

Trauma Care Advisory Council

# Trauma Care in Tennessee

2020 Report to the 112<sup>th</sup> General Assembly

Tennessee Department of Health

Trauma Care Advisory Council

May 6, 2021

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STATE OF TENNESSEE  
DEPARTMENT OF HEALTH  
DIVISION OF HEALTH LICENSURE AND REGULATION  
**TRAUMA CARE ADVISORY COUNCIL**  
665 MAINSTREAM DRIVE  
NASHVILLE, TN 37243

May 6, 2021

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 implemented in 1990 advises the Board for Licensing Health Care Facilities and the Emergency Medical Services (EMS) Board about the 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 but limited financial resources to support and maintain Tennessee's statewide Trauma System.

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

Respectfully Submitted,

Brian J. Daley, MD, MBA, FACS  
Professor of Surgery, UTHSC- Knoxville  
University of Tennessee Medical Center at Knoxville  
Chair, Trauma Care Advisory Council  
Chair, Tennessee Committee on Trauma

## **2020 EXECUTIVE SUMMARY**

Over calendar year 2019, 39,169 patients received care in a state designated trauma center or a Comprehensive Regional Pediatric Center (CRPC) due to a trauma-related injury. The total number of patients managed in centers designed to improve the care of the injured has risen by approximately 3400 patients over previous years (35,712). The effect of the care to these patients in these institutions has been to reduce potential years of life lost, to return as close to pre-injury health and to increase the return to family, work, and community.

Along with managing patients affected by trauma, a mandate of every trauma center is outreach and prevention. Raising awareness around both pediatric and adult causes of trauma from teen suicide and seatbelt use, to helmet use, along with fall prevention in the elderly has been paramount for the Trauma Care Advisory Council (TCAC) with the help of the Tennessee Committee on Trauma and other state agencies. Most importantly, though, is the maintenance of trauma center excellence to ensure optimal care of the injured. Our trauma centers provided care for Tennesseans from every county in the state, as well as patients from nearly every state in the continental US.

The Trauma Care Advisory Council (TCAC) was established in 1990 to advise the Office of Health Care Facilities regarding trauma care policy and regulation. Currently, Tennessee has 5 Level I trauma centers, 2 Level II centers, 6 level III centers, and 1 provisional Level III center, for 14 total adult centers. There are an associated 4 CRPC's, two of which have been verified by the ACS as Level 1 Pediatric Trauma Centers (LeBonheur in Memphis and Monroe Carrell in Nashville) treating those injured under the age of 16. In 2019, the updated trauma center rules to include the verification process of the American College of Surgeons Committee on Trauma to assess the programs at the highest national standard for trauma care as well as designation guidelines was passed. TCAC has also provided support to the Council on Pediatric Emergency Care (CoPEC) to update the rules for pediatric trauma.

There is an ongoing epidemic across Tennessee (and the nation) with elderly ground level falls as the number one cause of trauma admission and mortality. The admissions and death rates continue to climb as our population ages, accounting for greater than 50% of admissions in several trauma centers. Unfortunately, motor vehicle crashes (MVCs) remain lethal and are the second highest cause fatality rate in the state. Gun-related suicide deaths continues to overshadow homicides at a rate of 2 to 1 at both the state and national level.

This report provides information on injury patterns across the state, referral patterns, and financial statistics. Other key aspects of this report include Injury Prevention actions and statewide research efforts. It is the goal of the TCAC to target future outreach and prevention activities through 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 research. Such efforts consist of outreach to nursing homes and specific communities to educate the elderly on fall risk, “Battle of the Belts” for high school student awareness of seatbelt use and motorcycle and ATV safety education. The latest initiative that has been rolled out by all trauma centers and will be the focus of May 21, 2020 is the ‘Stop the Bleed’ campaign- a simple method to ensure as many first responders, bystanders and others are prepared in any situation to stop active hemorrhage in a trauma patient. So far, the efforts of the trauma programs have led to educating over 5000 individuals across the state. This includes school nurses, first responders and many members of the legislature and state offices.

This report also reflects the ongoing effort of the Trauma Centers as dedicated to caring for the injured patient. As the number of trauma patients continues to increase in the state, we believe the efforts of the trauma council are important to maintain and improve the outcomes of our citizens across the entire state. We are aware that there are areas of the state that remain outside the contiguous counties of the major metropolitan areas that are not within easy reach of a designated trauma center. We continue to advocate for a formal universal system to designate all hospital centers as Level I, II, III or IV, ensuring not only the capture of all injured patients data but rendering and maintaining the highest possible level of trauma care for all Tennesseans. This would require additional state dedicated funding to preserve the infrastructure of many of the smaller, rural hospitals to support a complete trauma system.

With your ongoing support and endorsement, we can continue with our mission of providing the highest level of care, injury prevention, education, and research to minimize the death and disability occurring because of injury across the state of Tennessee. In my first year chairing the TCAC and TN Committee on Trauma, and working alongside Rob Seesholtz and other members of the state team, and it has rewarding to see the dedication and diligence of my fellow Tennesseans to the care of the injured.

Brian J. Daley, MD, MBA, FACS  
Chair, Trauma Care Advisory Council  
Chair, Tennessee Committee on Trauma

## **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:

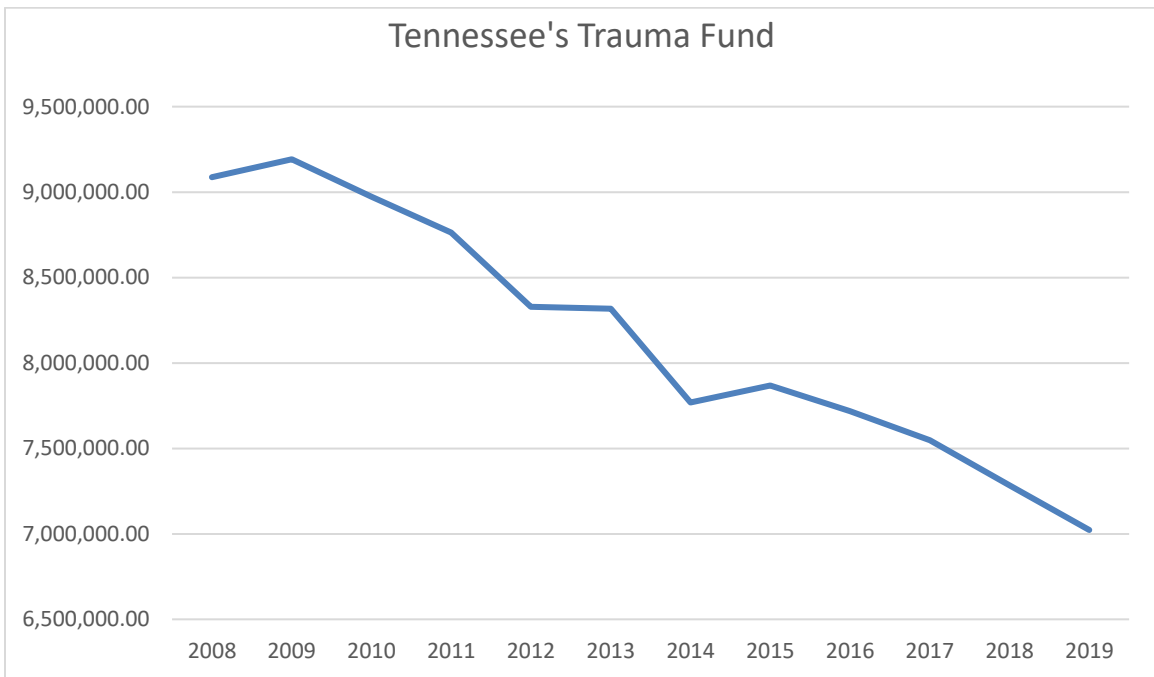
1. Money to support the **trauma system infrastructure** at the state level:
  - The State Trauma System Manager is responsible for providing general oversight for Tennessee's Trauma Care System. Responsibilities include oversight of Tennessee's trauma fund, trauma registry, administrative support to the Trauma Care Advisory Council, and the coordination of site visits for new and existing trauma centers. In addition, trauma system infrastructure has been bolstered as monies were approved by the Trauma Care Advisory Council for the expenditure on trauma education, trauma registry improvements and a state-wide trauma symposium.
2. **Readiness costs** to designated trauma centers and comprehensive regional pediatric centers:
  - Tennessee trauma centers and CRPC's are ready at a moment's notice to treat those suffering from traumatic injury and are required to maintain life critical services 24 hours a day, 7 days a week, 365 days a year. While readiness costs disbursed from the trauma fund cannot realistically compensate centers for all of their costs, readiness funds help to ensure that these necessary life critical services are maintained. Readiness cost amounts for state designated trauma centers and CRPC's may be found in **appendix III**.
3. Money for **uncompensated care**:
  - The trauma funding 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.
  - 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 2019, trauma fund disbursements totaled \$7,022,767.11 to eligible facilities. **Appendix III** shows quarterly payments made to eligible hospitals for calendar year 2019.

Trauma Fund disbursement totals have seen a steady decline since the funds inception. Since then, the trauma fund has decreased over \$2,000,000.00 dollars making finding alternative sources of funding a priority to ensure the viability of Tennessee's Trauma System.

