

**A Study on Trauma Patient Reimbursement
at Brooke Army Medical Center**

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by

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INTRODUCTION

a. Conditions which prompted the study

In September, 1997, Brooke Army Medical Center (BAMC) underwent Level I trauma certification from the American College of Surgeons and the Texas Department of Health (TDH). During the certification several questions BAMC could not answer concerned how much trauma care provided by BAMC is uncompensated care, or whether the money BAMC receives from the City of San Antonio is enough to cover the cost of civilian emergency patients. Further, which third party payers are reimbursing the hospital and which are not?

In the year prior to the survey, BAMC participated in the Trauma Medcom project. Trauma Medcom is a regional, coordinated approach to accepting trauma patients from Southwest Texas. This area covers 23 counties from Bexar county to the border of Mexico. As such, this study will examine the difference in reimbursement rates from the patients in the Trauma Medcom project and compare their reimbursement rates with those of Bexar county patients. The goal is to determine if there is a difference in reimbursement rates from Trauma Medcom patients and regular trauma patients treated at BAMC.

This study will only focus on civilian trauma patients and exclude all beneficiary categories since they are eligible for treatment at BAMC. The study is a snap shot in time since reimbursements occur on a daily basis.

b. Statement of the problem

Brooke Army Medical Center has a contractual agreement with the City of San Antonio to provide emergency services to civilian casualties in Bexar county. As with any

health care institution, the level of reimbursement must be examined to determine the cost effectiveness of this service. Since 1995, the City of San Antonio provided \$1.5 million annually for the treatment of civilian casualties at BAMC (MOA, 1995). Is that \$1.5 million enough to cover the cost of treating civilian emergencies? From the remainder of uncollectibles, how much is "written off" to the Defense Finance and Accounting System (DFAS)? How much of BAMC's uncompensated care is from the Trauma Medcom project? Is there a difference between reimbursements for Trauma Medcom patients and Bexar county civilian patients? Additionally, is there a difference in reimbursement levels from the county of injury? Lastly, is there a difference in reimbursement levels from different third party payers?

c. Literature Review

Overview of the Trauma System

The origin of trauma centers came from the Korean and Vietnam conflicts. During these conflicts, techniques were developed for treating severely injured soldiers (Hackey, 1995). Since then, trauma centers have existed in the United States since the mid 1960s, although they are a relatively new concept (Trunkey, 1995). A trauma center is a regional hospital capable of providing care for critically injured patients (Thomas, 1993). This definition, although succinct, understates the importance of trauma care in the United States. Trauma is a disease that can occur anywhere at anytime. The Texas Department of Health's Bureau of Emergency Management (TDHBEM) defines trauma as an injury or wound to a living body caused by the application of an external force or violence (TDHBEM, 1992). Included in this definition are motor vehicle accidents, gunshot wounds, burn wounds, near-drowning, and suffocation. Trauma injuries are generally

categorized into four subcategories: severe, emergent, urgent, non-urgent (Smith & West, 1994).

A trauma victim is defined as any patient discharged from a hospital with at least an ICD-9 CM diagnosis code in the 800-959.9 range. It is further defined as either major trauma or severe trauma. Major trauma injury victims are patients with injuries severe enough to benefit from treatment at a trauma-qualified hospital; their injury severity score (ISS) is 9 or above. They also must fall in one or more of the following clinical categories: lower extremity injuries, upper extremity injuries, femur/pelvic injuries, maxillofacial fractures, burn injuries, abdominal injuries, thoracic injuries, ophthalmic injuries, spinal injuries, or head injuries. Severe trauma injury victims are patients with injuries severe enough that they should be taken to a trauma-qualified hospital; and their ISS is 16 or above. Critical trauma victims must reach definitive care within a short period of time, often called the "golden hour," to help prevent death or disability. To insure this occurs, a set of resources must be in place and immediately accessible at all times. These resources include informed citizens, communications systems, prehospital care providers, and multidisciplinary trauma teams in emergency departments. Studies have shown that coordination of the emergency medical resources available in an area can result in a major decrease in preventable trauma death rates. With the inclusion of public information and prevention activities and rehabilitation, this coordination of resources is called a trauma system.

The significance of trauma can be seen in the following findings (Kellerman, 1993):

1. Trauma is the leading cause of death for Americans under the age of 45.

2. Each year 25 percent or approximately 90 million persons in the United States are injured to a degree which requires a doctor's care.
3. Injury is the cause of death for over 140,000 people in the United States each year.
4. Every year injuries permanently incapacitate 80,000 Americans.
5. The annual expenditures for the treatment of traumatic injuries is over \$150 billion.
6. All combined causes of childhood disease leading to death do not equal the number of children who are killed as a result of traumatic injuries each year.

The statistics displayed above show the tremendous impact traumatic injury has on our society. The health care profession has committed immense resources to the development of facilities and techniques specifically designated for the care and treatment of traumatically injured patients.

Within a trauma system, trauma centers operate in conjunction with acute care hospitals and other medical facilities. Usually a lead trauma center within a system will be selected through a trauma advisory committee which acts as the central governing body for the trauma system (Committee on Trauma, 1993). Individual trauma centers are categorized based on the capabilities of each trauma center. Trauma centers are divided into four categories, Level I through IV, with a Level I trauma center providing the most extensive care for trauma patients. Listed below are trauma center characteristics by center designation level, each trauma center may bear one of the following designations (Smith & West, 1994):

Level I: A Level I trauma center must be a regional resource for trauma care available to patients requiring trauma treatment on a 24-hour basis. The Level I trauma center must have the capability to perform all types of surgeries at anytime, surgical

services must include, orthopedic, neurosurgery, pediatric, cardiovascular, thoracic, and sub-specialties. Trauma patients treated at a Level I center must have access at all times. The available hospital facilities must also include cardiopulmonary bypass, acute hemodialysis, nuclear scanning, and neuroradiology. Because a Level I trauma center is required to provide leadership and research on a regional level in all facets of trauma care, most Level I centers need not be university based, but must have a large emphasis on teaching programs due to the tremendous infrastructure and personnel resources required of a regional trauma facility.

Level II: A Level II trauma center is distinguished from a Level I trauma center in that trauma surgery services must be available at anytime, however, for certification sub-specialties need not be available. The Level II trauma center is usually located in rural or urban community hospitals, but may also be associated with academic institutions. Patients treated in a Level II facility are provided with initial and definitive treatment, although, trauma victims with complicated trauma injuries are transferred to a Level I trauma center after being stabilized. Trauma injury education and prevention programs are required of Level II facilities, but research is not a required facet for credentialing.

Level III: Unlike Level I and II trauma centers a Level III trauma center does not provide comprehensive and definitive care for trauma victims. Level III facilities are primarily responsible for providing resuscitative procedures, emergency surgery, and stabilization for trauma patients. The main role of the Level III facility is to stabilize the trauma patient for transfer to a Level I or II trauma center. Level III facilities are not required to have surgeons immediately available, surgeons respond to patients on an as

needed basis. Level III centers must have transfer agreements with higher level centers and treatment protocols in place as a basis for certification.

Level IV: Level IV trauma centers are primarily located in rural areas and provide advanced life support, resuscitation, and stabilization before a trauma patient is transferred to a Level I, II, or III trauma center. Level IV facilities may be located in a clinic or small community hospital and are not required to have a physician available at all times. Like Level III facilities, all Level IV trauma centers are required to have standardized treatment protocols and transfer agreements with Level I, II, or III trauma centers.

Within a trauma system all trauma facilities are linked to provide the victims of traumatic injury definitive care in Level I or II trauma center. It is the responsibility of the lead trauma center in the trauma system to ensure that all facilities in the system have strategic guidance in the development of medical treatment protocols, education programs for the population served, injury prevention initiatives, and programs to monitor and continuously improve the quality of trauma care within the system. The impetus for organizing individual trauma centers into organized systems was to increase the chance of survival for trauma victims. This was done by increasing the quality of care by providing a framework of specific standards for trauma care.

Studies have shown that when a Level I trauma system is instituted within a region, the outcomes for severely injured patients will improve. Level I facilities are available to all patients that require their life saving services. A Level I trauma center must have the capability of providing leadership and total care for every aspect of injury, from prevention through rehabilitation [Texas Department of Health Bureau of Emergency Management (TDHBEM, 1992)].

One such study conducted by Mullins, Veum-Stone, Helfand, Zimmer-Gembeck, Hedges, and Trunkey (1994), sought to determine if the risk of death for injured patients decreased after trauma system was established in a four county urban region near Portland, Oregon. The study showed that after the trauma system was established the risk of death declined for injured patients admitted to Level I trauma center, but did not change in the hospitals not designated as a Level I trauma center. Also, severely injured patients were more likely to be treated in a Level I trauma center. The study supported two possible explanations for the decrease in mortality. First, the increased proficiency in the staff and better defined procedures in Level I trauma centers provided higher quality care for treating trauma victims. Second, the quality of pre-hospital care improved as a result of streamlining pre-hospital treatment protocols within the trauma system.

Another study conducted by Smith and Sloan (1990) found that the mortality rate of seriously injured patients dropped when trauma centers treated specific volume of trauma patients. The reason for the mortality rate decline can be explained by the increase in experience and proficiency in trauma care gained by health care providers in treating large numbers of trauma patients.

A trauma system is a regionalized organization of trauma centers within a specific geographic area designed to arrange and facilitate the treatment of critically injured and ill patients (Trunkey, 1995). The system consists of hospitals with designated trauma center, qualified staff, medical equipment, and an emergency medical system, all of which have pre-determined plans of response for the treatment of severely injured or ill patients. Texas Department of Health (TDH) defines a Regional Trauma System as an emergency medical service and trauma care system developed by a regional advisory council in a

multi-county area consisting of hospitals, personnel, and public service agencies that have preplanned responses for treating severely injured patients (TDHBEM, 1992). A standardized system for the establishment of trauma programs has been developed based on the recommendations of the American College of Surgeons (Bazzoli, Madura, Cooper, MacKenzie, & Maiwe, 1995). In order to be considered a complete trauma system, a program must center around eight attributes (Bazzoli et al, 1995). The eight attributes are as follows:

1. The existence of a governing body that has the legal power to appoint trauma centers within the system.
2. The application of formal procedures to designate a trauma center within the system.
3. All trauma centers within the system must use the American College of Surgeons standards for trauma centers.
4. An impartial team from outside the system must survey each trauma center for designation.
5. The number of trauma centers within the system must be limited based on the requirements of the community.
6. Written triage criteria must be used as the justification for by passing hospitals without trauma centers.
7. A regulatory system designed to monitor the trauma system must be established.
8. Trauma centers must be available throughout the state.

