

2018-2021

TRAUMA REGISTRY REPORT

- Protection of 1st responders & 1st responders
- Public information & lessons
- Transportation
- Knowledge & safety
- Case

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Introduction/Timeline

The Trauma Division of the COTS functions as a Regional Trauma Organization (RTO). We are a group of dedicated individuals working together to provide optimal care to trauma patients within Central, Southeast, and Southeast Central Ohio. Our partnership includes eight trauma centers verified by the American College of Surgeons (ACS), thirty three acute care hospitals, seventeen free-standing emergency departments, one alternate care facility, emergency preparedness experts, and emergency medical services (EMS).

Mission

COTS is a group of physicians, healthcare professionals, and other experts working together to improve the health and safety of our communities.

Vision

Access to the best care and outcomes through collaboration, coordination, education, and prevention.

Values

- Optimistic – we have a positive and uplifting attitude and are open to new challenges
- Good people, doing good things – we aim to be principled in all aspects of our work
- Trustworthy – we have caring and personal attitudes toward building our partner relations
- Practiced – we are knowledgeable, experienced, and able to carry out our assigned work/projects
- Collaborative – we support the diverse nature of our regional partners, and we are unbiased and collegial
- Engaged – we are proactive and responsive to our customer's needs

COTS is a voluntary, cooperative, self-regulatory organization and maintains a 501(c)(3) Internal Revenue status for charitable, educational, and scientific intent.



The following timeline demonstrates the development and growth of the COTS from 1998-2021.

The Central Ohio Trauma System was established in 1998 with the following committees: Clinical Trauma, Executive, Finance, Injury Prevention, Pre-Hospital, and Registry. In 1999, the Trauma Nurse Coordinator and Trauma Registrar was hired, and the Trauma Regional Registry was implemented with data submitted from 11 Franklin County hospitals.

1999- 2005

- Trauma Nurse Educator hired part time (2004)
- Education Coordinator full time (2005)
- Administrative Assistant full time (2005)

Committees

- Diversion Committee (1999)
- Regional Hospital Incident Commend System (2000)
- STEMI Committee (2004)

Protocols/Guidelines/Education

- EMS Field Triage (1999)
- Columbus Metropolitan Medical Strike Team (CMMST) Plan (1999)
- Regional Level I and II Criteria Alert criteria (1999)
- Emergency Patient Transport Plan (1999)
- Real Time Activity Status (RTAS) (2001)
- Centralized coordination of education classes began for ATLS®, TNCC™, ENPC™ (2001)
- EMS Infectious Exposure (2001)
- ED care protocols (2001)
- Transfer agreements (2001)
- Family Violence and Screening Protocols (2001)
- Performance Improvement (2001)
- Regional Guidelines for Patients with Concealed Carry Weapons (2004)

2006-2010

- 4 emergency preparedness staff hired

Committees

- Stroke Committee (2007)
- STEMI Task Force (2009)

Protocols/Guidelines/Education

- MOUs for shared services personnel during a disaster for Central Ohio
- Regional EMS/hospital communication tool (2004)
- Hospital Resource Attestation Guide for EMS (2009)
- Publish Injury Report with Columbus Public Health



2011-2015

- Trauma performance improvement (PI) nurse hired

Committees

- Aeromedical Committee (2011)
- First Research Symposium (2011)
- Medical Review Executive Committee (MREC) initiates PI with Trauma Registry data (2013-2014)

Protocols/Guidelines/Education

- Burn Emergency Preparedness Plan (2011)
- Regional Hospital Pediatric Surge Plan (2011)
- Surgical Emergency Response Team (SERT) (2011)
- Expanded Pre-hospital Trauma Triage Guidelines to include Adult, Geriatric, and Pediatric (2012)
- Aeromedical Transport Communication Guide (2013)
- Guidelines for EMS Multi Casualty Trauma Scenes (2014)
- Spinal Immobilization Guideline (2015)

2016-2021

- 2018 – 2 new staff hired for Southeast /Southeast Central Regional Emergency Preparedness development and began the work to develop the Southeast/Southeast Central Healthcare Coalition in 2019.
- March 2020 – COTS coordinated the COVID -19 response for regions 4,7,8 known in Ohio as Zone 2

Committees

- Emergency Services Workgroup (2018)
- New organizational structure that includes a COTS Board of Trustees and three advisory boards: Trauma, Emergency Services, and Emergency Preparedness. Updated Mission, vision, values statements (2019)
- Diversity Task Force and created a diversity statement and IDEA principles (2019)
- American College of Surgeons - Regional Trauma Quality Improvement Program – (TQIP) (2020)
- Research Council (2020)