### Trauma Fund Disbursement Totals Since Inception

	Calendar Year	Trauma Fund Disbursement Totals
*Start of Trauma Fund	<b>2008</b>	\$9,086,822.57
	<b>2009</b>	\$9,192,013.69
	<b>2010</b>	\$8,973,548.13
	<b>2011</b>	\$8,762,345.31
	<b>2012</b>	\$8,328,132.57
	<b>2013</b>	\$8,316,610.13
	<b>2014</b>	\$7,768,758.15
	<b>2015</b>	\$7,867,741.77
	<b>2016</b>	\$7,717,970.86
	<b>2017</b>	\$7,548,708.50
	<b>2018</b>	\$7,283,384.96
	<b>2019</b>	\$7,022,767.11

**\$2,064,055.46 below initial disbursement when trauma fund started**





## TRAUMA REGISTRY

The Tennessee Trauma Registry is the data repository for patients presenting for care at Tennessee's 14 participating trauma centers and 4 CRPC's. A new patient registry has recently been implemented which allows for a more in-depth review of injury related codes in addition to comorbidities and complications to better determine the consequences of trauma in Tennessee. This report is based on patient abstractions completed through 2019. The registry reports represents views of the injuries sustained and related hospital admissions in 2019 with additional volume trend reporting that includes the 9 years prior.

## RESEARCH

Level 1 trauma centers are charged with performing research. These endeavors allow ongoing improvements in care on a continuous basis. **Appendix IV** represents a sample of these state-wide research publication efforts.

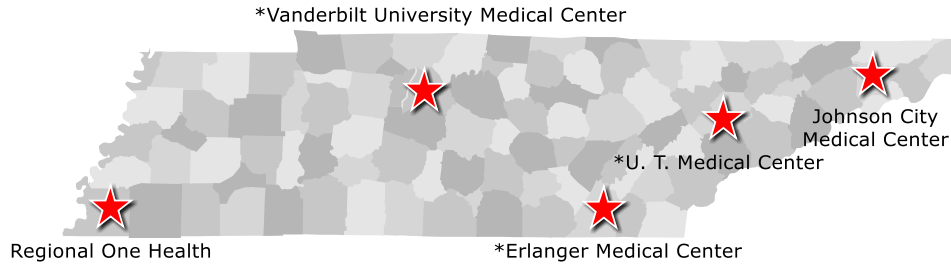
## OUTREACH & INJURY PREVENTION EFFORTS

Tennessee's trauma centers and CRPC's provide many different outreach and injury prevention opportunities for both the public and for those who are responsible for the specialized care of injured Tennesseans and visitors in our state. These outreach and injury prevention efforts are in part targeted to injury trends seen by trauma centers and CRPC's with the ultimate goal of reducing the incidence of traumatic injury through targeted outreach and education.



Appendix I:  
Current Trauma Center Location & Level of Designation

**Level I Tennessee Trauma Centers**

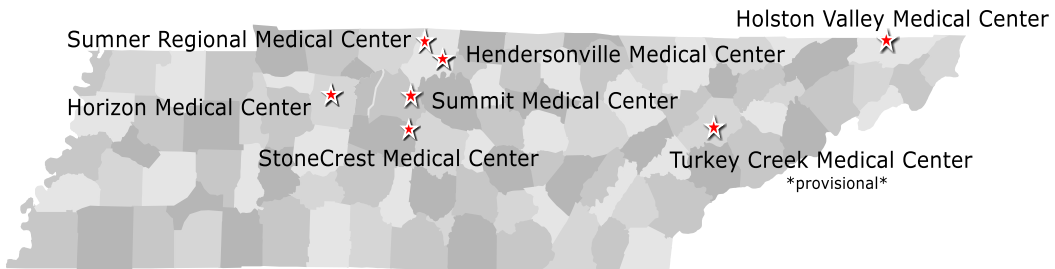


In addition to state designation "\*" indicates verification as an American College of Surgeons Trauma Center

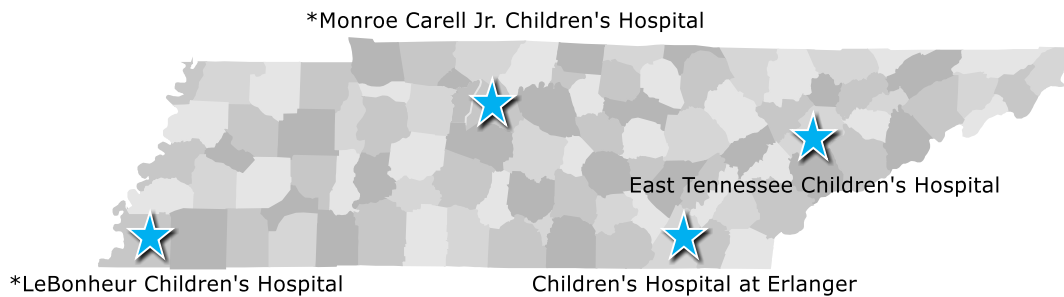
**Level II Tennessee Trauma Centers**



**Level III Tennessee Trauma Centers**



**Comprehensive Regional Pediatric Centers**

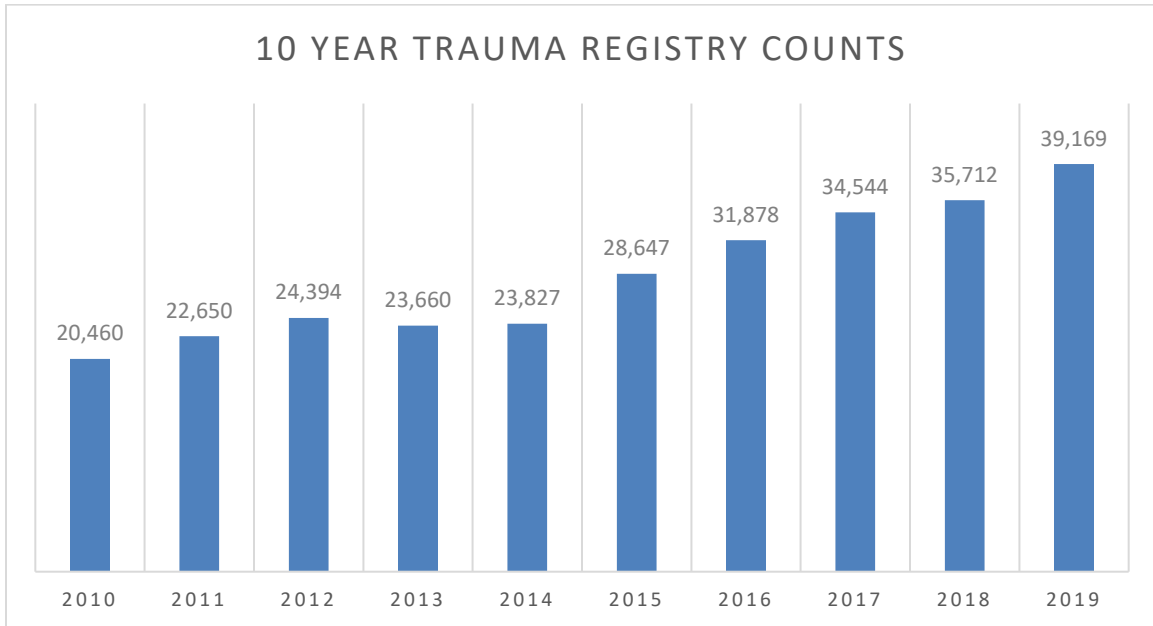


\*Indicates verification as an American College of Surgeons Pediatric Trauma Center

Appendix II:  
2019 Trauma Registry Reports

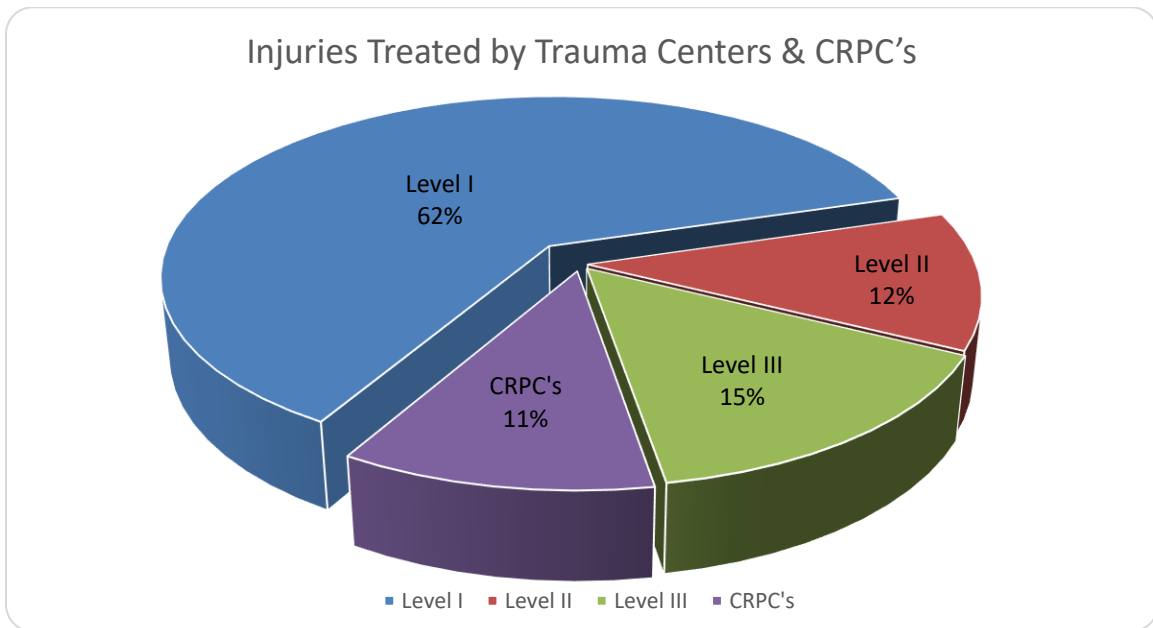
Figure	1a: 10 year trauma registry counts 2010 - 2019.....	12
	1b: Injury Distribution by Facility Level	
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	6b: Patient Counts by Emergency Department Disposition	
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	7b: Fatalities by Age Group	