Studies have identified the type of hospitals that make good candidates for designation as trauma centers. Trauma system planners should look for major teaching hospitals with a wide range of specialized medical and surgical services for designation as

Level I trauma centers. Level II trauma centers should be located in mid-sized hospitals with non-profit ownership and smaller, but meaningful teaching programs. Small hospitals that have some form of government association and limit specialized services tend to be affiliated with Level III trauma centers. Hospitals which would be poor applicants for classification as trauma centers include those hospitals with exceedingly limited or no teaching facilities and for-profit hospitals (Bazzoli & MacKenzie, 1995).

In the early 1980s many trauma centers in this country were closing due to the lack of government funding, inadequate staffing, and lack of integrated nationwide network trauma care systems (Kellerman, 1993). However, in the early 1990s many states began to pursue the development of trauma care systems largely due to the Trauma Care Systems Planning and Development Act of 1990, which made federal funds available to form systems for the administration of trauma care (Brazzoli et al, 1995).

As of 1995, 37 state and local associations had the legal authority to govern trauma systems in the United States. Of the 37 associations identified, 20 states and Washington DC have the legal authority to commission trauma centers and an additional 19 states are formulating designs for pursuing government authority to administer trauma systems. Of the 21 state level agencies currently authorized to appoint trauma centers, only five completely fulfill the eight criteria for the designation of trauma care systems as described previously. Additionally, most of the 21 state level authorities have experienced a lag in timing for the development and implementation of three key trauma system characteristics: trauma center designation, pre-hospital triage procedures, and inter-hospital transfer procedures (Brazzoli et al, 1995).

Studies in the development of trauma centers and systems indicate that more trauma care systems are being formed and the number of fully qualified governing bodies according to the eight criteria, has risen between 1988-1993. One major finding is that trauma systems fail to limit the number of trauma centers designated within a region based on the needs of that region. Most trauma systems have an open ended designation process where any hospital meeting the prescribed criteria may be appointed as a trauma center. The ability of trauma systems to limit the number of trauma centers in a region is important for two reasons: first, channeling trauma patients to a few designated centers ensures that trauma center physicians and staff treat an adequate number of trauma patients to remain proficient at trauma care; and second, cost savings through economies of scale may be achieved if the number of trauma centers is controlled to an adequate, but reasonable number (Bazzoli et al., 1995).

Texas Trauma System

The state of Texas faces the same problems as the nation when it comes to trauma systems. An average of 30 Texans die every day from injuries; almost 11,000 each year. In 1989, 10,805 Texas residents died of injuries and poisoning. A fully developed trauma system could have saved a large number of them. The essence of a trauma system is to get the right patient to the right place at the right time; that ability is in jeopardy in Texas. The health care institutions that are used to make up a trauma system are suffering significant morbidity due to uncompensated and under-compensated care. Much of which was traceable to the treatment of trauma patients. Since trauma is the leading cause of death in persons aged 1 - 44 years, the years of potential life lost equals: 293,239 in 1990. Using a per-capita income of \$15,450, this represents a staggering \$4.5 billion in lifetime

income lost and a loss to the state in lifetime tax revenues of \$417 million for one year of trauma mortality alone (TDH, 1991).

Mortality is not the only side of this issue; for every trauma victim who dies, at least six are seriously injured. Total years of productive life lost to disability are not currently known, but would add greatly to the figures above. In addition, many persons with severe disabilities resulting from injuries may be dependent to some degree on federal, state and local assistance (TDH, 1991).

In 1989, the Texas Legislature recognized the need for a more formal and complete statewide trauma system and passed legislation directing TDH to initiate a trauma system in Texas. The legislation also charges the bureau with establishing a trauma registry designed to evaluate and monitor the system and to conduct research on the costs, causes, and distribution of trauma in Texas. No funding was provided for this endeavor.

In 1990, the Texas Legislature released a study on trauma care in Texas which found that trauma systems within the state are experiencing significant morbidity due to uncompensated trauma care. Other elements that have led to the demise of Texas trauma care include:

1. a lack of trauma care facilities;
2. the prominence of virulent disease;
3. the reluctance of health care networks to expose themselves to liability and risk of losing money in the risky business of trauma care;
4. a shortage of emergency residency programs;

5. the rural character of the state;
6. increasing injury due to violence;
7. the shifting of geriatric patients to trauma facilities for primary care; and
8. a lack of governmental guidance.

If the trauma systems begin to fail in Texas, all Texans will suffer. When trauma victims are taken to non-trauma facilities for care, their chance of survival drops by some 50 percent (Hylton, 1992). In 1989, the state legislature passed House Bill 18, which called for the Bureau of Emergency Management to ... “identify severely injured trauma patients... identify severely injured trauma patients.... identify the total amount of uncompensated trauma care expenditures... in Texas”. That same session of the Legislature made it known that it was their intent for there to be a study conducted to determine the uncompensated costs of trauma to Texas hospitals and to also identify the causes of uncompensated trauma. After which, the Texas Department of Health’s Bureau of Emergency Management (TDHBEM) developed a set of emergency medical system and trauma system rules that were approved in 1992. Rules for implementation of the trauma system were adopted by the Texas Board of Health in January 1992. These rules divide the state into twenty-two regions called trauma service areas, provide for the formation of a regional advisory council in each region to develop and implement a regional trauma system plan, delineate the trauma facility designation process, and provide for the development of the state trauma registry. Additionally, the rules provide guidance for the establishment of a statewide trauma system in the following areas (Texas Department of Health, 1992):

1. Trauma Service Areas (TSA) - Texas is divided into 22 service regions (A-V) in order to develop a coordinated approach to trauma care. Each TSA consists of multiple counties, with no fewer than three counties in each TSA. Figure 1 is a graphical depiction of the 22 trauma service regions. San Antonio and Bexar county are located in Trauma Service Region P.(TDHBEM, 1992).
2. Regional Advisory Councils (RAC) - each of the TSAs are required to establish a regional advisory council that must consist of health care facilities participating in the TSA. TSA-P is governed by the Southwest Texas Regional Advisory Council (STRAC).
3. Regional EMS/Trauma Systems - each TSA must develop a plan for the provision of trauma care within a structured system that includes the criteria described by the Texas Department of Health.
4. Requirements for Trauma Facility Designation - each health care entity desiring designation as a Level I, II, III, or IV trauma facility must go through a three stage process which consists of an application phase, a review phase where the facility is surveyed to ensure compliance with prescribed standards, and a recommendation phase where the commissioner reviewing the facility make the final decision for designation.
5. State Trauma Registry - each TSA will establish a data base for the collection of information on trauma care for analysis and identification of major trauma patients, uncompensated trauma care expenditures, and monitoring of trauma patient care.
6. Other areas covered in the Texas trauma system rules include provisions for denial, suspension, and revocation of trauma facility designation, as well as, procedures for handling complaints within the system.

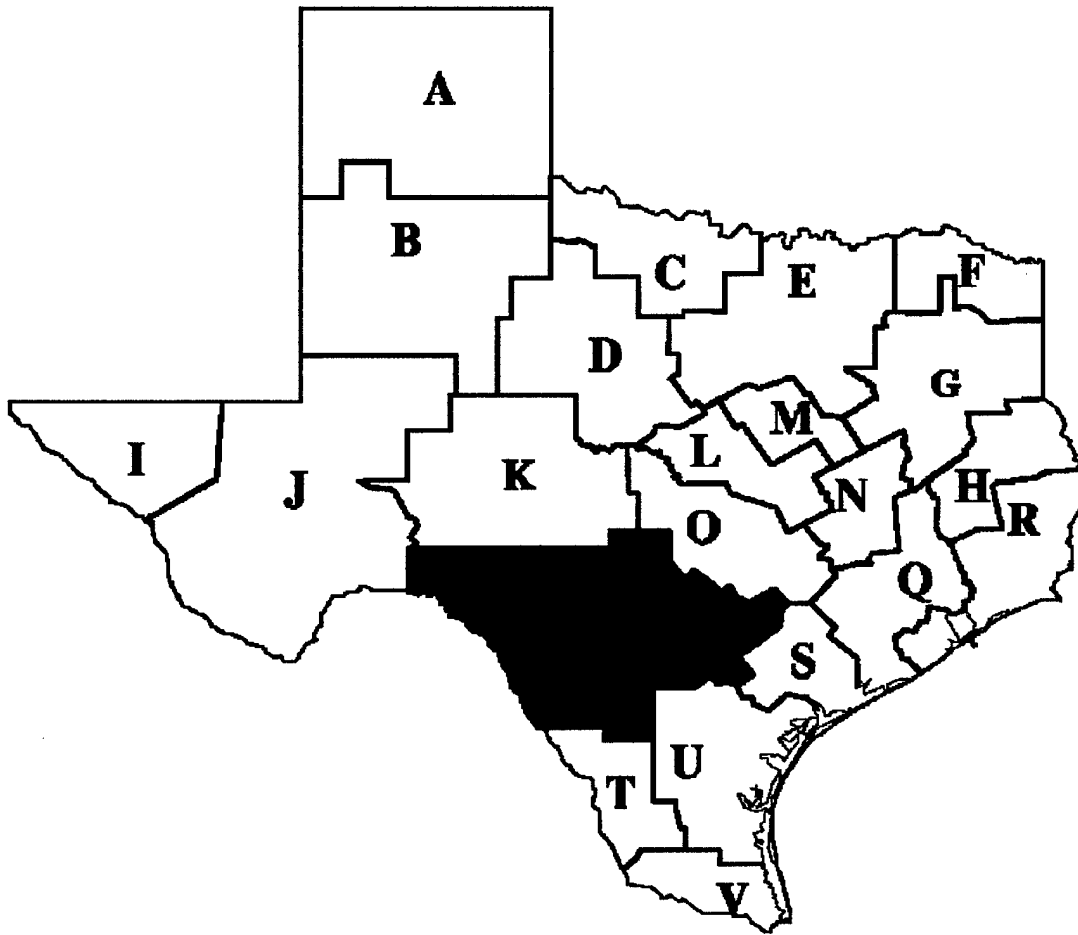


Figure 1. Trauma Service Regions

Additionally, seventy-five hospitals have been designated as trauma facilities, with more than 200 submitting letters of intent. All of this activity is occurring despite the fact that no funding has been made available for either system development or uncompensated trauma care (TDH, 1991).

