Scudder Oration on Trauma: The accident hospital

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My subject concerns a different kind of hospital, one that I would like to propose as the focal point of a system of care for accident victims. Neither new or original, it represents an approach to the accident problem that heretofore has either been ignored or rejected by the trauma leaders of this country.

I suspect that some, perhaps most, will see little merit in resurrecting the concept of an accident hospital and adapting it to the special changes that are currently occurring in the practice of medicine. To forge ahead against the opposition of a reluctant or even outraged medical profession is in the great tradition of the advocates of accident hospitals throughout their history. Armed with their conviction, determination, and success, I shall try to convince you of a better way of serving the needs of the injured in the 1990s.

What is an accident hospital? It is an autonomous facility containing all of the usual components of a general hospital but dedicated exclusively to the care of accident victims. It has its own emergency department, inpatient beds, radiology suite, operating theatres, intensive care units, rehabilitation service and outpatient center. Its full time staff consists principally of surgeons who are engaged solely in the treatment and rehabilitation of injuries. Unlike the trauma center or accident service that functions as a unit of a general hospital, the accident hospital's efforts are directed toward the treatment of both minor and major injuries, with particular emphasis on those arising in the workplace. It functions, however, to treat more than industrial accidents, and ultimately serves the vast majority of injured patients in any community in which it stands.

EMS and the trauma center

Why, you might ask, should we depart from our present course of establishing trauma centers in general hospitals as a key component of a nationwide system for emergency medical services? John Davis, in his 1980 Scudder oration, used the subtitle "We've come a long way, Baby" to describe the remarkable progress that has occurred in the years following the 1966 National Research Council/National Academy of Sciences report on "trauma, the neglected disease of modern society."

Having been associated with the trauma center concept since its inception, I share John's enthusiasm for the advances that it fostered. But progress has slowed considerably with the withdrawal of federal initiatives, and it is in danger of coming to a halt with the drive to contain hospital costs in an increasingly competitive medical environment. Where hospital administrations once fought ardently for the prestige and honor of being a region's trauma center, the need to staff and provide expensive services on a 24-hour basis for a group of severely injured patients who may not be able to pay has cooled their ardor.

The trauma center concept is in trouble for reasons other than economics, however. As with any developing system, there are numerous instances of what might be best described as a "Trauma-EMS mismatch." While the emergency medical services (EMS) system has gone forward with regional and state guidelines, improved communication, designation of resource hospitals, standards for ambulance services, emergency medical technician and paramedic training, and even verification, there are still large areas in this country without any of these advances and many more with key components that are missing.

Several knowledgeable observers have estimated that the plan for a wall-to-wall EMS network with as many as 350 Level I trauma centers strategically located throughout is either nonexistent or less than one-third complete. In some locations, too many hospital trauma centers are designated to allow any one of them to receive the numbers of patients required to maintain their skills. In others, the designated but unverified trauma center receives from the EMS system patients who require services far beyond those attainable in its limited facilities and uncommitted medical staff. A helicopter purchased to fill hospital beds brings a level of need that often surpasses the experience or capabilities of those who await its arrival.

Boyd, who more than anyone else is responsible for establishing the 303 separate EMS regions, and the "systems approach" to the care of the severely

CARING FOR THE INJURED PATIENT

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injured, has acknowledged that there are vast areas of this country in which little change has occurred, especially in our larger cities. An informal survey that I recently conducted of knowledgeable surgeons working in the 35 largest population centers of this country confirmed that in all but six, a severely injured patient struck down in the center of town is more likely to be taken to the nearest hospital than to a designated trauma center.

Not only is the trauma-center concept not working as planned in many areas of this country but it is flawed by a preoccupation with the 10 percent of injuries that are life-threatening, and it tends to disregard the vast number of minor injuries that deserve better care. Continued emphasis on caring only for critical injuries will doom the trauma-center concept.

In addition to ignoring a potential economic base, i.e., industry, this emphasis will create a crisis in leadership for centers that treat only severe injuries. General surgeons, traditionally the captains of the trauma-center team, are learning that as the complexity of injury increases, particularly outside the inner city, they are called upon to provide more and more critical care and perform less and less surgery. Fewer than 25 percent of patients who arrive by helicopter to the Maryland Institute for Emergency Medical Services Systems require an emergency laparotomy, the traditional domain of the general surgeons. While the general surgeon's services are clearly essential to the recognition and treatment of the patient's head injury or pelvic fracture, in a procedure-oriented payment system it may be difficult to make a living as a general surgeon emphasizing trauma care.