Figure 1a:



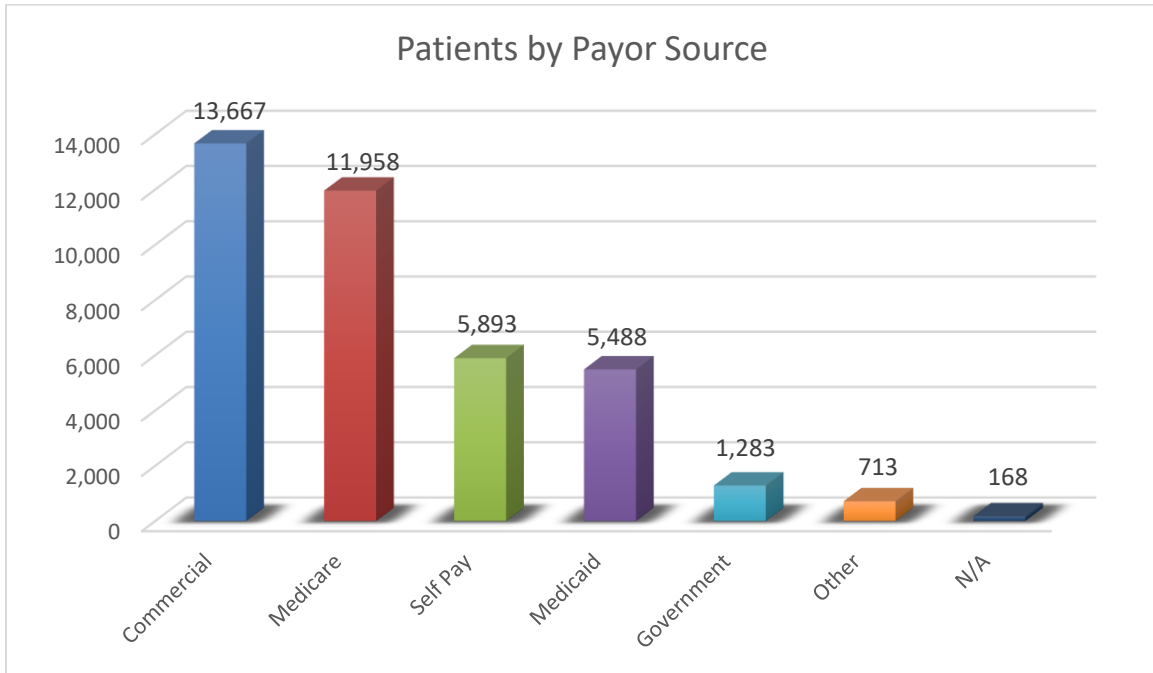
In 2019, 39,169 patients were entered in the state trauma registry as a result of meeting inclusion criteria related to traumatic injury. The overall growth pattern of patient totals recorded in the registry since 2010 is shown above.

Figure 1b:



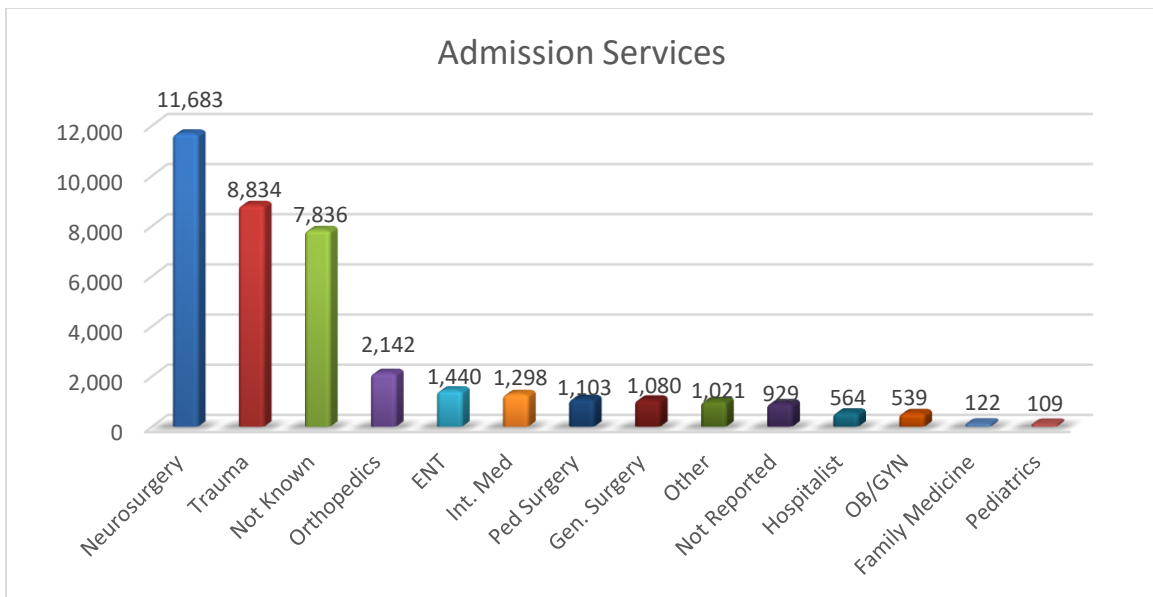
As might be expected, over two thirds of all trauma patients for 2019 were treated at a Level 1 trauma center.

Figure 2a:



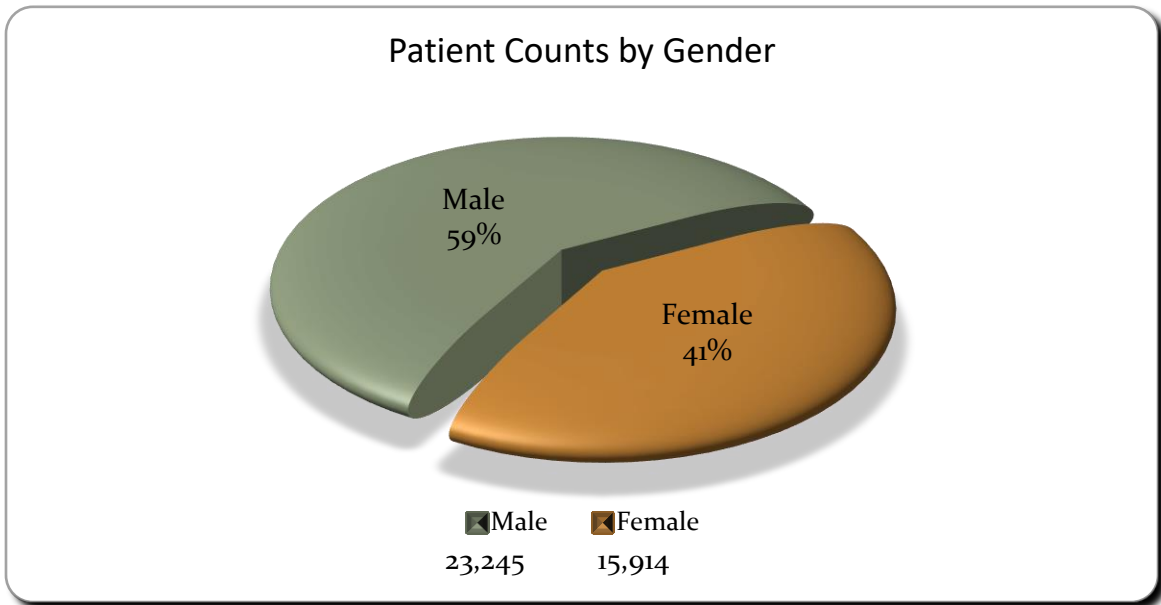
Commercial Insurance is currently the number one payor source for those receiving treatment at a trauma center or CRPC in 2019.

