Trauma Care Advisory Council

Trauma Care in Tennessee

2012 Report to the 108th General Assembly

Tennessee Department of Health

Trauma Care Advisory Council

December 20, 2012

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December 20, 2012

Dear Members of the General Assembly,

As required by Tenn. Code Ann §68-59-103, we are pleased to submit our Annual Trauma Report. This report reflects activities and accomplishments of the Trauma Care Advisory Council (TCAC) and Tennessee's designated Trauma Hospitals.

The Trauma Care Advisory Council was implemented in 1990 to advise the Office of Health Care Licensing Facilities and the Emergency Medical Services (EMS) Board in regards to regulatory standards to ensure the adequacy of statewide trauma care. Rule promulgation is guided by national standards.

In 2007, the General Assembly enacted the Trauma Fund Law, providing valuable resources to support and maintain Tennessee's vital Trauma System.

The data in this publication give an overview of patients cared for in Tennessee designated Trauma Centers. With your ongoing support, the TCAC hopes to continue to expand access to quality trauma care for injured Tennesseans.

Respectfully Submitted,

Ben L. Zarzaur, MD, MPH, FACS
Associate Professor of Surgery
University of Tennessee Health Science Center
Chair, Trauma Care Advisory Council
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2012 EXECUTIVE SUMMARY

The Trauma Care Advisory Council (TCAC) was established in 1990 to advise the Office of Health Care Licensing Facilities regarding trauma care policy and regulation. The Tennessee Trauma System, when first instituted, boasted 11 trauma hospitals: 4 as Level I (the highest level of care) and 7 as Level II. Several Level III centers were later designated, bringing the total to 13. The last decade has seen an erosion of these services. Currently, Tennessee has 6 Level I trauma centers, 1 Level II center, and 2 Level III centers. Fortunately for Tennesseans, the 6 Level I centers are well-distributed geographically across the state such that all of its citizens are within 100 air miles.

Trauma centers across the state provide more than just trauma care – they provide a safety net of care for those patients in most dire need - 24 hours a day, 7 days a week, at the highest level available. Last year, the Board for the Office of Licensing Health Care Facilities approved new more demanding guidelines for designation of trauma centers in Tennessee, raising the bar for quality care of injured Tennesseans. These regulations provide that Level I trauma centers have the resources available to care for the severely injured including fully staffed operating rooms, lab and radiologic capabilities, intensive care units, and professional personnel in-house and available on a moment's notice. This service availability provides a halo effect to local communities and regions – by also being available to care for patients with ruptured aneurysms, strokes, cardiac emergencies, and other time-limited, life-threatening emergencies at a moment's notice. This year, three Level I trauma centers in the state had their designation renewed using the more demanding rules.

The TCAC, in conjunction with the Department of Health, has implemented a statewide trauma registry. As this registry matures, valuable data regarding the care of injured patients in the state will be available to improve the quality of care at all trauma centers. A person from nearly every county in Tennessee was treated at a Tennessee trauma center. The overwhelming majority of those injured were the result of motor vehicle crashes and falls.

This report provides information on injury patterns across the state, referral patterns, and financial statistics. Other key aspects of this report include Injury Prevention activities and statewide research efforts. It is the goal of the TCAC to aim future activities based upon data from the state registry and to continually strive to improve patient outcomes through an array of performance improvement initiatives, research activities, and outcomes based evidence.

Despite the advances in the system in the last decade, many gaps still exist across the state. Much work needs to be accomplished to develop a truly *inclusive* trauma care network, forming a system in which all hospitals participate, so ALL citizens of Tennessee can be assured of receiving the same level of care, regardless of where they are injured.

This report speaks volumes about the hospitals designated as trauma center and dedicated to caring for the injured patient. But, there is still much to be done. With your ongoing support we can continue with our mission of providing the highest level of care, injury prevention, education, and research to minimize the death and disability that occurs as a result of injury across the state of Tennessee

Ben L. Zarzaur, MD, MPH, FACS
Chair, Trauma Care Advisory Council and
The Tennessee Committee on Trauma

INJURY PREVENTION IN TENNESSEE

Injuries are the leading cause of death among Tennessee residents ages 1-44 and the third leading cause of death overall after heart disease and cancer. The majority of injuries are unintentional; however, injuries can be intentional through self-harm or by another individual. In 2010, 4,935 Tennessee residents were fatally injured, another 38,201 were hospitalized for non-fatal injuries, and 623,273 visited an emergency department due to injury.

The cost of all of these injuries is tremendous. In 2010, the median admission charge in Tennessee for non-fatal injury hospitalizations was $43,000. The total charges exceeded $1.6 billion; this does not include rehabilitation, emergency medical services, or physician costs. Many of these injuries were preventable.

The Tennessee Department of Health received the Core Injury Surveillance, Prevention, and Control Grant from the Centers for Disease Control and Prevention (CDC) in 2005 to address injuries. An objective of this grant was to ensure that injury prevention efforts provided by public health and private agencies were coordinated. This coordination assisted with eliminating redundancy, sharing resources, and increasing support and impact for injury prevention initiatives statewide. As part of this coordinated effort, the Commissioner's Council on Injury Prevention and Control was established as an advisory council for injury prevention efforts in Tennessee. The statewide membership includes injury prevention experts from a variety of public and private agencies with a common goal of reducing injuries among Tennesseans.

The Tennessee Department of Health received a five year continuation of that grant in 2011. Under that new grant, four priority areas were chosen with input from the Commissioner's Council. Those priority areas for 2011 – 2016 include: motor vehicle crashes, poisoning, sleep-related deaths and senior adult falls. Many injury prevention efforts are being implemented related to these areas and others throughout Tennessee. Examples of injury prevention efforts among designated trauma centers and comprehensive regional pediatric centers include:

- **Safe Kids Coalitions** – The safe kids coalitions provide education to families and advocate for better laws to keep children safe and healthy. In addition, the Safe Kids coalitions often provide safety devices, such as car seats, to families in need.

- **The Safety Store** - The Safety Store is the first of its kind in Tennessee. Open to the public, the Safety Store serves families in Middle Tennessee and across the state by providing low cost safety products for children such as child passenger safety seats, cabinet locks and bicycle helmets.

- **Battle of the Belt** – This competition is a collaborative effort between trauma centers and high schools to increase seat belt usage among teens. Each trauma center chose one or more schools and is working with them to conduct three seat belt checks and education for students throughout the year. A winning school will be chosen at the

end of the school year based on increased percentage of seat belt usage and quality of educational campaign.

- **Trauma Nurses Talk Tough –** This program teaches parents, teenagers and children about safety topics and injury prevention. Topics include; seatbelt safety, dangers of speeding and driving impaired, and the importance of wearing helmets when bicycling and skating.

- **Tennessee Coalition for ATV Safety** – This coalition, supported by the Trauma Center's Injury Prevention Programs, was developed to promote ATV safety among youth and adults.

- **Matter of Balance** – This program is centered on Fall Prevention efforts in Senior Adults, ages 60 and over.

PEDIATRIC TRAUMA CARE

The state legislature unanimously passed the TN Emergency Medical Services for Children (TN EMSC) legislation in 1998 and revised in 2007 creating a standing committee on pediatric emergency care (CoPEC) which reports directly to both the Board for Licensing Health Care Facilities (BLHCF) and the Emergency Medical Services Board (EMSB). CoPEC holds primary responsibility for the pediatric trauma system and interfaces with the Trauma Care Advisory Council (TCAC) by providing expertise and pediatric representation from CoPEC as members of TCAC.

A comprehensive strategic plan is being created but has five overarching goals.

The five goals include:

1. To exceed the national EMSC performance measures. Statement of Direction: EMSC performance measures are part of the foundation for providing quality pediatric emergency care.
    - In order to measure the effectiveness of federal grant programs, the Health Resources and Services Administration (HRSA) requires grantees to report on specific performance measures related to their grant funded activities. The measures are part of the **Government Performance Results Act (GPRA)**.
    - Two pediatric readiness statewide assessments will be completed in 2013, one for EMS and one for adult focused hospitals
    - Proposals to both the EMS board and the Board for Licensing Health Care Facilities for revisions for pediatric equipment and emergency care in 2013.
2. To expand leadership capacity and communications tools to drive and promote TN EMSC including CoPEC.
3. To develop and integrate a statewide disaster plan for children. This task force has made progress with mapping how disaster management in Tennessee is organized with respect to caring for pediatric patients. CoPEC is committed to supporting the agencies that are ultimately responsible for caring for Tennessee's pediatric

population during a disaster. This task force will continue to research and implement the integration of pediatric disaster care within the state's current disaster organizational and command structures.

4. Use education (including publications) to support, develop, and disseminate current best practice for emergency medical services for children.
    - Developed wall chart that outlined protocols for common pediatric emergency care diagnosis and distributed to every adult hospital with an emergency department in the state.
    - Developing an Emergency Guidelines for Schools handbook that includes common pediatric emergency care, disaster, and violence prevention. Once finalized it will be downloadable @ www.tnemsc.org

The pediatric emergency care facility rules and regulations, **1200-8-30-.03 (1) (i),** require that comprehensive regional pediatric centers provide public education on injury prevention. A detailed report will be forthcoming July 1, 2013.

TRAUMA CENTER FUNDING

With the passage of the Tennessee Trauma Center Funding Law of 2007, the Trauma Care Advisory Council was charged with developing recommendations on how to distribute Trauma System Fund reserves. In keeping with the intent of the statute, three broad categories for disbursement were identified:

1. Money to support the **trauma system infrastructure** at the state level.
2. **Readiness costs** to designated trauma centers and comprehensive regional pediatric centers.
3. Money for **uncompensated care**.

Trauma System Infrastructure

Robert Seesholtz is the State Trauma System Manager as of August 2010 and is responsible for providing general oversight for Tennessee's Trauma Care System. Responsibilities include oversight of the trauma fund, the trauma registry, administrative support to the Trauma Care Advisory Council, and the coordination of site visits for new and existing trauma centers.

Readiness Costs

Readiness costs vary annually for each designated Trauma Center. While the fund cannot realistically compensate centers for these costs, certain key elements must be in place to ensure state designation is maintained by state statute. Readiness cost amounts for those state designated trauma centers and comprehensive regional pediatric centers may be found in **appendix III**.

Uncompensated Care Methodology

The law provides for uncompensated care funding to be distributed to: 1) designated trauma centers 2) comprehensive regional pediatric centers and 3) other acute care hospitals functioning as a part of the trauma system. Actual hospital claims data was selected by the committee to determine the levels of trauma care provided by each center/hospital and the uncompensated costs related to that care.

While designated trauma centers and comprehensive regional pediatric centers are automatically eligible for participation in this portion of the fund, not all acute care hospitals are. Criteria used to determine which hospitals "function as a part of the trauma system", include: 1) Utilization - the percentage of all claims that are trauma related and 2) Acuity – the acuity of the trauma injuries seen by a hospital. Acute care hospitals, which prove to have a utilization rate and acuity equal to or greater than the minimum utilization and acuity rates of the designated centers, are eligible for participation in the pool.

Distribution to eligible hospitals is based on: 1) the level of funding within the reserve account following infrastructure and readiness costs and 2) the documented level of each hospital's uncompensated trauma cost. Though this amount will vary from year to year, at the end of 2012 this portion of the fund was approximately $8,328,132.57. **Appendix III** shows quarterly payments made to eligible hospitals for calendar year 2012 and totals for the previous year's disbursements.

Trauma Fund disbursement totals have seen a steady decline for the past three years. Fiscal year 2012 saw its biggest reduction in funds with a drop of over $400,000.00 in reimbursement for those hospitals eligible to receive monies from the trauma fund. The Trauma Care Advisory Council will look at alternative sources of funding to ensure the viability of Tennessee's Trauma System.

TRAUMA REGISTRY

The Tennessee Trauma Registry is the data repository for patients treated at the 9 participating trauma centers and the 4 comprehensive regional pediatric centers (CRPC). The first full year of data submissions was in 2007, and the Registry now includes activity through June 30, 2012. The following reports were generated using data from the Registry for calendar years 2007 through 2011. They typically represent trends for all trauma patients treated in the 13 Centers during this period as well as snapshots of activity for 2011 only.

The provisional inpatient Hospital Discharge database was used to get a sense of the overall financial burden of injury in Tennessee. In 2011 the average injury cost for trauma patients (hospital care only) was just over $71,000. This compares to $50,436 when all hospitals are considered. MVTC (Motor Vehicle Traffic Collision) was the second most frequent trauma cause (6,083) and generated the highest average injury cost at $108,048 per incident. Falls was the leading trauma cause (6,751) but had a lower average cost of $49,386 per incident.