The establishment of a statewide trauma system for Texas requires significant funding; estimates range as high as \$300 million. Results of an uncompensated cost study conducted for the Bureau by Udell Associates, Inc. showed a total of \$157 million of

uncompensated trauma care was provided by hospitals in 1989. Uncompensated prehospital trauma costs for the same year were projected at \$54 million. Additionally, some experts have estimated that physician losses for uncompensated trauma care were approximately \$75 million that year. Uncompensated rehabilitation costs are not included in these estimates because they are difficult to determine; the majority of uncompensated trauma patients do not receive rehabilitation because they cannot pay for such care. The effect is an increased likelihood that such patients will become dependent on federal, state, and local assistance programs (TDH, 1991).

A fully implemented statewide trauma system in Texas could have many positive consequences, including decreases in the number of trauma incidents, injury severity, the number of preventable deaths, severity of trauma-related disability, and the number of persons dependent on state assistance programs. It could also ultimately result in an increase in state tax revenues.

Although funding is not yet available at the state level, the state is making progress in the development of a comprehensive trauma system. At the present time the major facet lacking in the fledging system is funding for the establishment and operation of trauma centers. In 1989, metropolitan government owned teaching hospitals in Texas provided an average of \$8.4 million in uncompensated trauma care, while private teaching hospitals provided an additional \$2.5 million (Hylton, 1992). Until the problem of uncompensated care caused by the uninsured is ameliorated, the majority of current funding will come from local governments, private institutions, and philanthropic sources.

In response to the state level initiative to form a trauma system, the Bexar County Medical Society launched a task force to study trauma care in San Antonio and the

surrounding area. In 1994, the task force published a document which summarized the current state of trauma care in the greater San Antonio area and gave recommendations for advancing trauma care in the region. The task force found that "San Antonio has few trauma system crises or diversions of long term or permanent nature", the problems faced by the trauma system in the region are "episodic and unpredictable" (Bexar County Medical Society, 1994). One major result of the task force's study was the formation of the South Texas Regional Area Council (STRAC) which was established to provide a governing body for strategic planning efforts within the region. Additionally, in an effort to alleviate the unpredictable nature of trauma crisis in San Antonio and the surrounding region the University Health System has begun an assessment of trauma needs to advance the strategic planning efforts in the region. The report by the task force makes recommendations in the following areas:

1. Injury prevention and rehabilitation;
2. Needs assessment and asset inventory;
3. Emergency medical system communication and transportation; and
4. Trauma care funding.

Trauma faces problems and potential difficulties that are particular to the region. San Antonio is unusual in that Wilford Hall Air Force Medical Center and Brooke Army Medical Center are both military facilities and provide approximately half of the Level I trauma care rendered in the region. Although the military facilities continue to dedicate their resources for the care of civilian trauma victims, due to a civic duty and as part of their graduate medical education programs, the future use of the military trauma center by civilians is not assured.

As the military down-sizes and less fiscal resources are available, the significant costs incurred in providing trauma to local civilians may become a serious burden as beneficiaries compete for the resources provided to non-military trauma victims. If policies at the Department of Defense change and the military trauma centers cut back trauma civilian care, San Antonio may see a significant drop in its trauma care capacity (Bexar County Medical Society, 1994). Also, there exists a reluctance from lower trauma level hospitals to accept trauma patients from the military trauma centers after they have been stabilized and moved to intensive care units. This practice occupies trauma care capacity in Level I facilities which can cause trauma patients to be diverted to lower level trauma facilities.

A 1993 finance subcommittee task force found that in 1993 trauma costs totaled \$31 million annually for the three trauma centers. Only \$10 million was collected from third party payers, the remaining \$21 million was absorbed by the trauma centers as a loss. The two military trauma centers incurred over \$10 million in trauma care costs associated with civilian emergencies. Approximately half of the trauma victims treated in San Antonio come from outside Bexar county, which supports the regional approach to managing and financing trauma care.

In a study conducted by Udell Research Association Inc. for TDH found the average cost of treating an uncompensated trauma patient was \$5,110 for inpatient hospital care (\$5,908 for governmentally owned, teaching hospitals) which equates to \$157,528,100 for inpatient hospital care across Texas. They also identified the major causes of uncompensated trauma among Texas hospital patients, which include (TDH,1991):

Table 1Major causes of uncompensated trauma in Texas Hospitals

Major Cause	# of occurrences	Percentage
Vehicular	1,670	21%
Stab Wounds	1,272	16%
Falls	1,193	15%
Assaults	1,033	13%
Firearms	795	10%
Pedestrians	238	3%
Industrial	159	2%
Other*	1,591	20%

*includes sports injuries, self-inflicted injuries, train injuries, burns, falling objects, lawn-mower accidents, water-related accidents, delayed effects of earlier injuries, and drug related injuries.

A significant finding of this study was uncompensated trauma care is provided by a small percentage of the total number of hospitals in the state of Texas. Almost seventy percent (69.5%) of all uncompensated trauma services were provided by thirty-four hospitals. The same hospitals provided 76.5 percent of all the uncompensated care to major trauma victims and 82 percent of the uncompensated care to severely injured trauma victims. On average, major trauma hospitals provided \$3,291,940 in uncompensated trauma care annually. In large metropolitan cities governmentally-owned teaching facilities provided an average of \$8,387,940 of uncompensated trauma care. Whereas, private teaching hospitals provided an average of \$2,459,790 in uncompensated trauma care annually.

The agenda set forth in 1994 by the Critical Care and Trauma Task Force stands as a framework for continued development of the trauma services area in Southwest Texas. Although, progress is being made toward providing more efficient and effective trauma care in the region, until the problem of the medically uninsured is improved at the state

and federal level, significant systematic advancement on a national and regional level will continue to evade trauma system planners.

Another significant problem for the state of Texas is a large portion of the population has no health insurance. They do not have a private third-party carrier, they do not qualify for Medicare, and they do not qualify for Medicaid. One 1985 estimate puts the percentage of uninsured Texans at 17 percent; a later, 1990 estimate pegs the percentage at 22 percent. Moreover, the portion of the uninsured in Texas is likely to rise (TDH, 1991).

Taking a stratified sample from the same study they found that Medicaid reimbursed 48 percent of the trauma charges while 52 percent was uncompensated care. Medicare fared slightly better with 59 percent reimbursed and 41 percent unreimbursed. The ratio of Medicare to Medicaid coverage for trauma hospitalization was 5.2 to 1 which indicates the limited role Medicaid plays in providing health insurance in Texas (TDH, 1991).

Medicaid pursues a policy calling for the hospital to accept Medicaid reimbursement as full payment. The unpaid portion is a contractual adjustment negotiated and agreed to prior to the hospital's actual treatment of Medicaid patients – a deduction of uncertain size to be taken from revenue each year. Thus, Texas' current Medicaid health insurance program is not only small in scope (in term of the number of potential trauma victims it covers); it is also one of the least forthcoming when it the hospital bill is presented. The effect on uncompensated trauma care is self-evident. The potential of Medicaid to reduce the pool of uninsured in Texas is slight unless changes are made in the program to expand coverage. Furthermore, the high percentage of trauma charges not

reimbursed by Medicaid highlights an enduring problem: under-compensated trauma care. Trauma services lose money when they treat uninsured indigent patients who cannot pay; this is uncompensated care. They also lose money when an insured patient's carrier reimburses at a low rate; this is under-compensated care. The problem of under-compensation for trauma care is not confined to Medicaid reimbursements. Rarely do private insurance carriers pay the full amount of hospital charges billed (TDH, 1991).

Under the DRG prospective payment system a Level I trauma center may suffer. One patient within a DRG may be hospitalized for a day, another for 10 days. The hospital receives the same reimbursement for both. Hospitals treating a case-mix of severe injury patients experience serious short-falls under the prospective payment system; their cases do not average out. Severely injured patients need more intense treatment, more equipment, more pharmaceuticals supplies, more blood, more labor, and longer period of hospitalization. But the hospitals specializing in the treatment of such patients are reimbursed at the same flat rate per DRG as hospitals with a normal case mix. Prospective payment systems put a special burden on high-level trauma center.

Trauma Medcom

San Antonio and Bexar county are located in Trauma Service Area P (TSA-P). TSA-P is composed of 22 counties in Southern Texas stretching from central Texas to the border of Mexico. Figure 2 displays TSA-P. The counties it includes are: Val Verde, Edwards, Real, Kerr, Gillespie, Kendall, Bandera, Uvalde, Kinney, Maverick, Zavala, Frio, Medina, Bexar, Comal, Guadalupe, Gonzales, Wilson, Karnes, Atascosa, Dimmit, and La Salle. TSA-P is governed by the Southwest Texas Regional Advisory Council (STRAC).

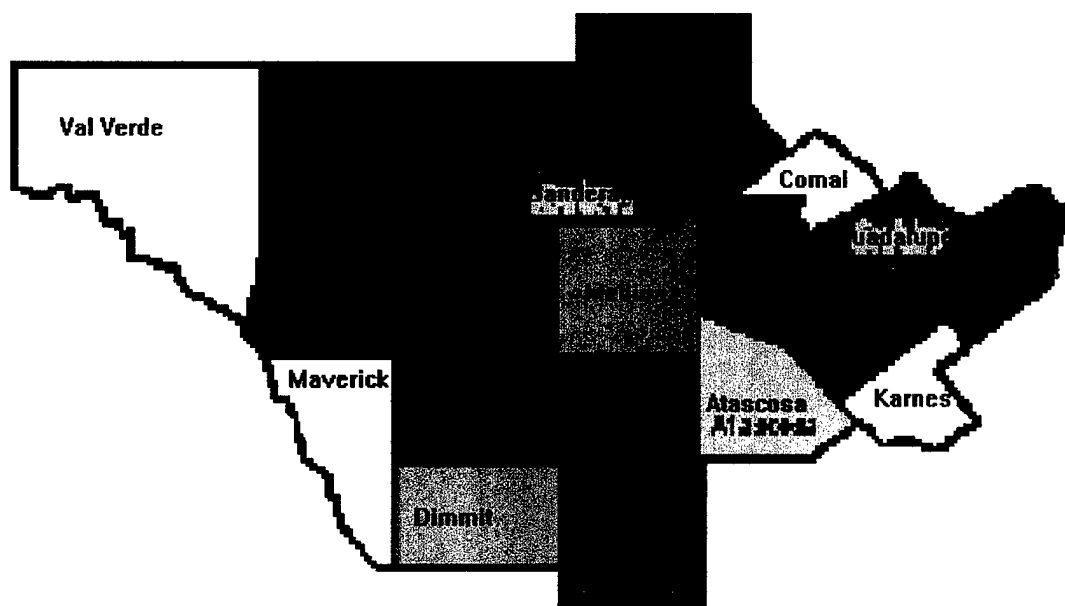


Figure 2. Trauma Service Area P (TSA-P)

The three Level I trauma centers that serve TSA-P are University Hospital, Wilford Hall Air Force Medical Center, and Brooke Army Medical Center. The University Hospital - South Texas Medical Center has been designated as the lead trauma center in the region. The American College of Surgeons recommends that a metropolitan city should have one Level I trauma center for every million people in its population (Hylton, 1992). Based upon the American College of Surgeons standard, San Antonio has an excessive trauma care system with its three Level I trauma centers which serve a population of just over one million. However, since the three hospitals serve a large portion of south Texas, the intent of the standard may be met. All three trauma centers have obtained their Level I trauma certification from the Texas Department of Health with BAMC being the last to receive this designation in the fall of 1997.