Figure 2b:



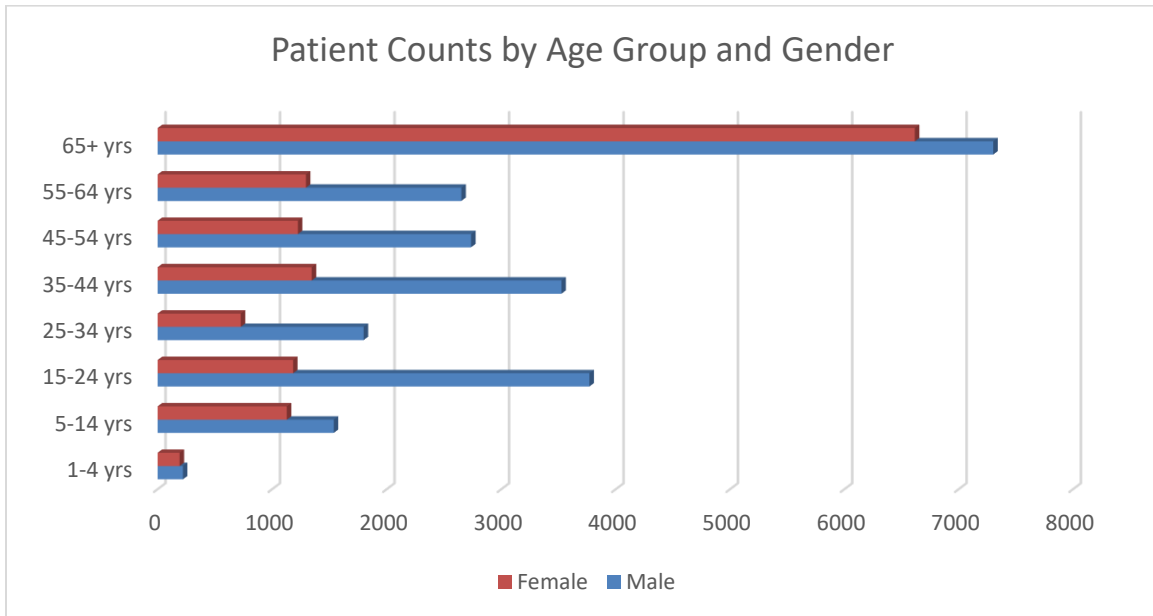
The graph above reflects the surgical/medical admission services when being admitted for a traumatic injury.

Figure 3a:



59% of all patients treated at a Tennessee trauma center or CRPC were male. This 2019 data reflects no change in the injury gender distribution from 2018.

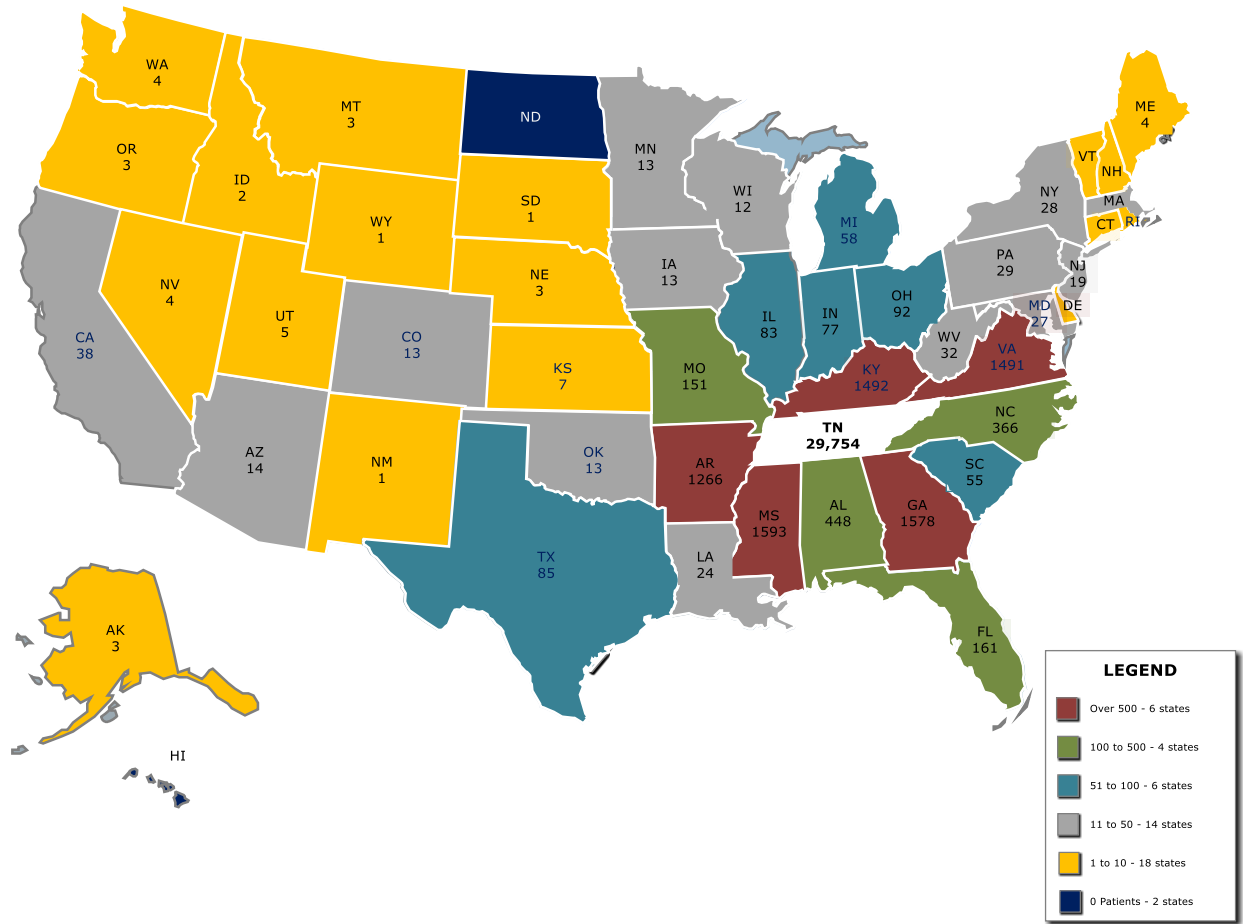
Figure 3b



The information above is reflective of traumatic injury patient counts by age and gender.

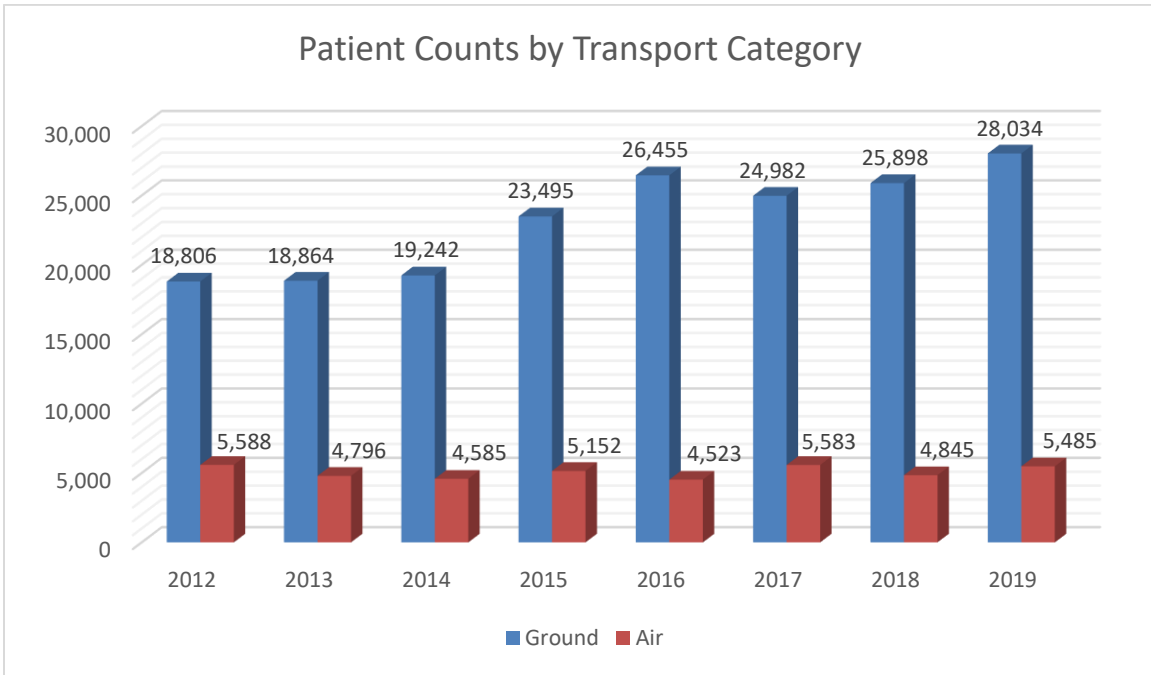
Figure 4:

Trauma Patients Treated in Tennessee Trauma Centers and CRPC's by State of Residence in 2019