Trauma Registry Profile
2011 Submissions: 22,650
Number of Adult Facilities: 9
Number of Pediatric Facilities 4

Trauma Registry, Injury Prevention and Injury Surveillance System

The TN Department of Health performs Injury Prevention analysis of Tennessee injuries based on Hospital Discharge data for all hospitals in the State as well as ER and Vital Records. The Trauma Registry serves as a source of information that is not provided in these three sources.

OUTREACH

Tennessee's Trauma Centers and Comprehensive Regional Pediatric Centers (CRPC's) provide many different outreach opportunities for both the public and for those who are responsible for the specialized care of injured Tennesseans and visitors in our state. The outreach opportunities listed below represent just a sample of the outreach opportunities that are being provided.

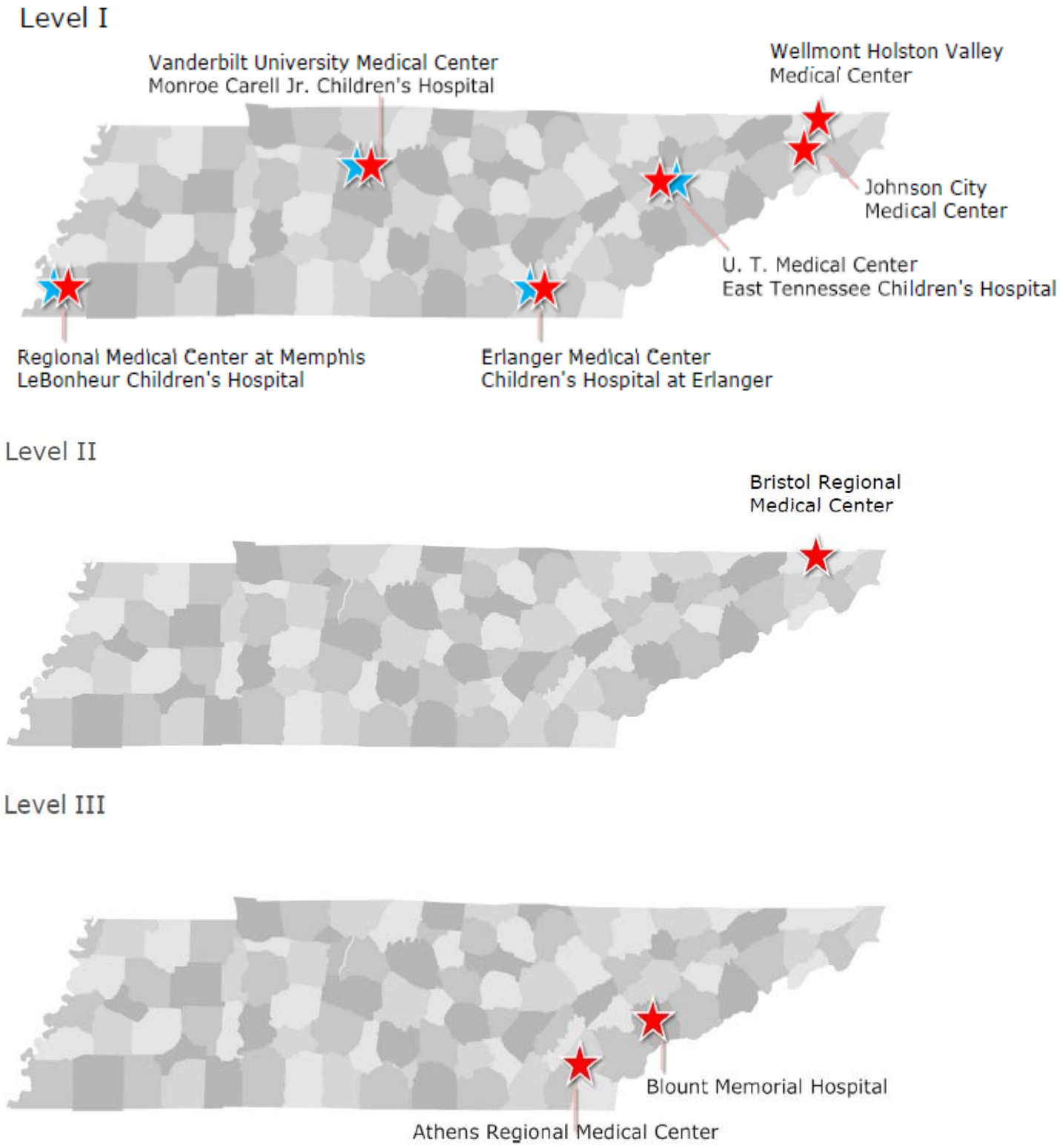
- Advanced Trauma Life Support
- Trauma Nurse Core Course
- Advanced Trauma Care for Nurses
- Emergency Nursing Pediatric Course
- Basic Life Support
- Helicopter scene safety
- EMS night out
- Community Health Leaders Program
- Transport Ventilator Management course
- Fundamental Critical Care Course
- Rural Trauma Team Development Course
- Prehospital Trauma Life Support
- EZIO Course
- EMS appreciation
- Trauma Symposiums
- Bike Helmet Fittings
- Car Seat Inspections
- Health Fairs
- Distracted Driving Simulator
- Sports Safety

RESEARCH

Level 1 Trauma Centers are charged with performing research. These endeavors spur improvements in care on an ongoing basis. **Appendix IV** represents just a sample of state wide research publication efforts.

Appendix I:

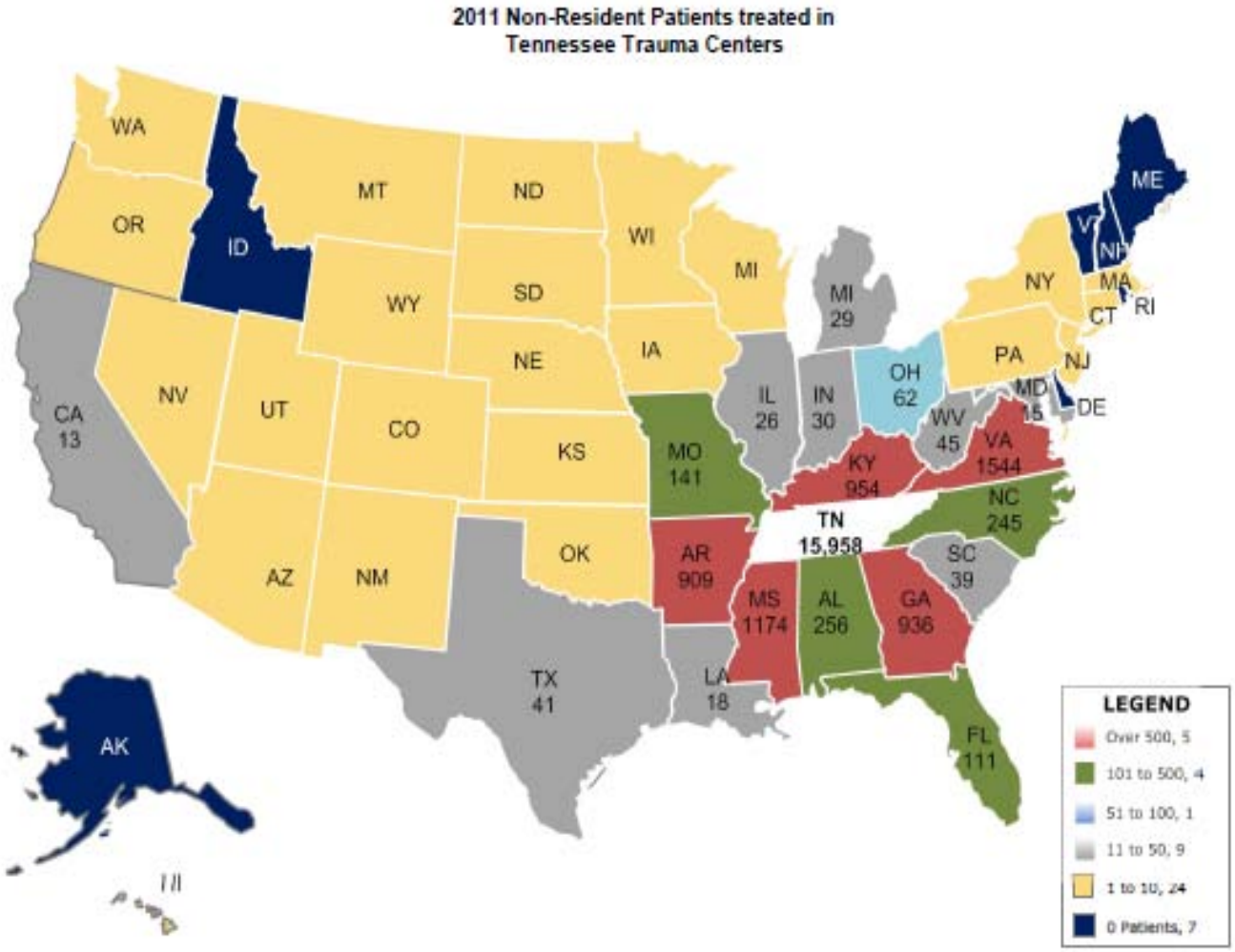
Trauma Center Location & Level Designation



Appendix II:

Trauma Registry Reports

Figure 1:



Tennessee is the only state in the nation that shares a common border with eight other states. This presents a unique challenge as Tennessee trauma centers and comprehensive regional pediatric centers strive to meet the medical needs of injured Tennesseans and of the over six-thousand injured visitors who seek medical care from Tennessee's trauma centers and comprehensive regional pediatric centers.

Figure 2:

2011 Tennessee Resident Injuries by County

1 to 10 patients	11 to 50 patients	51 to 100 patients	101 to 500 patients	over 500 patients
5 counties	29 counties	29 counties	25 counties	7 counties

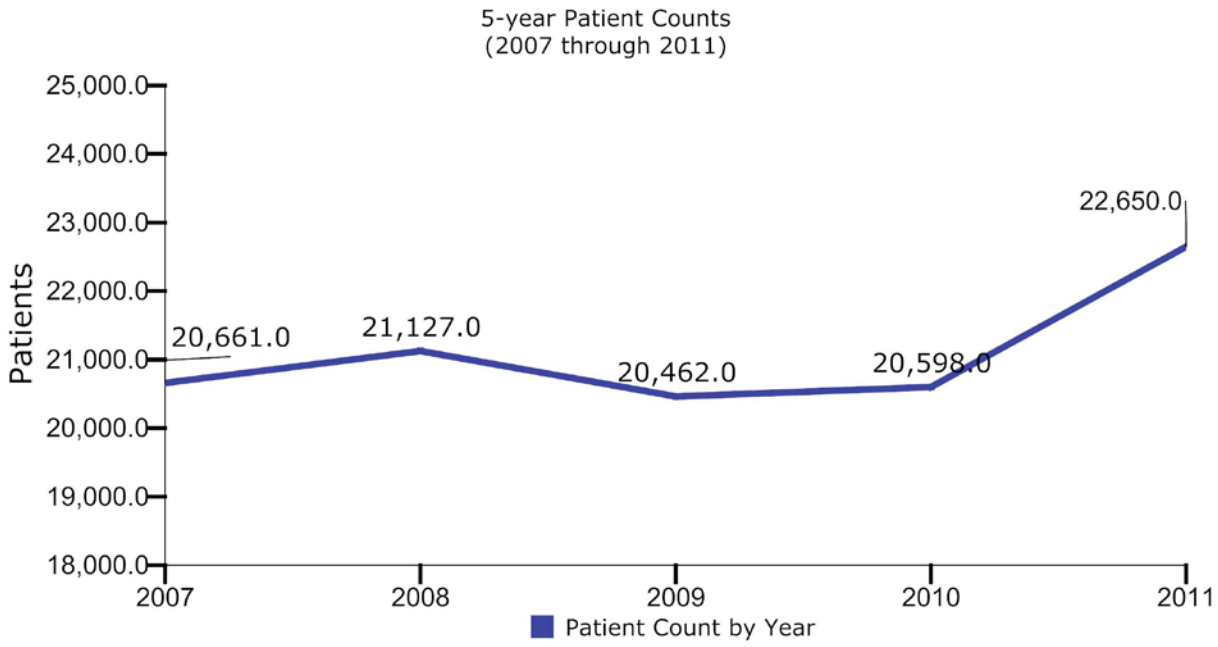
Figure 3:

2011 Incidents by County Residency

Residency	Population	TN Resident Admissions
Anderson	74,254	169
Bedford	47,312	58
Benton	16,680	20
Bledsoe	13,487	48
Blount	124,880	624
Bradley	98,180	229
Campbell	41,727	182
Cannon	14,143	17
Carroll	29,734	53
Carter	59,828	286
Cheatham	41,700	58
Chester	16,760	16
Claiborne	32,347	129
Clay	8,186	12
Cocke	36,533	180
Coffee	54,205	62
Crockett	15,063	21
Cumberland	55,300	113
Davidson	598,895	707
Decatur	11,494	22
DeKalb	19,211	27
Dickson	49,238	62
Dyer	38,865	92
Fayette	38,728	71
Fentress	18,055	51
Franklin	42,820	55
Gibson	49,061	72
Giles	29,955	35
Grainger	23,551	111
Greene	67,746	276
Grundy	14,859	48
Hamblen	63,185	236
Hamilton	317,758	1098
Hancock	6,807	29
Hardeman	29,738	59
Hardin	26,846	51
Hawkins	59,224	334
Haywood	19,678	32
Henderson	27,767	30
Henry	32,525	46
Hickman	25,740	32
Houston	8,221	10
Humphreys	18,961	29
Jackson	11,350	8
Jefferson	52,855	192
Johnson	18,653	85
Knox	426,489	1564
Lake	7,407	20
Lawrence	42,423	56
Lewis	12,120	12

Residency	Population	TN Resident Admissions
Lincoln	33,895	27
Loudon	46,879	180
Macon	22,974	19
Madison	100,059	61
Marion	28,383	66
Marshall	30,637	37
Maury	83,218	106
McMinn	54,305	349
McNairy	26,251	55
Meigs	12,315	105
Monroe	47,022	228
Montgomery	157,247	161
Moore	6,334	7
Morgan	20,781	68
Obion	32,675	41
Overton	21,282	27
Perry	7,792	15
Pickett	5,034	1
Polk	16,209	59
Putnam	71,810	89
Rhea	31,576	125
Roane	54,467	181
Robertson	67,533	97
Rutherford	252,394	181
Scott	23,044	86
Sequatchie	13,878	91
Sevier	87,777	358
Shelby	943,681	2294
Smith	19,900	25
Stewart	13,982	26
Sullivan	154,155	1144
Sumner	160,366	133
Tipton	62,102	176
Trousdale	8,215	14
Unicoi	17,859	100
Union	20,588	82
Van Buren	5,510	9
Warren	41,901	79
Washington	118,605	776
Wayne	17,333	20
Weakley	33,841	48
White	25,347	52
Williamson	180,620	139
Wilson	112,787	99
Total	**6,311,234**	**15,958**

Figure 4a:



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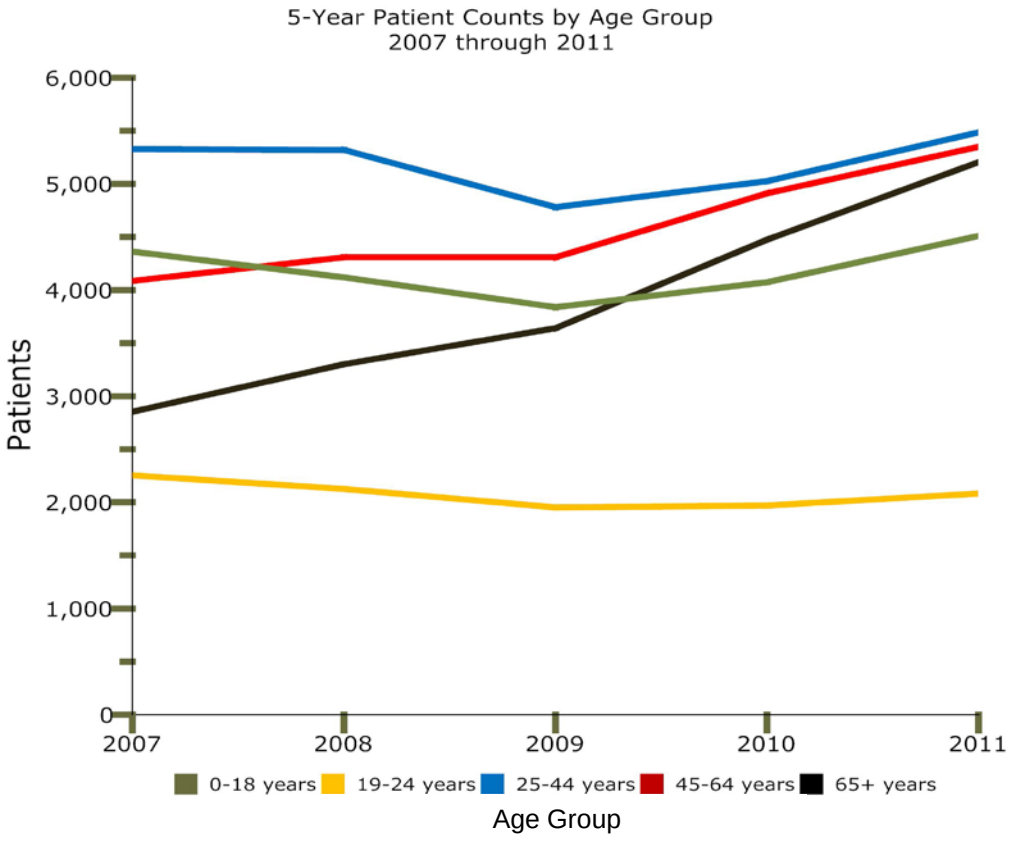

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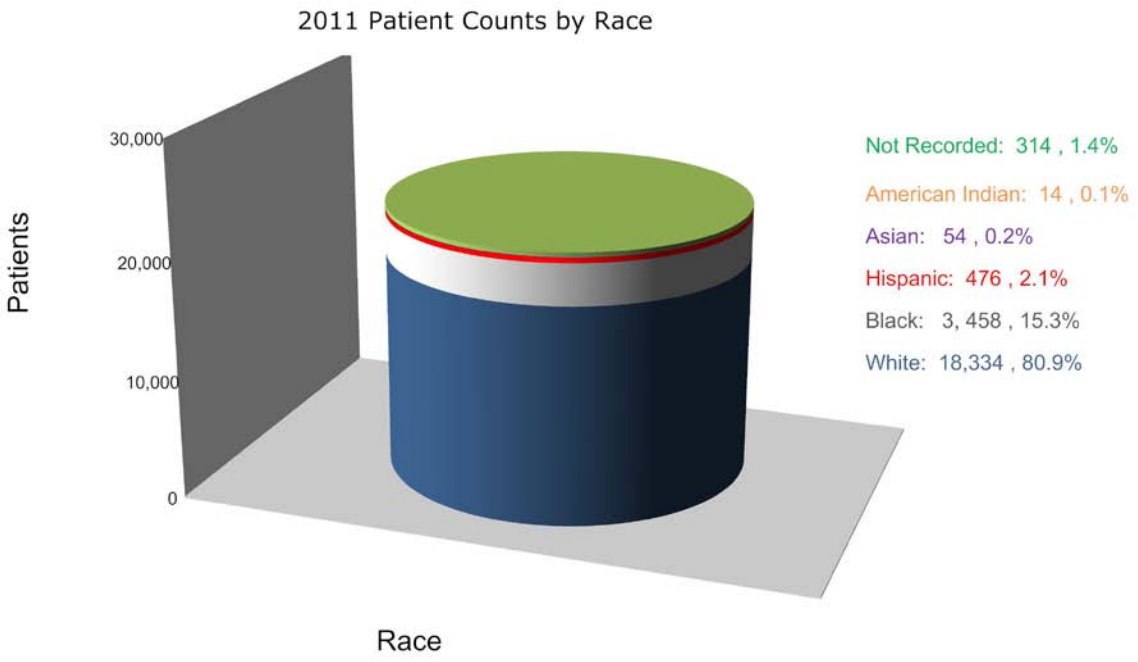

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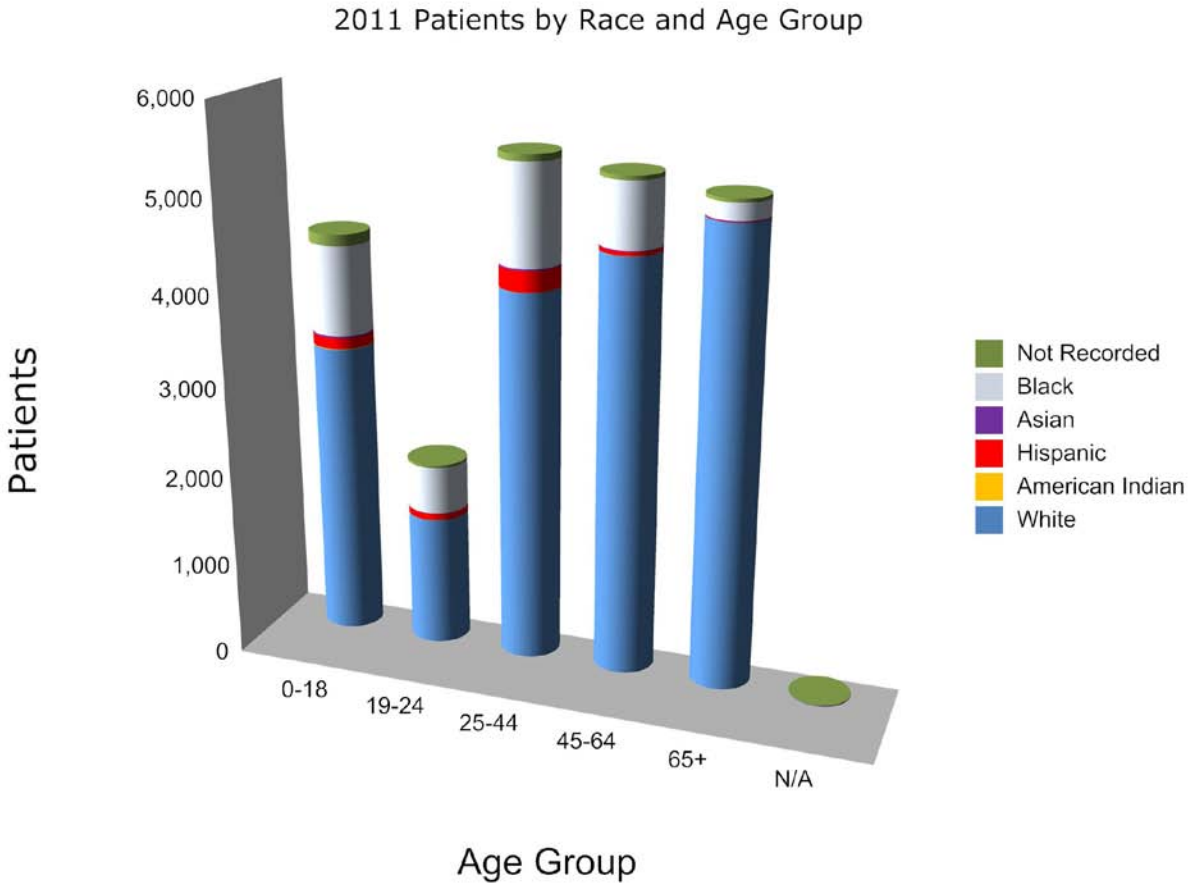

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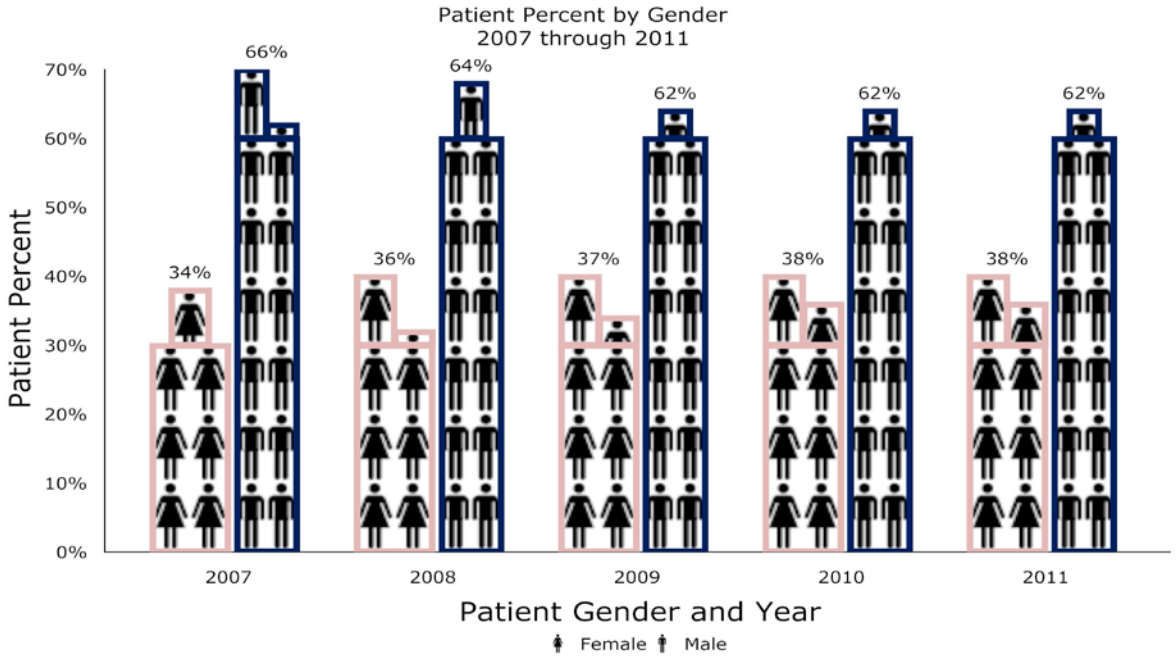

