

Appendix G

Emergency and Trauma Care in Texas:
Assessment, Challenges, and Options

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October 2005

I. Introduction

Trauma is the leading cause of death for Texans under the age of 45 and the third leading cause of death and disability for all Texans. Every day there are an average of 32 trauma deaths in Texas with motor vehicle crashes, suicide and homicide topping the list of causes.^a Emergency and trauma care systems have been shown to increase survival of severely injured patients by providing pre-hospital emergency (EMS) and specialized hospital care (trauma care).^b State and regional efforts to develop regionalized trauma systems have been ongoing in Texas for about 30 years. This paper provides a historical overview of the factors contributing to the development of these systems, describes their characteristics, discusses current issues and challenges, and suggests options to enhance their development and performance.

II. Historical Overview

The historical development of trauma systems in Texas can be understood in relation to the history of emergency medicine in the military, the realization of injury as a public health problem in the United States in the 1960s, and the subsequent federal and state government funding of systems and services.

The earliest historical evidence of emergency transport and treatment of wounded soldiers in military campaigns dates back to the Roman Empire. Emergency medical practices employed by France in the Napoleonic Wars by Baron Dominique-Jean Larrey remain guiding principles still in use today. Baron Larrey developed battlefield protocols that included a rapid mode of transport, known as an *ambulance volante*, where trained personnel could reach the wounded quickly and provide stabilization and minor treatment before quickly evacuating them to aide stations or a medical facility for more definitive care. Efforts to replicate Larrey's precepts of rapid transport, immediate treatment, and triage were made in the United States during the Civil War.^c

In the 20th century, medical knowledge, technology and practice in treatment of wounded soldiers advanced in the two world wars leading to progressively higher survival rates. Motorized transport provided quicker access to the wounded and to the various levels of care.

The treatment of shock prior to surgery and new surgical therapies were among the medical innovations employed especially during World War II. The Korean War led to broad use of helicopters as transport vehicles and the mobile surgical army hospital, or MASH unit.^{d e}

While these advancements in medical care were being made in the military, the expertise and resources to transport and care for critically injured civilians in the United States was also slowly being developed. Near the end of the Civil War, a few major urban areas began to develop ambulance services, primarily organized by local hospitals. Cincinnati General Hospital opened an ambulance service in 1865 shortly followed by services opened by local hospitals in Atlanta, New Orleans and New York City.^f Other than a few major municipalities with this foresight, most early emergency transports were organized by local funeral homes.^g

Urban teaching hospitals gradually began to develop trauma care capacity and faculty began to publish clinical research on trauma care and outcomes, and provide training in trauma care. However, when trained trauma surgeons left the urban hospital setting, they found little support for their specialty and gaps remained between military and civilian capacity and the number of preventable deaths of injured patients grew.^h

The organized, modern emergency medical services and trauma system only began to look like it does today following the publication of *Accidental Death and Disability: The Neglected Disease of Modern Society* by the National Research Council/National Academy of Sciences in 1966. With the publication of this paper, policymakers in the United States began to look at death and disability from injury as a public health problem worthy of governmental attention and funding.

This paper had far-reaching recommendations, most of which have been implemented over the last 40 years to create the modern trauma system. The report called for training and credentialing of ambulance service providers, implementation of radio-communication technology, special training of physicians in emergency medicine and trauma care, regulatory authority to categorize hospital capabilities, hospital and care provider accountability for patient outcomes, patient registries, and investment in injury prevention through research, public education and governmental intervention.ⁱ Congress responded to the report by passing the National Traffic and Motor Vehicle Safety Act and the National Highway Safety Act of 1966. These acts not only established motor vehicle safety standards, but created the EMS Program within the Department of Transportation, ultimately leading to systematic planning and program development of emergency medical services and trauma care.

Federal funding for emergency system planning and provider training was granted during the 1970s through two pieces of legislation – the Emergency Medical Services System Act of 1973 and the Emergency Medical Services Amendments in 1976. Although \$300 million was spent over eight years and 304 EMS regions were created, only a few areas were able to establish continual funding for EMS at the state or local government level.^{j k} The Omnibus Budget Reconciliation Act of 1981 substantially reduced the allocation of EMS grants to the states and incorporated the funding in block grants to states for programs to support preventive measures and health services.^l

Additional federal funding of trauma systems includes block and categorical grants from the Health Resources and Services Administration (HRSA), and the Centers for Disease Control and Prevention (CDC). HRSA provides trauma-emergency medical services systems state grants based upon the *2002 National Assessment of State Trauma System Development, Emergency Medical Services Resources, and Disaster Readiness for Mass Casualty Events*.

The CDC provides funding to state and research programs based upon their *Injury Research Agenda* which was recently revised to increase support for acute injury research. Funding is focused primarily on injury prevention efforts and injury research centers. Texas does not receive any of these federal funds.