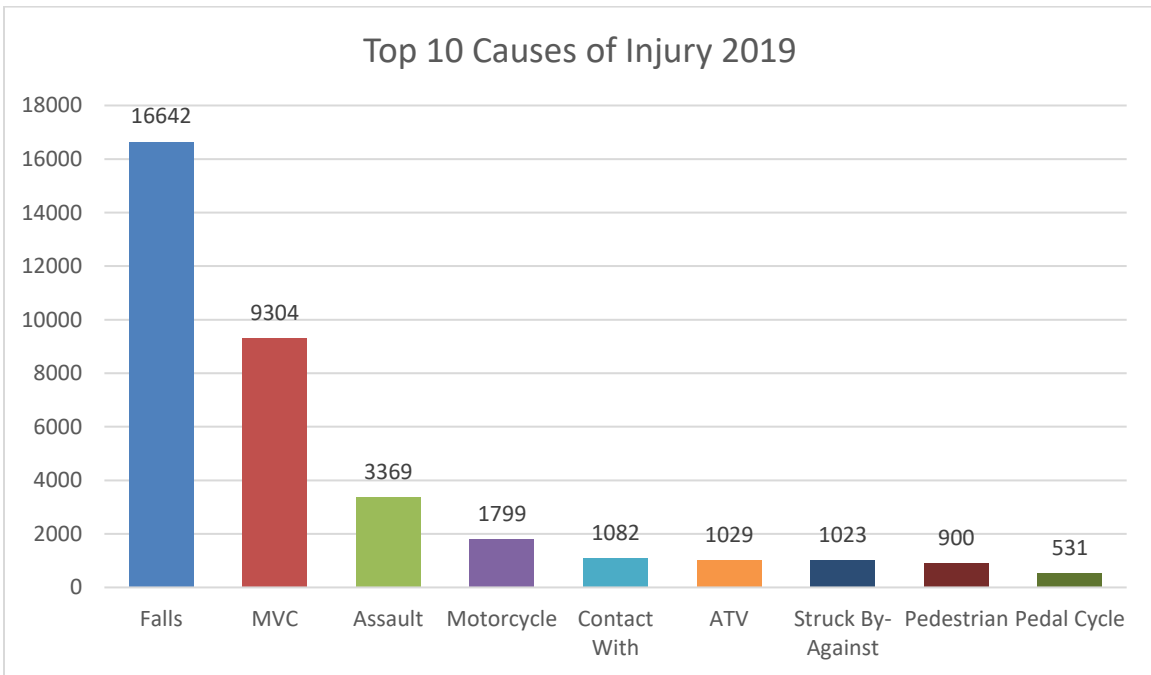
76% of all trauma cases treated in Tennessee trauma centers or CRPC's were Tennesseans (29,574); 24% of all cases (9,415) were residents of other states.

Figure 5a:



Patient transports by air travel to a trauma center or CRPC have shown an increase compared to 2018.

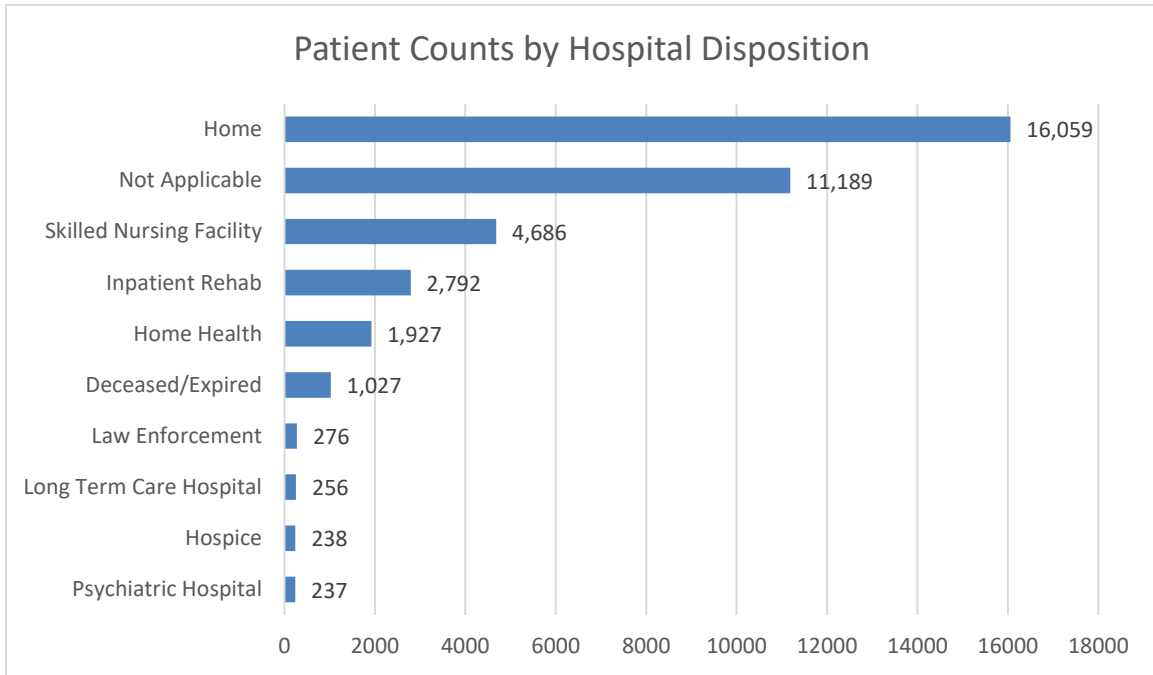
Figure 5b:



The graph above reflects the top ten causes of injury for seeking treatment at a trauma center or CRPC in 2019.

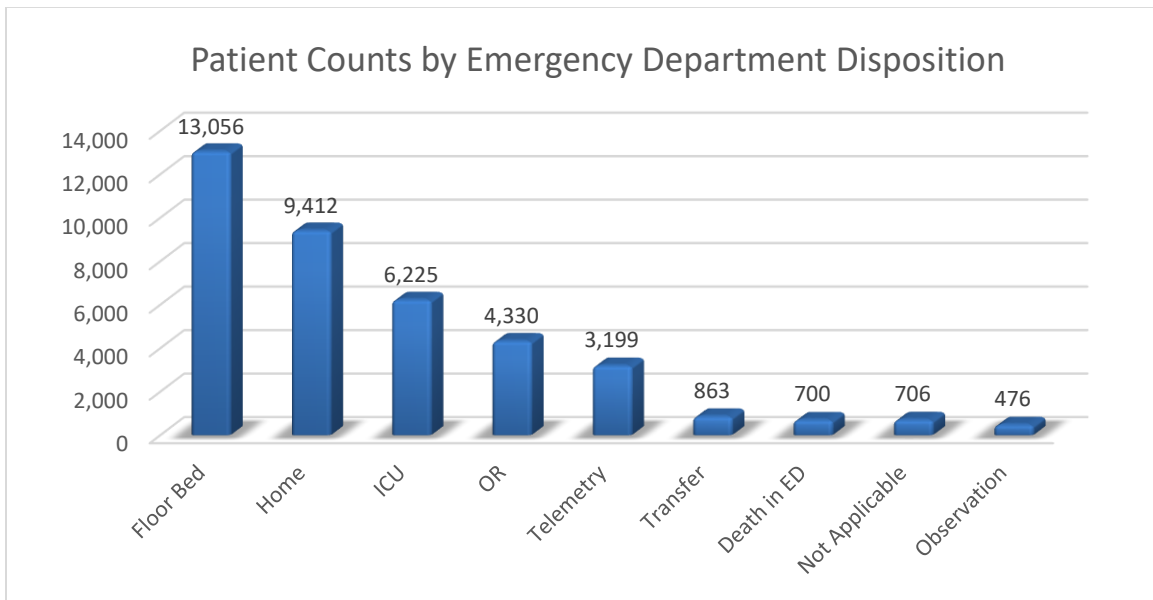


Figure 6a:



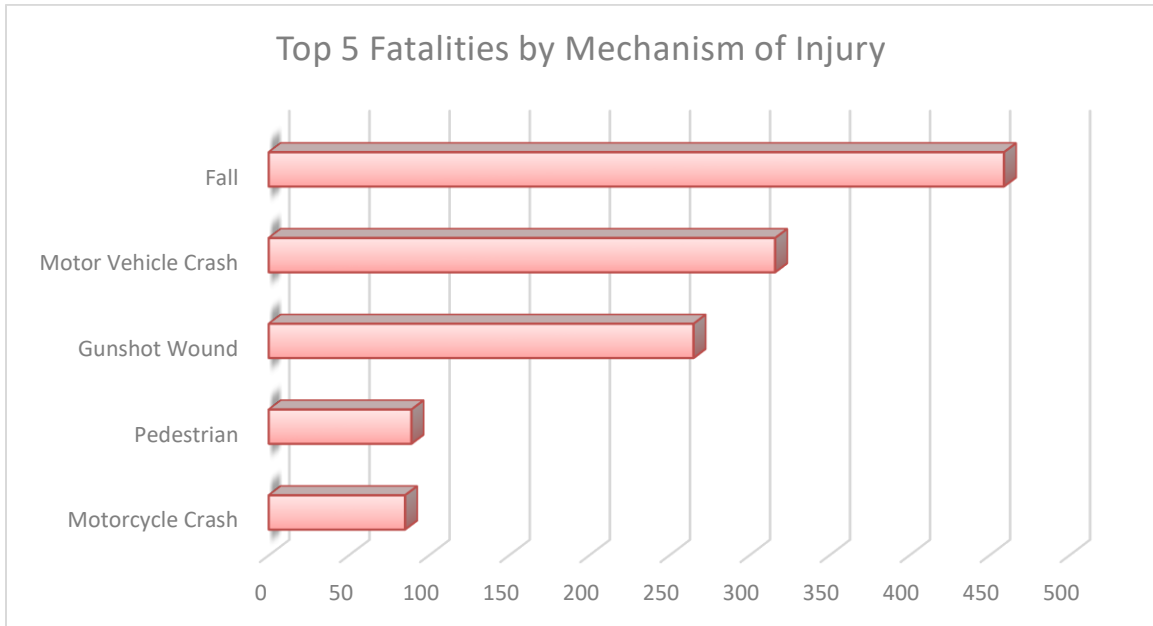
41% percent of patients seeking care from a trauma facility in 2019 were released back to their home while 12% were admitted into a skilled nursing facility upon hospital discharge. Approximately 3% of patients had an outcome of death.