In addition, the demands of weekend and night call deprive the trauma surgeon of the opportunity to reduce his work load or schedule as he grows older or modify it consistent with the needs of his family. Inconvenient hours, low reimbursement, and few operations are not likely to attract competent surgical leaders to care for the injured.

If the general surgeon were to withdraw from his current role as captain of the trauma-center team, it seems unlikely that his place will be taken by one of the other surgical specialists. Increased subspecialization in orthopaedics has provided far more attractive and remunerative alternatives than a career devoted to the care of acute injuries. A scarcity of neurosurgeons willing to care for the acutely injured is a constant complaint of many trauma centers.

Maintaining a cadre of broadly trained, technically proficient, and financially secure surgeons to care for the injured will, I predict, require recognition of a specialty of traumatology with a scope that encompasses the role of both general, thoracic, and orthopaedic surgery in the care of the injured. Were he or she to serve in an accident hospital with its heavy commitment to both minor and major injury and rehabilitation, such a specialist could continue to provide care, consultation, and operative skill for most of his professional life.

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Economics aside, current or projected problems with EMS, trauma centers, and trauma surgery as a career are additional reasons to look at alternative methods for accident care.

History of accident hospitals

Civilian hospitals devoted exclusively to the care of accident victims have been in existence since 1882 and continue in a variety of forms throughout the civilized world. Most began in response to the huge increases in work-related accidents that accompanied the industrial revolution. As such, they have been supported largely by voluntary or mandated contributions from employers or their insurance programs. While the health and welfare of employees in the workplace has, since the time of Bismarck, been a responsibility of the employer,

SCUDDER ORATION

the scope, duration, and cost of that responsibility has increased relentlessly since its inception.

Bohler and the Austrian hospitals

One of the earliest examples of an accident hospital opened in 1925 in Vienna, Austria, under the talented and determined leadership of Lorenz Bohler, often called the father of modern accident surgery.

Bohler was born in Vienna and graduated from the University of Vienna Medical School. His military service in World War I placed him in charge of the treatment of soldiers who had sustained what were at that time uniformly disabling and often fatal gunshot fractures of the extremities. He soon learned that by using traction that was meticulously maintained and regularly adjusted on the basis of frequent x-ray examination, he could not only save lives but prevent the dreaded shortening and deformity that would otherwise doom these young men to a lifetime of disability.

"One of the earliest examples of an accident hospital opened in 1925 in Vienna."

Determined to prove the superiority of his techniques, he set about to increase his patient volume. Armed with a box of fine cigars, he would regularly meet the troop trains used to carry injured soldiers from the front lines to civilian hospitals. His persuasive manner and proffered cigar soon convinced those responsible for patients with femoral shaft fractures that their patients were clearly "too sick to travel further" and arranged for them to be moved to his hospital for care.

Upon returning to civilian life, Bohler discovered that the Austrian Workmen's Compensation Board had for many years been responsible for the care and compensation of people with work-related injuries. The industrial revolution was taking a tremendous toll on the lives and limbs of the work force. Bohler noted the deplorable results and permanent disability that so regularly followed the treatment of fractures. Never shy, he soon convinced the leadership of the board that if permitted to treat such patients, he could save them considerable funds by shortening hospital stays and reducing disability compensation.

Arrangements were made to lease beds in several private hospitals in Vienna for this bold and innovative experiment. However, once the surgeons in those hospitals learned of the plans, they succeeded in scuttling the arrangements and Bohler was excluded from all Vienna hospitals. Never to be outdone, Bohler persuaded the Workmen's Compensation Board to empty out a series of offices on one floor of its administration building where he established a ward for the treatment of these patients. His results were so impressive and led to such immense savings to the Workmen's Compensation Board and the industries they served that Bohler, his methods, and his hospitals, became world-famous.

Not only were accident hospitals developed throughout the whole of Austria but the persuasive Bohler led surgeons from all over the world to adopt his techniques and methods and to imitate his organization and structure.

One such surgeon was an Australian, William Gissane, who was to provide a lifetime of leadership to the first accident hospital in England. Gissane, too, was appalled by the care of the injured workers coming out of the heavily industrialized city of Birmingham. Then, as now, such patients were often entrusted to the most junior staff members working in the overcrowded facilities of a "casualty department." The patients had little supervision and little prospect of receiving either follow-up care or rehabilitation.

