health Service.

Congress appropriately responded to the accidental death and disability report by enacting legislation, the National Highway Safety Act of 1966 (Public Law 89-564) that had a profound effect on the treatment of the trauma patient in America.\textsuperscript{13} The Department of Transportation was given the responsibility to allocate money as well as instruction to implement the law. Because one of the goals of the legislation was to reduce injury to occupants in motor vehicle accidents, this research resulted in the development of effective car safety devices. The bill also identified systematic changes that should improve the care of injured patients, including expanded capability for radio communication and use of helicopters for medical evacuation of injured patients to hospitals. Funding of ambulance services was integrated into the National Highway Traffic Safety program.
Maryland, Florida and Illinois were the major benefactors of the Federal Programs funded by the National Highway Safety Act of 1966. These States revolutionized the development of regional emergency services programs, including Trauma Systems. Under the leadership of R. Adams Cowley in the Maryland Institute for Emergency Medicine, the University of Maryland Hospital joined together with the Maryland Police Aviation Division in a revolutionary transport program. It will come as no surprise that implementation of this first trauma system in Maryland caused a dramatic reduction of the mortality rate of seriously injured patients.14

Most trauma centers today consist of a few beds in the emergency department or in an intensive care unit (ICU) and dedicated to trauma patients. Hospital administrators will call it a trauma center. This arrangement results in fundamental changes in the care given in the emergency department or ICU. However, R A. realized that the mission of the emergency departments and the ICU’s were and still are different than that of a true trauma center. The emergency department must be geared to a wide variety of patients with different conditions, most of which are not life-threatening. The average ICU is structured to provide post-operative care to patients receiving major surgical procedures or needing support for heart and/or lung failure.

R A.’s concept of a trauma center was neither an emergency department nor an ICU. His trauma center had a resuscitation area, combining the best of the emergency department and the ICU, always prepared to immediately receive and treat the most critically ill and injured patients. The severely injured trauma patient arrives at the hospital undiagnosed and untreated with his survival at stake. R A.’s Trauma Center had the ability to provide resuscitation as well as diagnostic and therapeutic measures for most critical situations, and they continued such care until that patient’s condition stabilized. R A.’s cardinal rule was “treatment before definitive diagnosis.”

In his Trauma Center, all necessary lifesaving services, diagnostic and ancillary equipment, were brought to the patient; the patient was not transported all over the hospital to get diagnosis and treatment. Treatment was immediate, and operations were performed on instant notice. Rehabilitative measures began on admission and were a fundamental, continuous part of care to minimize disability. In his Trauma Center, there was no waiting. Resuscitation, stabilization, definitive care, and rehabilitation were all a part of his Trauma Center, and they all began on the patients’ arrival.

Working with the Maryland State Police Aviation Division, he developed an efficient and cost-effective Air Med-Evac Helicopter Program. Helicopters were based across the State, and the patients were flown directly to the Shock Trauma Center in Baltimore from almost any corner of the State in less than one hour, the “golden hour” for treating the trauma patient. Simultaneously, R A. created a communication network that became the first comprehensive statewide communication system to provide radio contact between the scene of an emergency, ambulances, hospitals, specialty referral center, Med-Evac helicopters, and fire department central alarms, with both voice and telemetry capabilities. Cowley’s growing Emergency Medical system won support from the State and the University of Maryland, and after reorganization in 1973, became an autonomous
Institute within the University of Maryland (Maryland Institute for Emergency Medical Services Systems) (MIEMSS). This Institute combined the Shock Trauma Center with the statewide Emergency Medical System program.

The development of his modern Trauma Center within a university setting was not accomplished without difficulties. Resistance to a physically and administratively separate facility was intense. R A. had to overcome opposition of healthcare professionals and administrators who were reluctant to relinquish control of the Trauma Center. R A. surmounted these enormous obstacles and demonstrated the significant potential of a modern Trauma Center in a university setting that reached the goals of excellence of care at all levels, standards of therapy developed through research and education, dissemination of new knowledge, and provision of care systems for the community.

On the morning of April 13, 1971, the tide of resistance dramatically changed when Governor Marvin Mandel was fortuitously involved in trauma care. His long-time friend, James P. Mause, Deputy Governor or Lt. Governor, was involved in a serious auto accident and a land ambulance took him to a the nearest hospital in Frederick, Maryland. Because the doctors at the hospital were unable to care for his injuries, he was transferred to a larger hospital in nearby Hagerstown, MD. When Mandel was alerted to the severity of his friend’s injuries, he immediately intervened by taking a State police helicopter to the hospital in Hagerstown to see his friend. In a scene dramatically pictured in Franklin and Doelp’s book “Shock Trauma”. “He was lying flat” Mandel remembers, “I walked over to him and spoke to him. He was conscious, but he could hardly do anything but move his arm a little. I’ll never forget that as long as I live. He indicated distinctly that he wanted a pad and pencil.” Slowly, with agonizing effort, Mause wrote, “Marvin, please, I want to live.” Mandel called Cowley to transfer Mause to the Shock Trauma Center where Cowley’s team saved Mause’s life.

Cowley later took the Governor on a tour of the Shock Trauma Center. Realizing the enormous benefit of the Center, the Governor became a strong advocate for Cowley. Despite Cowley’s clinical achievements in the care of the trauma patient, there was still continued resistance to patient transfer as well as criticism of Cowley’s efforts. When this criticism wended its way to the Governor’s office, Mandel commented: “I think medical politics are much tougher than politics as I know it. Much tougher. They tried to make Dr. Cowley look like an individual who’d gone berserk, who was doing everything counter to what the medical profession would want to see. And, oh, my God, they had meetings all over the place, denouncing him.”

When the Chairman of the Department of Surgery at the University of Maryland threatened the autonomy of the Shock Trauma Center, Governor Mandel interceded and signed an executive order that created the Maryland Institute for Emergency Medical Services and separated the Trauma Center from the Department of Surgery. With the skillful use of his friendship with Mandel, Cowley sold the concept of the Shock-Trauma Center to the State of Maryland. He had successfully affected a societal transformation program that would allow all patients in Maryland to gain the
benefit of care in a modern trauma center. Ultimately, he directed the entire emergency medical system of Maryland as well as a new $50 million, eight-story, 135-bed trauma center until his retirement in 1989.