In July, 1996, the STRAC in conjunction with three CEO's of their respective trauma centers responded to service TSA-P by initiating a pilot program titled Trauma Medcom. On July 1, 1996, Trauma Medcom began operation as a one-year demonstration project. The mission of Medcom is to coordinate the rapid transport associated with critically injured patients in TSA-P, the Southwest Texas Region. The goal was to provide seamless communications between outlying hospitals, trauma centers, and their physicians in Emergency Medical Service. The three centers agreed to accept trauma patients in transfers as "pre-authorized". A central dispatch center was arranged (co-located with the dispatch of the local aeromedical transfer service) and a dedicated phone line established. The phone number and system were publicized to the regional community hospitals (Vinca, Sees, Martin, & Flaherty, 1997). Prior to Medcom, the average time in coordinating a transfer was one and a half (1 ½) to two hours. At the end of the demonstration year the average time of coordinating a transfer decreased to 9.4 minutes (Rasco, 1997). The program's intent is to save lives, enhance quality health care, and decrease costs. The first study conducted on Medcom's efficiency was conducted by Vinca, Sees, Martin, & Flaherty (1997) and demonstrates Trauma Medcom's efficiency in accepting patients and a decrease in actual transfer time.

Funding and Reimbursement

In the 1970s trauma centers saw wide spread proliferation throughout the country. One reason for this proliferation was that many hospitals regarded trauma care as a profit center due to the retrospective cost-based reimbursement of the time. Retrospective payment for trauma care encouraged health care providers to generate trauma workload because third party payers would reimburse all costs. Another basis for the spread in

trauma centers was that the prestige associated with institutions that operate trauma centers and could be used as a marketing tool to attract additional patients (Hackey, 1995).

The 1980s however, saw the demise of the Health Planning and Resource Development Act of 1974 (PL 93-641) which provided federal funds for development of trauma infrastructure in America. The expiration of this legislation was due to the spiraling medical costs and the political administration's favoring of competition rather than regulatory control in the health care system. With the competition influence of the early to mid 1980s came a transition from retrospective to prospective reimbursement by insurers for medical expenses (Hackey, 1995). Under the prospective payment plan providers and hospitals received reimbursement for the average cost of procedures based on a per group of hospitals. Under this system trauma centers whose actual costs exceed the average reimbursable costs are forced to absorb the difference as a loss.

The reduction in reimbursement for third party payers, the growing number of uninsured people using emergent care facilities for primary medical care, and the increase in traumatic injuries caused ten percent of the nations trauma centers to close between 1983 and 1992 (Trunkey, 1995). In the late 1980s concern over the rapid decline in the trauma care infrastructure and the recognition of injury as a public health problem led to the enactment of the Trauma Care Systems Planning and Development Act of 1990 (PL 101-590) (Hackey, 1995). The legislation provides state block grants and matching funds for the development of trauma care capacity at the state level. The goals of the legislation include (Hackey, 1995):

1. Public education, programs for injury prevention, and data collection and evaluation.
2. Increased access to care by developing effective emergency medical service systems and pre-hospital procedures.
3. Ensure proper training for emergency medical system personnel in triage protocols and pre-hospital procedures.
4. Employ common standards for the identification and classification of emergent care facilities.
5. Create an evaluation system to regulate the quality of care provided in trauma systems and centers.
6. Ensure effective rehabilitation services are provided so individuals with trauma injuries may have a productive life.

Since the Trauma Care Systems Planning and Development Act was passed in 1990, 19 states have received grants to develop trauma systems and 16 others have been awarded grants to enlarge and improve their existing systems (Trunkey, 1995). The development of trauma systems and advancement of trauma centers seem to be on the rebound, however, federal funding and regulation cannot solve all the problems faced by trauma systems. State and local officials must continue to search for solutions to the problems that persist in the provision of trauma care.

In Texas, the State's Trauma Care Act, which passed the Legislature in 1990, set up an extensive system for referral and treatment of patients who suffer from traumatic injuries. The system includes 77 trauma centers around the state specifically designated to provide care for the traumatically injured. The original legislation included funds for planning and education, as well as a study of the costs of uncompensated trauma care.

As a result of the legislation, an independent study was done analyzing the costs of caring for patients who suffer traumatic injuries and have no means to pay for it. The report was completed in 1991 and estimated that the overall losses for participants in the trauma care system for the 1993-95 biennium would be \$38 million. There has been concern since the trauma care system went into effect that hospitals and other providers who participate voluntarily will not be able to continue to do so due to the burden of uncompensated care.

Academic Medical Centers are a prime source for uncompensated medical care. They have historically provided care to populations that are at risk for medical underservice. Information from the Council of Teaching Hospitals and Health Systems Annual Survey of Hospitals' Financial and General Operating Data show that (Valente & Serrin, 1997):

1. The costs of uncompensated care in individual integrated AMCs varied widely. In 1995, for example, the top 10 percent of integrated AMCs had uncompensated care costs greater than \$75 million each, while the bottom 10 percent had costs less than \$7.5 million each.

2. The rate of growth in uncompensated care costs after the offset of government appropriations suggests that decreasing appropriations contributed to the increased cost burden.

Median uncompensated care costs in integrated AMCs increased from 1991 to 1995, while state and local non-research appropriations decreased funding during the same period (hospitals that did not receive government appropriations were excluded from the calculation of that median). Additionally, increases in uncompensated care costs relative

to operating expenses in the period 1991 to 1995 were exacerbated by concurrent decreases in government appropriations (Valente & Serrin, 1997).

These results do not reflect cost-control measures implemented since 1995, but the data reinforce the need for AMCs to control costs in order to remain financially viable while caring for patients at risk for underservice.

In another study conducted by the Government Accounting Office (GAO) on the Department of Veterans Administration (DVA) Hospitals the DVA must do a better job at collecting payments from third party insurers. In 1996, the DVA recovered just 31 percent of what was it billed to private health insurers, raising \$495 million, according to the report. To achieve its goal, the DVA would have to raise collections to \$852 million, a near impossibility given complex policies used by private insurers in making payments. The GAO report indicates the opportunities to recover more of its billed charges appear to be limited. The DVA plans to double the money recovered from private health insurance over the next five years, but the report says there is "little potential" the goal can be met. One indication of how difficult that would be, investigators said, is that the DVA collected five percent less in 1996 than it did in 1995 (GAO, 1997).

The high cost of providing trauma care to civilians is significant in the San Antonio area; however, the reimbursement levels remain low. Using the prospective payment system is costly for high level trauma centers despite their annual adjustment levels. There are several methods of reimbursement for military hospitals in Texas, they include: private or commercial insurance, Medicaid, Victims of Violent Crimes, Medicare, Department of Finance and Accounting System (DFAS), and Disproportionate Share Funding.

Additionally, a large share of patients are also uninsured who are billed for their services.

Private insurance can take several forms which include: automobile insurance, health insurance, and workman's compensation. Private insurance are organizations that specialize in accepting risk (Jacobs, 1991).

Another source of funding is Medicaid. The Medicaid program, originally designed to finance medical care for low-income families, was introduced in 1966 under Title XIX of the Social Security Act. The Medicaid program is a state-federal partnership but is administered by the state. The federal contribution is at least 50 percent. Additionally, Medicaid will not always reimburse hospitals and physicians for 100 percent of billed charges. The program determines a reasonable amount and reimburses only the reasonable amount. According to Jacobs (1991) individuals covered under the joint federal-state program fall into three groups:

1. Cash recipients of the aid to Families with Dependent Children (AFDC) program;
2. Cash recipients of Supplemental Security Income (SSI); and
3. The "medically needy," many of whom would not qualify on an income basis but who have spent a sufficient amount on medical care such that their incomes net of medical care expenses fall below specific levels.

A sub-category of Medicaid is the Texas Victims of Crimes Program. This program was created in 1979 by the Texas Legislature and continues to be administered by the office of the attorney general. It is financed from fees paid by convicted criminals as part of their sentencing. In order to receive money from this program a person must register and meet the eligibility requirements which include:

1. The victim must be a Texas resident, a U.S. resident who becomes a victim of a violent crime while in Texas, or a Texas resident who becomes a victim of a violent crime in a state having no violent crime program;
2. Victim must file the claim within one year. Exceptions exist for child victims;
3. The crime must be reported to law enforcement within 72 hours. Exceptions exist for child victims;
4. The victim must cooperate fully with law enforcement and prosecution;
5. The victim must not have contributed to the crime by his or her own misconduct;
6. In motor vehicle collisions, the defendant must intentionally cause the injury, be intoxicated or fail to stop and render aid.

A victim of a violent crime is defined as: someone who has suffered bodily injury or death or who is the victim of sexual assault, kidnapping, or aggravated robbery; the close relative (spouse, parent, or adult brother, sister or child) of a deceased victim, or the guardian of a victim.

Another source of funding is Medicare. The Medicare program was instituted with the passage of Title XVIII of the Social Security Act, entitled "Health Insurance for the Aged" in 1966. It is the largest health insurance program in the United States and is funded by the federal government. It serves people over the age of 65 who are eligible for Social Security benefits, disabled individuals, and individuals who have end-stage renal failure. Coverage for these individuals is in two parts. Part A is for inpatient services including hospitalization and limited skilled nursing facility coverage. Part B is a supplemental medical insurance that covers outpatient (ambulatory) services, physician

services, pharmaceuticals, radiological, laboratory, and medical equipment and supplies (Jacobs, 1991).