In 1941, the Queen's Hospital, built 100 years earlier and scheduled for closure, was instead selected to serve the growing numbers of industrial injuries as well as an increasing number of air-raid casualties. Gissane became its first director and continued in that capacity for the next 25 years. In that time, through his efforts and those of the great

scientists who worked there, this aged 122-bed hospital became world-famous as a center for research and education in injury prevention and treatment. Much of what we know today about hand injuries, fluid losses in major burns or at fracture sites, fat embolism, and venous thrombosis was discovered at this hospital.

Accident hospital in U.S.

The first and only accident hospital in North America is the Maryland Institute for Emergency Medical Service Systems (MIEMSS), established in Baltimore in 1968 under the leadership of R. A. Cowley. It has become one of the outstanding facilities of its kind in the world and the hub of an entire emergency medical services system that serves the 3.5 million people who live on the diverse terrain of the state of Maryland.

The MIEMSS, unlike accident hospitals elsewhere in the world, has relied primarily on state government and third-party payors for its support. It has little direct involvement with industry or the insurance companies that cover its patients. Its focus is on motor-vehicle accidents and the critically injured, with over 80 percent of its patients arriving by helicopter and 70 percent transported directly from the scene of the accident. It sees almost no ambulatory patients, and most of the penetrating trauma injuries from the streets of Baltimore are cared for at other institutions. With its 73 beds and staff of 320 largely preoccupied with life-saving issues, it is not surprising that most rehabilitation services are underdeveloped and provided in outside institutions.

The remarkable accomplishments of Cowley and his colleagues have set a standard for acute care of critically injured patients that all must emulate and few can hope to surpass. A steady decline in mortality has occurred in the face of the increasing severity of the injuries treated. A "systems approach" to all major trauma operates throughout Maryland and assures the early arrival of appropriate patients. Firmly established protocols for evaluation and resuscitation begin on arrival, and great emphasis is placed upon physiologic monitoring and critical care. The team approach enables a full range of surgical specialists to provide outstanding care to a large number of severely injured patients.

Such care is costly and not always reimbursable, and were it not for Cowley's persuasive ways with Maryland politicians, it seems likely that none of this could have come about. Few of those who look to state and local government for funding remain optimistic that such support will always be forthcoming. At present, the hospital relies on a $12-million state grant for nonreimbursable care and for the additional funds to expand and renovate its facilities.

Each of these three accident hospitals has made unique and lasting contributions to our concepts of injury care. Common to each was a long-lived, dedicated, and fiercely independent leader who was frequently at odds with his medical colleagues in practice or in academe. Yet each was able to influence and persuade those outside the profession — industrialists, politicians, or insurers — of the need for improved accident care. By building upon the accomplishments of these leaders and learning from their mistakes, our society can develop an ideal accident hospital system.

The Austrian experience today

Bohler's legacy is a network of accident hospitals that are scattered throughout Austria and provide the finest care for accident victims available anywhere in the world. An understanding of their organization and function is required to judge the merits of a similar system for this country.

Austria has a population of seven million people, and its 32,000 square miles make it roughly half the size of the state of Illinois. It is a country with a strong work ethic, socialized medicine, and low unemployment (currently at an all-time high of four percent). There is no underclass of unemployed, uninsured minorities. Government-sponsored health care is available at no cost to all citizens, but virtually all workers and students are covered by a private, independent insurance program that derived from the Austrian Workmen's Compensation Board. This General Accident Insurance Company is responsible for all aspects of care, disability, and

compensation for accidents arising in conjunction with work or school.

The General Accident Insurance Company is supervised but not operated by the Austrian government. Each employer with more than two employees is required to contribute 1¾ percent of his payroll toward the support of this program. This payroll tax had been remarkably constant for many years at 1½ percent but was raised to its present level in 1976 to underwrite coverage of all students. Coverage extends from the moment the worker or student leaves his home until he returns, so that accidents to and from work or school, including those resulting from motor vehicles, are eligible for both care and compensation.

The accident hospitals are required to care for those covered by insurance programs but are available to any Austrian citizen who chooses to go there. Since all health care is paid for by the government, and since the hospitals are renowned for both the efficiency and quality of their care, they serve virtually the entire population.

Of the 12 hospitals operated by the General Accident Insurance Company, seven provide acute care and short-term rehabilitation, and five are used for chronic rehabilitation, including a separate hospital devoted primarily to spinal cord injuries and one for brain injury. One hospital of 60 beds is used for non-traumatic occupational illness or disease, which is also under the supervision of the accident insurance company.