Additional federal legislation that impacts trauma care includes the Emergency Medical Treatment and Labor Act (EMTALA).^m Passed in 1986 as part of the Consolidated Omnibus Reconciliation Act of 1985 (Pub Law 99-272), this law, often referred to as the 'anti-dumping law,' creates a requirement for medical screening and stabilization of patients with emergencies presenting to a hospital emergency center. In addition, this law imposes regulations and restrictions on transfer of patients between hospitals. While provisions have been made for payment for screening examinations, this law still largely imposes an 'unfunded mandate' on hospitals and trauma centers caring for injured patients.ⁿ

The Centers for Medicare & Medicaid Services (CMS) issued final guidance in May of 2005 for a nationwide \$1 billion program mandated under the Medicare Prescription Drug, Improvement, and Modernization Act (MMA) to help hospitals and other providers with the cost of providing emergency care to undocumented aliens. The 4-year program provides extra funding to those states, including Texas, with a higher burden of care for undocumented aliens. The funding, often referred to as Section 1011, designates a national contractor to administer reimbursement to hospitals, certain physicians and ambulance providers.^o

Initial state legislation to establish regionalized emergency and trauma care systems in Texas was passed in 1989. The Texas Legislature charged the Texas Department of Health (now the Texas Department of State Health Services, or TDSHS) to implement a statewide EMS and trauma care system including a designation system for trauma facilities and a trauma registry. No funding was provided to TDSHS to accomplish these directives, however.^p In 1992, the Texas Board of Health adopted rules for implementing the Texas trauma system which called for the state to be divided into 22 trauma service areas (TSAs). Each TSA was required to develop a regional advisory council (RAC) with appropriate representation from local EMS agencies and trauma hospitals. RACs were required to develop and implement a regional trauma system plan. The TDSHS rules also required the department to develop a trauma facility designation process and a statewide trauma registry.^q

Throughout the decade, emergency services and trauma system planning and development continued as the TDSHS rules were implemented. Yet, much of these activities took place with little funding. In 1997, the Texas Legislature redirected \$4 million from 9-1-1 funds to the newly created EMS/Trauma System fund. Each legislative session thereafter has redirected approximately \$4 million to this account each biennium from 9-1-1 fees. In 1999, \$100 million of the state's tobacco funds was set aside in a permanent endowment with the interest on these funds directed toward trauma and EMS needs. The annual interest from these funds, approximately \$3 million a year, is directed toward local project grants to EMS agencies and funding for the RACs. Also during the 1999 legislative session, the tertiary medical account was established to reimburse trauma hospitals the cost of uncompensated trauma care incurred for out-of-county patients.^r A little over \$16 million was allocated to this account in 2001 and 2002. No funds have been appropriated since 2002.

An important development in trauma and emergency services system planning was the establishment of the Governor's EMS and Trauma Advisory Council (GETAC) in 1999 by the TDSHS Sunset legislation. GETAC was established to provide input and recommendations to the Texas Board of Health and TDSHS staff. Later, GETAC's charge was expanded to assess

the EMS needs in rural areas of the state and to create a strategic plan relating to development of EMS and trauma systems in the state and to refine educational and certification requirements of EMS providers.^s

With a growing vocal constituency calling for funding support for the state's EMS agencies and trauma centers, the 78th Texas Legislature passed two funding vehicles in 2003. Senate Bill 1131 directed funds to EMS and trauma care providers through an additional \$100 fee to be paid by those convicted of certain intoxication offenses and was expected to bring between \$3 million to \$6 million annually in funding for uncompensated trauma care. Funding realized from this legislation in the most recent biennium was just over \$2 million to support trauma hospitals, EMS agencies, the RACs and the TDSHS Office of EMS/Trauma Coordination. House Bill 3588, on the other hand, promised a great deal more in funding to EMS and trauma care providers through its Driver Responsibility Program. This program, which would penalize habitually bad drivers, was expected to generate \$220 million annually for uncompensated trauma care costs, as well as the cost to provide EMS services throughout Texas.

Simultaneously with the development of the EMS and trauma system was the implementation and growth of the emergency communications system. The publication of *Accidental Death and Disability: The Neglected Disease of Modern Society* in 1966 called for a radio-communications system throughout the country and the following year the Federal Communications Commission supported the concept of a single nationwide emergency number promoted by Congress.¹

While Odessa was the first city in Texas to implement the universal emergency telephone number of 9-1-1 in 1970,^u by the end of the decade, only 20 such systems existed in Texas cities. The 1980s saw the creation of emergency communication districts in various counties in Texas. During the 70th Texas Legislature in 1987, a bill known as House Bill 9-1-1 was passed, charging regional planning councils to develop a statewide emergency communications system. By 1990, all regions within the state not covered by an existing emergency communications district had submitted plans for the development of the telecommunications system needed to support 9-1-1. The regions were then allowed to begin collecting fees charged on local citizens and business' telephone lines to fund implementation of the telecommunications plans.^v

From the perspective of emergency management, the importance of adequate funding for EMS agencies and trauma facilities cannot be minimized. Today, funding for local EMS services remains primarily an obligation of local governmental entities in Texas, despite federal and state efforts to provide support. Likewise, support for trauma services is generally dependent upon the voluntary decisions of local hospitals. One state legislator exclaimed when hearing of issues related to inadequate provider funding, "Do you mean that the Texas Legislature has worked to ensure 9-1-1 capability in all 254 counties in Texas and neither can we guarantee that there will be an ambulance to pick someone up after a 9-1-1 emergency call nor can we expect that there will be a hospital available to care for this constituent?"¹

¹ Personal communication from Guy Clifton, M.D.