Figure 6b:



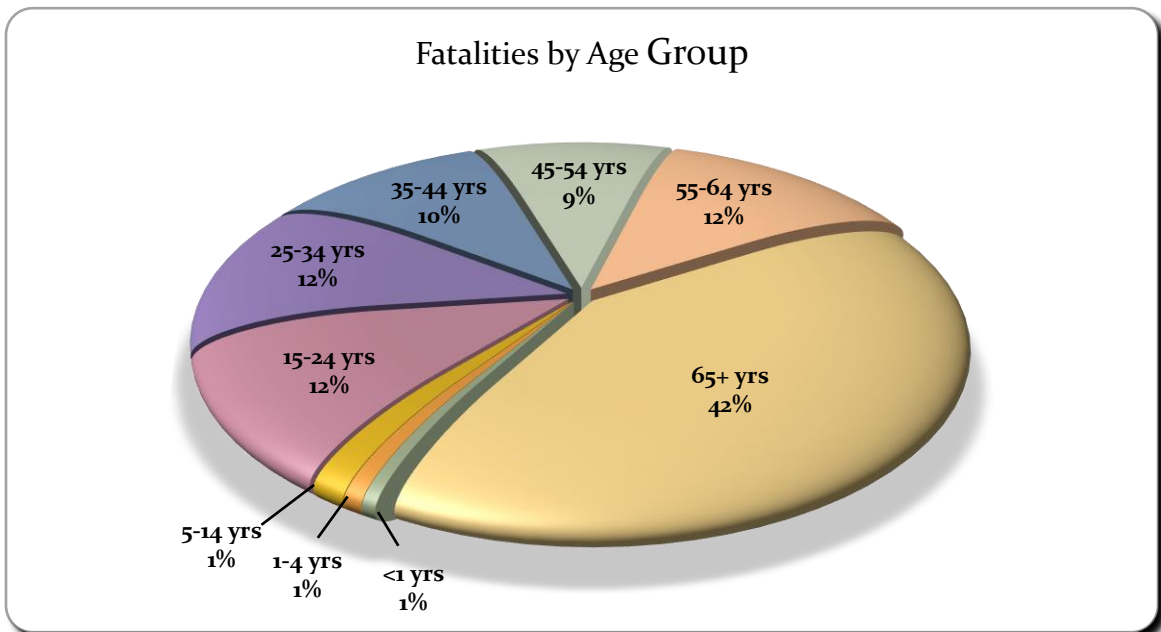
Most patients who met inclusion criteria for trauma registry submissions for 2019 were admitted to a floor bed based on their disposition from the Emergency Department.

Figure 7a:



Fatalities from falls, motor vehicle crashes, gunshot wounds, pedestrian injuries and motorcycle crashes remain the top 5 mechanisms for injury that lead to death.

Figure 7b:



The chart above is reflective of fatalities separated into their respective age groups.

Appendix III:  
2019 Trauma Fund Distribution

**FUNDS DISTRIBUTED TO TRAUMA CENTERS AND NON-TRAUMA CENTERS  
FROM TENNESSEE TRAUMA FUND - FY2019 – 1st QUARTER DISTRIBUTION**

Level	Hospital Name	Hospital Specific Pool Payment	Readiness Costs	Total Hospital Distribution Payment
	<b>TOTAL</b>	<b>\$874,085.98</b>	<b>\$903,750.00</b>	<b>\$1,777,835.98</b>
Lev 1	Regional One Health	\$378,607.99	\$97,250.00	\$475,857.99
Lev 1	Vanderbilt University Hospital	\$205,873.53	\$153,250.00	\$359,123.53
Lev 1	The University of Tennessee Med. Cntr.	\$82,921.30	\$102,250.00	\$185,171.30
Lev 1	Erlanger Medical Center - Baroness	\$20,414.93	\$153,250.00	\$173,664.93
Lev 1	Johnson City Medical Center	\$18,987.56	\$72,500.00	\$91,487.56
Lev 1	Wellmont Holston Valley Medical Ctr.	\$16,692.08	\$72,500.00	\$89,192.08
Lev 2	TriStar Skyline Medical Center	\$47,468.53	\$37,750.00	\$85,218.53
PED	LeBonheur Children Medical Center	\$6,360.06	\$64,250.00	\$70,610.06
PED	East Tennessee Childrens Hospital	\$236.90	\$51,000.00	\$51,236.90
Lev 2	Wellmont Bristol Regional Med. Ctr.	\$4,326.47	\$37,750.00	\$42,076.47
Lev 3	TriStar Summit Medical Center	\$3,732.14	\$15,500.00	\$19,232.14
Lev 3	TriStar Stonecrest Medical Center	\$2,551.63	\$15,500.00	\$18,051.63
Lev 3	TriStar Horizon Medical Center	\$661.81	\$15,500.00	\$16,161.81
Lev 3	Sumner Regional Medical Center	\$644.20	\$15,500.00	\$16,144.20
	Methodist Healthcare-Memphis Hospitals	\$16,144.20		\$16,144.20
	Jackson-Madison Cnty. General Hospital	\$15,827.17		\$15,827.17
	Nashville General Hospital	\$8,125.77		\$8,125.77
	St. Thomas Rutherford Hospital	\$7,567.93		\$7,567.93
	Baptist Memorial Hospital-Memphis	\$7,010.81		\$7,010.81
	Maury Regional Medical Center	\$5,362.62		\$5,362.62
	Methodist Hospital-North	\$3,601.97		\$3,601.97
	Tennova Healthcare Physicians Regional M C	\$3,550.46		\$3,550.46
	Parkridge Medical Center	\$2,636.50		\$2,636.50
	Saint Thomas West Hospital	\$2,390.14		\$2,390.14
	LeConte Medical Center	\$1,973.43		\$1,973.43
	Methodist Medical Center of Oak Ridge	\$1,953.72		\$1,953.72
	TriStar Southern Hills Medical Center	\$1,813.59		\$1,813.59
	Parkwest Medical Center	\$1,570.97		\$1,570.97
	Saint Francis Hospital-Bartlett	\$1,407.39		\$1,407.39
	CHI Memorial Hospital Hixon	\$805.14		\$805.14
	CHI Memorial Hospital Chattanooga	\$725.33		\$725.33
	Cookeville Regional Medical Center	\$556.02		\$556.02
	Blount Memorial Hospital	\$529.05		\$529.05
	Southern TN Reg. Health Sys. - Winchester	\$421.17		\$421.17
	Williamson Medical Center	\$225.50		\$225.50
	Henry County Medical Center	\$207.23		\$207.23
	Tennova Healthcre - Lebanon	\$200.73		\$200.73

**FUNDS DISTRIBUTED TO TRAUMA CENTERS AND NON-TRAUMA CENTERS  
FROM TENNESSEE TRAUMA FUND - FY2019 – 2nd QUARTER DISTRIBUTION**

<b>Level</b>	<b>Hospital Name</b>	<b>Hospital Specific Pool Payment</b>	<b>Readiness Costs</b>	<b>Total Hospital Distribution Payment</b>
	<b>TOTAL</b>	<b>\$779,190.91</b>	<b>\$903,750.00</b>	<b>\$1,682,940.91</b>
Lev 1	Regional One Health	\$336,748.65	\$97,250.00	\$433,998.65
Lev 1	Vanderbilt University Hospital	\$215,013.08	\$153,250.00	\$368,263.08
Lev 1	Erlanger Medical Center - Baroness	\$22,144.68	\$153,250.00	\$175,394.68
Lev 1	The University of Tennessee Med. Cntr.	\$67,301.83	\$102,250.00	\$169,551.83
Lev 1	Johnson City Medical Center	\$17,736.33	\$72,500.00	\$90,236.33
Lev 1	Wellmont Holston Valley Medical Ctr.	\$15,060.81	\$72,500.00	\$87,560.81
PED	LeBonheur Children Medical Center	\$10,088.19	\$64,250.00	\$74,338.19
Lev 2	TriStar Skyline Medical Center	\$29,303.73	\$37,750.00	\$67,053.73
PED	East Tennessee Childrens Hospital	\$1,100.87	\$51,000.00	\$52,100.87
Lev 2	Wellmont Bristol Regional Med. Ctr.	\$7,604.18	\$37,750.00	\$45,354.18
Lev 3	TriStar Summit Medical Center	\$4,835.41	\$15,500.00	\$20,335.41
Lev 3	TriStar Stonecrest Medical Center	\$2,330.56	\$15,500.00	\$17,830.56
Lev 3	TriStar Horizon Medical Center	\$1,813.54	\$15,500.00	\$17,313.54
Lev 3	Sumner Regional Medical Center	\$1,384.73	\$15,500.00	\$16,884.73
	Methodist Healthcare-Memphis Hospitals	\$15,308.28		\$15,308.28
	Jackson-Madison Cnty. General Hospital	\$6,071.44		\$6,071.44
	Baptist Memorial Hospital-Memphis	\$3,682.92		\$3,682.92
	Maury Regional Medical Center	\$2,826.50		\$2,826.50
	Methodist Medical Center of Oak Ridge	\$2,475.81		\$2,475.81
	TriStar Southern Hills Medical Center	\$1,941.89		\$1,941.89
	Methodist Hospital-North	\$1,862.42		\$1,862.42
	Saint Francis Hospital-Bartlett	\$1,812.18		\$1,812.18
	Parkridge Medical Center	\$1,404.99		\$1,404.99
	Southern TN Reg. Health Sys.- Winchester	\$1,402.83		\$1,402.83
	Tennova Healthcare Physicians Regional M C	\$1,297.33		\$1,297.33
	Williamson Medical Center	\$1,189.20		\$1,189.20
	Cookeville Regional Medical Center	\$1,101.60		\$1,101.60
	Saint Thomas West Hospital	\$1,046.03		\$1,046.03
	LeConte Medical Center	\$769.29		\$769.29
	Blount Memorial Hospital	\$699.02		\$699.02
	Tennova Healthcre - Lebanon	\$631.80		\$631.80
	Tennova Healthcare Harton Medical Center	\$613.16		\$613.16
	CHI Memorial Hospital Chattanooga	\$468.83		\$468.83
	CHI Memorial Hospital Hixon	\$118.80		\$118.80