Each of the seven acute-care hospitals is located in or near a major population center and provides the full range of services for accidental injuries. A typical hospital will have 200 beds, admitting an average of 30 patients a day, and seeing as many as 500 patients a day in its emergency department or outpatient facilities. There are separate operating theatres for emergency, clean, and septic cases. Virtually all care, including rehabilitation, is under the direction of traumatologists. Subspecialization within the field of traumatology is common, with various surgeons emphasizing such important areas as hand, spinal cord, and peripheral nerves. Medical consultation is provided from outside physicians, and surgical specialty consultations are similarly arranged for eye or complex maxillofacial injuries. Severely injured patients are delivered to a resuscitation area adjacent to the x-ray department that has its own fully equipped and staffed operating room.

The multiple injury patient is cared for by the traumatologists who are full-time employees of the accident insurance company and its hospitals. Great emphasis is placed on efficiency in diagnosis and treatment of both major and minor injuries to enable the injured employee or citizen to return to full activity as soon as possible. Rehabilitation begins early in the course of treatment and is supervised by the traumatologist. Patients requiring long-term rehabilitation are transferred to one of the five rehabilitation hospitals near their home.

Throughout the entire system, the hospital's staff imparts a positive and supportive attitude that appears to reduce dependency or malingering on the part of the injured worker. Bohler's insistence on adequate and strategically located secretarial support for each physician, combined with modern electronic communication systems, provides early assessment and medical records to the employer and insurance company; this facilitates wages or disability compensation to all who are eligible.

The accident hospitals of Austria combine under one roof the various services and staff essential to the complete care of accident victims according to Bohler's precepts. Even before arrival, the "hurt" have been separated from the "ill" since these hospitals care only for accident cases. The multiple injury patient receives trauma-center type care without having to wait for the arrival of surgical consultants, the availability of an x-ray technician or radiologist, or an available operating room.

At the same time, the walking wounded are seen promptly in a highly efficient emergency department, where they have their lacerations sutured or cast applied under senior level supervision. Both the severely injured and walking wounded will ultimately return to the same hospital and surgeon for follow-up care, needed rehabilitation, and approval to return to work. This continuity of care extends for a long time after the patient regains function.

A U.S. accident hospital system

If the U.S. were to incorporate the many outstanding features of the Austrian accident hospital concept into its existing health-care system, care of the injured could be more comprehensive, accessible, and cost-effective than what exists today. Adapting such a system to the needs of this country would require only minor changes in our existing health-care system, many of which are already under way.

Location. To assume the full spectrum of injury care now handled by trauma centers, dispensaries, emergency departments, hospitals, industrial clinics, and urgent-care centers, accident hospitals would need to be located within major population centers with a large number of insured workers. While proximity to the workplace is advantageous, location in a major medical center is a preeminent consideration. Location next to general hospitals or academic medical centers would provide the full range of consultants, students and teachers, allied health personnel, and investigators important to the care of some patients, education of the professions, and scientific research.

Access to expensive yet infrequently needed diagnostic facilities, such as nuclear magnetic resonance, would relieve the accident hospital of significant cost burdens. The rare patient who requires renal dialysis or cardiopulmonary bypass should be able to obtain those services by transport through tunnels that connect to a hospital with a full range of diagnostic and treatment services.

Staffing. Accident hospitals require a different kind of medical specialist than currently exists in this country. The talents and skills of the broadly trained general surgeon are needed to assure early and adequate resuscitation, evaluate the extent of injuries, and establish priorities in both diagnostic studies and therapeutic interventions, particularly for the multiple injury patient. Our present system had produced a large number of young, well-trained, and enthusiastic surgeons capable of meeting these needs in the five to 10 percent of patients with severe life-endangering injuries.

While the well-trained general surgeon provides needed operative skills for patients with wounds involving the abdomen, chest, soft tissues, or vascular system, these problems probably account for less than 20 percent of the operative interventions of patients who would be treated at an accident hospital. The typical general surgeon with an interest in trauma is not well versed in many of the patient-care problems seen in these hospitals and has tended to rely heavily upon neurosurgical, orthopaedic and other surgical consultants for evaluation and treatment of injuries that fall within their expertise. In addition, and of greater importance, the general surgeon has traditionally been spared the decisions involved in rehabilitation, and much of the paper work of disability evaluation and workmen's compensation so important to the insurance company and employer who underwrite this care.

Orthopaedic surgeons are clearly essential to the care of the overwhelming majority of patients seen at accident hospitals. Not only will the majority of major as well as minor accident victims require orthopaedic evaluation and treatment but the ever-increasing use of operative fixation of fractures will insure that the skills of orthopaedic surgeons will be in high demand.