III. Facilities and Utilization

Trauma Centers

Currently, there are 227 designated trauma centers in Texas, 13 Level I, 9 Level II, 40 Level III, and 165 Level IV.^w The Texas DSHS designates facilities using standards set forth by the American College of Surgeons. The resources that must be maintained by these facilities is described below.

Level I trauma centers typically serve a large city or a population dense area and are expected to manage large numbers of injured patients. These centers are required to have a trauma program, trauma service, trauma team and medical director. There must be departments or divisions of surgery, neurosurgery, orthopedic surgery, emergency medicine and anesthesia. General surgeons, anesthesiologists and emergency medicine specialists must be immediately available 24 hours a day. Every surgical subspecialty as well as obstetrics/gynecology, critical care medicine and radiology must be on call and promptly available 24 hours a day. Board certification is expected for general surgeons, emergency physicians, neurosurgeons and orthopedic surgeons. Level I trauma centers are expected to maintain specific emergency department personnel as well as equipment pertinent to trauma in all age groups. Twenty-four hour a day immediate operative capability, a staffed recovery room, intensive care units for the critically injured, respiratory therapy services, radiological services (including angiography, sonography, computed tomography with an in house technician and MRI), clinical laboratory services, hemodialysis, burn care and acute spinal cord management are all essential. Rehabilitation services must be available. Performance improvement including chart audits, care reviews and a trauma registry are essential. Finally Level I trauma centers are expected to be leaders in continuing education, trauma prevention programs and research.

Level II trauma centers provide care either in a population dense area to supplement the activity of a Level I center or in a less populated dense area where a Level I center is not immediately available. In the second case, there should be transfer agreements prearranged with a distant Level I facility. Level II centers are expected to have similar institutional organization, hospital departments/divisions and clinical capabilities as Level I facilities. However, cardiac surgery, microvascular/replant surgery and acute in-house hemodialysis are not required. A surgeon is expected to be on call 24 hours a day and present at resuscitations and operative procedures. The operating room must be adequately staffed and available when needed in a timely fashion. Emergency department personnel and equipment, recovery room and intensive care unit availability mirror that of a Level I institution. Many of the radiological services expected for the Level I center are expected for the Level II center. However, it is acceptable to not have an in-house CT technician or an MRI unit. There are fewer requirements for continuing education/outreach programs, prevention programs and research.

Level III trauma centers are required to have the capability to manage the initial care of the majority of injured patients and have 24-hour general surgical coverage. They should have transfer agreements in place for patients that exceed resources. The only specialties considered essential are emergency medicine, anesthesia, orthopedics, plastic surgery and radiology. Twenty-four hour availability of an operating room and on-call personnel are desirable. In-house radiological services are desirable but not expected; computed tomography availability is expected. A trauma registry and CME availability for physician and nursing staff are expected. Prevention programs and research are desirable, but not required.

Level IV trauma centers should be able to provide the initial evaluation, assessment and resuscitation of injured patients. Patients with known or potentially serious injuries are to be stabilized and arrangements made for safe transfer to a larger facility with more resources. The facility should have 24-hour coverage by a physician; surgical coverage may not be available. These facilities are typically located in rural areas. Continuing education and prevention programs are desirable.

Trauma Service Areas and Regional Advisory Councils

The trauma services areas (TSAs) provide integration with local EMS agencies and trauma hospitals. The Trauma Regional Advisory Councils (Trauma RACs) are responsible for oversight of EMS diversion criteria. The TDSHS maintains EMS and trauma registry databases and has established rules for EMS and trauma oversight. The TDSHS certifies Emergency Medical Technicians (EMT) and approves EMS providers (first responders, basic and advanced, and air vehicles). Oversight is provided by county or city government for 9-1-1 response.

Trauma Care Use and Outcomes

Trauma volume in Texas hospitals for 1999, 2000 and 2003 was estimated from Texas hospital admission data.² Trauma patients were identified by principal ICD-9-CM diagnosis code in the range 800.00 – 959.99, excluding 905-909 (late effects of injuries), 930-939 (effects of foreign bodies entering through an orifice), 958 (traumatic complications), and 820.0-820.99 if age \geq 65 (hip fractures in the elderly). These are widely accepted codes for trauma cases.¹⁵

There has been an overall increase of 16.1% during the five year period (Table 1). As a percentage of total discharges, trauma admissions increased from 3% to 4%. The characteristics of trauma cases has remained relatively stable over the period. The majority of cases are adults age 18-64. The race/ethnicity distribution reflects that of the population. About one third are commercially insured, 40% are covered by Medicare and Medicaid, and 15% are uninsured.

