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Impact Of Violence On The Nation’s Trauma Care
by Donald D. Trunkey

Although the delivery of trauma care to the victims of violence does not address any of the underlying social causes of that violence, the trauma care system is an essential component of a unified response to violence. In this Commentary I offer my views on the state of trauma care and my suggestions for improving this link in the nation’s response to violence. My assessment of the strengths and weaknesses of our current trauma care system is based on nearly three decades of experience in the field.

The system of trauma care as we know it today took shape in 1966, with the establishment of two trauma centers, one at Cook County Hospital in Chicago and the other at San Francisco General Hospital. Titles 18 and 19 (Medicare and Medicaid) had just been introduced, and the old city/county hospitals were looking to increase their patient loads. At the same time, urban violence was on the rise, primarily as a consequence of social decay in urban ghettos and an increase in drug-related violence. The leaders of these two trauma centers, Robert Freeark in Chicago and William Blaisdell in San Francisco, recognized the need for a systematic approach to trauma care, and thus the concept of a trauma center was born. Not long thereafter the political and administrative genius of R. Adams Cowley established the Maryland system of trauma care. In 1976 the American College of Surgeons (ACS) Committee on Trauma developed a formal outline of injury care, Resources for Optimal Care of the Injured Patient. Task forces of the Committee on Trauma have met approximately every four years and have updated their criteria, which now are used extensively in establishing regional and state trauma systems.

Components Of Trauma Care

During the 1960s surgeons performed multiple studies documenting problems in trauma care, which clearly showed that trauma care was failing...
to prevent unnecessary death and disability. These studies led the ACS Committee on Trauma to develop its optimal criteria document. As this process has evolved, the Committee on Trauma has identified the elements of a trauma system. These elements include four primary or patient components: access to care, prehospital care, hospital care, and rehabilitation. Five additional components are vital for society to address: prevention, disaster medical care, education, research, and the economics of trauma care delivery.

Patient components. A basic assumption is that to prevent unnecessary death and disability, a region or state should have a complete trauma system that includes each of these elements. Access to care is obviously critical. There must first be recognition that an injury has taken place. In farm or logging accidents, there may be major delays in identifying injury. With urban violence there also may be delays when a person has been wounded and there are no witnesses. Once an injury is recognized, access must be obtained to an emergency service such as a centralized dispatch or ambulance company. The 911 system is an example of how a universal number may get emergency care immediately. Access to a system also implies that the patient or a witness knows how to use the system or find the right emergency help.

Prehospital care involves many elements, but the most important is the personnel who provide resuscitation, treatment, triage, and transport of the injured patient to the hospital. This implies a standardized curriculum and supervised clinical experience. We have yet to achieve national standards and certification for emergency medical personnel. The prehospital component should facilitate coordination between various public safety agencies that deal with trauma patients, with a special effort to minimize inefficiency, duplication, and excessive costs.

In many ways the trauma center is the crown jewel in a well-developed trauma system. Medical, nursing, and paraprofessional staffs are on call twenty-four hours a day to provide necessary care for victims of violence. A trauma center requires all of the support elements that make up modern hospital care, including operative care, intensive care, and early rehabilitation. Rehabilitation, the fourth patient component, has received less emphasis in the past. However, it makes little sense to resuscitate and provide acute care for victims of violence and not make an equal effort to return them to a productive life. Multiple studies have shown that most trauma patients can be rehabilitated successfully and that rehabilitation costs far less than custodial care.

Societal components. Prevention, the first of the societal components of a trauma care system, is in some ways the most difficult to achieve. Nearly 55 percent of trauma deaths occur instantly after injury. Since it is
impossible to treat these fatal injuries in a timely fashion, the only practical way to address these deaths is through prevention. Prevention also would have a profound impact on early and late deaths within the hospital and would even reduce permanent disability. Arguably, prevention is the most important, and most cost-effective, societal component of trauma care, and society must develop the strategies necessary to achieve it. Unfortunately, this is very difficult, since preventive strategies must address tough social issues such as drunken driving, mandatory restraints and helmet use, handgun control, and violent crime associated with drugs. Preventing trauma-related injuries and deaths requires alteration of personal behavior through either education or changes in current laws. Some of these issues, such as the decriminalization of drugs, are quite controversial, and many would argue that society currently is unwilling to make the necessary changes. Others would argue that violence in inner cities cannot be controlled until the basic social problems are corrected.