Most Maryland physicians and surgeons who were practicing when Cowley was introducing and refining these new approaches to trauma care, and who knew of the outcomes of that type of treatment, are convinced that he is the most successful trauma surgeon in the world, an achievement that the Governor, the Maryland legislators, and the public recognized appropriately by naming the new modern shock Trauma Center, the R Adams Cowley Shock Trauma Center at the University of Maryland. Of the patients treated there, 4,759 (95%) were transported from the scene of injury at the request of local fire services and 252 (5%) were transported between hospitals doing higher level of care. In 2003, Maryland’s emergency medical service community commemorated the transport of the Maryland State Police Aviation Division’s 100,000th patient. In continuous operation since March 19, 1970, the Maryland State Police Program is the oldest existing Med-Evac Program for the transport of civilians in our country.

The authors Franklin and Doelp concluded their book “Shock-Trauma” with the following hopeful message. “Perhaps most important of all a steady stream of trauma resident fellows come each year to Shock Trauma to study under Cowley, and when they leave the young surgeons often take Cowley’s convictions with them. Across the country, veterans of shock trauma are fighting the same battles that Cowley fought and for the same reasons”. One of Dr. Cowley’s gifted residents was Dr. William B. Long III who pioneered the development of the only American College of Surgeons Verified Level I Trauma Center for children and adults at Legacy Emanuel Hospital in Portland Oregon, and who was instrumental in helping Oregon develop the first statewide trauma system in the Pacific west coast states.

Initially Federal funding supported only development of Emergency Medical Service systems in all 50 states, a program created and overseen by Dr. Dave Boyd, who became the Director of EMS for the Federal Department of Health, Education, and Welfare. Dr. Boyd was a fellow at the Center for the Study of Shock and studied patients on the two bed ICU research Dr. Cowley founded at the University of Maryland Hospital.

Professional organizations, such as the American College of Surgeons Committee on Trauma (ACSCOT), began to advocate standards for Trauma Center categorization The Committee on Trauma of the American College of Surgeons had a leadership role in trauma system development. With its publication of the first Edition of Optimal Hospital Resources for Care of the Seriously Injured in 1976, the Committee on Trauma provided a landmark document of the essential characteristics of Trauma Centers and stressed that trauma centers must operate in the context of a trauma system. This Optimal Resource Document and its subsequent editions are always cited by State authorities designing trauma systems and utilize its recommendations to form state standards for trauma centers and trauma systems.
As Emergency Medical Service Systems and Trauma Systems have evolved in each state with and without federal funding, the principle of a coordinated approach to Trauma Care established by Dr. Cowley in the State of Maryland has not been replicated in other parts of the country. The role of aeromedical services are limited to non-existent in many states, and land ambulance politics have limited the use of rapidly available, medically staffed helicopters in many others. In San Francisco, a city ordinance prevents medical helicopters from landing at major trauma centers in the city, necessitating the transfer of a critically injured patient to a level one trauma center. Reason: noise abatement. The “golden hour” of life concept is not available to the trauma patients being transferred to San Francisco General Hospital from outside San Francisco.

Many other states do not have statewide coordinated air and ground advanced life support services with access to a separate and dedicated trauma facility. This lack of a statewide coordinated advanced life support program has resulted in unnecessary loss of lives.

**ORIGIN OF EMERGENCY MEDICAL SYSTEMS IN THE COMMONWEALTH OF VIRGINA**

I accepted the position of Acting Director of the Emergency Room at the University of Virginia Health Sciences Center in 1974. At that time, I was Assistant Professor of Plastic Surgery and had no specialized clinical and educational emergency healthcare experiences that allowed me to be selected for this position. I had neither formal training in pre-hospital care, emergency care, or trauma care. The lack of awareness about this public health problem and the resources needed to address it led to no other applicants for this position when my predecessor resigned. Ironically, the University of Virginia faculty was worried that my academic credentials would cause me to focus more on research than clinical care in the emergency room. I emphasize the term emergency Room, because that was all the University Hospital provided me to see emergency patients. By appointing me as Acting Director, the University was implying that I could be easily terminated from the position if I did not fulfill responsibilities that were never changed from Acting Director to Director because the University was continually concerned that I was making too many changes in the University Emergency Room.

On my first day as Acting Director, I thought it would be appropriate to gather together the entire staff involved in caring for the nearly 35,000 patients treated annually in the Emergency Room. The staff consisted of second-year surgical residents, third-year medical residents, full-time emergency medical nurses, and one hospital administrator. I had no supervisory control over the staff because these individuals reported to their own administrative department heads.

I scheduled a meeting with this wide range of health professionals who treated this large number of patients, personally contacted each of the individuals and posted announcements of the first conference. I anticipated participating in a dynamic conference in which they would share visions about the future of the emergency room. When I arrived at 8 a.m. for the conference, I was surprised that no one was there. After waiting for 15 minutes in the empty room, I set out to find out why no one showed up.
The medical and surgical residents were sleeping because they had been awake all night taking care of patients. The nursing staff was busy preparing for a change in shift. The hospital administrator could not be found.

After this learning experience, I immediately reflected on the sage advice of my mentor, Dr. Owen Wangensteen, Chairman of the Department of Surgery at the University of Minnesota Health Sciences Center, in selecting a medical career. There were two important considerations. First, select a field that is important to humankind and that provides an opportunity to save lives. Second, choose a field in which relatively few health professionals see opportunities for revolutionary advances in care. It would appear that the directorship of the University of Virginia Emergency Room had met all of Dr. Wangensteen’s criteria for an ideal job. Armed with this sage advice, I learned the ropes by using a system of crisis management to approach the problem of emergency medical services systems and trauma care.

With regard to the pre-hospital system, I found that most rescue squads were poorly trained and driving antiquated vehicles with no radio communication system. In 1974, the minimum requirements for certification of ambulance attendants was the American Red Cross Advanced First Aid Course, which was generally considered inadequate for those who were required to render care to persons who were seriously ill. Most rescue vehicles had citizen band radios that allowed them to communicate to the University police who would relay the message to the Emergency Room by telephone.