² Data problems prevented us from reporting estimates for 2001 and 2002.

Table 1. Trauma Cases, 1999 – 2003

	1999	2000	2003
Total discharges	74,275	76,642	86,203
Gender (%)			
Female	42.9	42.7	46.2
Male	57.1	57.3	53.8
Age (%)			
Children 0-17	15.6	15.1	15.3
Adults 18 – 64	58.3	58.6	55.9
Elderly 65 and older	26.1	26.4	28.7
Race (%)			
American Indian/ Eskimo/Aleut	.2	.1	.1
Black (non-Hispanic)	10.5	10.4	9.6
White (non-Hispanic)	58.4	58.5	60.0
Hispanic	24.7	24.8	26.0
Asian/Pacific Islander	.8	.8	.7
Other	3.9	5.4	5.1
Payment Source (%)			
Commercial Insurance	36.5	36.1	32.9
Medicare	25.3	25.8	30.2
Medicaid	8.8	8.4	11.5
Other Government	.3	.3	.3
Other Private	6.4	6.4	5.0
Uninsured/Self-pay	16.7	15.6	15.3
Other	5.6	6.9	4.6

Source: Texas Health Care Information Council, Hospital Discharge Survey^x

The Injury Severity Score (ISS) is used to measure the severity of the patient's injury. Table 2 shows the distribution of admissions by severity and outcome. Most cases fall in the 1-15 range of severity with 8-9% per year hospitalized for major trauma (ISS>15). The percentage of major trauma cases did not change over the period. Over 70% of all patients treated were discharged home or to self-care expecting a full recovery. Approximately a fourth of the patients were transferred to another facility where their condition upon discharge is unknown. Only 2-3 % died before discharge or were discharged to hospice care.

Table 2. Trends in Trauma Severity, Deaths, and Charges

	1999	2000	2003
Trauma Severity³	# (%)	# (%)	# (%)
Trauma ISS < =15	64,712 (87.1)	66,635 (86.9)	75,751(87.9)
Major Trauma ISS >15	6,480 (8.7)	6,740 (8.8)	7,157(8.3)
Unknown or Non-injury	3,083 (4.2)	3,267 (4.3)	3,295 (3.8)
Discharge Status			
Discharged to home or self-care	53,499 (72.0)	55,629 (72.6)	61,281 (71.1)
Discharged to other Facility	19,089 (25.7)	19,175 (25.0)	22,912 (26.6)
Deceased	1,687 (2.3)	1,838 (2.4)	2,010 (2.3)

Source: Texas Health Care Information Council, Hospital Discharge Survey²⁴

IV. Current Issues and Challenges

Uncompensated Care

Trauma centers are financially vulnerable because in their role of providing critical care services to a community they treat a disproportionate share of uninsured and underinsured patients. There has not been an on-going effort to measure the amount of trauma care costs that are uncompensated in Texas' EMS and trauma care systems. However, uncompensated trauma hospital costs can be extrapolated from figures supplied by hospitals to the TDSHS to solicit HB 3588 funds. If these self-reported figures are used, it would appear that Texas hospitals spent about \$208 million treating uninsured trauma patients in 2003.^y This figure is based on uncompensated trauma care charges to which DSHS applied hospital specific cost-to-charge ratios to derive uncompensated trauma care costs for each designated facility. The figure is similar to an independent estimate by Bishop+Associates in a 2002 study conducted on behalf of Save Our ERs in Houston.^z Based upon their analysis, 32% of all trauma patients in Texas were uninsured, generating uncompensated costs at these facilities of over \$181 million. An effort is being made at the TDSHS to include questions in the annual survey of hospitals related to the provision of care to uninsured emergency and trauma patients. This will likely be included in the 2005 Annual Survey which will be administered in mid-2006.

Hospitals must recoup their costs, or risk going out of business. The standard practice is to shift the cost of uncompensated care to those who can pay. A recent national study estimated that in 2005, premium costs for family health insurance coverage provided by private employers will include \$922 in premiums due to the cost of care for the uninsured.^{aa} Health insurance premiums for Texas families is estimated to be \$1,551 higher due to the unreimbursed cost of health care for the uninsured. The portion of these costs attributable to uncompensated costs of trauma care is unknown.

³ Injury severity scores are translated from ICD-9 diagnosis codes using the program developed by Mackenzie.

ER Overcrowding and Trauma Care

In addition to providing specialized trauma services, many trauma centers are also a critical part of their community's health care safety net. With the enactment of the Emergency Medical Treatment and Active Labor Act (EMTALA) in 1986, they became the legally mandated "open door" for everyone in a community. Under EMTALA, all Medicare-participating hospitals with emergency departments must provide a medical screening exam, followed by stabilization and further care or transfer as needed, regardless of the patient's ability to pay. EMTALA also requires hospitals to maintain a list of on-call physicians in a manner that best meets the needs of the hospital's patients in accordance with the resources available to the hospital. This obligation does not mandate the provision of broader emergency department services, yet most hospitals offer a wide range of specialty coverage to attract insured patients and to meet local expectations.