Disaster medical care, the second societal component, usually is not involved in urban violence unless there are mass shootings or terrorism. Disaster medical care is a critical component of any trauma system, since most disaster victims have some form of physical injury. In addition, a disaster medical care program either includes or must consider all of the components of a trauma system.

The third societal component of a trauma system is education, both public and professional. Public education could include school-based drug education programs, first aid courses, and training on how to prevent trauma-related injuries. Professional education includes training of both surgeons and the other professionals who make up the “trauma team.”

The fourth societal element is research, in both biological and social sciences. Studies have shown that trauma research is one of the most neglected elements of the trauma system. Compared with spending on heart disease and cancer research, trauma research is severely underfunded and receives a low priority in overall research strategies.

The final societal element is economics. This has been a major problem with trauma care, since many of the people who use the system are underinsured or uninsured. Many hospitals and physicians have opted out of trauma care because of the economic implications. I return to this point later.

Development Of A Trauma Care System

The development of the U.S. trauma care system was slow; it encountered many obstacles in the early years, not the least of which was financing. The aforementioned criteria from the ACS offered some guidance to
communities and regions. These guidelines contain the explicit recognition that a redistribution of patients and of medical and economic resources may occur, and they require public and legislative support. In fact, the legislative process has evolved so that only a few hospitals have a franchise to care for trauma patients. This recognizes two important concepts. First, the expertise of trauma care professionals improves if the most acutely injured persons are concentrated in a few hospitals. Second, major cost savings can be achieved if the number of hospitals providing trauma care is limited.

**Determination of need.** The first step in the development of a trauma system is to determine need. This can be achieved in a number of ways. Ongoing quality improvement methods can be used to assess the care of trauma patients. Retrospective studies and autopsy studies also can ascertain whether a community needs to change its trauma care delivery. The determination of need also looks at resources within a region or community. The effects of violence are particularly vexing in large urban centers, and resources often are focused on municipal hospitals or state medical schools. Determination of need should address some of the financial concerns when placing the burden of trauma care on these state and municipal institutions.

**Legal authority.** Once need has been established for a trauma system, the second priority becomes establishing a legal authority for the development of such a system. This usually requires authorization of a public or state agency (usually by legislation). This element is absolutely critical, because only a limited number of hospitals will care for trauma patients. This “franchise” runs counter to the delivery of other tertiary care and is one of the rare instances of rational planning for delivery of services. Most hospitals providing tertiary care compete with other hospitals and offer duplicate services. Trauma care professionals believe that the interests of trauma patients are not well served by competing facilities, not only from a cost standpoint but from an expertise standpoint as well.

**Trauma care criteria.** The third task in developing a trauma system is to formulate trauma care criteria. Although the ACS has developed such criteria, it recognizes that regional differences may exist and that some communities may wish to have stricter criteria than those it recommends. Going through the process of developing trauma care criteria is also a healthy part of building consensus and establishing a regional system.

**Democratization.** The fourth task is to democratize the process. Since a franchise is being given, it is important that all interested groups (hospitals and physicians) have a fair chance of providing the service—recognizing that the final determination will be limited to whatever the regional needs are. Unfortunately, most hospitals do not willingly seek out the victims of urban violence, since many of these patients are uninsured and are per-
ceived as representing a “seedy” side of society. Nevertheless, the democratization of the process is important and usually can be accomplished by a process known as request for proposals (RFP). The lead agency, or authoritative body, sends an RFP to the major hospitals and health professionals within the region announcing the establishment of a trauma system and requesting the various institutions to send a proposal to the agency for review. Criteria for this process also have been developed by the ACS Committee on Trauma.