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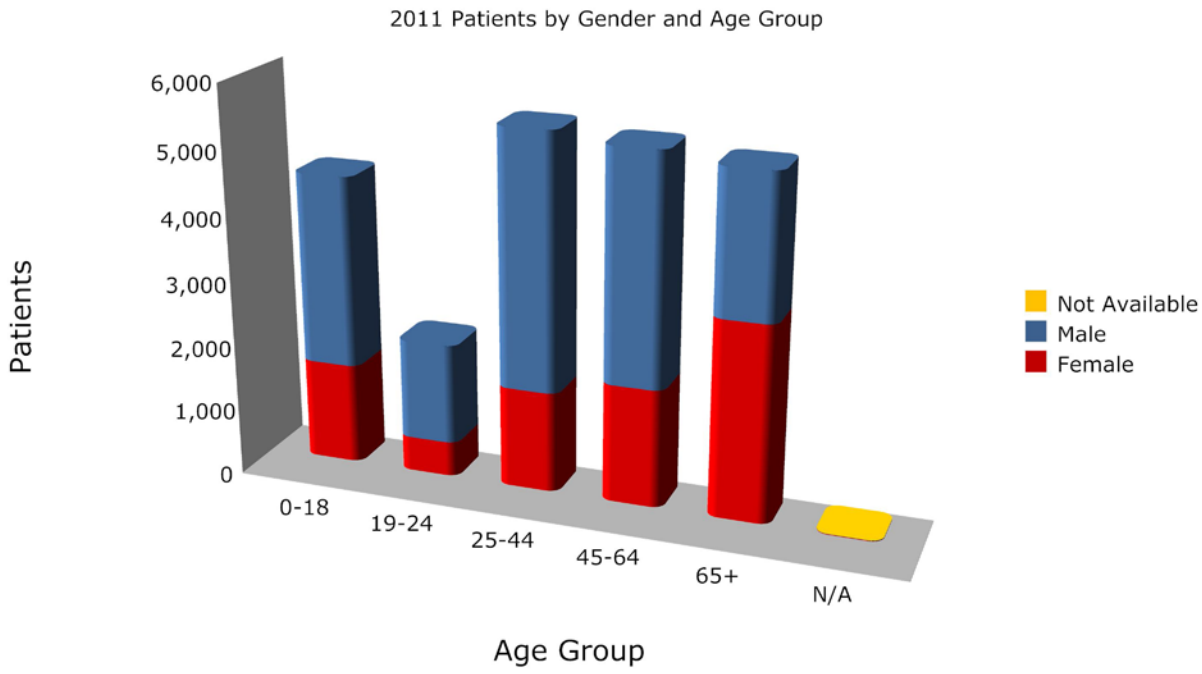
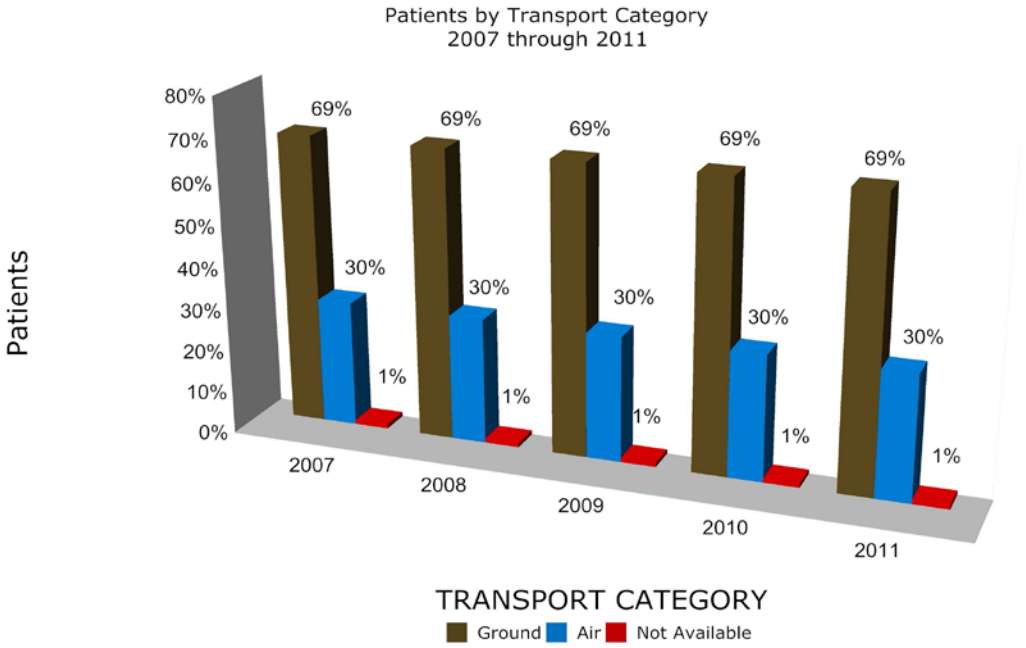


Age Group	Female	Male	Not Available
0-18	1,557	2,953	0
19-24	539	1,545	0
25-44	1,552	3,934	0
45-64	1,822	3,528	0
65+	3,027	2,179	0
Not Available	8	4	2

Figure 7a:



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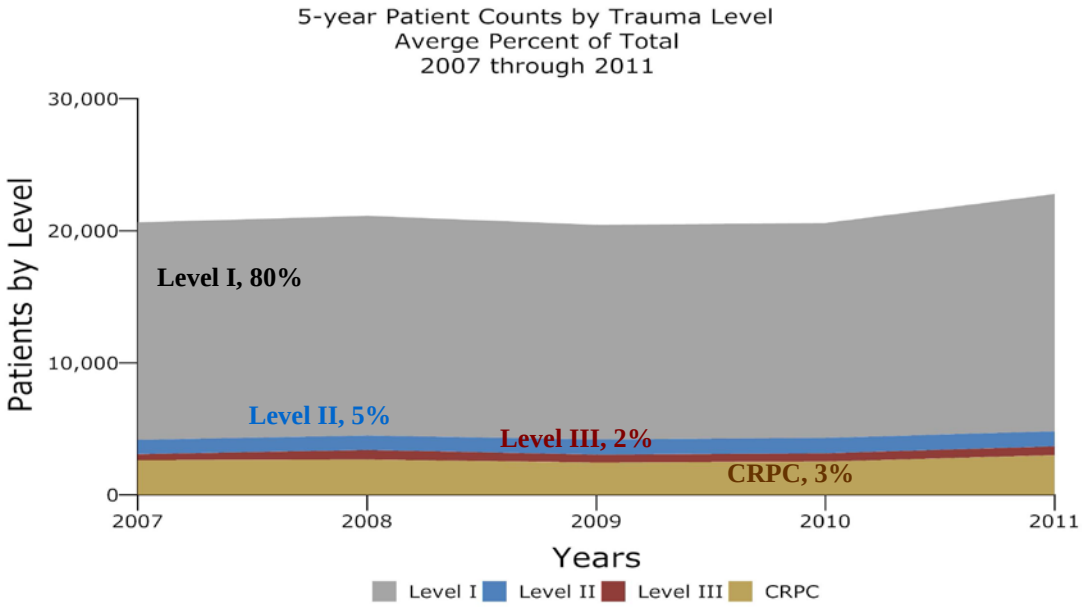
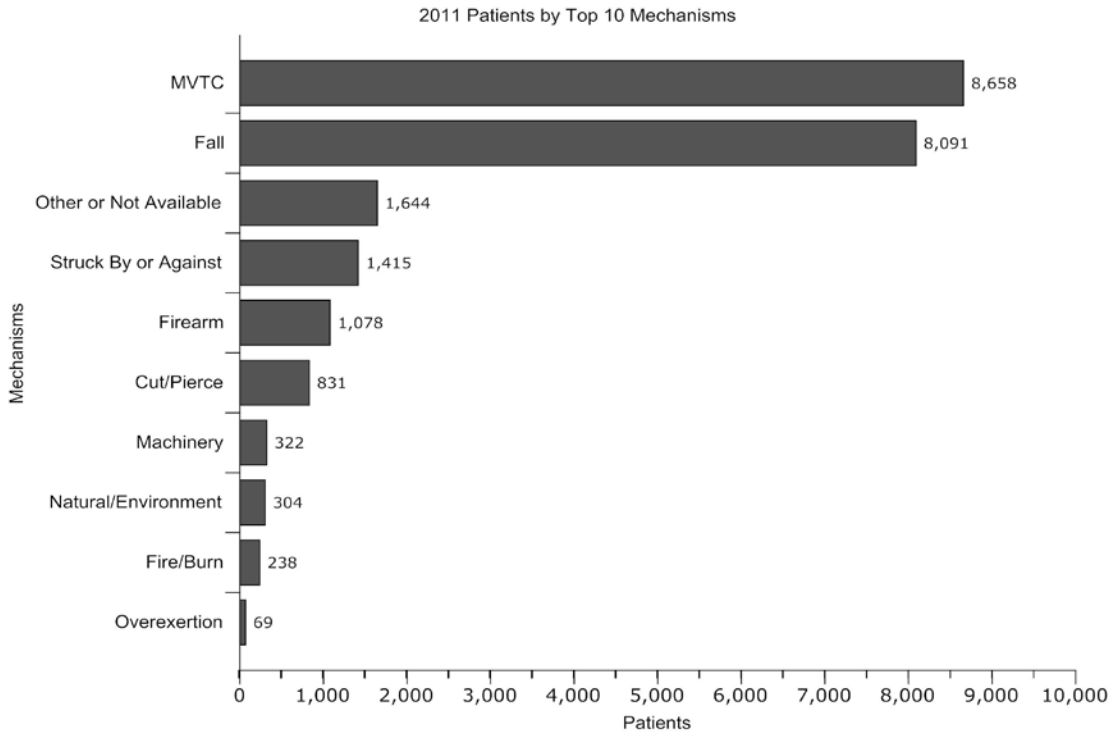


Patients Counts by Trauma Level

	2007	2008	2009	2010	2011
Level I	16,488	16,631	16,261	16,283	17,975
Level II	1,083	1,102	1,137	1,174	1,143
Level III	455	713	612	618	677
CRPC	2,635	2,681	2,452	2,523	3,005

Figure 8a:



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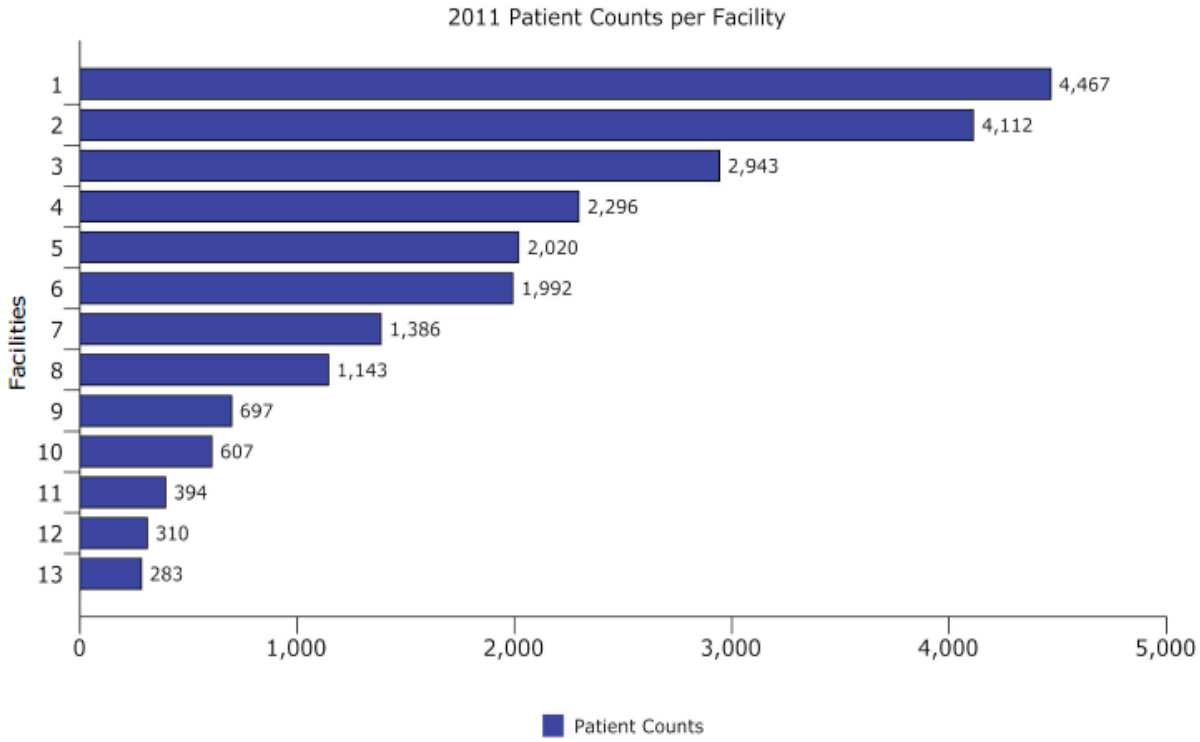