The fifth source of funding is from DFAS. This is a last resort to reimbursement for the military hospitals. In essence it is a "write-off" and states the account is uncollectable. DFAS is located in San Antonio and reimburses military hospitals 100 percent of delinquent accounts. Enactment of Public Law 97-365, the Debt Collection Act of 1982, generated a realignment of the U.S. Army's installation resource management accounting priorities. The major thrust of the Debt Collection Act was to establish accountability for debt collection at the level the debt occurred. However, DFAS Regulation 37-1 allows medical claims (accounts receivable) to be transferred to DFAS without any loss of budgetary resources. If DFAS is unable to fully collect debts transferred from no-year and multi-year funds, DFAS will transfer the uncollectible portion back to the applicable FAO (Finance and Accounting Organization) with authority to write off the entries. This applies to all medical claims except those with an open allotment.

The last source of funding is Disproportionate Share Funding. Disproportionate Share Funding was enacted by Congress in 1981 to support hospitals that serve a disproportionately large volume of Medicaid or low-income patients. In Texas it is administered by the Texas Medical Assistance program and is the line item under the Medicaid program. As such it is a source of scrutiny for legislators and is expected to diminish by 20-40 percent in the next five years. That would mean a decrease in \$15 billion for the nation and \$1.5 billion for the state of Texas (Gaffney, 1997). The program serves a disproportionate number of indigent patients and reimburses hospitals who

participate in the state trauma system. A hospital must meet one of three criteria in order to receive Disproportionate Share Funding:

1. 16,000 inpatient Medicaid days per year;
2. Thirty percent of inpatient days being Medicaid eligible; or
3. Low income utilization rate of 25 percent.

Although this type of reimbursement is available to other hospitals, it is limited in use for the military. With the current system a military hospital does not have uncompensated or undercompensated care because of DFAS' reimbursement policy.

Billing Process for Medical Savings Accounts (MSAs)

It is also important to differentiate the two sources of financial collection programs for military hospitals: the third-party collection program (TPCP) and the Medical Savings Account (MSA). First, the TCPC is only for military beneficiaries such as active duty dependents and retirees along with their dependents. The Consolidated Omnibus Budget Reconciliation Act of 1986 (COBRA) established the Third Party Collection Program. Under this provision, military medical treatment facilities are authorized and obligated to bill health insurance carriers for the cost of medical care furnished to retirees and dependents who are covered by health insurance policies [BAMC Memo 40-166 dated 21 June 1994 Third Party Collection Program (TCPC)]. Second the Medical Savings Account (MSA) is designed for billing of civilian emergencies treated in a military facility.

BAMC follows Army Regulation 37-1 and DFAS Regulation 37-1 for its billing process on all medical accounts receivable. According to AR 37-1, all accounts are considered not delinquent while accounts remain at the hospital. The MSAOs (Medical Services Accountable Officer) will exhaust all collection procedures available within the

proper time limits before transferring uncollectible accounts to the Finance and Accounting Office (FAO).

The procedure is as follows:

1. The MSAO makes an initial demand (this is the first debt notice) for payment on the day of discharge from the hospital. This is either done by presenting the patient with a bill in person, for which a receipt is obtained, or by mailing the patient a bill for the an after hours discharge in the next day's mail. The initial demand will include a complete explanation of the debtors rights, responsibilities and additional charges which may be levied. The MSAO will follow up on unpaid accounts using the criteria established in the Table 2. If, based upon table 2, the debtor is sent only one notice or two notices whichever is the final notice and will advise that the unpaid account will be transferred to the servicing FAO. Debts in excess of \$100 will be sent by certified mail and anything less than \$100 can be sent via regular mail. The MSAO will transfer the unpaid account to the servicing FAO after the final demand for payments is made on DA Form 1854-R (Daily Transfer Summery). Debtors must respond to the initial demand letter with full payment or enter into a written agreement with the time limits specified in the demand letter. If the debtor refuses to pay or indications exist from the debtor that further demands for payment would be futile, the account may be written off or transferred to DFAS for additional collection actions. Additionally, all accounting records must be maintained for three years.

For accounts transferred to an insurance carrier they again are not considered delinquent. The accounts are deferred for six months or until payment is made, whichever

occurs first. At the end of the six months, the MSAO will bill the patient for any unpaid balance if:

1. the insurance company states the payment went directly to the patient
2. at the expiration of the deferred period of 6 months
3. when accounts are still unpaid 30 days after the invoice date with no interim payment or payment arrangement; these accounts are considered delinquent.

Table 2

Techniques for debt notification

Technique	\$ Range \$1-\$100	\$ Range \$100-\$1000	\$ Range over \$1000
1st Debt Notice	Yes	Yes	Yes
2nd Debt Notice	Optional	No	Yes
3rd Debt Notice	Optional	No	Optional
Transfer Debt to DFAS	No	Yes	Yes

The installations will allow at least 60 days from the date of delinquency notification before transferring qualifying debts to DFAS. This allows the debtor to respond to the initial demand letter and make arrangements for payments. Once the 60 days has elapsed, the installation may transfer the debt if payment has not been received.

BAMC uses the following collection procedure for settling outstanding accounts receivable. They consider accounts receivable delinquent if not paid within 30 days of discharge or treatment.

1. The date of billing is equivalent to the date of discharge and the MSA will attempt to collect all accounts receivable at the time of discharge.
2. If the charges are not paid within 15 days, follow up is accomplished through either a delinquent letter or by documented contact with the patient.

3. If charges are not paid within 30 days a DD Form 139 (Pay Adjustment Authorization) is prepared. The account is not closed out at this time. The MSA follows up in writing after 60-90 days. If the FSO has not forwarded payment within 180 days, the MSA will transfer the account to the FSO and close out the account receivable.
4. For patients whose health insurance plan has been billed, a follow-up letter is sent 60-90 days after. If the payment is not received in 180 days from the date the claim was submitted, then collection attempts are made to the patient. A DD Form 139 may be processed with the local FSO 30 days after notification of balance due to the patient. If the account remains uncollected after 30 days then transfer the account to FSO. If a payment is received the payment is forwarded to the FSO.
5. Once an account is transferred to the FSO, the MSA is released from further responsibility for collecting on the account.

PURPOSE

The purpose of this study is to look retrospectively at the reimbursement rates for civilian trauma and to specifically look at the Trauma Medcom project from a financial aspect to include uncompensated charges and the county from which the injury occurred. Additionally, are Medcom patients costing BAMC more than regular trauma patients? The study examines the difference in reimbursement rates from Trauma Medcom patients compared to regular trauma patients. The variables used in the analysis are: category of trauma patient (either a Trauma Medcom patient or regular trauma patient), county of injury, type of reimbursement (commercial insurance, Medicare, Medicaid, or no insurance), and amount reimbursed. The hypothesis is:

H_0 : The rate of reimbursement is not dependent upon the type of insurance, location of injury (by county), or a Trauma Medcom patient.

H_a : The rate of reimbursement is dependent upon the type of insurance, location of injury (by county) and whether or not they are a Trauma Medcom patient.

The dependent variable is the amount of reimbursement and the independent variables are: type of insurance (no insurance, commercial insurance, Medicare, or Medicaid), location of injury (by county) and a Trauma Medcom patient or regular trauma patient.

Putting this in functional form H_a : $y = a + f\{x_1\} + f\{x_2\} + f\{x_3\}$ or H_a :
 Reimbursement = $a + \text{type of insurance} + \text{location of injury} + \text{Trauma Medcom or regular trauma patient}$. The null hypothesis is H_0 : $y = aU_0$ or reimbursement $\nless f\{\text{variables evaluated}\}$.

Other variables will also be considered. The following variables will be analyzed through descriptive statistics to assist in defining the population: age, gender, location of discharge, injury severity score, and length of stay. These variables will not be used in any substantiating analysis.

ANOVA will be used to determine if there is a difference in reimbursements between regular trauma patients and Trauma Medcom patients, the county of injury and the type of insurance.

METHODOLOGY

The data for this project was gathered from several sources including PASBA II, Sentient, Composite Health Care System (CHCS), and the trauma registry. The first three

data sources are data programs maintained by the Patient Administration Division (PAD) and the fourth is a state registry maintained by the trauma coordinator at BAMC.

Initially, a list of all civilian emergencies was generated from PASBA II software for the year July 1996 - June 1997. These specific dates correspond with the demonstration year of the Trauma Medcom project. The registry includes all civilian emergencies. Another list of all trauma patients was generated from the trauma register to compare against the civilian emergencies. Both data sets included patient registration number, patient name, and social security number. Once the consolidated list was obtained the records were then compared against Sentient and CHCS in order to gain patient billing information. Using the registration number, social security number, and patient name, the reliability in this study is high. The lists were able to be merged and compared against each other. However, there was a significant discrepancy in the billing information between Sentient and CHCS. This discrepancy was mainly due to the emergency room bill. The additional bill was not always found in both data sources. After talking with the billing clerk, she recommended to use CHCS since it was most accurate.

In addition to demographic information the trauma register provided county where the injury occurred, county of residence, and location the patient was discharged to (home, another facility, morgue, etc.). This information was not used in the analysis but does provide some insight to the sample studied. According to the trauma register, the population of all trauma patients treated at BAMC equaled 827. After eliminating the beneficiary trauma patients (n=158) and beneficiary Medcom trauma patients (n=9) the data used for the initial comparison was n=613 for all other trauma patients and n=47 for

Medcom trauma patients (total n=660). The sample of 660 was used in describing the demographics of the trauma registry; however, for the purposes of examining the billing practices an additional 41 patients were eliminated due to the PAD having no record of those patients being billed. All 41 patients were in the civilian trauma (not Medcom) sample; therefore n=572. The list of 41 patients names were given to the PAD in order to examine their billing practices. Therefore the study is a sample of the trauma registry for the Trauma Medcom demonstration year. Table 3 displays the break out of trauma patients by beneficiary category treated at BAMC with the trauma column equaling the number of regular trauma patients treated; whereas, the Medcom column displays the Trauma Medcom patients. Additionally, Figure 3 shows the same data in graphical form. Figure 4 combines the two trauma categories. Most significant is the fact that over 80 percent of the trauma patients treated at BAMC were civilians.