**Outside peer review and verification.** The fifth step in the development of a trauma system involves seeking outside peer review of the various proposals; ultimately a site visit is made to each hospital to verify the capability of the hospital and its medical staff. This review and verification process is also available through the ACS Committee on Trauma, and other groups provide this service as well. The importance of peer review cannot be overemphasized. It is an explicit measure of the commitment of hospital administrators and medical staff to care for trauma patients.

Following peer review and verification, a formal designation is carried out by the lead agency or authoritative body. This is a binding process on prehospital providers, directing them to take the most severely injured patients to these trauma centers. It also assures that there are only a few hospitals within the system, which increases experience for health professionals and minimizes duplication of costs.

**Needs assessment and quality improvement.** The final step in establishing a trauma system is the process of ongoing needs assessment and quality improvement. This requires a trauma registry to document the epidemiological and demographic characteristics of injury in a given community or region. It also serves as a means to provide concurrent quality improvement programs. This process reassesses the needs of the region on an ongoing basis; trauma system components can be added or deleted as needed.

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**Problems With The U.S. Trauma System**

The current status of trauma care in the United States is less than optimal. Recent estimates suggest that less than 25 percent of the entire geographic area of the United States is served by a trauma system. The areas not served are primarily in the Midwest, Rocky Mountain West, and other rural areas. A report published in 1988 found that only two states had all of the recommended components of a trauma system; nineteen states had one or more of the essential components; and twenty-nine states had no formal trauma center designation. Since publication of that report, some states have initiated the process, but at the same time at least sixty-
one trauma centers have closed for various reasons. Paradoxically, a number of studies in the surgical literature support the efficacy of a trauma system once it has been established.

There are multiple reasons why the provision of trauma care has not grown logically and rapidly. Some of these reasons have been reported previously, and I summarize them here.

**Financing.** One of the major reasons that trauma centers have failed to gain acceptance relates to finances. In 1990 Brent Eastman and colleagues reported at the annual meeting of the American Association for the Surgery of Trauma some of the reimbursement problems of trauma centers. They demonstrated in a nonrandomized survey that trauma care is underfunded, which confirmed the views of many trauma center directors. The causes of this underfunding include (1) more self-pay patients compared with other hospitalized patients; (2) a reduced bill-collection ratio for patients covered by Medicaid and Medicare; (3) inability to shift the cost of all of the losses to other payers; and (4) inappropriate assignment and poor definition of diagnosis-related groups (DRGs) for Medicare prospective payment.

A study by Udell Research Associates of West Palm Beach, Florida, documented the financial losses to all hospitals in Texas. In 1989, 114,800 persons in Texas suffered traumatic injuries severe enough to require hospitalization. The cost of this care, which was provided by 403 hospitals, was almost $600 million. During the same year the cost of care for 30,860 trauma patients was uncompensated, resulting in a loss to the hospitals of $157 million. This study found that thirty-four hospitals (less than 10 percent of the hospitals in the state with emergency departments) provided 69.5 percent of this uncompensated trauma care. The same hospitals provided 76.5 percent of the uncompensated hospital care for patients with major trauma and 82 percent of the uncompensated care for severely injured patients with trauma. The majority of these patients were victims of violence.

The average hospital in Texas treating patients with major trauma provided more than $3 million in uncompensated trauma care in 1989. There was a significant difference between government-owned teaching hospitals, which provided an average of $8 million in uncompensated trauma care, and private teaching hospitals, which provided an average of $2.5 million.

Before the Texas study, many trauma surgeons assumed that most of the uncompensated care was for inner-city populations. However, the Texas study showed that the estimated annual cost to rural hospitals for all injured patients who required transfer exceeded $9 million. Thirty percent of these transferred patients were identified as unsponsored patients, whose care resulted in uncompensated care costing rural hospitals $3 million that year.
An additional loss of $14 million was attributed to uncompensated care for injured patients admitted to rural hospitals.