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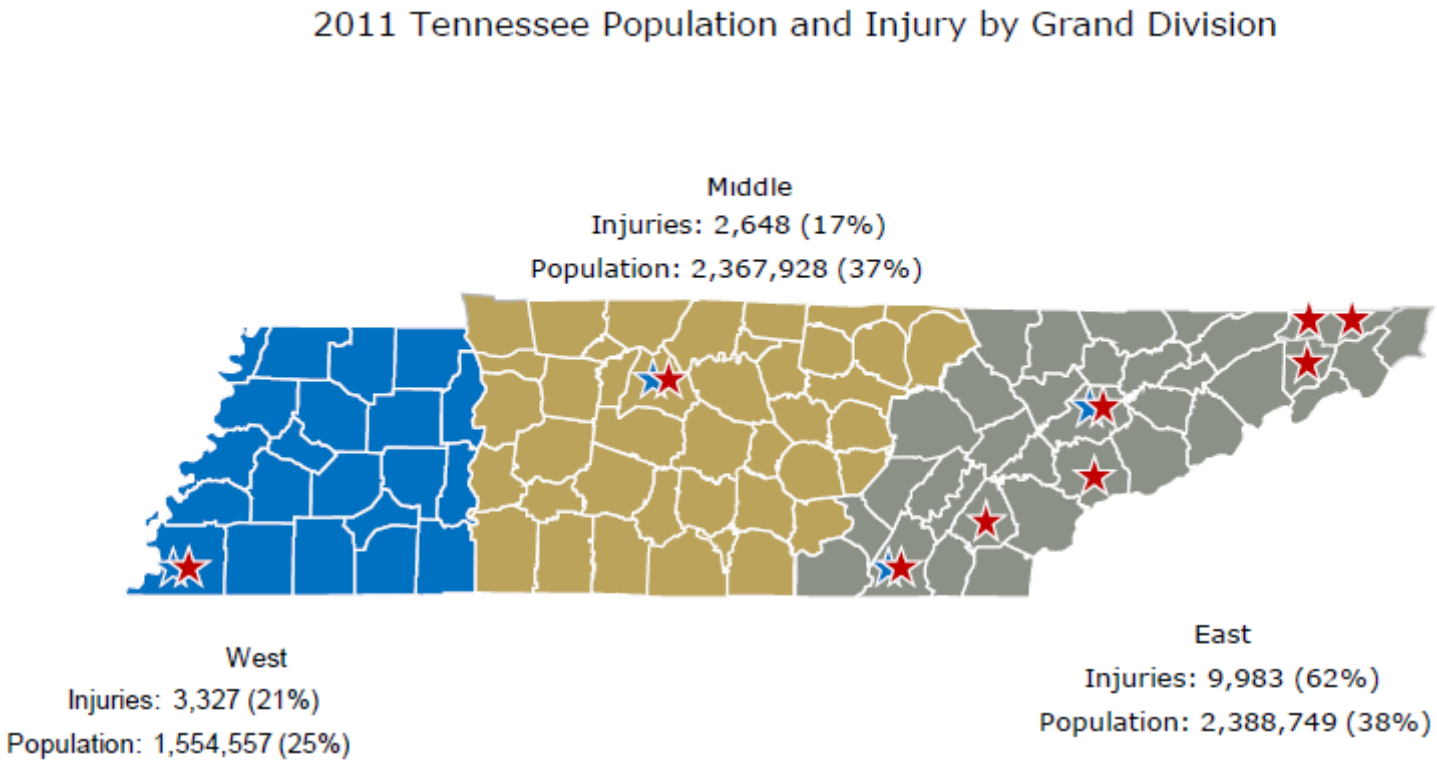
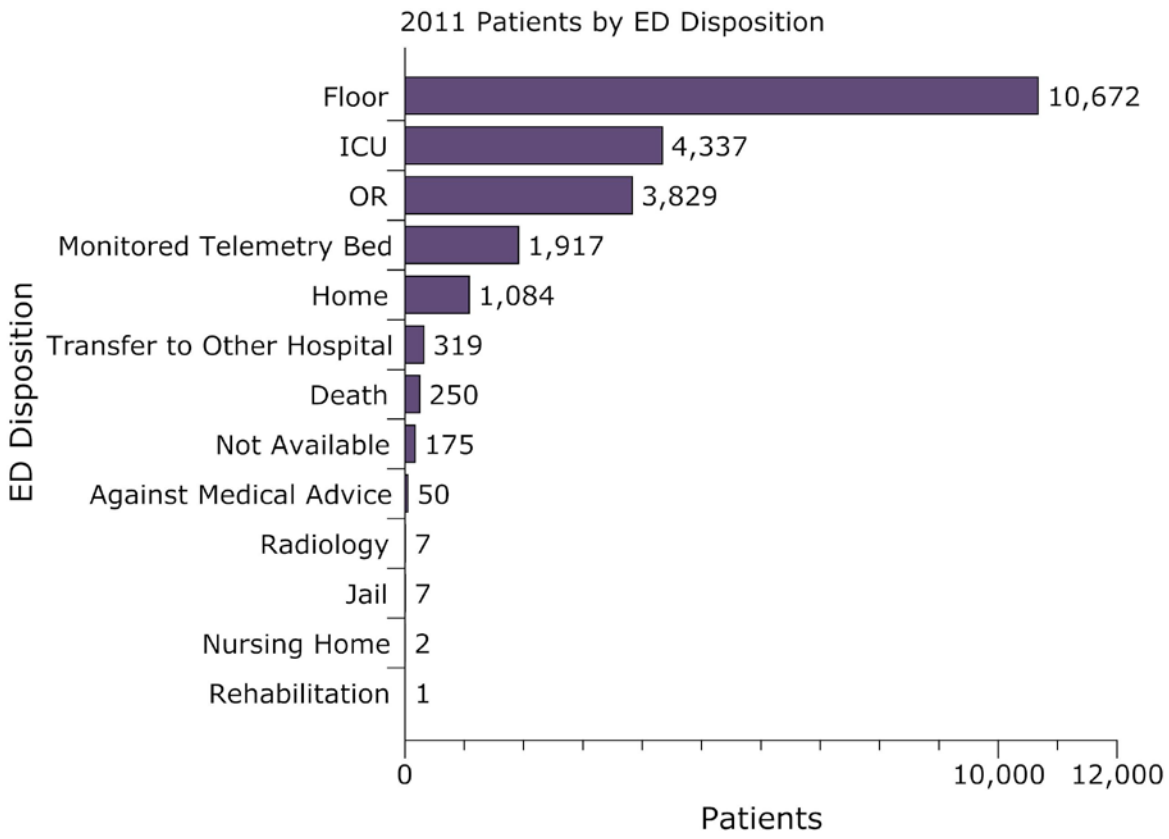


	West	Middle	East
Tennessee Population Percent	25%	37%	38%
Tennessee Injury Percent	22%	18%	60%
Number of Trauma Centers (Adult)	1	1	7

Figure 10a:



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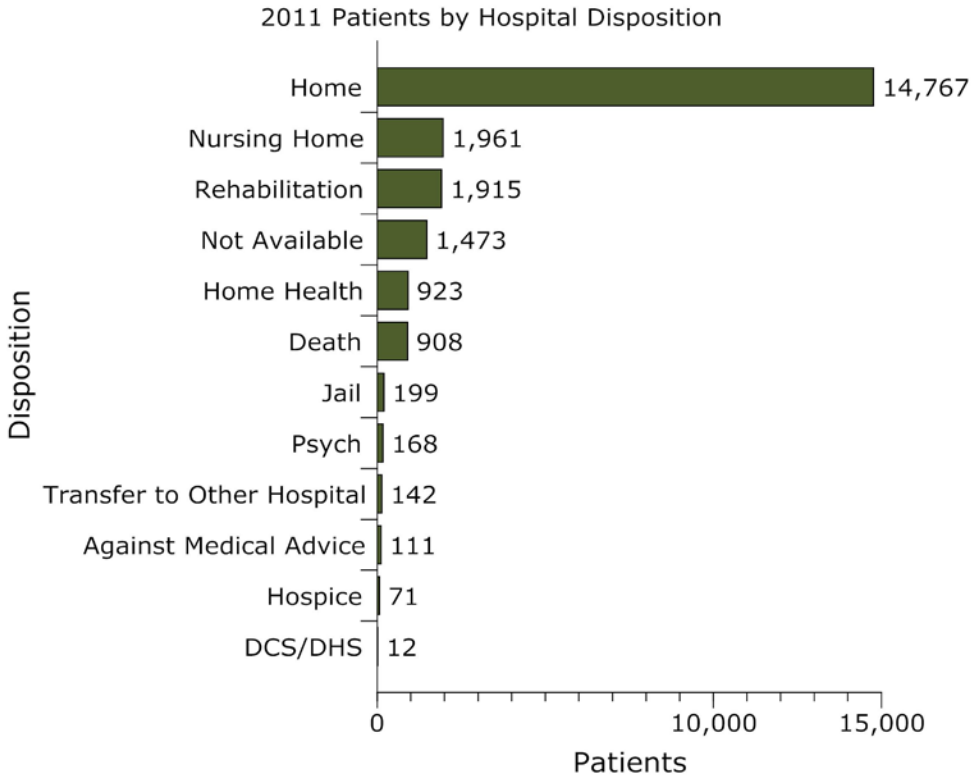

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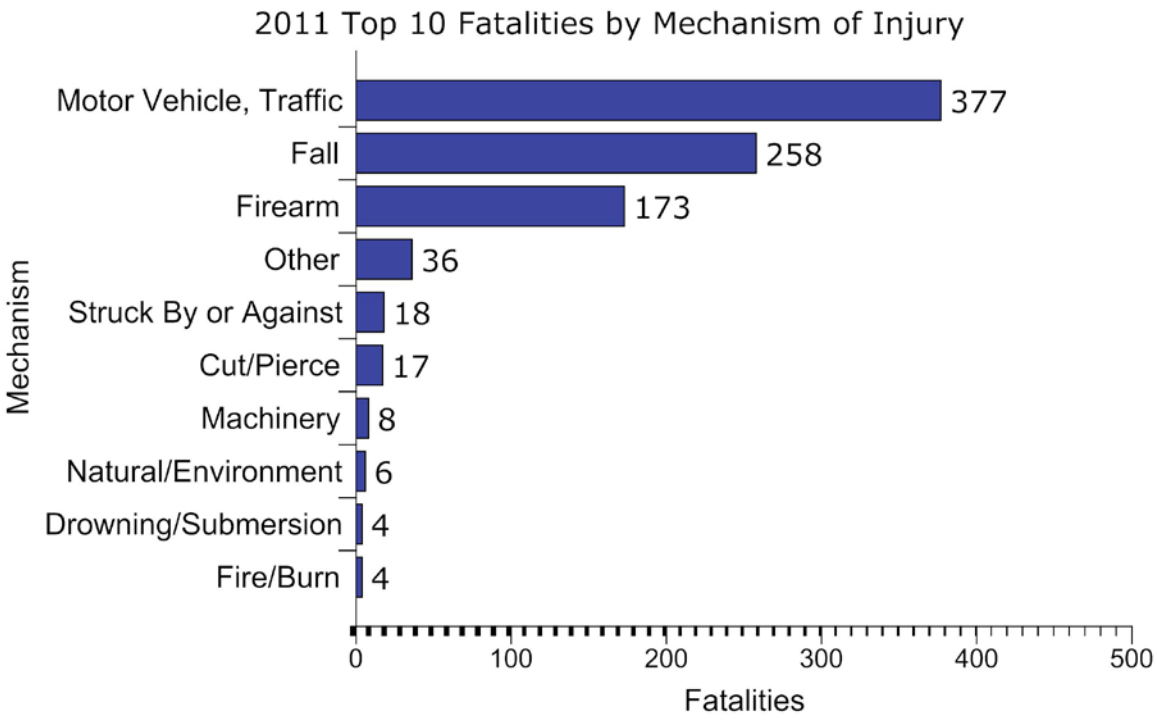