As I prepared for the arrival of my first transport of an accident victim to the emergency room, I was surprised to find a patient who had been injured in an automobile accident, was not breathing, but resting comfortably on a soft stretcher. The 42-year-old male patient had cold, purplish-colored skin and no detectable vital signs. He must have been dead for at least 30 minutes. When I asked the rescue squad if they had performed cardiopulmonary resuscitation (CPR), they indicated that they had no training in this technique. It was even more disturbing to find that none of the hospital personnel in the entire facility had any formal training in CPR. I had to acknowledge, however, that the nursing and administrative staff had an expeditious and organized plan to transfer the patient from the hospital to the morgue. They knew exactly how to encircle the large toe of the corpse with a label, allowing proper identification and transfer to the funeral home. I was horrified by my hospital staff’s lack of interest in and knowledge of emergency medicine. Our emergency room had no life saving equipment and staff capability; one could observe that we served merely to transport the dead patient to the funeral home. These memories caused me many sleepless nights and became my first life-defining experience in emergency medicine.

This was only the first of many frightening life-defining experiences involving other emergency clinical care services offered by my hospital. My reflection of these services are the best illustrated by recounting several tragic and potentially preventable personal losses. In the crisis intervention service, a medical resident had answered a telephone call from a patient who was threatening to kill himself. The suicidal patient had organized a detailed plan, ensuring that he would be successful in his effort. He told the resident that
he had placed a microphone next to his heart so that he could localize the audible noises of his heartbeat to ensure an accurate shot from his gun. The resident pleaded with him not to take this desperate action and offered to get immediate psychiatric consultation. After carefully writing down the patient’s name and telephone number, he immediately called the psychiatric resident, asking him to contact the suicidal patient. The psychiatric resident, who was also busy interviewing a patient for admission to the hospital, delayed returning the call for at least five minutes. His delayed call to the patient was not answered. Forty-five minutes later, a call was received from the police that this same patient had a self-inflicted bullet wound to his heart. The emergency room staff had failed to save this frightened patient’s life. This warning gave the nurses ample time to find another toe tag. The patient was dead on arrival and expeditiously transferred to the morgue.

Prior to 1976, the poison control system consisted of a drug card file that was updated daily by one of the clinical departments. A resident had received a telephone call indicating that a 4-year-old child had unwittingly swallowed 25 tablets of Tylenol®. The resident immediately called the pharmacy asking them for a drug dose study to determine the risk to the child. The pharmacy immediately called back, indicating that this dosage of Tylenol® was potentially life-threatening, and recommended the child come immediately to the emergency room for treatment. The embarrassed resident was unable to contact the patient’s family because he had not written down a name or telephone number.

Sexual assault patients were being routinely interviewed in the hallway of the emergency room, providing the patient no confidentiality. There were no guidelines for patient care or physical evidence recovery kits. Psychosocial support of the distressed individual was not provided by the staff. I had the perception that the distressed patient who was sexually assaulted was treated in the same manner as a college student complaining of a toothache. The hospital administrative staff and young residents were numb to the plight and psychological trauma of the sexually abused.

Handwritten medical records were completed only by physicians who ignored the nurses’ notes stapled to the back of the patients’ medical records. Critical patient information provided by the nurses about a patient was lost in this confused system of care. After reading the previously mentioned description of care given to patients, the reader might reasonably argue that the patients should not pay for their clinical care.

I soon learned that the inadequacy of the healthcare system in the emergency room was not the reason for the absence of a billing system. Receptionists did not have a computerized billing system and were not allowed to accept any cash payments for care. When I suggested the novel approach of billing patients for emergency medical services, the hospital administrator explained to me that the University would be reimbursed by the State Government for the cost of free care. Realizing the ineptitude of the infrastructure of the emergency room, I asked that my office in plastic surgery be relocated to the emergency room. Because the hospital had no funds for my relocation, they suggested I seek grant funds to pay for renovating my office.
As Acting Director of the University Hospital Emergency Room, I inherited a clinical care system that ignored the illness or injury as well as the soul of the patient. This emergency healthcare system had to be reformed so that it treated disease and listened to the patients. At the entrance to the Emergency Room, the staff had positioned a large, white board with each treatment room listed along the top of the board. A box outlined below the designated room that was used for writing pertinent information regarding each patient. Patient identification was by illness or injury and may have included sexual assault. Chairs were positioned below the white board for patients who had not yet been interviewed, waiting to be escorted to the designated room. The white board was adjacent to the entrance of the Emergency Room so Emergency Room staff as well as strangers could have an overview of the challenging clinical problems.

I hoped that a colleague or friend would join me in improving the Emergency Room situation, as well as its emergency medical system, and help transform it into a dynamic and caring lifesaving system. It was as if God had sent an angel to my rescue. On a busy Saturday evening in 1975, one of the licensed practical nurses, Shirley Talbert, asked to speak to me privately, regarding our care of sexual assault victims. She spoke in a gentle and kind manner that did not reflect her exasperation with the incompetent care. She began by providing a simple overview of her concerns. “Dr. Edlich, the care of sexual assault victims in this Emergency Room is outdated, inappropriate, ineffective, and dangerous. We act as if we are in the dark ages of medical care. For instance, both the police and the physician interview sexual assault victims in the hallway. Moreover, we don’t use an evidentiary recovery kit for obtaining legal specimens. Follow-up of these patients is nonexistent. I would recommend that we make some immediate changes.” Because Shirley was so concerned, motivated, and knowledgeable about this subject, I asked her to head a sexual assault task force that would develop standard protocols for treating these patients. Moreover, I asked that she identify other interested nurses who would become familiar with established treatment protocol. She pointed out that they were going to need considerable help from the police as well as attorneys to devise these protocols. She emphasized that the Emergency Room must have a demonstrated commitment to the care of these patients by allocating one treatment room to conduct confidential interviews with these patients as well as other assault victims. I agreed to her request and enlisted the help of the chief of police, John Bowen, as well as a dynamic attorney, Susan White. Both of these individuals helped organize protocols for the emergency care of the sexual assault victim, including guidelines for patient care, discussion of police investigations, written consent forms, and physical evidence recovery kits.

After developing these new protocols, I approached hospital administration regarding allocation of a separate room for confidential interviews. The space for the outdated Emergency Room was limited, and there was immediate reluctance to any space reallocation. After gaining support from all departments in the hospital, I persuaded hospital administration to reallocate this space. When this final decision was made, I believed that one of the administrators had severe misgivings about the new plan. After the room was stripped of cabinets and shelves, the tile floors were thoroughly cleaned in preparation for the change. My intuition about hospital administration’s reluctance to
accept the changes was confirmed when I asked the question, “Where can we get a couch and two chairs?” The administrator responded, “We have no money available for furniture.”