Several studies have shown that the uninsured without a regular source of primary care are disproportionate users of hospital ERs.^{bb, cc, dd} The reliance on hospital emergency rooms for basic care, particularly by low-income uninsured populations, contributes to the ER overcrowding problem. ER overcrowding is the term used to describe a nationwide problem of overloaded emergency departments that can lead to ER closures, diverted ambulances and greater risks for all patients and providers.

Emergency room data have been collected from four major trauma centers -- Brackenridge in Austin (a Level II trauma center), Parkland in Dallas (a Level I center), and Ben Taub and Memorial Hermann in Houston (both Level I centers) -- to examine the frequency of primary care-related visits being made by the uninsured in Texas.⁴ The data indicate that the primary care-related visits (non-emergent, primary care treatable, or preventable)⁵ represented 52.0% of visits at Brackenridge, 42.4% at Parkland, 57.2% at Ben Taub, and 45.1% at Memorial Hermann. The magnitude of primary care-related visits at these hospitals is not unusual. What is extraordinary is that the patients making these visits are mostly uninsured or on Medicaid, reflecting the payment characteristics of the populations served by these hospitals. The percentage of patients making primary care-related visits at Brackenridge that were uninsured was 46.0%, 48.1% at Parkland, 43.9% at Ben Taub, and 22.9% at Memorial Hermann. The percentage with Medicaid coverage were 24.1% at Brackenridge, 18.0% at Parkland, 19.4% at Ben Taub, and 42.0% at Memorial Hermann. Those making primary care-related visits to these hospitals that were commercially insured ranged from 3.4% at Ben Taub to 31.4% at Parkland.

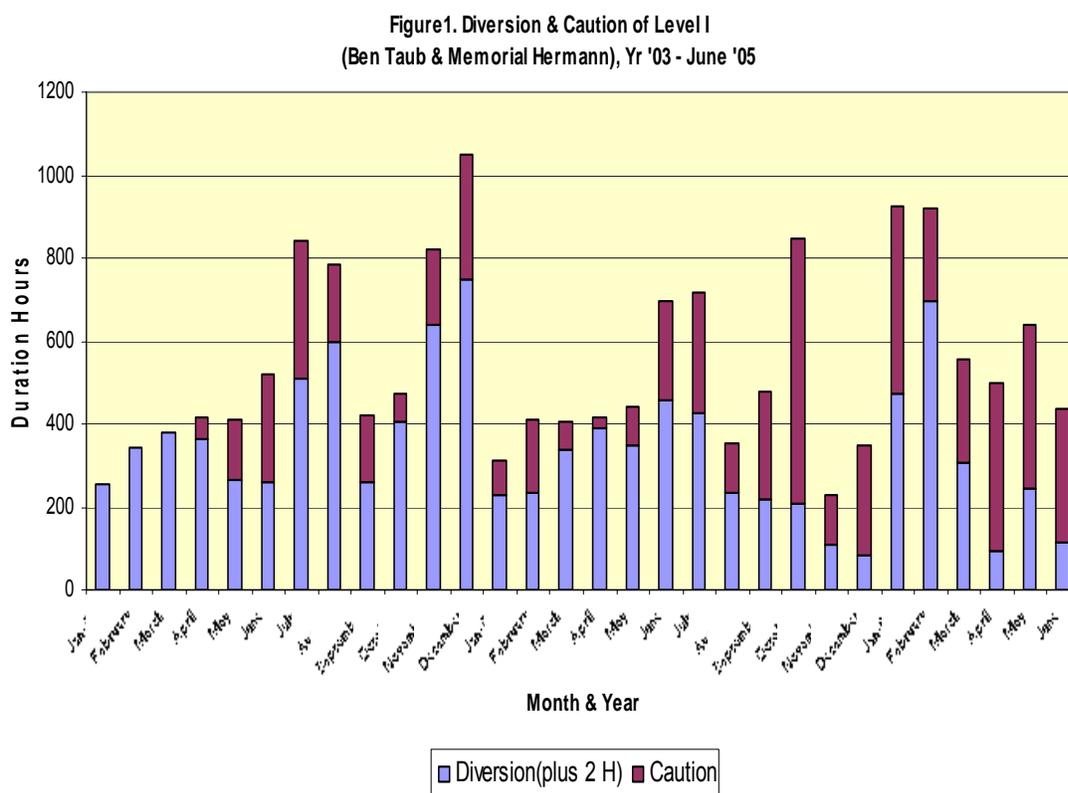
Data on the relationship between ER overcrowding and hospital diversion is available only for Houston hospitals. Figure 1 shows the pattern of hospital diversion and caution in total hours per month for the two Level I centers in Houston from January 2003 through June 2005.^{ee} Diversion hours indicate when the hospitals were unable to provide appropriate care to all trauma patients. Caution hours, which Houston hospitals began reporting in April 2003, indicate when the hospitals were only open for some trauma patients. During 2003, the two Level Is serving the greater Houston area experienced high levels of diversion totaling 4,366 hours (50.2% of the available total open time). This number was reduced to 2,857 hours in 2004 with additional reductions in 2003. Even with the diversion hour reductions, for 23 of the 30 months,

⁴ These data were supplied by Sandy Coe Simmons, Indigent Care Collaborative of Travis, Hays, and Williamson Counties; Dan Culica, UTSPH Dallas; Charles Begley UTSPH Houston.