The remaining medical and allied-health specialists involved in accident care would be delegated to a lesser role in accident hospitals. However, others would still be essential as consultants for specific injuries. Among those whose involvement would either be reduced or minimized would be the emergency physician, whose present role in the EMS system has contributed significantly to trauma care through training of paramedics, medical control, initial triage, and resuscitation.

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Eventually and inevitably, U.S. accident hospitals will be staffed by a new kind of health-care professional who will choose to devote his or her career to the care and rehabilitation of the injured as a full-time employee of the hospital. Surgeons from the fields of general and orthopaedic surgery will acquire the skills and knowledge of both these disciplines as they apply to injury care. These traumatologists will be the responsible surgeons in the treatment of virtually all injuries of the neck, thorax, abdomen, and extremities and will be comfortable with the management of most injuries to the head, face, and spine.

Ready access to the special knowledge and skills of neurological, cardiovascular, or other surgical specialists will be possible for the infrequent case that requires their unique talents and support services. It seems likely that within the group of general traumatologists there will evolve those who wish to specialize in the care of a single type of injury, e.g., the hand, back, or head.

SCUDDER ORATION

Economic considerations

No proposal to alter or improve health-care today is likely to succeed without identifying ways in which it will reduce costs. Both industry and the federal government are leading the current cost-containment effort, which threatens to revolutionize the practice of medicine in this country. U.S. corporations spend over $90-billion on health care every year. This figure has almost doubled since 1980 and nearly equals their after-tax profits. Much of this expenditure is related to the provision of insurance benefits to their employees.

Since 69 percent of the population has employer-provided health insurance and the employer pays about 80 percent of the premium, it is not surprising that corporate America has become a leading policymaker for health-care spending. While much of the increased spending can be traced to the high cost of new technology, e.g., transplants and nuclear magnetic resonance, a sizable portion is spent on care of the diseases associated with aging and the terminally ill. A far greater return on investment could be achieved if these funds were directed at the prevention and treatment of accidents, both in and outside the workplace. The number of years of potential life lost through injury is nearly four times that of heart disease or cancer, and the loss of work days as a result of disabling injury is even more staggering.

Just how much of the corporate dollar is being spent on accident care is unknown. The figure would include direct costs, such as wages provided to those who are injured or disabled, the cost of providing medical care, workmen's compensation, and the cost of administering the program. Indirect costs relate to the loss of worker productivity as a result of these injuries, a figure that is estimated at over $15-billion per year. The National Safety Council estimate for 1985 places the total figure at $33-billion, but this fails to include several costly items, such as health-care insurance premiums, a figure estimated at $23-billion.

The high cost of industrial accidents and the real or imagined disability that follows them is an extravagance that corporate America can no longer afford. An honest appraisal of the extent of injury by an impartial and independent physician is fundamental to controlling these costs. Providing high quality medical care and encouraging early return to work are key components of these efforts. A final step is assurance that those who suffer permanent disability receive adequate compensation and are provided an opportunity to retrain for another type of employment.

All of this can best be done in an accident hospital with a staff of specialists who are skilled in the care and rehabilitation of injured patients. Monies provided by corporate America and administered by an accident insurance company similar to Austria's would provide both a degree of impartiality and a far more consistent quality of care than is currently available.

The current emphasis on cost containment and the increasing role of private insurance companies and large for-profit corporations in our health-care system would seem to make this an opportune time to establish a system of accident hospitals for the care of the injured. If these hospitals functioned as preferred-provider organizations to a group of large industries and were marketed by health insurance companies interested in enrolling employees and their families, they would have a financial base to assure funds for construction, equipment, and staffing. The large number of minor injuries and their more even distribution throughout both the working day and the seasons of the year would avoid some of the peaks and valleys that complicate trauma-care staffing and economics. Income and savings from improved and more efficient care of minor injuries, along with assured reimbursement, would provide for adequate facilities and staffing for the more costly and not always fully reimbursed critical care. While industry would have a priority in the care of its workers, private citizens would be treated as well for both major and minor injuries.

Summary

The provision of prompt, skilled, cost-effective, and rehabilitation-oriented care for the injured worker is best achieved in a hospital with facilities and staff devoted exclusively to these purposes. As a semi-autonomous unit of a major medical center in or near a large metropolitan area, the accident hospital would assure the worker, his employer, and much of the general population the full range of skills and services essential to the treatment of both major and minor trauma at less cost than current or proposed methods.

Note: A bibliography is available from Dr. Freeark on request.