Fortunately, I was able to slowly make changes in the culture of the Emergency Room and the hospital that allowed improvements in emergency care. The hospital selected a new head nurse, Sue Loud, who was an emergency nurse practitioner. In addition, the hospital had hired a new director of nursing, Helen Ripple, who was a champion for excellence in patient care. She was a product of a devout Catholic family that was committed to service to the disadvantaged. She had a new and innovative managerial style that allowed her to make immediate decisions. These decisions were based on her loving concern for patients in the hospital. When I approached Helen regarding the sexual assault center without furniture, she had an immediate solution. Pointing at the furniture in her office, she said, “Use any or all of the furniture in my office!” While expressing my appreciation for her generous offer, I questioned her as to how she planned to replace it. She responded, “Those folding metal chairs in the hallway will be perfect.”

The opening of the Crisis Center for Sexual Assault Victims had numerous repercussions. First, the Charlottesville community began to view the Emergency Room as a safe retreat for sexual assault victims in which they would receive superb medical care that was coordinated with an effective legal investigation. Shirley Talbert expanded the nurse liaison role by identifying a safe haven for the patient after discharge as well as being present with the victim in any subsequent court appearance. This supportive environment for the sexual assault victim subsequently brought victims out of the closet. Their numbers were so great that the nurse liaison could no longer assume sole responsibility for their housing as well as the other services she provided. Realizing the enormous magnitude of the problem, the community established a shelter for victims of sexual assault and domestic violence. In addition, a non-profit organization with volunteer trained counselors was organized to serve as patient advocates in the Emergency Room as well as following discharge from the hospital. The Virginia legislation related to sexual assault was outdated and irresponsible and had to be changed to protect the assault victim. It was blanketed with rules that protected the man against a “vengeful woman.” Consequently, the victim was thoroughly cross-examined by the defendant’s attorney about her past sexual activities. The victim had to prove that she resisted the rape to the utmost, despite threats to her life. Another feature of the antiquated rape legislation was the draconian penalties for the convicted assailant. Juries often acquitted, rather than send the defendant to prison for 20 or more years. Subsequently, the Commonwealth of Virginia enacted modern legislation, similar to that of the Michigan Comprehensive Reform law. In this legislation, the victim cannot be cross-examined regarding her past sexual history. A victim who alleges that she was raped may still have her reputation within the community come to issue, but testimony about specific sexual acts is expressly prohibited. The victim does not have to prove that she physically resisted the assault. Furthermore, sentencing of the assailant is more flexible with graded penalties, based on the violence of the crime. In May 1979, Shirley Talbert gave a keynote address before the University Association for Emergency
Medicine in Orlando, Florida, outlining her organized effort to improve Emergency department care of the sexual assault victim.21 Her speech was especially notable in that she was the only licensed practical nurse to ever address this emergency physician academic organization. In addition, she was the recipient of a community service award from the Charlottesville Board of Supervisors.

As I reflected on this experience, I was certainly pleased that they have improved the quality of care for sexual assault victims. However, I was saddened that I was not aware of the treatment of women in the Emergency Room until Shirley awakened me from this anaesthetized state. During the last 20 years, I have grown to realize that the problems facing women in our Emergency Room in Charlottesville are only the small tip of a giant iceberg that is blocking women from equal status in the country.

These early life-defining experiences in the Emergency Room helped me define my goal: develop a model emergency medical system for the University of Virginia Hospital as well as the Commonwealth of Virginia. Faced with numerous life-threatening crises in emergency medical care, I began to search within the massive University medical bureaucracy for other angels to help me. I was delighted that my search was successful as I found two more unsung heroes at the University who assisted me in dramatically changing emergency care from a fatalistic, disorganized service to a vibrant, structured emergency healthcare system. One was Dr. Ernst Attinger, who was the Director of Biomedical Engineering. Ernst was both a physician and engineer; he was a skilled clinician whose talents in biomedical engineering complemented his innate sensitivity to clinical care.22 His Department had already established contractual relationships with the hospital in which his staff would provide quality assurance testing for medical devices used in the hospital. In addition, he had already established a computerized information system that could be potentially used in the Emergency Room.

Another unsung hero was Dr. Richard Crampton, Professor of Cardiology, who had clear visions of the potential benefits of pre-hospital care in saving lives of patients with heart attacks.23 He had developed an effective alliance with one rescue squad, the Charlottesville-Albemarle Rescue Squad, which was willing to develop a pre-hospital lifesaving plan for patients with heart attacks. Dick first designed this pre-hospital system so that the rescue squad would pick up a medical resident and transport the resident to the patient with signs of a heart attack. His embryonic program was beginning to save patients’ lives. He doggedly pursued his interests in pre-hospital cardiac care during the subsequent 20 years. He became a recognized leader in this field.

During my tenure as Acting Director of the Emergency Room, major developments resulted in dramatic improvements in emergency medical care. Cognizant of the need for improved emergency service in the country, the Robert Wood Johnson Foundation decided in the early 1970’s to authorize a nationwide competitive program to encourage communities to develop regional emergency medical systems. In 1974, Dr. Attinger and I were awarded a grant to implement an emergency medical system in the Thomas Jefferson Planning District 10, the five-county geographic catchment area for the University of Virginia Hospital. The grant program, which ended in 1977, focused on
access of the public to the emergency medical system by the 911 telephone number, training of rescue squads, and development of a radio communications system for rescue squads in this five-county region. The number 911, designated for public use throughout the United States to request aid from fire, police, or rescue agencies, had already been installed in Nelson County in 1969 after Hurricane Camille. By late 1976, adjacent Greene and Fluvanna Counties had this emergency telephone service. Installation of this system for the more populated regions of Albemarle County and the City of Charlottesville was accomplished in 1984. The development of this 911 telephone system eliminated the 40 telephone numbers for the different police and fire departments and rescue squads in the five-county area. Consequently, we had developed a system that allowed immediate access for hearing individuals into the emergency medical system.