⁵ These categories come from the New York University ED Algorithm, which was applied to the data allowing comparisons of rates of primary care-related and non-primary care-related ER visits. See reference 30 for more details.

the hospitals were on diversion or caution more than 400 hours a month or 27% of the time. For 10 of the months, they were on diversion or caution more than 800 hours or 55% of the time.

The hospitals also report the reasons for diversion (medical saturation, trauma saturation, ER saturation) and caution (CT scan down, equip down, no burn beds, no medical/surgical beds, no neurology beds, no psychiatry beds, no pediatric beds, no telemedicine beds). ER saturation was reported as the reason for 46.1% of all diversion hours for these two hospitals over the 2003 - 2005 period.



Studies have examined the effectiveness of diversion in reducing the volume of patients treated at overloaded hospitals^{ff,gg} and the impact of diversion on pre-hospital transit time of diverted patients.^{hh, ii} A study completed in Houston found a possible effect of EMS diversion on mortality.^{jj} A comparison was made of death rates of trauma patients hospitalized on significant diversion days, defined as days when both Level I hospitals were on diversion for more than eight hours, and non-significant diversion days when one or both hospitals were on diversion for less than eight hours or not on diversion at all. The study found that the percentage of deaths among all trauma patients, both those transferred and those not transferred, admitted on significant diversion days was consistently higher than on non-significant diversion days. For the most severe trauma patients who were transferred from another hospital the higher mortality rate approached statistical significance ($p \leq .11$).

Additional research is needed to confirm these relationships, but the combined findings from the mortality study, the diversion data, and the ER use data suggest that: 1) delays in treatment of trauma patients caused by hospital diversion may increase mortality, 2) diversion is frequently caused by saturation of the ER and, 3) primary care-related ER use of trauma centers contributes to ER saturation. These findings provide support for addressing the ER overcrowding problem through efforts to streamline ER procedures, triage patients to urgent care, creation of after-hours hot lines, assignment of case managers, or some other strategy that has the potential to reduce ER saturation and diversion. Hospitals should not be complacent about the possible harm that may be caused if they divert.

The Driver Responsibility Program

If fully funded and allocated, HB 3588 has the potential to cover a significant portion of Texas' EMS and trauma care systems' uncompensated care. However, many questions have arisen over the potential long-term viability and sustainability of the Driver Responsibility Program and whether the objective of alleviating the uncompensated trauma care cost burden of the hospitals will be fully achieved. Due to implementation delays, disbursements from HB 3588 by the Department of State Health Services was only a little over \$18 million in 2004 and reached \$46 million in 2005. At the end of the 79th Regular Legislative Session the Texas Legislature placed a cap on the account in which funding from the Driver Responsibility Program accrues. This account was capped at \$31.5 million for both state fiscal years 2006 and 2007 though it was projected to accrue \$59 million in 2006 and \$80 million in 2007. This is problematic for several reasons. First, and most obviously, this cap artificially lowers the amount in which hospitals, EMS programs and Regional Advisory Councils will receive from the fund assuming that it does grow to projected revenue amounts. Second, this cap is an indication that within the Texas Legislature support for this program has begun to erode. The author of the Driver Responsibility Program, State Representative Delisi, continues to be the champion of this program by working to make improvements to and protect the program. Governor Perry has also shown support for the program by recently issuing an Executive Order directing the Legislative Budget Board to lift the cap that was placed during the 79th Regular Legislative Session. However, the Legislative Budget Board is made up of both House and Senate members whose action is required to execute the Governor's order and it remains uncertain at this time whether this will happen.

The Texas Department of Public Safety (TDPS) is the primary agency responsible for enforcement of the Driver Responsibility Program, as well as for collection of surcharges resulting from traffic violations. According to a Texas State Auditor's Report,^{kk} the TDPS has not fully implemented the Driver Responsibility Program, nor have they effectively overseen the collection of surcharges by a vendor contracted to do so in 2003. The report states that at the end of February 2005 greater than \$25 million had yet to be billed for or collected. It is uncertain at this time whether the TDPS will make necessary improvements to collections that are essential to the viability of the program.

On the other hand, the program has continued support from stakeholder groups, including the Texas Hospital Association, the Governor's EMS and Trauma Advisory Council, Trauma Regional Advisory Councils, the Houston-Galveston Area Council, and the TDSHS. TDSHS is responsible for implementing any rules changes and disbursement of the funding that becomes available as a result of the collection of surcharges. Initially upon passage of HB 3588 there was an outpouring of enthusiasm and optimism over the potential positive impact of the Driver Responsibility Program on the state's uncompensated trauma care costs. Though the program was slow to meet projections, optimism continued through the 79th Legislature as

Representative Delisi was successful in passing HB 2470 that made needed improvements and changes to the Driver Responsibility Program. However, in light of problems at the Department of Public Safety related to collections and delayed implementation, and apparent eroding support in the Texas Legislature, the future of the program is less certain than ever.