**FUNDS DISTRIBUTED TO TRAUMA CENTERS AND NON-TRAUMA CENTERS  
FROM TENNESSEE TRAUMA FUND - FY2019 – 3rd QUARTER DISTRIBUTION**

Level	Hospital Name	Hospital Specific Pool Payment	Readiness Costs	Total Hospital Distribution Payment
	<b>TOTAL</b>	<b>\$808,372.70</b>	<b>\$903,750.00</b>	<b>\$1,712,122.70</b>
Lev 1	Vanderbilt University Hospital	\$251,302.58	\$153,250.00	\$404,552.58
Lev 1	Regional One Health	\$293,733.36	\$97,250.00	\$390,983.36
Lev 1	Erlanger Medical Center - Baroness	\$30,380.56	\$153,250.00	\$183,630.56
Lev 1	The University of Tennessee Med. Cntr.	\$62,645.61	\$102,250.00	\$164,895.61
Lev 1	Wellmont Holston Valley Medical Ctr.	\$26,181.82	\$72,500.00	\$98,681.82
Lev 1	Johnson City Medical Center	\$21,016.41	\$72,500.00	\$93,516.41
Lev 2	TriStar Skyline Medical Center	\$38,545.53	\$37,750.00	\$76,295.53
PED	LeBonheur Children Medical Center	\$5,469.24	\$64,250.00	\$69,719.24
PED	East Tennessee Childrens Hospital	\$1,004.61	\$51,000.00	\$52,004.61
Lev 2	Wellmont Bristol Regional Med. Ctr.	\$13,883.46	\$37,750.00	\$51,633.46
Lev 3	TriStar Horizon Medical Center	\$2,416.95	\$15,500.00	\$17,916.95
Lev 3	TriStar Summit Medical Center	\$1,998.41	\$15,500.00	\$17,498.41
Lev 3	Sumner Regional Medical Center	\$1,263.77	\$15,500.00	\$16,763.77
Lev 3	TriStar Stonecrest Medical Center	\$449.41	\$15,500.00	\$15,949.41
	Methodist Healthcare-Memphis Hospitals	\$15,949.41		\$15,949.41
	Jackson-Madison Cnty. General Hospital	\$5,240.74		\$5,240.74
	Baptist Memorial Hospital-Memphis	\$4,706.75		\$4,706.75
	Fort Sanders Regional Medical Center	\$3,394.22		\$3,394.22
	Tennova Healthcare Physicians Regional M C	\$2,983.68		\$2,983.68
	Saint Thomas West Hospital	\$2,963.97		\$2,963.97
	TriStar Southern Hills Medical Center	\$2,836.19		\$2,836.19
	Tennova Healthcare Harton Medical Center	\$2,076.82		\$2,076.82
	LeConte Medical Center	\$2,057.69		\$2,057.69
	St. Thomas Rutherford Hospital	\$1,804.94		\$1,804.94
	Saint Francis Hospital	\$1,651.93		\$1,651.93
	Tennova Healthcre - Lebanon	\$1,211.91		\$1,211.91
	Methodist Hospital-North	\$1,184.40		\$1,184.40
	Methodist Medical Center of Oak Ridge	\$1,069.23		\$1,069.23
	Cookeville Regional Medical Center	\$1,057.14		\$1,057.14
	CHI Memorial Hospital Chattanooga	\$1,047.09		\$1,047.09
	Parkridge Medical Center	\$1,042.27		\$1,042.27
	Saint Francis Hospital-Bartlett	\$866.99		\$866.99
	Maury Regional Medical Center	\$716.69		\$716.69
	Blount Memorial Hospital	\$669.84		\$669.84
	Erlanger North Hospital	\$636.86		\$636.86
	Parkwest Medical Center	\$590.78		\$590.78
	CHI Memorial Hospital Hixon	\$526.64		\$526.64
	TriStar Hendersonville Medical Center	\$451.04		\$451.04
	Henry County Medical Center	\$441.62		\$441.62
	Williamson Medical Center	\$372.74		\$372.74
	Morristown-Hamblen Healthcare System	\$282.83		\$282.83

	Tennova Healthcare - Clarksville	\$180.72		\$180.72
	Sweetwater Hospital Association	\$65.87		\$65.87

**FUNDS DISTRIBUTED TO TRAUMA CENTERS AND NON-TRAUMA CENTERS  
FROM TENNESSEE TRAUMA FUND - FY2019 – 4th QUARTER DISTRIBUTION**

Level	Hospital Name	Hospital Specific Pool Payment	Readiness Costs	Total Hospital Distribution Payment
	<b>TOTAL</b>	<b>\$1,003,117.52</b>	<b>\$846,750.00</b>	<b>\$1,849,867.52</b>
Lev 1	Regional One Health	\$397,296.40	\$97,250.00	\$494,546.40
Lev 1	Vanderbilt University Hospital	\$274,742.83	\$153,250.00	\$427,992.83
Lev 1	Erlanger Medical Center - Baroness	\$65,515.44	\$153,250.00	\$218,765.44
Lev 1	The University of Tennessee Med. Cntr.	\$66,712.09	\$102,250.00	\$168,962.09
Lev 1	Johnson City Medical Center	\$40,325.40	\$72,500.00	\$112,825.40
Lev 2	TriStar Skyline Medical Center	\$60,695.12	\$37,750.00	\$98,445.12
PED	LeBonheur Children Medical Center	\$6,123.33	\$64,250.00	\$70,373.33
PED	East Tennessee Childrens Hospital		\$51,000.00	\$51,000.00
Lev 2	Wellmont Bristol Regional Med. Ctr.	\$7,236.24	\$37,750.00	\$44,986.24
Lev 3	Wellmont Holston Valley Medical Ctr.	\$14,746.14	\$15,500.00	\$30,246.14
Lev 3	TriStar Horizon Medical Center	\$5,552.85	\$15,500.00	\$21,052.85
Lev 3	TriStar Summit Medical Center	\$3,690.63	\$15,500.00	\$19,190.63
Lev 3	Sumner Regional Medical Center	\$1,245.28	\$15,500.00	\$16,745.28
Lev 3	TriStar Stonecrest Medical Center	\$1,132.33	\$15,500.00	\$16,632.33
	Methodist Healthcare-Memphis Hospitals	\$13,951.54		\$13,951.54
	Saint Thomas West Hospital	\$6,162.29		\$6,162.29
	Tennova Healthcare Physicians Regional M C	\$6,162.21		\$6,162.21
	Baptist Memorial Hospital-Memphis	\$5,713.35		\$5,713.35
	Jackson-Madison Cnty. General Hospital	\$4,734.80		\$4,734.80
	CHI Memorial Hospital Chattanooga	\$3,148.54		\$3,148.54
	Methodist Medical Center of Oak Ridge	\$2,102.90		\$2,102.90
	Blount Memorial Hospital	\$2,080.32		\$2,080.32
	Parkridge Medical Center	\$2,030.04		\$2,030.04
	TriStar Southern Hills Medical Center	\$2,026.92		\$2,026.92
	Williamson Medical Center	\$1,992.94		\$1,992.94
	Maury Regional Medical Center	\$1,903.52		\$1,903.52
	Cookeville Regional Medical Center	\$1,632.11		\$1,632.11
	Methodist Hospital-North	\$1,342.32		\$1,342.32
	Saint Francis Hospital-Bartlett	\$1,153.26		\$1,153.26
	Erlanger North Hospital	\$1,016.13		\$1,016.13
	Parkwest Medical Center	\$950.25		\$950.25