The Department of Transportation’s National Highway Safety Administration allocated sufficient funds to develop a training course for rescue personnel that prepared them to care for the sick and injured using basic life-support techniques. This 81-hour training program was pilot-tested at Piedmont Virginia Community College in Charlottesville in 1975, after which it was offered to other rescue squads in the region. Successful completion of the course allowed the rescue squad personnel to be certified as emergency medical technicians-ambulance (EMT-A). In 1983, this training program became the minimum training requirement for the rescue squad personnel for certification by the Virginia Department of Health. The first training program at Piedmont Community College was an Edlich family event. I taught and attended all of the classes and completed certifications as EMT-A. During the mock field tests, my three children, Elizabeth, Richard, and Rachel, volunteered to participate as “casualties”.

A radio communications system was designed and implemented by Frank Hunter, Assistant Professor of Biomedical Engineering that allowed trained rescue squads to communicate with the University of Virginia Medical Center and Martha Jefferson Hospital, as well as with each other. Today, there are three advanced training programs for rescue squads certified by the Virginia Department of Health. The objectives of the emergency medical technician-shock trauma (EMT-ST) training program devised by Diana Rockwell, an emergency medical nurse at the hospital, were to have the students understand the dangerous consequences of significant traumatic injuries and selected medical emergencies, as well as to teach the appropriate therapeutic intervention to stabilize the patient’s condition. The emergency medical technician-cardiac (EMT-C) course focused on emergency care of the heart attack patient and taught the student to perform cardiac monitoring and defibrillation, the use of electric shock to correct irregular heartbeats. The emergency medical technician-paramedic course provided the highest level of training for pre-hospital personnel.

The passage of the Emergency Medical Service Systems Act (EMSS) in 1973 was the next major development. This program, led by Dr. David Boyd, authorized $185 million over 10 years and provided the awarding of grants and contracts for development of emergency medical systems throughout the United States. The passage of this Act provided the mechanism and funds for communities in Virginia to develop regional emergency care systems that were modeled after our successful regional system in...
Charlottesville. Because the system was receiving national recognition, Dr. Dave Boyd, head of Emergency Medical Services of the federal Department of Human and Health services, asked me to serve as one of his eight physician-technical advisors to assist state governments in designing and implementing their emergency medical systems. I was assigned to assist the State of Maryland, West Virginia, Commonwealth of Virginia, Pennsylvania as well as Puerto Rico to guide these geographic regions to implement their emergency medical systems. Because Dr. Boyd had developed a conceptual plan for an emergency medical system, my job was relatively easy to advise enthusiastic communities on implementing plans to improve emergency medical care.

Realizing that the emergency medical system in our country should benefit the President of the United States, I worked with Secret Service to develop an emergency care plan for the President of the United States. When President Reagan was shot, the Secret Service Agent immediately took President Reagan to a Trauma Center rather than to an emergency department. The trauma surgeons were ready for the arrival of the President and saved his life.

The only challenging part of my voluntary position was to advise Dr. Cowley regarding his exemplary statewide system that was a model for the world. Realizing that Dr. Cowley was the father of organized trauma care, I willingly accepted the role of student and listened carefully to Dr. Cowley’s retelling of his extensive experience at the Shock Trauma Center. As I carefully reviewed the organized trauma program, I realized that the Commonwealth of Virginia could benefit by replicating Dr. Cowley’s coordinated program.

Dr. Cowley and I spent long hours discussing the many obstacles to implementing a modern trauma care system. In Virginia, I had encountered the same resistance by administrators and surgeons to developing an organized trauma care program that Dr. Cowley had overcome in Maryland. On the basis of the pivotal support of Governor Mandel for Dr. Cowley’s trauma care program, Dr. Cowley suggested a simple remedy to my problem: enlist the help of the Governor of Virginia. It was fortuitous that the Virginia First Lady, Eddy Dalton, and Governor John Dalton were both sympathetic and appreciated the benefits of organized care. When the First Lady joined me on a tour of the Shock Trauma Center in Baltimore, Dr. Cowley provided a clear vision of the components of a successful trauma care system which I later promoted nationally. Eddy Dalton was impressed by what she saw and heard in Maryland to have an impassioned discussion with Governor Dalton, who directed Virginia’s Department of Health to designate regional trauma centers in 1981.

For hospitals to be designated as trauma centers by a governmental agency such as the Department of Health of the State of Virginia, the hospital has to apply to the state department of health to have a site visit by trauma experts who verify the hospital’s commitment of resources and organization as detailed in the American College of Surgeons (ACS) trauma center criteria to develop a responsive program that provides specialized care to the trauma patient. Designation as a Trauma Center had some influence on the University of Virginia Hospital. There was a positive change in attitude
toward the trauma patient by the entire hospital staff, especially surgical and emergency personnel, but also including hospital administrators, teachers, scientists, and support personnel, and gave impetus to the in-house reorganization necessary to develop a multidisciplinary trauma service. However, I must emphasize that I did not lobby effectively for a separate clinical trauma service in the hospital that would allow patients to be admitted directly to the trauma service rather than being seen initially by emergency physicians. Trauma Surgeons should be present at the time of the trauma patient arrival and be prepared to offer immediate surgery if necessary. Many trauma centers operate as a team by having the emergency physician and trauma surgeon work together as a team to resuscitate the patient, but the trauma surgeon is the team leader, and makes all surgical decisions.

Today, designation of trauma facilities is often done at the state level. The ACS does not participate in any designation process. However, The ACS has established both a trauma center and system verification process to assist hospitals (and systems) in evaluation and improvement of trauma care and to provide information regarding institutional capability, performance, and system development to aid those who are responsible for developing and maintaining these systems.

The federally supported program championed by Dr. David Boyd allowed me to implement other important programs in emergency medical care. An emergency first aid guide was written and published in the community telephone books so that each household with a telephone would have an understanding of first aid treatments for the sick and injured. An emergency medical nurse practitioner program was temporarily established in the Nursing School that became a fertile training ground for nurses who would assume leadership positions in medicine. In addition, staffs were trained to provide a coordinated, organized approach to the care of the victims of sexual assault, their treatment now guided by modern, updated practices of care. In addition, psychosocial support was arranged for each patient. A computerized poison information system was developed at the University of Virginia hospital that replaced the antiquated card file. Trained staff members could now answer each call and ensure optimal care. Trained psychiatrists and social workers staff the crisis intervention center and provided immediate and continued support for all patients. The Hospital employed two full-time nurses to provide continuing education courses for the 18 rescue squads that transported patients to the hospitals. A life support training center was established to teach the faculty and residents the psychomotor skills to care for trauma patients as well as those who have had a heart attack. These trauma and cardiac care programs were accredited educational programs that were instituted in the medical center. Recently, these programs were expanded to include continuing education programs involving the care of the injured or sick child. The cardiac training program has been made available to the fourth-year medical students.