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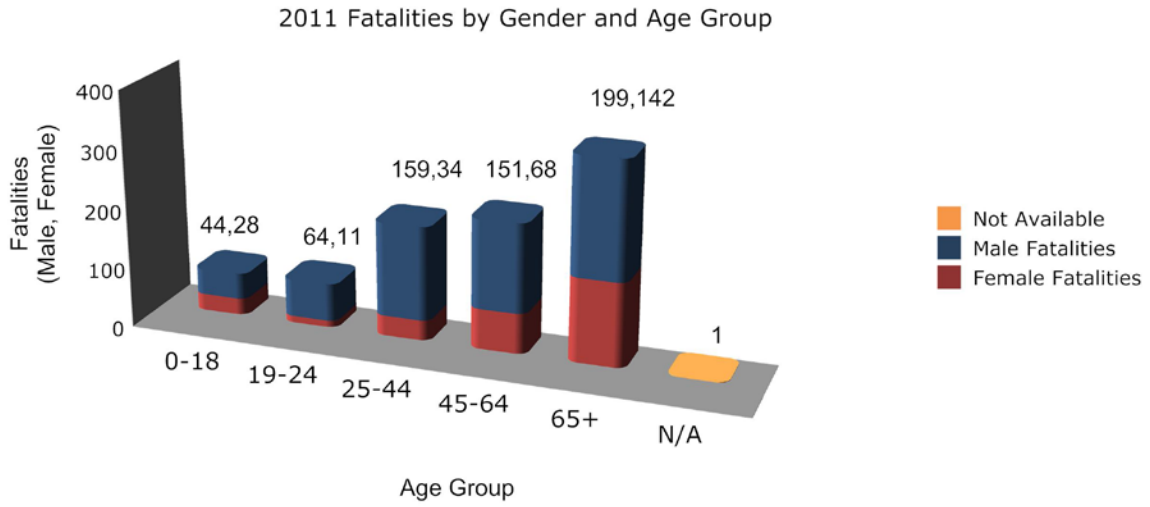

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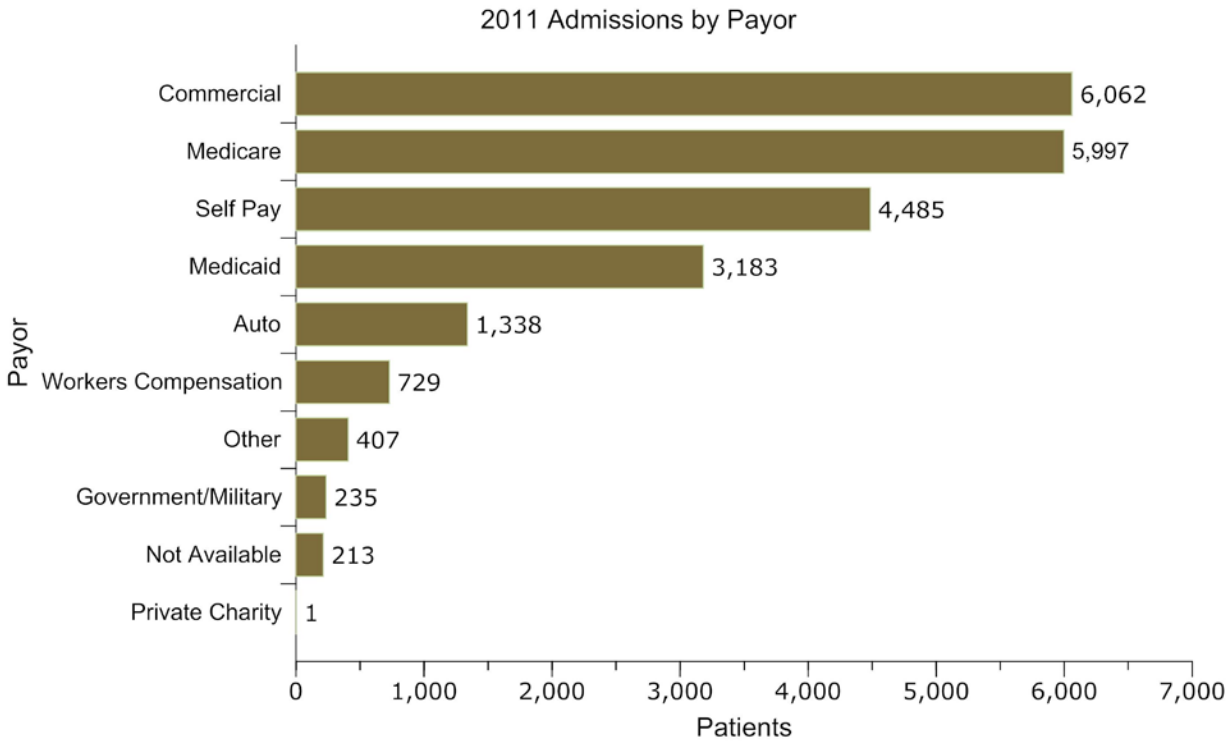

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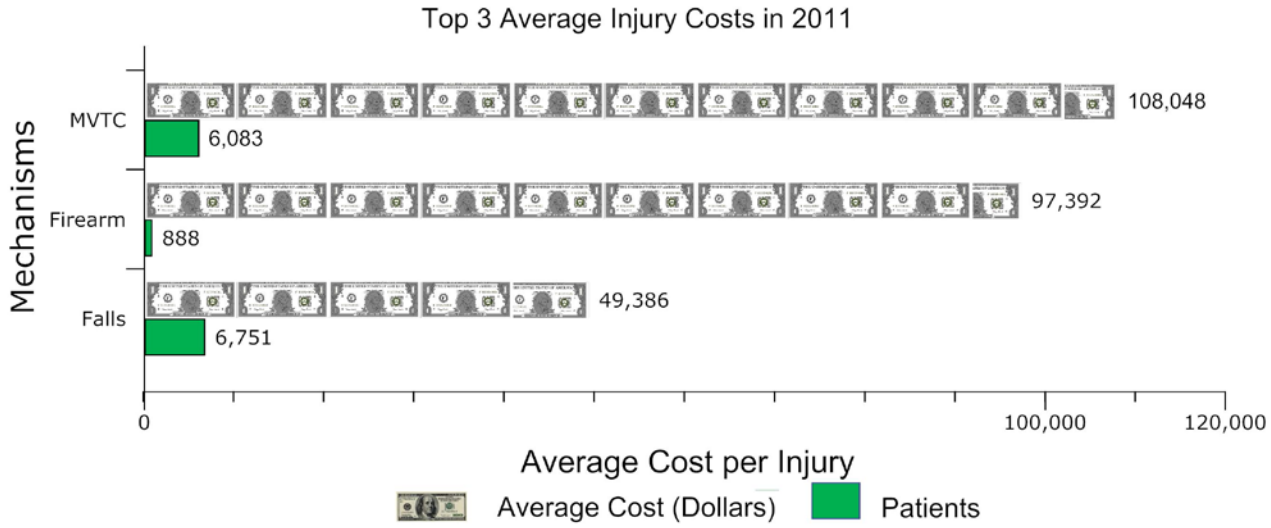
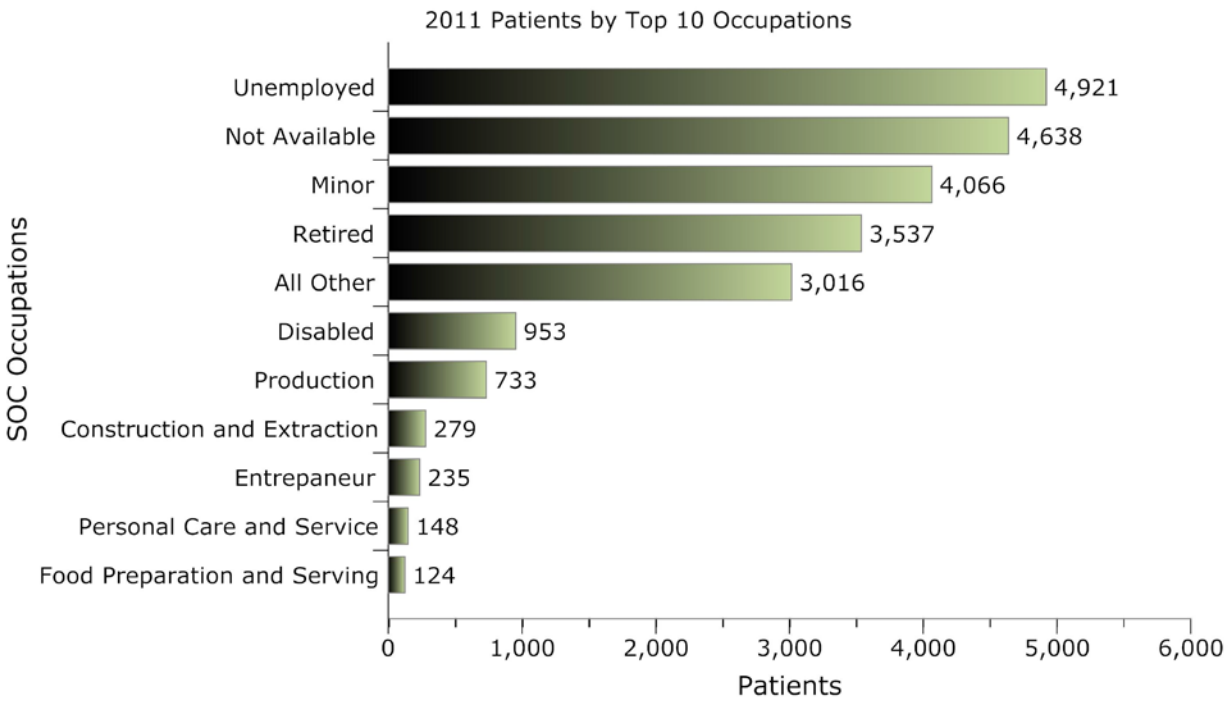


Source: 2011 Tennessee Department of Health Inpatient, Division of Health Statistics

Figure 13



Link to Bureau of U.S. Labor & Statistics SOC (Standard Occupational Class)
http://www.bls.gov/oes/2001/oes_stru.htm

Appendix III:

2012 Trauma Fund Distribution

FUNDS DISTRIBUTED TO TRAUMA CENTERS AND NON-TRAUMA CENTERS FROM TENNESSEE TRAUMA FUND - FY2012 – 1st QUARTER DISTRIBUTION

Level	Hospital Name	Hospital Specific Pool Payment	Readiness Costs	Total Hospital Distribution Payment
	TOTAL	$1,296,608.16	$835,000.00	$2,131,608.16
Lev I	Vanderbilt University Hospital	$369,144.64	$153,250.00	$522,394.64
Lev I	Regional Medical Center at Memphis	$412,052.60	$97,250.00	$509,302.60
Lev I	University of Tennessee Medical Center	$170,188.29	$102,250.00	$272,438.29
Lev I	Erlanger Health System	$88,898.76	$153,250.00	$242,148.76
Lev I	Johnson City Medical Center	$51,079.65	$72,500.00	$123,579.65
Lev I	Wellmont Holston Valley Medical Ctr.	$29,170.91	$72,500.00	$101,670.91
PED	LeBonheur Children Hospital	$5,421.06	$64,250.00	$69,671.06
PED	East Tennessee Childrens Hospital	.	$51,000.00	$51,000.00
Lev II	Wellmont Bristol Regional Med. Ctr.	$11,027.67	$37,750.00	$48,777.67
	Jackson-Madison Cnty. General Hospital	$30,604.76		$30,604.76
	Methodist University Hospital	$19,092.68		$19,092.68
Lev III	Athens Regional Medical Center	$1,876.76	$15,500.00	$17,376.76
Lev III	Blount Memorial Hospital	$1,216.55	$15,500.00	$16,716.55
	Saint Francis Hospital	$10,659.69		$10,659.69
	Baptist Memorial Hospital-Memphis	$10,153.34		$10,153.34
	Middle Tennessee Medical Center	$7,284.74		$7,284.74
	Skyline Medical Center	$5,621.72		$5,621.72
	Regional Hospital of Jackson	$5,017.69		$5,017.69
	Methodist North Hospital	$4,874.16		$4,874.16
	Sumner Regional Medical Center	$4,806.25		$4,806.25
	Mercy Medical Center St. Mary's	$4,432.21		$4,432.21
	Gateway Medical Center	$3,888.82		$3,888.82
	Cookeville Regional Medical Center	$3,667.49		$3,667.49
	Mercy Medical Center West	$3,551.12		$3,551.12
	Saint Thomas Hospital	$3,173.13		$3,173.13
	Maury Regional Medical Center	$3,161.91		$3,161.91
	NorthCrest Medical Center	$2,834.80		$2,834.80
	Henry County Medical Center	$2,795.02		$2,795.02
	Methodist Medical Center of Oak Ridge	$2,725.51		$2,725.51
	Indian Path Medical Center	$2,679.60		$2,679.60
	Southern Hills Medical Center	$2,633.18		$2,633.18
	University Medical Center	$2,626.04		$2,626.04
	Horizon Medical Center	$2,396.11		$2,396.11
	Harton Regional Medical Center	$2,019.39		$2,019.39
	Morristown-Hamblen Healthcare System	$1,940.65		$1,940.65
	Memorial Health Care System	$1,633.05		$1,633.05
	Southern Tennessee Medical Center	$1,554.69		$1,554.69
	Parkwest Medical Center	$1,423.97		$1,423.97
	Hendersonville Medical Center	$1,334.45		$1,334.45
	Summit Medical Center	$1,162.99		$1,162.99
	Parkridge Medical Center	$1,150.87		$1,150.87
	Memorial North Park Hospital	$1,117.08		$1,117.08