Appendix IV:  
Research Publications

1. Adams PW1, Warren KA, Guyette FX, Yazer MH, Brown JB, Daley BJ, Miller RS, Harbrecht BG, Claridge JA, Phelan HA, Witham WR, Putnam AT, Zuckerbraun BS, Neal MD, Sperry JL; PAMPer study group. "Implementation of a Prehospital Air Medical Thawed Plasma Program: Is It Even Feasible?" *J Trauma Acute Care Surg.* 2019 Jun 13. doi: 10.1097/TA.0000000000002406. [Epub ahead of print] PMID: 31205211
2. Taylor JE, Campbell M, Daley B. "The Management of Small Bowel Obstruction Caused by Ingested Gastrostomy Tube." *Am Surg.* 2019 Aug 1;85(8):e372-e373. PMID: 31560316
3. Reitz KM, Moore HB, Guyette FX, Sauaia A, Pusateri AE, Moore EE, Hassoune A, Chapman MP, Daley BJ, Miller RS, Harbrecht BG, Claridge JA, Phelan HA, Brown JB, Zuckerbraun BS, Neal MD, Yazer MH, Sperry JL. "Prehospital plasma in injured patients is associated with survival principally in blunt injury: Results from two randomized prehospital plasma trials." *The Journal of Trauma and Acute Care Surgery* 2019 Sep 12. [Epub ahead of print] PMID: 31524836
4. Daley BJ Commentary on "Benefits of using the pause after death in emergency departments: A Delphi Study". *Southern Medical Journal* 2019 Sep;112(9):475. PMID: 31485584
5. Griffard J, Daley B, Campbell M, Whittington E, Bhat S, Lawson C, Heidel E. Early ambulation does not affect outcomes in patients with low-grade (grade I-II) splenic lacerations or hematomas. *American Surgeon.* 2019 Oct;85(9):e501-e503. PMID: 31638554
6. McKnight, C.L., Newberry, C., Sarav, M., Martindale, R., R. Hurt, R., and Daley, B.J.. Refeeding Syndrome in the Critically Ill: a Literature Review and Clinician's Guide. *Curr Gastroenterol Rep* (2019) 21: 58. <https://doi.org/10.1007/s11894-019-0724-3> First Online: 22 November 2019
7. Doty J, Voskuil R, Davis C, Swafford R, Gardner W 2nd, Kiner D, Nowotarski P. Trampoline-related injuries: a comparison of injuries sustained at commercial jump parks versus domestic home trampolines. *J Am Acad Orthop Surg.* 2019 Jan 1; 27(1):23-31. doi: 10.5435/JAAOS-D-17-00470. Epub 2018 Aug 22. PMID: 30138296.
8. Spitler CA, Kiner DW, Row ED, Gardner WE 2nd, Swafford RE, Hankins MJ, Nowotarski PJ. Tranexamic acid use in open reduction and internal fixation of fractures of the pelvis, acetabulum, and proximal femur: a randomized controlled trial. *J Orthop Trauma.* 2019 Mar 29. doi: 10.1097/BOT.0000000000001480. [Epub ahead of print]. PMID: 30939507
9. Dunlap BD, Voskuil RT, Cincere B, Nowotarski PJ. Repeat posterior wall acetabular fracture-dislocation: High-energy trauma as a 'second hit phenomenon', *Trauma Case Rep.* 2019 Jun 28;22:100215. doi: 10.1016/j.tcr.2019.100215. eCollection 2019 Aug. PMID: 31338407
10. Spitler CA, Row ER, Gardner WE 2nd, Swafford RE, Hankins MJ, Nowotarski PJ, Kiner DW. Tranexamic Acid Use in High Energy Pelvic, Acetabular, and Femoral Fractures. *J Orthop Trauma.* 2019 Aug;33(8):371-376. doi: 10.1097/BOT.0000000000001480. PMID:30939507
11. Katsuura Y, Kim HJ. Katsuura Y, et al. Butterfly Vertebrae: A systematic review of the literature and analysis. *Global Spine J.* 2019 Sep;9(6):666-679. doi: 10.1177/2192568218801016. PMID: 31448202
12. Harrell K, Hyde A, Bell C, Maxwell R. Thoracoabdominal trauma requiring pulmonary vein repair and splenectomy on bypass. *Am Surg.* 2019 Aug 1;85(8):e377-e379. PMID: 31560318
13. Harrell KN, Hunt DJ. Penetrating subclavian artery injuries: recent challenges with variable solutions. *Am Surg.* 2019 Aug 1;85(8):e396-e397. PMID: 31560325

14. Aitken ME, Minster SD, Mullins SH, Hirsch HM, Unni P, Monroe K, Miller BK. Parents' Perspectives on Safe Storage of Firearms. *J Community Health*. 2020 Jun;45(3):469-477. doi: 10.1007/s10900-019-00762-2. PMID: 31625051.
15. Bauer JM, Stutz CM, Schoenecker JG, Lovejoy SA, Mencio GA, Martus JE. Internal Rotation Stress Testing Improves Radiographic Outcomes of Type 3 Supracondylar Humerus Fractures. *J Pediatr Orthop*. 2019 Jan;39(1):8-13. doi: 10.1097/BPO.0000000000000914. PMID: 27977497.
16. Vogel AM, Zhang J, Mauldin PD, Williams RF, Huang EY, Santore MT, Tsao K, Falcone RA, Dassinger MS, Haynes JH, Blakely ML, Russell RT, Naik-Mathuria BJ, St Peter SD, Mooney D, Upperman JS, Streck CJ. Variability in the evaluation of pediatric blunt abdominal trauma. *Pediatr Surg Int*. 2019 Apr;35(4):479-485. doi: 10.1007/s00383-018-4417-z. Epub 2018 Nov 13. PMID: 30426222.
17. Springer E, Frazier SB, Arnold DH, Vukovic AA. External validation of a clinical prediction rule for very low risk pediatric blunt abdominal trauma. *Am J Emerg Med*. 2019 Sep;37(9):1643-1648. doi: 10.1016/j.ajem.2018.11.031. Epub 2018 Nov 23. PMID: 30502218.
18. Dallas J, Mercer E, Reynolds RA, Wellons JC, Shannon CN, Bonfield CM. Should ondansetron use be a reason to admit children with isolated linear skull fractures? *J Neurosurg Pediatr*. 2019 Dec 13:1-7. [Epub ahead of print] PMID:31835245
19. Schroepel TJ, Sharpe JP, Shahan CP, Clement LP, Magnotti LJ, Lee M, Muhlbauer M, Weinberg JA, Tolley EA, Croce MA, Fabian TC. Beta-adrenergic blockade for attenuation of catecholamine surge after traumatic brain injury: a randomized pilot trial. [pubmed.ncbi.nlm.nih.gov] *Trauma Surg Acute Care Open*. 2019 Aug 18;4(1):e000307. doi: 10.1136/tsaco-2019-000307. eCollection 2019. PMID: 31467982
20. Manley NR, Holley JE, Martin LJC, Stavely TC, Croce MA, Fischer PE. Survival after Prehospital Traumatic Cardiac Arrest: A Comparison of Isolated Head and Non-Head-Penetrating Injuries. [pubmed.ncbi.nlm.nih.gov] *Am Surg*. 2019 Mar 1;85(3):e123-e125. PMID: 30947783
21. Manley NR, Croce MA, Fischer PE, Crowe DE, Goines JH, Sharpe JP, Fabian TC, Magnotti LJ. Evolution of Firearm Violence over 20 Years: Integrating Law Enforcement and Clinical Data. [pubmed.ncbi.nlm.nih.gov] *J Am Coll Surg*. 2019 Apr;228(4):427-434. doi: 10.1016/j.jamcollsurg.2018.12.033. Epub 2019 Jan 28. PMID: 30703539
22. Manley NR, Sharpe JP, Lewis RH, Iltis MS, Chaudhuri R, Fabian TC, Croce MA, Magnotti LJ. Analysis of over 2 decades of colon injuries identifies optimal method of diversion: Does an end justify the means? [pubmed.ncbi.nlm.nih.gov] *J Trauma Acute Care Surg*. 2019 Feb;86(2):214-219. doi: 10.1097/TA.0000000000002135. PMID: 30605141
23. Lewis RH Jr, Sharpe JP, Berning B, Fabian TC, Croce MA, Magnotti LJ. Impact of a simplified management algorithm on outcome following exsanguinating pelvic fractures: A 10-year experience. [pubmed.ncbi.nlm.nih.gov] *J Trauma Acute Care Surg*. 2019 Apr;86(4):658-663. doi: 10.1097/TA.0000000000002162. PMID: 30531209
24. Gates RL, Price M, Cameron DB, Somme S, Ricca R, Oyetunji TA, Guner YS, Gosain A, Baird R, Lal DR, Jancelewicz T, Shelton J, Diefenbach KA, Grabowski J, Kawaguchi A, Dasgupta R, Downard C, Goldin A, Petty JK, Stylianou S, Williams R. Non-operative management of solid organ injuries in children: An American Pediatric Surgical Association Outcomes and Evidence Based Practice Committee systematic review. *J Pediatr Surg*. 2019 Aug; 54 (8):1519-1526. doi: 10.1016/j.jpedsurg.2019.01.012. Epub 2019 Jan 31. PMID: 30773395.
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- current practice. *J Neurosurg Pediatr.* 2019 Feb 8; 23(4):471-479. doi: 10.3171/2018.10.PEDS18374. PMID: 30738383; PMCID: PMC6687576.
26. Harris LR, Arkader A, Broom A, Flynn J, Yellin J, Whitlock P, Miller A, Sawyer J, Roaten J, Skaggs DL, Choi PD. Pulseless Supracondylar Humerus Fracture With Anterior Interosseous Nerve or Median Nerve Injury-An Absolute Indication for Open Reduction? *J Pediatr Orthop.* 2019 Jan; 39(1):e1-e7. doi: 10.1097/BPO.0000000000001238. PMID: 30080770.
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