With the exception of an emergency air transportation system, I naively thought that all central Virginia now had immediate access to the finest medical care. This momentary naïve celebration of my accomplishments was shattered when I received a handwritten note from a disgruntled patient. This note became another life-defining experience. It
opened with a cry for help: “To whom it may concern: I had a frightening experience that I want to share with you. While I was cleaning dishes in the kitchen, I was shocked to see my five-year-old daughter swallow the last portion of a six-ounce bottle of cough syrup. I immediately grabbed the bottle from her hands, thinking that she had swallowed an overdose of medications that may be life-threatening. Using my teletypewriter, I telephoned your poison control center and got no response. Fearing for my daughter’s life, I asked my next-door neighbor to drive us to the Emergency Room at the Hospital. Your doctors and nurses were wonderful and assured me that my daughter was in no danger and that the cough syrup would have no side effects. They even showed me some childproof caps for bottles that even I had a hard time opening!” The presence of an interpreter who was skilled in sign language considerably facilitated the communication. However, she was shocked to learn that the University of Virginia Hospital did not have a TTY (teletypewriter) in its Emergency Room or hospital. While she thought that the University Hospital had wonderful emergency care for the hearing in its hospital, she believed that they had forgotten the deaf. This short letter burst my bubble as I realized that my modern Emergency department was not responsive to the deaf community. I wrote her an apologetic note, promising that the University Hospital would have TTY’s in the Emergency department as well as the hospital. As per usual, I naively made this promise without speaking to the hospital administrators. Because I purposefully tried to remain uninformed about hospital finances, it was easy for me to make promises without regard to budgets. Through grants from the federal government and the Robert Wood Johnson Foundation, as well as the annual state funding for the hospital, more than $4 million had been spent to develop the modern emergency medical system in the Commonwealth of Virginia. Consequently, I thought that the $350.00 needed to buy a TTY would be a drop in this large financial bucket.

I had to develop a written proposal for hospital administration to support the cost of purchasing the TTY for the Emergency Room as well as those for the hospital. I wrote the report with the same naïveté of a college student who was submitting a manuscript to his teacher. Because I had not met or treated individuals with severe hearing impairments, I had no perception of the plight of the deaf community. To familiarize hospital administrators with the importance of the project, I went immediately to the library to search for information on the TTY system that could be included in my report. This report began by describing the origin of the TTY so that the administrators would be better able to understand its purpose. It went something like this: “a major development in telecommunications enabled deaf individuals to use standard telephone technology to transmit messages between teletypewriters. In 1964, Robert Wiebrecht, a deaf physicist, developed a modem to convert teletypewriter code into frequency or tones that are transmitted over telephone lines. When receiving, the demodulator circuits of the modem convert the tones into the digital signals used by a teleprinter. More than 75,000 deaf people have the special teletypewriter/telecommunications devices (TTY/TDD) that allow them to send and receive messages by telephone and gain access to emergency care. This telecommunications device must be immediately purchased and available for use in the Emergency Room and poison control center. In addition, a TTY should be available for patients with hearing impairment to be used in their hospital rooms. The retail cost for this device is $350.00.”
My proposal was sent expeditiously to hospital administration with the expectation that I would receive an A for its content and $700.00 for TTY’s in the Emergency department and poison control center. One week later, the hospital administrator gave me an F and no check, explaining that the funding for my request would be placed in next year’s proposed hospital budget. While the eloquent letter from the deaf mother had touched my heart, my scholarly manuscript on TTY’s had not opened the hospital coffers. Dismayed by the failure of the hospital to implement this lifesaving system for the deaf, I telephoned the hospital administrator and reiterated the importance of the TTY’s to the hospital and even threw in the medical and legal implications of the failure to have TTY’s. My pleas fell on deaf ears…

My disappointment with the hospital’s lack of support for the deaf community, coupled with the weight of my promise to the distressed mother that my hospital would serve the deaf community, compelled me to search for another avenue to solve the problem, one that would also help deaf individuals throughout the State of Virginia: the development of a statewide emergency telecommunication system for the deaf. I sent in a grant request to the Office of Emergency Services located in the State government of the Commonwealth of Virginia. I provided a detailed description of the system that could be available at a bargain price of $25,000.00. A computer-aided emergency telecommunication system for the deaf would be housed in the poison control center and serve as a relay station for all TTY calls from the deaf. My grant for an innovative emergency program for the deaf community throughout the State was turned down by the Office of Emergency Services with the explanation that such a statewide program would be better coordinated by its Richmond office. It is important, however, to point out that my rejection letter did not include any promise by the office that such a program would be implemented.

Undeterred by this bad news, I then pursued yet another avenue for solving this urgent problem: garnering funds for the development of a nationwide emergency telecommunications system for the deaf. With the appropriate modifications, I expanded my proposal, describing a computer-aided emergency telecommunications system for the deaf for the entire country at a bargain price of only $250,000. I sent this grant request into the Office of Emergency Services of the Department of Health and Human Services of the federal government. I did not have any unrealistic expectations of successful grant approval because this division had planned to be terminated; moreover, my friend, David Boyd, had resigned from the office. Consequently, my next letter of rejection from the federal government came as no surprise. Despite this growing list of rejections for my plans for an emergency telecommunications system for the deaf, I remained blissfully optimistic that I would achieve my new goal of developing a nationwide system and keep my promise to the deaf mother. I realized that the reasons for my unsuccessful attempts to assist the deaf community were caused primarily by the fact that I was communicating with decision-makers who were unsympathetic to the plight of the deaf community. I had to find an individual or organization that listened to the deaf.

I found the answer to my search in a hotel room in Chicago. The reason for my visit to Chicago was the annual meeting of the American College of Surgeons. Because my
In June 1981, two years after I read the deaf mother’s impassioned plea, the National Emergency Medical Telecommunications System for the Deaf was established. The deaf community had 24-hour, toll-free access to this Center, which was staffed by emergency personnel especially trained to meet the communication needs of the deaf. The computerized system expedited exchange by automatically sending out questions. The staff member monitors this interchange between the deaf caller and the microcomputer and interrupts as needed to elicit additional information or clarify responses. A computerized directory of emergency services facilitated referral to an appropriate public agency. After identifying the agency, the staff member telephoned the agency,
requesting a response to the caller’s emergency situation. Within the first month, the staff responded to calls from 20 states as well as the District of Columbia.