Protocols/Guidelines/Education

- Spinal Motion Restriction Guidelines (2016)
- EMS Medical Director Guidelines (2016)
- The Trauma in the First 48 hours Course© (2016)
- Standard Objectives for the Trauma Nurse and Process Objectives for the Advanced Practice Provider (2016)
- The COTS Trauma Data Registry Validation Program (2016)
- EMS Resource for the Identification and Care of Human Trafficking Victims (2017)
- Tranexamic Acid (TXA) Guideline (2017)
- Disaster Management and Emergency Preparedness (DMEP™) Course started at COTS (2017)
- “Stop the Bleed®” Campaign for central Ohio (2018)
- Reviewed/updated the SERT protocol (2018)
- Regional Concealed Carry Guidelines for Patients and Law Enforcement Officers (LEO) (2019)
- Regional Helicopter Air Ambulance Communication and Safety Guideline (2020)
- Guideline for The Pre-Arrival Notification of Detainee or LEO escort (2021)
- Blood Conservation Guidelines (2021)

Today, COTS is a significant force in the Central, Southeast, and Southeast Central Ohio communities around issues of trauma, emergency services, and emergency preparedness. COTS is THE organization where patient care issues affecting more than one stakeholder group can be brought and addressed in a neutral forum. It is the one place in Central, Southeast, and Southeast Central Ohio where no matter which stakeholder groups are involved in addressing



the issue, the PATIENT is always at the center of decisions being made. The work done by COTS stakeholders ultimately benefits the patient even though no direct patient care services are provided through COTS.

The success of COTS is due to the tireless dedication of many stakeholders---physicians, nurses, EMS providers, public health experts, emergency response personnel, registrars, program coordinators, administrators, and countless others. Without these unsung heroes, a regionalized system of care could not be possible.

Published Research Papers & Presentations

Gascon, G.M., Steinberg, S., Kovach, S., & Falcone, R.E. (2021, December 7). Mixed methods approach to understanding the influence of changes in successive versions of the Advanced Trauma Life Support program on student performance. *Surgery*. 171(3):584-589. <https://doi.org/10.1016/j.surg.2021.08.064>

Curcio, J.E. & Ferretti, N. (2021, November). Ohio Diversion Plan Keeps Emergency Patients Moving. *EMS World*. 50(11). Retrieved from <https://www.hmpgloballearningnetwork.com/site/emsworld/original-contribution/ohio-diversion-plan-keeps-emergency-patients-moving>

The Joint Commission. (2021, September). Training health care staff for emergencies. *Environment of Care® News*. 24(9):pp. 9-14.

Keller, J., Kovach, S., Gascon, G.M., Falcone, R.E. (2020, Fall). A regional trauma organization as a coordinating body for a regional pandemic repose: A brief report. *Am J Disaster Med*. 15(4):227-240. <https://doi.org/10.5055/ajdm.2020.0372>

Kovach, S., Shaffer, J., Gascon, G.M., & Falcone, R.E. (2020, August 20). Deployment of a shared alternative care site during the COVID-19 pandemic. *JEMS*. Retrieved from <https://www.jems.com/best-practices/deployment-of-a-shared-alternative-care-site-during-the-covid-19-pandemic/>

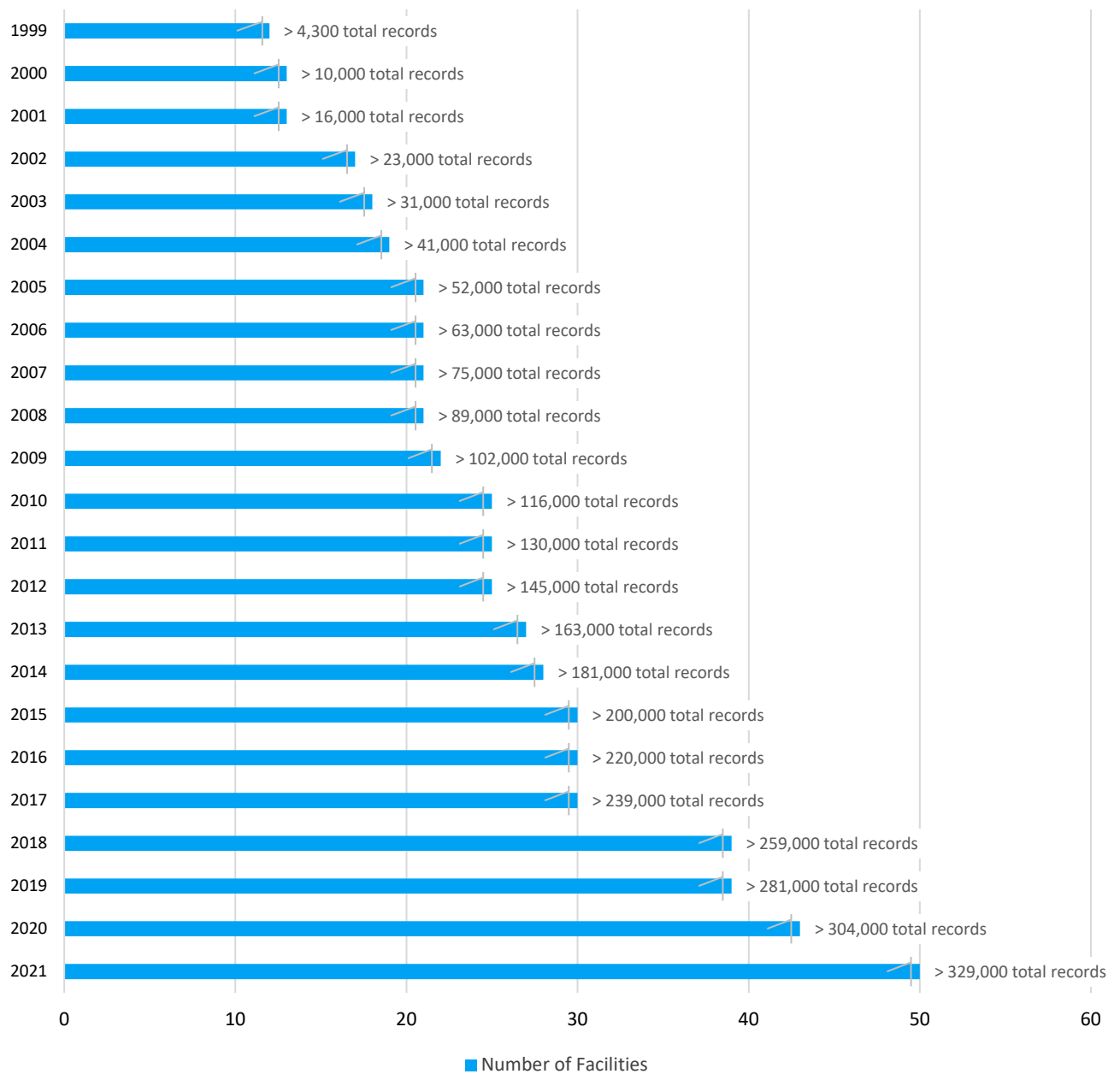
Burt, J., Cookman K., Giambri, R., Harrison, K., Houck, O., & Moore, D. (2020, August 18). *Collaborate to validate: A region-led statewide data validation project* [Virtual poster session]. Trauma Center Association of America Virtual 2020 Best Practice Poster Event, Mooresville, NC, United States.