	Laughlin Memorial Hospital	$987.51		$987.51
	Williamson Medical Center	$887.02		$887.02
	Cumberland Medical Center	$805.72		$805.72
	Roane Medical Center	$703.12		$703.12
	Claiborne County Hospital	$687.18		$687.18
	Baptist Memorial Hospital-Union City	$443.60		$443.60

FUNDS DISTRIBUTED TO TRAUMA CENTERS AND NON-TRAUMA CENTERS FROM TENNESSEE TRAUMA FUND - FY2012 – 2nd QUARTER DISTRIBUTION

Level	Hospital Name	Hospital Specific Pool Payment	Readiness Costs	Total Hospital Distribution Payment
	TOTAL	$1,190,905.12	$835,000.00	$2,025,905.12
Lev I	Regional Medical Center at Memphis	$446,625.77	$97,250.00	$543,875.77
Lev I	Vanderbilt University Hospital	$271,968.88	$153,250.00	$425,218.88
Lev I	Erlanger Health System	$124,854.38	$153,250.00	$278,104.38
Lev I	University of Tennessee Medical Center	$127,853.95	$102,250.00	$230,103.95
Lev I	Johnson City Medical Center	$61,667.63	$72,500.00	$134,167.63
Lev I	Wellmont Holston Valley Medical Ctr.	$37,958.44	$72,500.00	$110,458.44
PED	LeBonheur Children Hospital	$3,957.30	$64,250.00	$68,207.30
PED	East Tennessee Childrens Hospital		$51,000.00	$51,000.00
Lev II	Wellmont Bristol Regional Med. Ctr.	$11,292.57	$37,750.00	$49,042.57
	Jackson-Madison Cnty. General Hospital	$18,400.89		$18,400.89
Lev III	Blount Memorial Hospital	$2,770.99	$15,500.00	$18,270.99
Lev III	Athens Regional Medical Center	$1,501.40	$15,500.00	$17,001.40
	Baptist Memorial Hospital-Memphis	$13,015.17		$13,015.17
	Methodist North Hospital	$6,628.04		$6,628.04
	Skyline Medical Center	$5,747.77		$5,747.77
	Williamson Medical Center	$5,446.37		$5,446.37
	Saint Thomas Hospital	$4,957.40		$4,957.40
	Regional Hospital of Jackson	$4,810.34		$4,810.34
	Maury Regional Medical Center	$4,458.94		$4,458.94
	Cookeville Regional Medical Center	$4,352.08		$4,352.08
	Methodist Medical Center of Oak Ridge	$4,066.69		$4,066.69
	University Medical Center	$3,289.09		$3,289.09
	Dyersburg Regional Medical Center	$3,048.50		$3,048.50
	Sumner Regional Medical Center	$2,237.58		$2,237.58
	Roane Medical Center	$2,145.31		$2,145.31
	Horizon Medical Center	$2,135.66		$2,135.66
	Henry County Medical Center	$2,007.64		$2,007.64
	Southern Hills Medical Center	$1,704.37		$1,704.37
	Harton Regional Medical Center	$1,522.66		$1,522.66
	Heritage Medical Center	$1,476.04		$1,476.04
	Summit Medical Center	$1,436.85		$1,436.85
	Sweetwater Hospital Association	$1,428.37		$1,428.37
	NorthCrest Medical Center	$1,372.92		$1,372.92
	Southern Tennessee Medical Center	$1,152.42		$1,152.42
	Cumberland Medical Center	$633.46		$633.46
	Memorial North Park Hospital	$626.89		$626.89
	LeConte Medical Center	$612.25		$612.25
	Baptist Memorial Hospital-Union City	$582.55		$582.55
	Saint Marys Jefferson Memorial Hospital	$512.55		$512.55
	Hendersonville Medical Center	$501.75		$501.75
	Skyridge Medical Center Main	$143.28		$143.28

FUNDS DISTRIBUTED TO TRAUMA CENTERS AND NON-TRAUMA CENTERS FROM TENNESSEE TRAUMA FUND - FY2012 – 3rd QUARTER DISTRIBUTION

Level	Hospital Name	Hospital Specific Pool Payment	Readiness Costs	Total Hospital Distribution Payment
	TOTAL	$1,170,321.33	$835,000.00	$2,005,321.33
Lev I	Regional Medical Center at Memphis	$440,741.45	$97,250.00	$537,991.45
Lev I	Vanderbilt University Hospital	$280,364.42	$153,250.00	$433,614.42
Lev I	University of Tennessee Medical Center	$153,644.67	$102,250.00	$255,894.67
Lev I	Erlanger Health System	$89,486.31	$153,250.00	$242,736.31
Lev I	Johnson City Medical Center	$76,260.68	$72,500.00	$148,760.68
Lev I	Wellmont Holston Valley Medical Ctr.	$34,383.40	$72,500.00	$106,883.40
PED	LeBonheur Children Hospital	$2,234.52	$64,250.00	$66,484.52
PED	East Tennessee Childrens Hospital	.	$51,000.00	$51,000.00
Lev II	Wellmont Bristol Regional Med. Ctr.	$12,785.17	$37,750.00	$50,535.17
	Jackson-Madison Cnty. General Hospital	$26,310.19		$26,310.19
Lev III	Blount Memorial Hospital	$2,410.84	$15,500.00	$17,910.84
Lev III	Athens Regional Medical Center	$218.18	$15,500.00	$15,718.18
	Summit Medical Center	$7,047.90		$7,047.90
	Baptist Memorial Hospital-Memphis	$6,772.90		$6,772.90
	University Medical Center	$5,001.38		$5,001.38
	Skyline Medical Center	$4,854.98		$4,854.98
	Southern Hills Medical Center	$3,893.43		$3,893.43
	Maury Regional Medical Center	$3,796.52		$3,796.52
	Mercy Medical Center St. Mary's	$3,624.90		$3,624.90
	Methodist North Hospital	$2,932.52		$2,932.52
	Henry County Medical Center	$2,555.97		$2,555.97
	Methodist Medical Center of Oak Ridge	$2,090.08		$2,090.08
	Williamson Medical Center	$1,895.91		$1,895.91
	Horizon Medical Center	$1,776.26		$1,776.26
	Southern Tennessee Medical Center	$1,454.48		$1,454.48
	NorthCrest Medical Center	$1,088.44		$1,088.44
	Hendersonville Medical Center	$906.20		$906.20
	Claiborne County Hospital	$831.29		$831.29
	Memorial North Park Hospital	$766.75		$766.75
	Baptist Memorial Hospital-Collierville	$191.58		$191.58

FUNDS DISTRIBUTED TO TRAUMA CENTERS AND NON-TRAUMA CENTERS FROM TENNESSEE TRAUMA FUND - FY2012 – 3rd QUARTER DISTRIBUTION				
Level	Hospital Name	Hospital Specific Pool Payment	Readiness Costs	Total Hospital Distribution Payment
	TOTAL	$1,330,297.96	$835,000.00	$2,165,297.96
Lev I	Regional Medical Center at Memphis	$520,083.59	$97,250.00	$617,333.59
Lev I	Vanderbilt University Hospital	$382,238.89	$153,250.00	$535,488.89
Lev I	Erlanger Health System	$114,178.49	$153,250.00	$267,428.49
Lev I	University of Tennessee Medical Center	$116,665.43	$102,250.00	$218,915.43
Lev I	Johnson City Medical Center	$85,219.95	$72,500.00	$157,719.95
Lev I	Wellmont Holston Valley Medical Ctr.	$28,904.65	$72,500.00	$101,404.65
PED	LeBonheur Children Hospital	$5,737.18	$64,250.00	$69,987.18
PED	East Tennessee Childrens Hospital	.	$51,000.00	$51,000.00
Lev II	Wellmont Bristol Regional Med. Ctr.	$8,161.61	$37,750.00	$45,911.61
Lev III	Blount Memorial Hospital	$3,949.35	$15,500.00	$19,449.35
	Jackson-Madison Cnty. General Hospital	$17,658.00		$17,658.00
Lev III	Athens Regional Medical Center	$601.71	$15,500.00	$16,101.71
	Maury Regional Medical Center	$5,789.94		$5,789.94
	Southern Hills Medical Center	$4,955.25		$4,955.25
	Mercy Medical Center St. Mary's	$4,951.03		$4,951.03
	Parkwest Medical Center	$4,928.19		$4,928.19
	Skyline Medical Center	$3,986.97		$3,986.97
	Williamson Medical Center	$2,831.90		$2,831.90
	Summit Medical Center	$2,710.48		$2,710.48
	Henry County Medical Center	$2,658.09		$2,658.09
	Heritage Medical Center	$2,487.12		$2,487.12
	Southern Tennessee Medical Center	$2,480.73		$2,480.73
	University Medical Center	$2,028.13		$2,028.13
	Baptist Memorial Hospital-Huntingdon	$1,799.25		$1,799.25
	Methodist Medical Center of Oak Ridge	$1,793.91		$1,793.91
	Horizon Medical Center	$1,737.36		$1,737.36
	Baptist Memorial Hospital-Collierville	$883.79		$883.79
	Lakeway Regional Hospital	$664.97		$664.97
	Claiborne County Hospital	$211.99		$211.99

	Fiscal Year	Trauma Fund Disbursement Totals
*Start of Trauma Fund	**FY2008**	$9,086,822.57
	FY2009	$9,192,013.69
	FY2010	$8,973,548.13
	FY2011	$8,762,345.31
	FY2012	$8,328,132.57

$758,690 below initial disbursement when trauma fund started

Appendix IV:

Research Publications

1: Sharpe JP, Magnotti LJ, Weinberg JA, Zarzaur BL, Shahan CP, Parks NA, Fabian TC, Croce MA. Impact of location on outcome after penetrating colon injuries. J Trauma Acute Care Surg. 2012 Dec;73(6):1426-31. doi:10.1097/TA.0b013e31825bff06.

2: Sharpe JP, Magnotti LJ, Weinberg JA, Zarzaur BL, Shahan CP, Parks NA, Fabian TC, Croce MA. Impact of location on outcome after penetrating colon injuries. J Trauma Acute Care Surg. 2012 Dec;73(6):1426-31. doi:10.1097/TA.0b013e31825bff06. PubMed PMID: 22914082.

3: Dickerson RN, Medling TL, Smith AC, Maish GO 3rd, Croce MA, Minard G, Brown RO. Hypocaloric, High-Protein Nutrition Therapy in Older vs Younger Critically Ill Patients With Obesity. JPEN J Parenter Enteral Nutr. 2012 Nov 20. [Epub ahead of print] PubMed PMID: 23169899.

4: Wells DL, Swanson JM, Wood GC, Magnotti LJ, Boucher BA, Croce MA, Harrison CG, Muhlbauer MS, Fabian TC. The relationship between serum sodium and intracranial pressure when using hypertonic saline to target mild hypernatremia in patients with head trauma. Crit Care. 2012 Oct 15;16(5):R193. [Epub ahead of print] PubMed PMID: 23068293.

5: Dickerson RN, Johnson JL, Maish GO 3rd, Minard G, Brown RO. Evaluation of nursing adherence to a paper-based graduated continuous intravenous regular human insulin infusion algorithm. Nutrition. 2012 Oct;28(10):1008-11. doi: 10.1016/j.nut.2012.01.010. Epub 2012 May 31. PubMed PMID: 22658642.

6: Stapley R, Owusu BY, Brandon A, Cusick M, Rodriguez C, Marques MB, Kerby JD, Barnum SR, Weinberg JA, Lancaster JR Jr, Patel RP. Erythrocyte storage increases rates of NO and nitrite scavenging: implications for transfusion-related toxicity. Biochem J. 2012 Sep 15;446(3):499-508. doi:10.1042/BJ20120675. PubMed PMID: 22720637.

7: Dickerson RN, Pitts SL, Maish GO 3rd, Schroeppel TJ, Magnotti LJ, Croce MA, Minard G, Brown RO. A reappraisal of nitrogen requirements for patients with critical illness and trauma. J Trauma Acute Care Surg. 2012 Sep;73(3):549-57. PubMed PMID: 23007014.