I was very surprised by the different types of calls. Sixty-one percent of the callers used the emergency service for information referral. Because deaf individuals had no access to banks, utility companies, or directory assistance, they viewed themselves as isolated from society and in desperate need of assistance in conducting the business of their everyday lives. While hearing individuals telephone a bank about checks, loans, and mortgages, banks, like hospitals, had no TTY’s to receive calls from the deaf community. Consequently, the deaf community appropriately judged calls to a utility company or bank to be an emergency. Only 24% of the callers requested lifesaving emergency care. The remaining callers (15%) requested that our staff relay information to members of the hearing community. The type of information relayed included contact with employers to give notice of illness, personal business inquiries, and notification of death of a family member. Their joint efforts clearly demonstrated that the deaf community throughout the country was isolated from society and subject to discrimination because of their disability. This unconscionable and deplorable situation was finally resolved with the passage of the American with Disabilities Act (ADA) in 1990. Because this Act required that each local telephone system design an emergency response system for the deaf, the need for our pilot program ended.

Their attempts to improve communication and safety for the deaf community facilitated the vast changes implemented by the ADA. In watching this revolution take place, I learned a very important lesson. The pursuit of a dream that changes lives is so grand it cannot be contained. Its power radiates, takes on a life of its own, and provides the blueprint for other changes and contributions in areas that were never identified from the outset.

As I participated in developing revolutionary advances in the emergency medical system in the common wealth of Virginia as Acting Director of the Emergency department, I was notified by a friend that the University of Virginia planned to terminate my position as Acting Director. As I thought about this potential crisis in my life, I thought about the advice and guidance of my beloved mentor, Dr. Owen H. Wangensteen. He had indicated to me that if my neck was on the guillotine for an extended period of time, ask my friends for help. Consequently, he immediately called the director of the University of Virginia Health System and said that Dr. Edlich wants to develop emergency medical systems in our country. Let him achieve his dreams. When the director heard Dr. Wangensteen’s impassioned plea for me, the director said immediately that I should be allowed to achieve this goal. When Dr. Wangensteen called me and told me this good news, I knew that my position as acting director was safe.

Because I was part of Dr. David Boyd’s medical adventure, he thought it should be documented in the scientific literature. Dave expressed some reluctance in collaborating in this endeavor because he was too busy changing the nation’s healthcare system. Fortunately, in 1983, he agreed to edit with me and Dr. Sylvia Micik, Associate Professor of Clinical Pediatrics at the University of California School of Medicine in San Diego,
the landmark publication, *Systems Approach to Emergency Medical Care.*

In the preface to this book, it was pointed out that, “This book is of importance to EMS systems today as few, if any, regional EMS systems have yet to accomplish the task of completing a totally comprehensive regional EMS system.” This prediction was verified by a report in the Journal of the American Medical Association in 1989 that acknowledged that only The Commonwealth of Virginia and Maryland had successfully implemented all components of a comprehensive regional Emergency Medical System. Today, the University of Virginia Hospital has a new Emergency department with modern critical care facilities. A residency training program has been established to train future leaders in academic Emergency Medicine.

An important development in the Virginia emergency medical system has been the establishment of an emergency air transportation system. The emergency air transportation system began on a beautiful fall day in 1975 when the University of Virginia was contacted by a physician in Grundy, Virginia, requesting that the University of Virginia burn center accept a burn patient from its hospital. Because the ground transportation distance from Grundy to Charlottesville was more than nine hours, I knew that this seriously ill burn patient would die of shock during the long ambulance transport. Knowing that I could possibly save the patient’s life if I had a plane to fly there and back, I rented a fixed-wing aircraft to fly me to Grundy. After gathering together appropriate lifesaving equipment, I began the first emergency medical flight for the University Hospital. I remember clearly the beautiful, spectacular adventure flying over the mountains of Virginia on such a magnificent day.

When I arrived in Grundy, I was met by an ambulance that transported me to the hospital. After stabilizing the condition of this desperately ill young man, they transported me and the patient back to the airport. The patient was accompanied by his father as well as a nurse from the Grundy hospital. I welcomed the father to fly with me, but the nurse was concerned that the father would have no place to stay in Charlottesville. The father assured me that he would be very comfortable sleeping in the lobby of the University Hospital. When the nurse from the Grundy asked the father if he had enough money for food, he indicated that he did not have enough if his son’s hospitalization lasted longer than a week. Without hesitation, she opened her purse and gave him $40 to help him on his journey. This generous gift from the nurse exemplifies the gifts of love and affection that I have encountered from so many loving individuals during my travels through emergency medicine during the last 40 years. I transported the patient back to the hospital where the patient made an uneventful recovery. When I presented the bill for renting the plane to the Director of the hospital, the Director of the hospital looked at me with considerable surprise and asked me if I planned to continue these rescue operations. I assured him that this first flight was just the beginning. My prediction became a reality with the development of the Pegasus Flight Operations.

During its first 10 years of operation, Pegasus had transported 5,945 patients by helicopter and 1,393 patients by fixed wing. In 1993, 571 critically ill patients were transferred by helicopter to the University of Virginia Hospital. The majority of the patients (68%) flown by helicopter were transferred from a referring hospital to the
University of Virginia Hospital. The remaining patients (32%) were stabilized by the trained rescue squad at the scene of the accident and then transferred to the emergency department of the University of Virginia Hospital.

The fixed-wing air transport team made 205 flights. Of these, 135 flights involved the transfer of critically ill patients. In 70 other flights, the transplant team procured organ donations. The newborn ICU accounted for approximately 5% of the fixed-wing flights, as well as helicopter flights bringing critically ill babies back to the University’s neonatal ICU.