Table 3

Trauma beneficiary category

	Trauma	Medcom	Total
Civilian	613	47	660
Active duty	37	5	42
Retiree	37	0	37
VA Benefit	22	0	22
Family Member	60	2	62
Other	2	2	4
Total	771	56	827

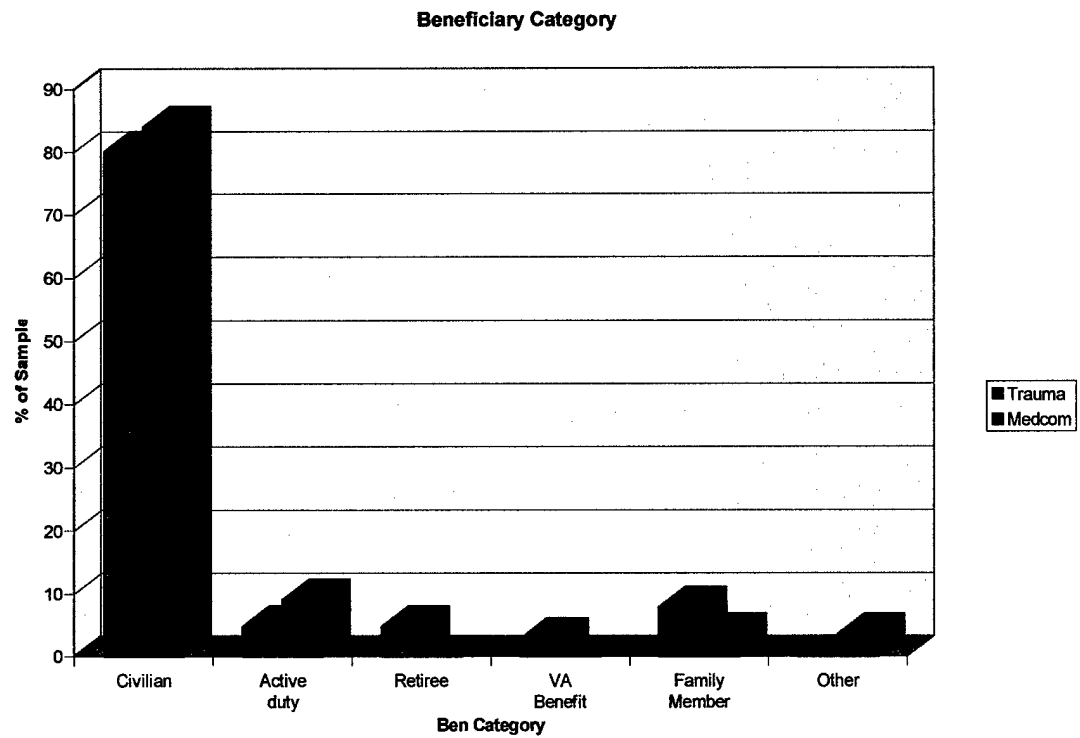


Figure 3. Relation of trauma patients by beneficiary category

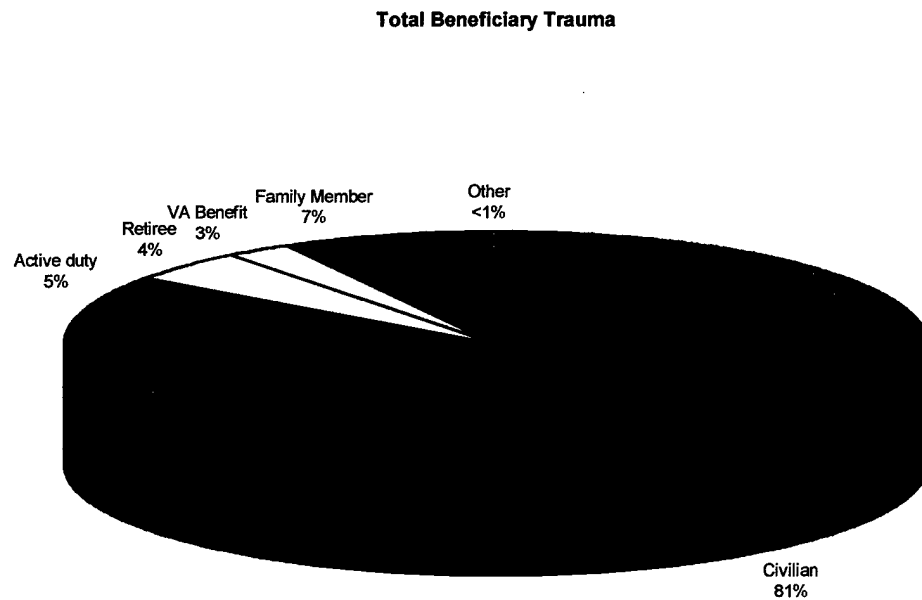


Figure 4. Trauma population by beneficiary category

RESULTS

a. Descriptive Statistics

In order to get a better understanding of the demographics for this study sample, descriptive statistics were used to examine patient characteristics. The demographic overview provides a brief insight into the population studied but is not used in the analysis. The data is displayed in Tables 4-7 and is graphically depicted in Figures 5-7. The data examined includes: gender, ethnicity, disposition, average age, the average length of stay in critical care, average hospital length of stay, and the average Injury Severity Score (ISS). Second, the demographic overview extends to the variables examined in the analysis and include: insurance type, average DRG rate, and average payment.

Table 4

Trauma patients by gender

	Trauma	Medcom	Total trauma
Male	460	38	498
Female	153	9	162
Total	613	47	660

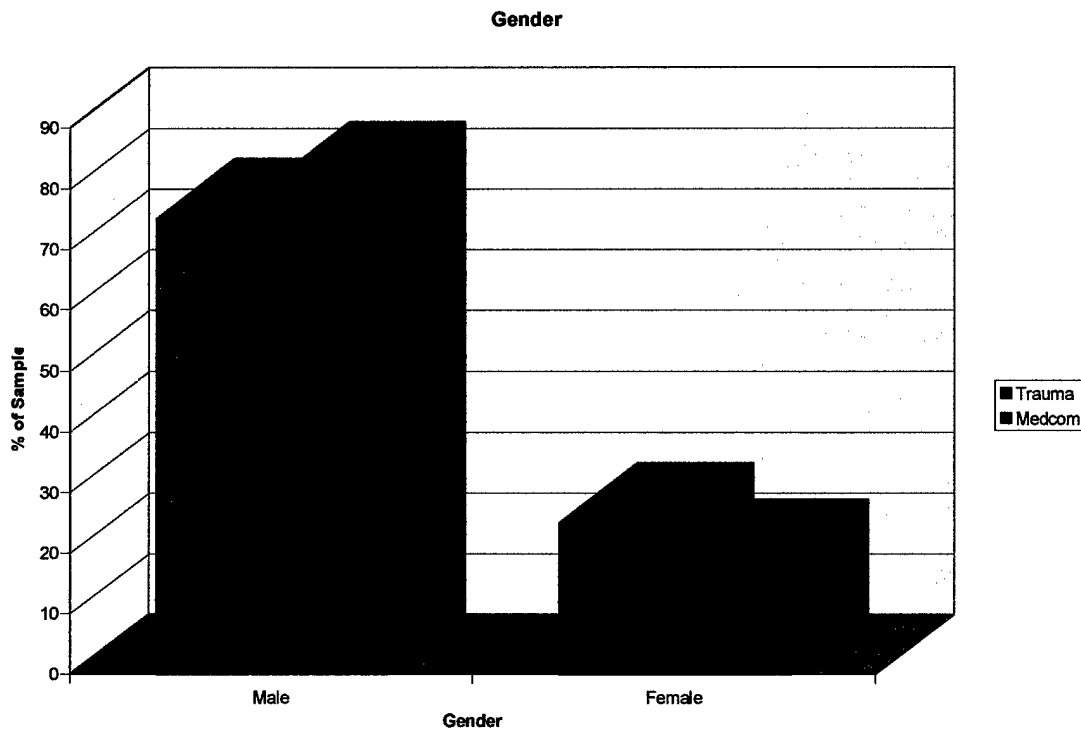


Figure 5. Gender relationship between Medcom patients and regular trauma patients

Hispanics represent a much higher percentage in trauma Medcom patients compared to regular trauma patients; whereas, Caucasian and blacks represent a much lower percentage.

Table 5

Ethnicity of trauma patients

	Trauma	Medcom	Total
Asian	3	0	3
Black	118	3	121
Caucasian	235	14	249
Hispanic	246	30	276
Other/Unk	11	0	11
Total	613	47	660