State and Local EMS/Trauma Councils

Despite chronic funding issues, concerted efforts have continued to not only build and strengthen the emergency and trauma system in Texas but to make strategic improvements as well. GETAC remains a respected forum for policy-making and planning. With committees that focus on medical direction, pediatric care, trauma system development, EMS, injury prevention, education and air medical issues, GETAC's quarterly meetings draw hundreds of trauma center representatives and leadership of EMS agencies from across the state to continue its charge of providing input and leadership on emergency and trauma care issues.

Several of the major trauma regions in Texas have pursued initiatives of their own designed to make improvements in their systems' response and function. In early July 2005, the Austin-Travis County area announced that hospitals had reached an agreement to not divert ambulances to other hospitals when faced with routine or on-going capacity challenges.^{ll} As a means to alleviate pressure in their own facilities, hospitals across the country employ a practice whereby they notify local EMS agencies when they have reached capacity and request that incoming ambulances be directed, or diverted, to other hospitals. Generally, this leads to a domino-effect in the emergency health care system where capacity issues in one hospital quickly leads to over-utilization of emergency rooms in neighboring hospitals and resulting in delays in medical treatment provided to critically ill or injured patients as they are driven to hospitals that are in less favorable proximity. Austin area hospitals recognized the use of diversion was not in the best interest of the patient and have agreed to no longer refuse ambulance delivery unless their facility is dealing with a particular and short-term disaster, such as flooding or loss of heating or air conditioning.

In recognition of the challenges rural and suburban hospitals have in seeking to transfer their patients who need a higher level of care than they can provide, the North Central Texas Trauma RAC in the Dallas-Fort Worth area has established a formal hospital transfer process. Hospitals needing to arrange a patient transfer contact a toll-free number for the Trauma Transfer Hotline. Dispatch workers contact contracted hospitals, on a rotating basis, which can provide a higher level of care to inquire whether they have the capability or capacity to accept this patient transfer. Hospitals have a contracted 15-minute window to accept the transfer before the dispatch center contacts the next hospital on the list. This system has been an effective process for hospitals in the outlying areas to arrange patient transfers in a seamless and time-sensitive manner.^{mmm}

The Southwest Texas RAC in the San Antonio area has implemented a unified identification badge for EMS personnel, nurses and physicians throughout the region to not only improve security but decrease frustration related to facility access. The ID badge is also a security keycard to gain entrance to hospital emergency departments, freeing EMTs and paramedics from having to remember separate security codes for each hospital they deliver patients to and allowing physicians quick parking access to the different hospitals they staff. Another initiative in the San Antonio area is the development of the Regional Medical Operations Center. Initially a response to 9/11 events, the vision for this center was expanded to focus on disaster preparedness and crisis response, whether natural or man-made. It serves

as a combined dispatch and transfer center during times of identified crisis that integrates public health, acute care and EMS. Once activated by either the public health officer, the emergency management coordinator or a hospital CEO, the center identifies hospital bed availability in the region, assesses stockpile of critical medications, arranges patient reception if necessary and coordinates identified medical personnel needs. The center activated for the first time in the fall of 2005 in preparation for welcoming Hurricane Katrina evacuees to the San Antonio area and stayed in operation to do the same for Hurricane Rita evacuees from southeast Texas.ⁿⁿ

With a growing diversion rate, Houston area physicians, hospitals and the business community began to work together to find solutions for the growing trauma and emergency services crisis in the Texas Gulf Coast region. They created Save Our ERs in late 2001 with the goals to educate the public and implement regional solutions to help ensure that the Gulf Coast's trauma system could meet the area's growing needs. Local task forces were begun to explore these issues and four major studies were commissioned to measure the exact impact of the lack of resources on this community.^{oo}

In response to the growing crisis, the Houston-Galveston Area Council created the Emergency/Trauma Care Policy Council in 2003. The Policy Council was designed to examine policy options and possible strategic initiatives to improve the functioning of the region's emergency and trauma care system. Its data committee has begun to measure hospital diversion in the eight-county region through EMS system data provided by the Southeast Texas Trauma RAC. The Committee has worked with the TDSHS for access to the region's trauma registry data to measure EMS response time and hospital trauma admissions. The Policy Council's long range planning committee selected a nationally respected EMS and trauma care consulting firm to analyze pre-hospital and hospital resources and needs in the region. The study, due to be released in late fall of 2005, is expected to provide the region with a roadmap for system improvements.^{pp}

Reorganization

With the passage of House Bill 2292 in 2003, the entire infrastructure of health and human services programs in Texas was reorganized with 12 separate agencies consolidated into four distinct departments under the Health and Human Services Commission. This reorganization was designed to bring cost savings to the State and allow more local programmatic control of health and human services programs. The Bureau of Emergency Management within the TDH, with oversight of EMS credentialing and trauma center designation among other responsibilities, was converted to the Office of EMS/Trauma Coordination. With that redesign, many EMS and trauma care stakeholders have expressed concern whether the State can fulfill its critical oversight mission.