I have tried to show, dramatically and graphically, how patients with life-threatening illnesses or injuries, who once would have died during transport to the nearest Emergency department, are now being safely transported to Verified Level One Trauma Centers that are prepared to take heroic measures to save the patients’ lives. Most of these survivors are rescued by a well-trained team of health professionals who gain little national recognition. However, when Christopher Reeve suffered a spinal cord injury after falling from his horse in nearby Culpeper, Virginia, every American celebrated his emergency medical and rehabilitation journey. It was indeed fortunate that his injury occurred after the implementation of this modern emergency medical system in the Commonwealth of Virginia.

As doctors, nurses, paramedics, pilots, and rescue squad volunteers save lives, they are faced with tremendous emotional pressures in their efforts to reverse the tide of violent death. Breathtaking in its immediacy, moving in its intimacy, and exhilarating in its message of hope, it has been an unforgettable saga of an emergency medical adventure that State Emergency Medical Systems are still waging together. As I reflect on my career in Emergency Medicine over the last 40 years, I have had the unrivaled honor of championing the development of a model emergency medical system in the Commonwealth of Virginia that has saved thousands of lives. The success of this emergency medical system is because of the talented members of the emergency medical team who care for the patient from the time of injury until complete recovery. My professional career has truly been a joyful experience. I have ridden the winged horse Pegasus to a constellation in the stars. I am one of the luckiest people in the world to have been privileged to be part to this heavenly adventure.

EXPANDING DR. COWLEY’S DREAM

The organized approach to caring for trauma patients was introduced into the civilian setting by the innovative pioneer, R Adams Cowley. His system in Maryland has the following 11 components: (1) a State Police Aviation Division that transports patients throughout the State, (2) trained paramedics at the scene of the accident as well as on the helicopter that will stabilize the patient’s en route to the Shock Trauma Center, (3) one central dispatch communication center in Baltimore that coordinates information between paramedics and the Trauma Center, (4) a Shock Trauma Center with a helicopter landing port on the roof of the building, (5) trained trauma nurses as well as trauma technicians to transfer the patient from the helicopter by stretcher to the resuscitation area. If there is a
special complication, such as an airway problem, the anesthesiologist and or trauma surgeon may meet the helicopter on the roof as well, (6) all trauma surgeons are board-certified in surgery with a certificate of added qualification in surgical critical care care for the critically ill trauma patients in the resuscitation area, (7) a CT Scan and portable X-ray units in the admission area that aid in the diagnosis of the injury, (8) operating rooms adjacent to the admission area for repair of trauma injuries, (9) a surgical intensive unit to care for the trauma patient, (10) a team of specialty physicians trained in a wide variety of specialties works as a multidisciplinary unit caring for the hospitalized patient, and (11) an ambulatory outpatient unit that allows the patient to be followed in the Center after discharge. Dr. R Adams Cowley incorporated each of these eleven components for an organized trauma center in Maryland. His legend in Trauma Care lives on!

Like so many other regions in our country, the Pacific Northwest urgently needs Statewide aviation systems that transport patients throughout Oregon and Washington to the only designated Verified Level I Shock/Trauma Center for children and adults at Legacy Emanuel Hospital in Portland, Oregon. These helicopter transport units have immediate access to trauma surgeons working in the Legacy Emanuel Shock Trauma Center that is a separate functioning unit in the hospital. This separate Trauma Center has a separate trauma resuscitation unit with CT Scan and portable x-ray units. Operating rooms are immediately adjacent to the resuscitation unit. It is my quest to have every citizen in the Pacific Northwest know about this Verified Level I Shock/Trauma Center led by the gifted trauma surgeon, Dr. William B. Long, III, President and Medical Director of Trauma Specialists, LLP.31

As I have accepted the position as Director of Trauma Education, Research and Prevention at the Legacy Emanuel Verified Level I Shock Trauma Center for children and adults, it has been an exciting adventure where the trauma team has made revolutionary advances in healthcare that requires lift equipment in all hospitals in the State of Washington to prevent back injuries in healthcare workers.32 We have developed operating room posters for the use of the double glove hole indication systems that prevents the transmission of deadly blood borne viral infections.33 In addition, we have instituted the use of emergency medical examination gloves with a glove hole leakage rate of only 1% as compared to 4% glove hole leakage rate for the standard hospital examination gloves at the Emergency department and Trauma Center.34 We have devised a web-site for Trauma Specialists, LLP that has eight free continuing medical education courses sponsored by the Dannemiller Memorial Foundation that has not been incorporated into the Legacy Health Care System web-site for the past two years. In addition, there are no highway signs directing people to the Trauma Center or signs within the hospital, even though I have personally had two TRAUMA CENTER signs framed and given to the Legacy Emanuel Administration. Finally, I have published an editorial on the use of CAR BUMPER STICKERS that can be attached to the car indicating that the injured occupants want to be taken to Legacy Emanuel Shock Trauma Center.35 These bumper stickers have not been given to all of the Legacy Health System employees. Fortunately, I have two bumper stickers on my Dodge Caravan. Hope springs eternal that I can awaken the Legacy Health System and the citizens of the Pacific
Northwest to the presence of this landmark Verified Level I Trauma Center for children and adults. This is my Quest!

CONCLUSION

As I accept the James D. Mills Award from The American College of Emergency Physicians, I want to acknowledge the guidance and advice of three gifted physicians, Dr. James D. Mills, Dr. R Adams Cowley and Dr. William B. Long III, for their guidance and advice in my efforts to develop comprehensive emergency medical systems in our country. As you may have guessed, I view each individual in my emergency medical journey as a teacher. In recognition of their enormous contributions to my life-saving career, I have given to each of them a copy of a picture developed by a graphic artist that identifies the six unique features of a teacher that have been highlighted by Dr. Owen H. Wangensteen who is recognized as one of the best surgical teachers during the last century. Dr. Wangensteen and I would like each of our teachers to achieve their wonderful dreams that allow our country and world to be a safer and happier place to be. This is our Quest!

ACKNOWLEDGMENT

This is to acknowledge Catherine L. Cross, Research Assistant for Legacy Emanuel Hospital in Portland, Oregon (USA), as well as Jill J. Dahlstrom, Research Assistant for Legacy Emanuel Hospital in Portland, Oregon (USA), for their efforts to join me in saving lives in the Pacific Northwest. I also want to acknowledge my mentor and gifted friend, Dr. Peter Rosen, for nominating me for this Award.

REFERENCES


Teacher

Faithful Supporter

Understanding Counselor

Loyal Friend

Generous Provider

Gentle Guide

Inspirational Leader