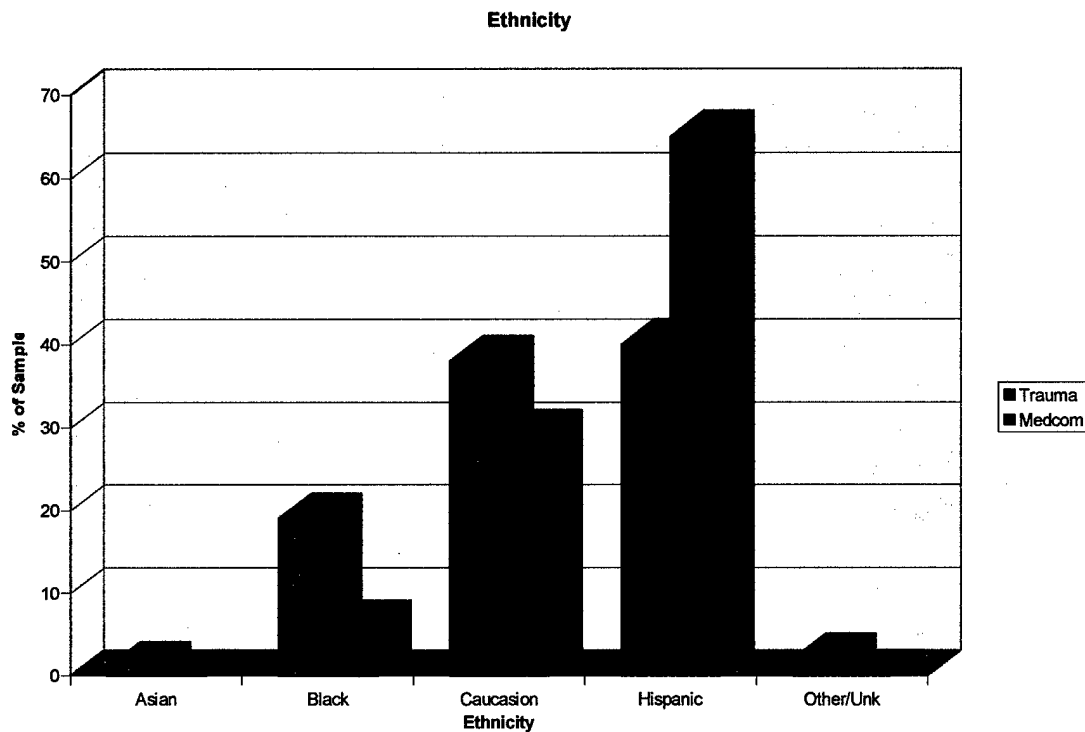
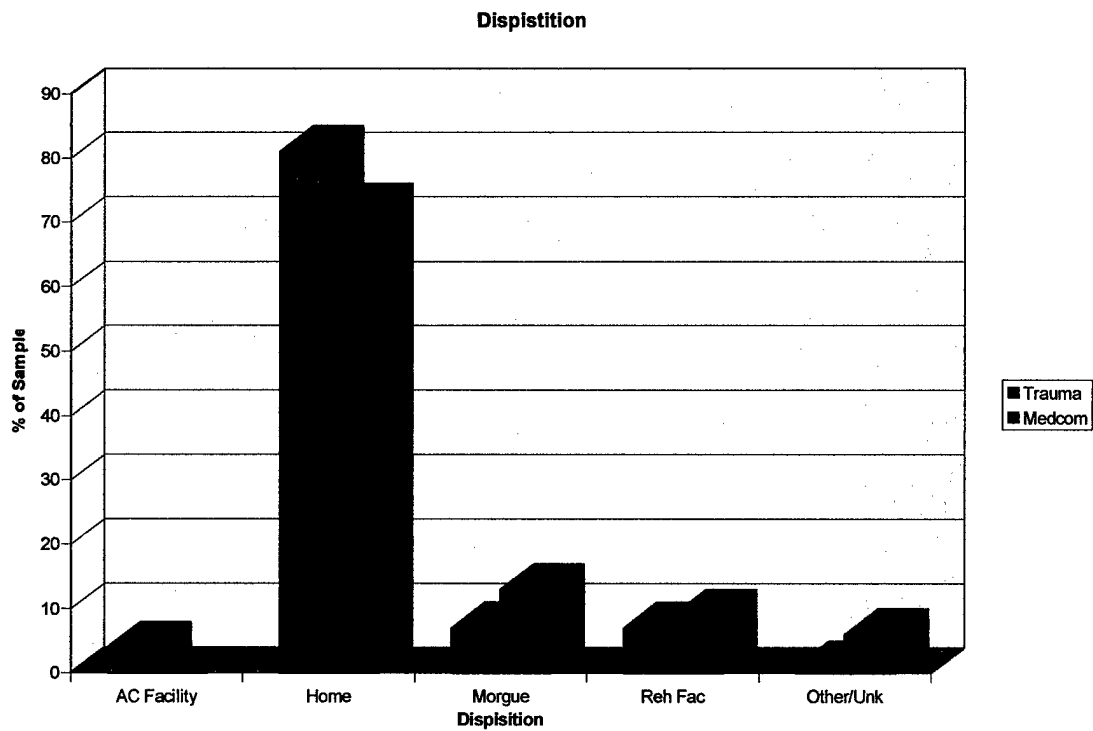


Figure 6. Comparison of ethnicity between Medcom vs. regular trauma patients

Consistent with the fact that Medcom patients are more severely injured, the data displayed in Table 6 and Figure 7 show an increase in mortality and transfer of patients to a rehabilitation facility. Thirteen percent of the Medcom patients died whereas only seven percent of the regular trauma patients. Nine percent of the Medcom patients are discharged to a rehabilitation facility compared to seven percent of the regular trauma patients. Inconsistent with the more severely injured is the fact that no Medcom patients were discharged to an acute care facility; whereas, four percent of the regular trauma patients were discharged to an acute care facility.

Table 6Disposition of trauma patients

	Trauma	Medcom	Total
AC Facility	27	0	27
Home	495	34	529
Morgue	43	6	49
Reh Fac	41	4	45
Other/Unk	7	3	10
Total	613	47	660

**Figure 7. Disposition of trauma patients between Medcom and regular trauma patients****Table 7**Average age of trauma patients

	Trauma	Medcom
Age	33.28	39.00

Table 8Average ISS and length of stay in intensive care and within the hospital

	Trauma	Medcom
ISS	10.00	12.79
ICU Day	1.90	4.02
Hosp Day	5.60	9.07

Table 8 provides insight to the severity of injury between the two trauma samples. The Trauma Medcom patients bypass other hospitals in order to receive treatment at a Level I trauma center. It makes sense that the length of stay in intensive care and in the hospital are longer for the Medcom patients. It also is logical for the ISS to be higher for Trauma Medcom patients for the same purpose.

Table 9 depicts the type of insurance held by the trauma patients treated at BAMC. During the demonstration year, over 60 percent of the civilian trauma treated at BAMC did not have any type of third party insurance. Of the 419 trauma patients with no insurance only 75 patients or 19 percent have signed a BAMC Form 1014 stating they do not have insurance. This indicates the hospital needs to improve on obtaining signed documentation stating the patient does not have third party insurance. Figure 8 displays the percentage of all trauma patients and the type of insurance they have while Figure 9 shows the same information but differentiates between trauma Medcom and regular trauma patients.

Table 9Type of Insurance for civilian trauma patients

	Trauma	Medcom	Total
Commercial	172	21	193
Medicaid	23	6	29
Medicare	9	1	10
No Ins	400	19	419
Vic of Crime	9	0	9
Total	613	47	660

Insurance Type**Figure 8. Type of insurance held by civilian trauma patients treated**

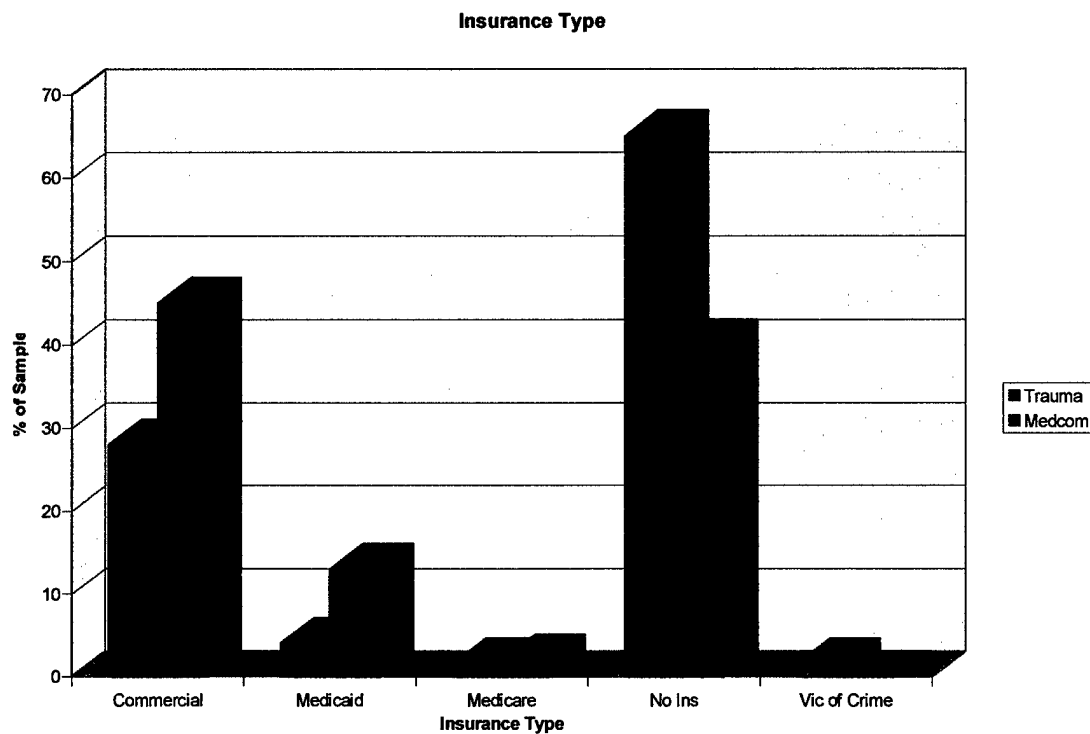


Figure 9. Comparison of insurance type for regular trauma patients vs. Medcom patients

There are several categories of commercial insurance. The three main commercial insurance types are: commercial such as Pacificare, Blue Cross-Blue Shield; MVA which is motor vehicle insurance such as USAA; and lastly workman's compensation is for businesses who have employees injured while on duty. Table 10 displays the types of commercial insurance held by civilian trauma patients. Regular commercial insurance represents the largest of the third party commercial insurance. Workman's compensation for Trauma Medcom patients have a much higher percentage than regular trauma patients. For the purpose of this study the primary source of insurance was used in the comparison.

Table 10Types of commercial insurance

	Trauma	Medcom	Total
Commercial	141	14	155
MVA-CE	13	1	14
Wkmcomp	18	6	169
Total	172	21	193