As mentioned above, some hospitals have removed themselves from the trauma system. A national hospital survey found that sixty-one hospitals reported having terminated their trauma services. This survey of hospital administrators identified twenty-six factors that may have prompted or contributed to the closure of these trauma centers. Four of the five leading reasons for closure involved costs: the perceived cost of uncompensated care; high operating costs, specifically, costs associated with trauma services; inadequate reimbursement from medical assistance programs; and reduced compensation for trauma patients under the Medicare prospective payment system (PPS) (involving DRGs).

Significantly, the remaining of the top five reasons for closure was the unwillingness of physicians to be on call. Tom Esposito and colleagues have further examined this latter reason for trauma center closure. In a study of Washington State surgeons, Esposito showed that 39 percent of all responding surgeons preferred not to treat trauma patients. Forty-three percent of general surgeons and neurosurgeons preferred not to treat trauma patients, compared with only 14 percent of orthopedic surgeons. Thirty percent of surgeons would not be on call for trauma care if such coverage were not mandatory in their hospitals. The survey also documented some of the reasons why surgeons preferred not to care for trauma patients. These included disruption of an elective surgery practice, a labor-intensive level of care, lower reimbursement rates, liability risk, and increased cost of malpractice premiums. Almost all of these concerns cannot be substantiated by the literature. My own observations confirm those of Esposito and give subjective reasons as to why this has occurred.

The future of trauma care: lessons from Oregon. What will happen to trauma care and financing by the year 2000? In many respects trauma care financing will be dependent on the outcome of our current health care reform. I am optimistic that trauma care will be better funded under a new system than it is now. I make this prediction based on recent experiences in Oregon. In 1988 legislation was passed in Oregon that set in motion the Oregon Health Plan. The purpose of this experiment was to give all Oregonians access to health care and, at the same time, to rationalize this care based on criteria determined by the health care community and the public. A Health Services Commission was established consisting of five physicians, one public health nurse, one social worker, and four consumers. Under the direction of this commission, diseases and injury were divided into diagnosis-treatment pairs. Based on the professional input of numerous subcommittees, these diagnosis-treatment pairs were examined from the standpoint of outcome, cost/benefit ratio, quality of life, effective treat-
ment, and other parameters of overall good. The commission developed seventeen categories of health services and ranked these categories on the basis of value to society, value to a person at risk of needing the service, and whether each category was an essential component of a basic health care package. One of the most important steps in the process was then to present these diagnosis-treatment pairs to public groups for prioritization and commentary. Based on the commission’s standards and public input, each of the 709 diagnosis-treatment pairs were then given a priority ranking. With few exceptions, care for injuries was given a relatively high priority among the first 200 diagnosis-treatment pairs listed. The state legislature ultimately will determine how many of the diagnosis-treatment pairs on the list will be funded.

The important concept learned from this Oregon experiment is that once the public becomes knowledgeable about health care options, trauma care becomes a high priority in the public decision-making process. This is due in no small part to the wealth of outcome studies in the surgical literature that document the efficacy of trauma care and the positive aspects of rehabilitation and returning patients to productive lives. It also is appreciated that trauma primarily affects the young, and the fact that potential years of life are lost from a devastating injury is obvious to health policymakers and the public in general.

Violence and trauma care. It is unlikely that there will be significant reduction in violence by the year 2000. Gun control may finally be sensibly addressed by Congress, but inner-city violence likely will continue unabated because of underlying social problems. Preventive care activities will increase dramatically as violence becomes a public health concern, but I predict little progress in modifying behavior. Federal and state legislators will continue to build more jails to address increased drug use, instead of addressing decriminalization of drugs and the paucity of drug treatment and drug education programs. Not until the tax burden associated with our current penal system becomes too high will taxpayers seek alternative methods to our drug policy. Continued racial discrimination, breakdown of the family, inequality in educational opportunities, and lack of educational reform will only increase our inner-city problems over the rest of the decade. Failure to address these social problems will simply assure the continuance of inner-city violence. Thus, in the near future, a promising public policy approach to violence will be to improve trauma care. This will assure care for the victims of violence, but it will not solve the underlying causes of violence.
NOTES


11. Dailey et al., “Trauma Center Closures.”

12. Esposito et al., “Why Surgeons Prefer Not to Care for Trauma Patients.”