Data and Information Systems

There is very little information about the performance of trauma systems throughout the state. The TDSHS requires the collection of trauma registry data from EMS providers and trauma centers but until recently the data were poorly managed, there was poor compliance, and there has never been any sort of analysis or public report using the data. Inclusion criteria for reported cases has not been standardized nor have criteria been developed for excluding outliers. The State is actively taking steps to validate historical data and to improve data management of future data. It is anticipated that the validation work will be done in late 2005 and that access to the historical databases will follow in 2006.

Mental Health Access Challenges

Care for mental health patients is a burgeoning problem across the state and the safety net for these patients is the emergency department. In the Houston area, approximately 11% of all ED visits are for mental health reasons. Most EDs do not have mental health clinicians on staff to treat these patients and thus must transfer the patients to other sites, which is difficult.

Response to Disasters

Hurricanes Katrina and Rita highlighted the need for enhanced integration of emergency services at the regional and state level. While some regions met the challenges of these crises ably, there is an underlying need to see greater responsiveness and integration with local disaster planners, emergency medical services, tertiary and trauma care hospitals, RACs, and Texas Department of Transportation and other state agencies. The needs of evacuating citizens as demonstrated by Hurricane Rita required collaborative work across state agencies, municipalities, counties and emergency health care providers of all levels. Likewise, the health care needs of the Hurricane Katrina evacuees mobilized unprecedented collaboration on the regional level, yet issues still remain unresolved, like the repatriation of patients dispersed throughout the state.

V. Conclusions and Recommendations

Texas has done significant work to develop its emergency and trauma system. Adequate funding continues to be one of the most important concerns and regional leadership is needed to further develop coordinated systems of care and to distribute the responsibility for emergency and trauma care more widely among providers. With the Driver Responsibility Program, Texas has one of the richest authorized funding sources for trauma centers in the entire country. Efforts need to be made to ensure that all of the dollars predicted are realized. Even with full implementation, this source will only meet a portion of the need. Other funding mechanisms will need to be developed to pay for regionalized systems of care. Long-term legislative funding should be pursued through special taxing authorities or some other appropriate funding structure, such as restoring the medically indigent spend-down program in Medicaid. At the present time there are no strings attached to the dollars being distributed to EMS providers and trauma hospitals but a goal for the future should be to link payments to EMS and trauma center commitment to better coordination and development of organized systems of care.

The TDSHS should continue to focus on completing the assessment of trauma registry data and making it available. The State should work with providers to substantially improve consistency of EMS and hospital reporting. The State should also develop a complete inventory of emergency resources and begin to use these and other datasets to study the current emergency healthcare delivery system in terms of performance.

Since the mission of trauma centers is adversely affected by overcrowding of their ERs by the uninsured seeking primary care, the centers should develop assistance programs for safety net primary care clinics. This may include assessing, identifying or funding care-givers including nurse practitioners, physicians, residents and nurses. They should provide assistance in the identification of needed equipment and furniture for the clinics and when possible prioritize these sites for charity care. They should also provide technical assistance to improve administrative and back-office capability of the clinics. Finally, they should help access

specialty care referrals for primary care patients needing specialists in a timely manner. Other more comprehensive reforms are needed to address the uninsurance problem but trauma centers have a direct interest in taking steps to minimize the effects of the current system.

More work is needed to study the problems of patients with mental health needs and determine an appropriate response with more precise resources. Best practice models need to be developed for treating these patients in the ED and making transfers to appropriate settings for follow-up care.

An evaluation of the appropriateness of the new organizational structure of TDSHS and whether it is meeting the needs of the public and private stakeholders in emergency and trauma care should be conducted to ensure the State's oversight is adequate and appropriate. The level of responsiveness and responsibility should be benchmarked with other states and best practices should be identified to ensure that needed day-to-day infrastructure exists as well as the ability to ramp up activities to meet crises like bioterrorism threats and natural disasters

A review of lessons learned from hurricanes Katrina and Rita should be performed and a model of active cooperation and collaboration developed. The role of multiple agencies of the State need to be examined in light of the need for improved coordination and response. The State's different regions for disaster areas, public health and TSAs may be creating an unnecessary barrier for communication and response. After the storms, disaster coordinators were obligated to work with multiple public health regions and trauma regional advisory councils were required to work with several disaster coordinators. Standardization of regional subdivisions should be explored to improve efficiencies in planning, communication and responsiveness.

It is clear from our review that much remains to be done for Texas to become a leader in regionalized emergency and trauma care systems. Some of the challenges are symptomatic of much larger issues – the growing un-insurance problem, bioterrorism, natural disasters – but efforts must continue to be made to shore up the system through funding mechanisms, oversight and infrastructure development.

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