8: Dickerson RN, Wilson VC, Maish GO 3rd, Croce MA, Minard G, Brown RO. Transitional NPH Insulin Therapy for Critically Ill Patients Receiving Continuous Enteral Nutrition and Intravenous Regular Human Insulin. JPEN J Parenter Enteral Nutr. 2012 Aug 22. [Epub ahead of print] PubMed PMID: 22914894.

9: Parks NA, Croce MA. Routine screening for methicillin-resistant Staphylococcus aureus. Surg Infect (Larchmt). 2012 Aug;13(4):223-7. doi: 10.1089/sur.2012.130. Epub 2012 Aug 22. PubMed PMID: 22913747.

10: Parks NA, Magnotti LJ, Weinberg JA, Zarzaur BL, Schroeppel TJ, Swanson JM, Fabian TC, Croce MA. Use of the clinical pulmonary infection score to guide therapy for ventilator-associated pneumonia risks antibiotic overexposure in patients with trauma. J Trauma Acute Care Surg. 2012 Jul;73(1):52-8; discussion 58-9. PubMed PMID: 22743372.

11: Sharpe JP, Weinberg JA, Magnotti LJ, Maclennan PA, Schroeppel TJ, Fabian TC, Croce MA. Accounting for differences in transfusion volume: Are all massive transfusions created equal? J Trauma Acute Care Surg. 2012 Jun;72(6):1536-40. PubMed PMID: 22695418.

12: Hamilton LA, Christopher Wood G, Magnotti LJ, Croce MA, Martin JB, Swanson JM, Boucher BA, Fabian TC. Treatment of methicillin-resistant Staphylococcus aureus ventilator-associated pneumonia with high-dose vancomycin or linezolid. J Trauma Acute Care Surg. 2012 Jun;72(6):1478-83. PubMed PMID: 22695410.

13: Luchette FA, Pasquale MD, Fabian TC, Langholff WK, Wolfson M. A randomized, double-blind, placebo-controlled study to assess the effect of recombinant human erythropoietin on functional outcomes in anemic, critically ill, trauma subjects: the Long Term Trauma Outcomes Study. Am J Surg. 2012 Apr;203(4):508-16. Epub 2011 Dec 15. PubMed PMID: 22177550.

14: Rabbi JF, Valaulikar G, Appling NA, Bee TK, Ostrow BF, Weiman DS. Secondary abdominal compartment syndrome causing failure to wean from cardiopulmonary bypass. Ann Thorac Surg. 2012 Apr;93(4):e99-100. PubMed PMID: 22450114.

15: Sharpe JP, Magnotti LJ, Weinberg JA, Parks NA, Maish GO, Shahan CP, Fabian TC, Croce MA. Adherence to a simplified management algorithm reduces morbidity and mortality after penetrating colon injuries: a 15-year experience. J Am Coll Surg. 2012 Apr;214(4):591-7; discussion 597-8. doi: 10.1016/j.jamcollsurg.2011.12.029. Epub 2012 Feb 8. PubMed PMID: 22321522.

16: Weinberg JA, MacLennan PA, Vandromme-Cusick MJ, Angotti JM, Magnotti LJ, Kerby JD, Rue LW 3rd, Barnum SR, Patel RP. Microvascular response to red blood cell transfusion in trauma patients. Shock. 2012 Mar;37(3):276-81. PubMed PMID: 22344313.

17: Parks NA, Croce MA. Use of computed tomography in the emergency room to evaluate blunt cerebrovascular injury. Adv Surg. 2012;46:205-17. Review. PubMed PMID: 22873041.

18: Sharpe JP, Magnotti LJ, Weinberg JA, Zarzaur BL, Stickley SM, Scott SE, Fabian TC, Croce MA. Impact of a defined management algorithm on outcome after

traumatic pancreatic injury. J Trauma Acute Care Surg. 2012 Jan;72(1):100-5. PubMed PMID: 22310122.

19: Zarzaur BL, Croce MA, Fabian TC. Play or pay: a financial model for trauma care in a regional trauma system. J Trauma Acute Care Surg. 2012 Jan;72(1):78-83; discussion 83-5. PubMed PMID: 22310119.

20: Swanson JM, Wood GC, Xu L, Tang LE, Meibohm B, Homayouni R, Croce MA, Fabian TC. Developing a gene expression model for predicting ventilator-associated pneumonia in trauma patients: a pilot study. PLoS One. 2012;7(8):e42065. doi: 10.1371/journal.pone.0042065. Epub 2012 Aug 15. PubMed PMID: 22916119; PubMed Central PMCID: PMC3419717.

21: DiCocco JM, Fabian TC, Emmett KP, Magnotti LJ, Goldberg SP, Croce MA. Components separation for abdominal wall reconstruction: the Memphis modification. Surgery. 2012 Jan;151(1):118-25. Epub 2011 Sep 22. PubMed PMID: 21943637.

22: Timmons SD, Bee T, Webb S, Diaz-Arrastia RR, Hesdorffer D. Using the abbreviated injury severity and Glasgow Coma Scale scores to predict 2-week mortality after traumatic brain injury. J Trauma. 2011 Nov;71(5):1172-8. PubMed PMID: 22071922.

23: Dickerson RN, Maish GO 3rd, Minard G, Brown RO. Clinical relevancy of the levothyroxine-continuous enteral nutrition interaction. Nutr Clin Pract. 2010 Dec;25(6):646-52. PubMed PMID: 21139130.

24: Kasper SO, Phillips EE, Castle SM., Daley BJ, Enderson BL and Karlstad MD. “Blockade of the Renin-Angiotensin System Improves Insulin Receptor Signaling and Insulin-Stimulated Skeletal Muscle Glucose Transport in Burn Injury” Shock. 35(1):80-85, 2011. doi: 10.1097/SHK.0b013e3181e762da

25: Lawson CM, Daley BJ, Ormsby CB and Enderson BL. “Missed Injuries in the Era of the Trauma Scan” Journal of Trauma 70:452-458, 2011. DOI: 10.1097/TA.0b013e3182028d71

26: EA Black, CM Lawson, S Smith and BJ Daley. “Open Pelvic Fractures: The University of Tennessee Medical Center at Knoxville Experience over Ten Years.” Iowa Orthopaedic Journal, 31:193-198, 2011.

27: BL Enderson and BJ Daley. “A Model to Increase Trauma Reimbursement in the Private Practice Environment.” Journal of Trauma 71:347 -351, 2011 DOI: 10.1097/TA.0b013e318220d746

28: CM Lawson, AM Alexander, BJ Daley and BL Enderson. “Evolution of a Level I Trauma System: changes in injury mechanism and its impact in the delivery of care.” International Journal of Burn Trauma 1(1):56-61, 2011. www.IJBT.org /ISSN: 2160-

2126/IJBT1107002 Epub September 3, 2011; published September 30, 2011

29: Alterman DM, Jones TM, Heidel RE, Daley BJ, Goldman MH. “The predictive value of general surgery application data for future resident performance.” Journal of Surgical Education. Nov;68(6):513-8, 2011 PMID:22000538

30: Daley BJ. Editorial Critique of “Estrogen Modulation of Pneumonia? An Immunoglobulin A Effect.” by Ali AA, Diebel LN and Liberati DM. J Trauma Acute Care Surg 2012 72:915.

31: Sams VG, Lawson CM, Coan P, Bemis D, Newkirk K, Karlstad M, Norwood J, Barlow P, Goldman MH, Daley BJ. “ Effect of local anesthetic on microorganisms in a murine model of surgical site infection.” J Trauma Acute Care Surg. 2012 Aug;73(2):441-6. PMID:22846953

32: Sams VG, Lawson CM, Humphrey CL, Brantley SL, Schumacher LM, Karlstad MD, Norwood JE, Jungwirth JA, Conley CP, Kurek S, Barlow PB and Daley BJ. “Effect of Rotational Therapy on Aspiration Risk of Enteral Feeds” Nutr Clin Pract 2012 27(6):808 - 811.epublished 19 October 2012, DOI:10.1177/0884533612462

33: Testerman GM, Hensley SA. The history of neurosurgery in Kingsport, Tennessee.Tenn Med. 2012 Oct;105(9):41-2. No abstract available. PMID: 23097959

34: Testerman GM, Easparam SA. Dr. Louis G. Britt, University of Tennessee Center for the Health Sciences surgical educator and mentor.Am Surg. 2012 May;78(5):511-3. No abstract available. PMID: 22546119

35: Testerman GM, Osborne JB, Easparam SA. Endoscopic clipping of bleeding ascending colon dieulafoy lesion.Am Surg. 2012 Feb; 78(2):68-9. No abstract available. PMID: 22369798

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37: Testerman GM, Sheffey JE. A novel frontier method of treating scalping injuries.Am Surg. 2011 Aug; 77(8):1106-7. No abstract available. PMID: 21944538

38: Testerman GM, Harris RM, West M, Easparam S 3rd. Full-time orthopedic traumatologists enhance rural trauma center pelvic fracture outcomes and financials.Am Surg. 2011 Jun;77(6):716-9.PMID: 21679639

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40: Hina M, Hunt DJ, Stanley JD, Dart BW 4th. Pellet venous embolism from a

destructive shotgun injury. Am Surg. 2011 Aug;77(8):E162-3. PubMed PMID: 21944501.

41: Dowden JE, Maxwell RA. Isolated traumatic shoulder disarticulation after a motor vehicle collision. Am Surg. 2012 Jun;78(6):E318-9. PubMed PMID: 22643248.

42: Thomas BW, Dart BW, Maxwell RA. Split down the middle: a functional survivor of complete traumatic hemipelvectomy. J Trauma Acute Care Surg. 2012 Apr;72(4):E117. PubMed PMID: 22491652.

43: Thomas BW, Maxwell RA, Dart BW, Hartmann EH, Bates DL, Mejia VA, Smith PW, Barker DE. Errors in administrative-reported ventilator-associated pneumonia rates: are never events really so? Am Surg. 2011 Aug;77(8):998-1002. PubMed PMID: 21944513.

44: Hartmann EH, Creel N, Lepard J, Maxwell RA. Mass casualty following unprecedented tornadic events in the Southeast: natural disaster outcomes at a Level I trauma center. Am Surg. 2012 Jul;78(7):770-3.

45: Guillamondegui OD, Richards JE, Ely EW et al. Does hypoxia affect intensive care unit delirium or long-term cognitive impairment after multiple trauma without intracranial hemorrhage? J Trauma 2011; 70:910-915.

46: Meyer NJ, Li M, Feng R et al. ANGPT2 Genetic Variant Is Associated with Trauma-associated Acute Lung Injury and Altered Plasma Angiopoietin-2 Isoform Ratio. Am J Respir Crit Care Med 2011; 183:1344-1353.

47: Mowery NT, Morris JA, Jr., Jenkins JM et al. Core temperature variation is associated with heart rate variability independent of cardiac index: A study of 278 trauma patients. J Crit Care 2011.

48: Ott MM, Norris PR, Diaz JJ et al. Colon anastomosis after damage control laparotomy: recommendations from 174 trauma colectomies. J Trauma 2011; 70:595-602.

49: Guillamondegui OD, Gunter OL, Hines L et al. Using the National Surgical Quality Improvement Program and the Tennessee Surgical Quality Collaborative to improve surgical outcomes. J Am Coll Surg 2012; 214:709-714.

50: Diaz JJ, Jr., Norris PR, Gunter OL et al. Does regionalization of acute care surgery decrease mortality? J Trauma 2011; 71:442-446.

51: Diaz JJ, Jr., Dutton WD, Ott MM et al. Eastern Association for the Surgery of Trauma: a review of the management of the open abdomen--part 2 "Management of the open abdomen". J Trauma 2011; 71:502-512.

52: Dutton WD, Diaz JJ, Jr., Miller RS. Critical Care Issues in Managing Complex Open Abdominal Wound. J Intensive Care Med 2011.

53: Richards JE, Guillamondegui OD, Archer KR et al. The association of reamed intramedullary nailing and long-term cognitive impairment. J Orthop Trauma 2011; 25:707-713.

54: Adams RC, Gunter OL, Wisler JR et al. Dynamic changes in respiratory frequency/tidal volume may predict failures of ventilatory liberation in patients on prolonged mechanical ventilation and normal preliberation respiratory frequency/tidal volume values. Am Surg 2012; 78:69-73.

55: Bechtel BF, Nunez TC, Lyon JA et al. Treatments for reversing warfarin anticoagulation in patients with acute intracranial hemorrhage: a structured literature review. Int J Emerg Med 2011; 4:40.

56: Bonatti HJ, Colon N, Ott M et al. Trimethoprim-associated hyperkalemia in a young trauma victim. Surg Infect (Larchmt) 2011; 12:419-420.

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