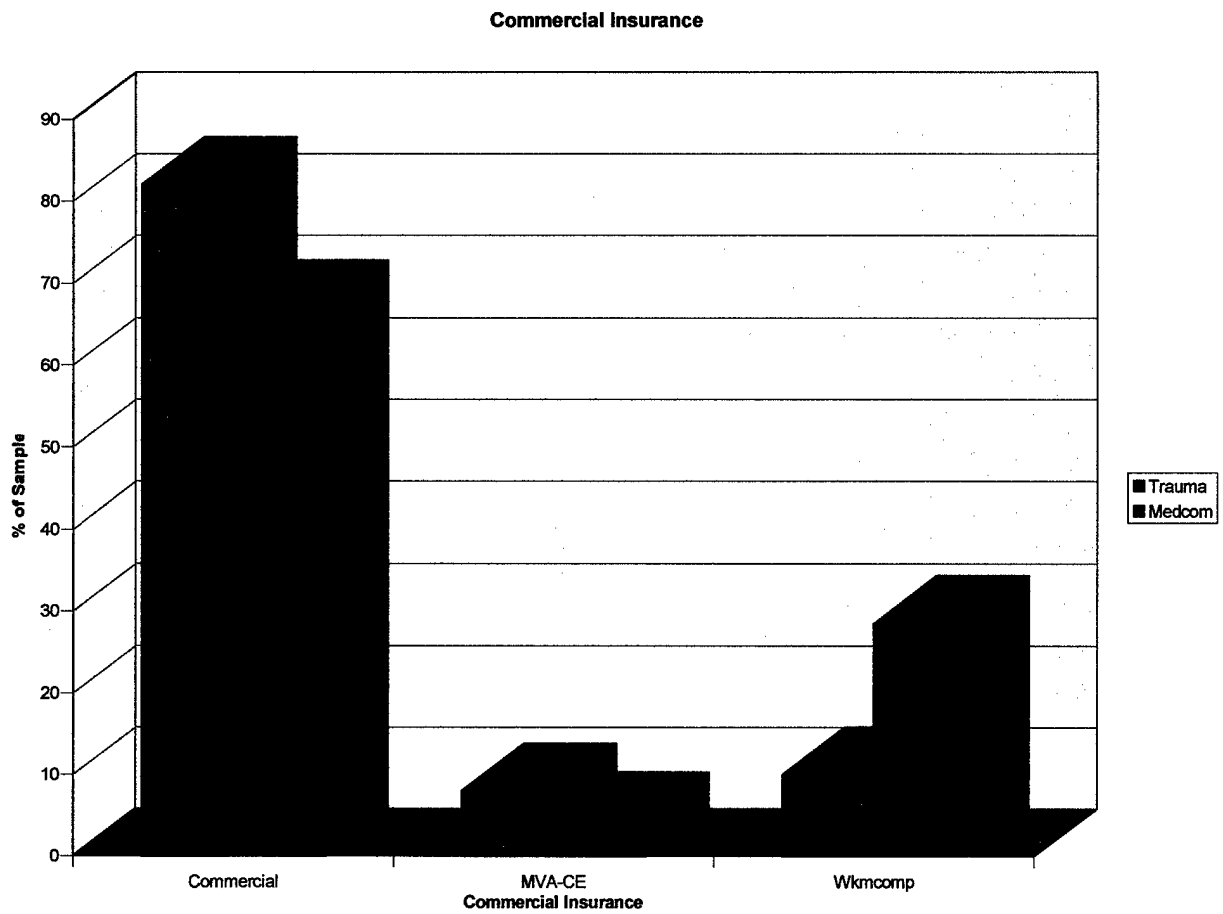
**Figure 10. Types of commercial insurance for the two trauma patient categories**

Table 11 represents the billing and collection dollar amounts. First, the amount collected is the amount the third party insurer (or individual patient) paid BAMC for the

services rendered. The second category is the amount DFAS reimbursed BAMC after the bill was transferred. Third is the total amount transferred to DFAS after the bill was determined uncollectable by BAMC's Patient Administration Division. Lastly, is the billed rate charged to the individual or their third party insurance.

Using the sums from Table 11, percentages were calculated and are presented in Table 12. First, the percent accounted for equals the DRG rate divided by the amount collected plus the amount transferred to DFAS. Second, the percent of written off paid by DFAS equals the amount transferred to DFAS divided by the amount collected from DFAS. Next, the percent reimbursed equals the DRG rate divided by the amount collected; where as, the percent reimbursed with DFAS includes the amount collected from DFAS added to the amount collected. Last, the percent written off to DFAS equals the DRG rate divided by the amount transferred to DFAS.

Table 11

Dollar amounts charged, billed, and collected by BAMC

	Trauma	Medcom	Total
Amount Collected	\$1,476,627.01	\$227,696.79	\$1,704,323.80
Amount Collected from DFAS	\$674,242.07	\$144,872.71	\$819,114.78
Amount transferred to DFAS	\$3,585,939.80	\$409,841.33	\$3,995,781.13
DRG Rate	\$6,443,020.90	\$796,700.95	\$7,239,721.85

Table 12

Percentage of dollars accounted for using the amount charged, billed, and collected

	Trauma	Medcom
% Accounted for	79%	80%
% of written off paid by DFAS	35%	19%
% Reimbursed	23%	29%
% Reimbursed w/ DFAS	33%	47%
% Written off to DFAS	56%	51%

Table 12 displays the average amount charged for treatment (DRG rate) and the average payment made by either the patient or their insurance company. The payment is significantly less than the rate charged. Additionally, the Medcom patients have a higher DRG rate which is consistent with the longer length of stay and higher injury severity scores. On average, BAMC receives 24 percent per patient billed; whereas, with the Medcom patients they receive 29 percent.

Table 13

Average amount billed and amount paid per trauma category

	Trauma	Medcom
DRG Rate	\$10,738.37	\$16,951.08
Payment	\$ 2,613.50	\$ 4,844.61
Percent	24%	29%

b. Inferential Statistics

Using SPSS version 7.0, inferential statistics were analyzed in order to make inferences about the trauma patients treated at BAMC. In order to gain a better understanding of the reimbursement, the sample was further decreased to exclude all the non-reimbursements (where reimbursement equaled zero). The sample size, for this variable became n=181 (19 Medcom and 162 regular trauma patients). This is a significant finding in itself. Sixty-eight percent or 391 patients never reimbursed BAMC anything for the treatment they received. These patients were eliminated since there was such a large number of non-reimbursed accounts which skewed the results. The Medcom patients were coded as binary in order to compare the two samples. The mean reimbursement for all trauma patients became \$9,416 with a standard deviation of \$15,304

(Medcom mean reimbursement was \$11,984 with a standard deviation of \$10,498 and for regular trauma the mean reimbursement was \$9,115 with a standard deviation of \$15,769). Using one-way ANOVAs, there was not a significant difference at the .05 level in reimbursement for insurance type (reimbursed, non-reimbursed, commercial insurance, Medicare, Medicaid), type of trauma patient (Medcom or regular trauma), or county of injury (Bexar or other county). Listed below in Table 13 is a summary of the ANOVA results.

Table 14
Analysis of Variance for reimbursement

Source	df	F	Sig
Between Subjects			
Medcom	1	0.596	0.441
Insurance Type	2	2.414	0.092
County of Injury	1	3.095	0.080
Within Subjects			
Medcom	179	0.596	0.441
Insurance Type	178	2.414	0.092
County of Injury	179	3.095	0.080

DISCUSSION

This study indicates that reimbursement is not dependent upon the type of trauma patient (Medcom or regular trauma), the type of insurance held by the patient, or the county where the patient was injured. However, based upon descriptive statistics, BAMC is being reimbursed at a higher percentage for trauma Medcom patients. This would indicate that involvement in the trauma Medcom is a positive benefit for third party collections as well a service to the community. Additionally, involvement in the program is a means to assist with graduate medical education. However, both types of trauma

patients have low reimbursement rates which is less than 30 percent. Therefore, BAMC and the Department of Defense are providing a significant service to the civilian population of South Texas with minimal reimbursement.

The billing practices at BAMC also need to be examined. The hospital is receiving reimbursements from DFAS but it is not always reflecting the money in their patient level accounting. Additionally, PAD must ensure all the paperwork is completed properly to include the BAMC Form 1014 when a patient does not have insurance. PAD has already made tremendous progress in capturing patients with third party insurance. The December 1997 billing report generated by PAD states 65 percent of all civilian emergencies have some type of third party insurance. Unfortunately those patients, identified in this study, who have not been billed can no longer be billed since too much time has lapsed. This accounts for 41 patients which equates to 6.2 percent of the civilian trauma population. Combining the 6.2 percent with the average amount billed for a trauma patient (not Medcom) this equates to \$66,578 of lost earned revenue for the hospital (or DoD since DFAS eventually reimburses the hospital at 100 percent). Additionally, using the average amount charged (DRG rate) and the average amount reimbursed, BAMC loses \$12,106 per Medcom patient and \$8,125 per regular trauma patient. Both have significant impact on the hospital and the DoD since these patients consume a large portion of BAMC's resources.

As stated previously, the city of San Antonio provides \$1.5 million annually to help offset the amount of uncollectable bills from trauma patients. Even with this \$1.5 million added to the \$1,704,324 that BAMC received in third party reimbursement for the

demonstration year, this still leaves BAMC short \$4,035,398 which equates to less than 50 percent of the hospital's charges.

Another area of concern is the discrepancies between the two billing data bases, Sentient and CHCS. CHCS is unable to generate a patient bill therefore Sentient is used. Both data bases should match in order for the data to be reliable. The hospital has plans to implement a new Keystone computer system for patient billing and eliminate Sentient. However, even with this major investment the double entry for the billing clerks will still occur. Additionally, financial data must be entered into the trauma registry. Currently BAMC fails to report this mandated information to TDH. In any respect, the data must be entered correctly in all three data bases.

CONCLUSIONS AND RECOMMENDATIONS

BAMC, as well as all health care institutions, must concern itself with the cost of providing services. BAMC provides a significant service to San Antonio as well as South Texas through the Trauma Medcom project. Using the accepted DRG rate, this study evaluated the cost of providing trauma care to the City of San Antonio and Southwest Texas. Currently, the City of San Antonio provides 1.5 million to assist BAMC with the financial burden of treating civilians. This study indicates that \$1.5 million is not enough to cover the billed rate for trauma patients. BAMC remains \$4,035,398 short of the break-even point. This equates to 56 percent of the billed charges. BAMC or DoD may want to request additional funding from the city or state in order to compensate for the civilian trauma they treat. Currently, only federal dollars are used for this care. At the very least, BAMC should request an increase annually if the city caps the dollar amount at 1.5 million. The \$1.5 million BAMC received in 1995 is not the same as it is in 1998 due

to inflation. However, BAMC does have an alternative motive for treating civilian trauma. These patients assist with training the military providers in trauma skills that they are likely to see in combat as well as providing training opportunities for graduate medical education. The \$4 million dollar delta is a significant cost for training providers.

The military has a tremendous advantage over civilian institutions since the DFAS currently reimburses DoD hospitals for uncollected accounts. BAMC actually has zero dollars of uncompensated and undercompensated trauma care, since DFAS absorbs all the loss. However, as institutions are scrutinized over management, BAMC must examine its business practices including third party reimbursements. Additionally, as more and more beneficiaries are being denied care at military institutions BAMC must be prepared to justify treating civilians. This study indicates the hospital must have a better management tool to examine third party collections in the MSA accounting process. The same study should be completed prior to the fiscal year in order to find any civilian trauma patients who were not billed. A billing clerk should work closely with the trauma registry to compare the data sources. Additionally, Utilization Management, Internal Review, and the Resource Management Division should examine this process to ensure all those treated are billed appropriately.

The findings of this study indicate there are no significant differences in reimbursement levels for regular trauma patients vs. Trauma Medcom patients; the county of injury; and for the type of insurance. However, on average the Trauma Medcom patients do cost BAMC more per patient. Conversely, the Trauma Medcom patients have a higher reimbursement rate than regular trauma patients treated at BAMC. Currently, there is statistically no difference between the two categories of patients treated at BAMC;

however, the process should be examined periodically as well as the business practices of the third party collection process.

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