Wilson, J., Schano, G., Panchal, A., Kovach, S., Treinish, M., Holden, L., Graymire, V., & Huckaby, M.A. (2020, June 23). Collaboration: The key to a successful patient care hand-off. *JEMS*. Retrieved from <https://www.jems.com/operations/the-key-to-a-successful-patient-care-hand-off/>

McElroy, J.A., Steinberg, S., Keller, J., & Falcone, R.E. (2019, October). Operation continued care: a large mass-casualty, full-scale exercise as a test of regional preparedness. *Surgery*. 166(4):591-592. <https://doi.org/10.1016/j.surg.2019.05.045>



Total number of facilities reporting by year and running total of records to COTS Registry



Considerations

- For this report:
 - 2018 data was defined as records that had an arrival date between 1/1/2018 and 12/31/2018 from 39 reporting facilities.
 - 2019 data was defined as records that had an arrival date between 1/1/2019 and 12/31/2019 from 39 reporting facilities.
 - 2020 data was defined as records that had an arrival date between 1/1/2020 and 12/31/2020 from 43 reporting facilities.
 - 2021 data was defined as records that had an arrival date between 1/1/2021 and 12/31/2021 from 50 reporting facilities.

These data are intended for descriptive purposes only and includes major trauma and minor single system trauma. ISS scores range between 1-75.

- The data utilized for this report for calendar years 2018, 2019, and 2020 was extracted on August 5, 2021 and 2021 was extracted on April 25, 2023. Any data received and processed for calendar year 2018 – 2021 after these date were not included in this summary.
- Region 7 and 8 officially joined COTS during 2019 and 2020. Spring 2020 regions 4, 7, 8 were consolidated into Zone 2 during the COVID-19 Pandemic by Governor DeWine. Not every hospital or free-standing emergency department (FSED) is included in the COTS registry from these regions. (See Appendix E)
- When specifically identified, Region 4, 7, and 8 data are included and compromise all of Zone 2 in Ohio.
- The figures in this COTS Trauma Registry Report are in some instances followed by tables with the actual data. Not all tables are associated with a Figure.
- For tables that have percentages, the percentages may not add up to 100% due to rounding.
- Throughout this document all trauma centers regardless of level were combined for reporting of 2018. Since then Level I and II trauma centers were reported together and Level IIIs were reported as their own category.
 - For 2018, The Ohio State University Hospital East was categorized as an acute care hospital; 2019, 2020, and 2021 a Level III trauma center since.
 - For 2018, Mount Carmel West was categorized as a trauma center; January – April 2019 an acute care hospital when the trauma center was relocated to Mount Carmel East hospital, the West campus became a FSED in May 2019 when it stopped admitted patients. Mount Carmel East was an acute care hospital in 2018 and has been a Level II trauma center since.
- Patients with the following isolated ICD-10-CM codes are EXCLUDED from COTS:
 - S72.00-S72.14, fracture of head/neck of femur ONLY IF age >70 AND it resulted from slipping, tripping, stumbling or a same level fall (W01.0, W18.30, W18.31, W18.39);
 - S00, S10, S20, S30, S40, S50, S60, S70, S80, S90, patients with abrasion or contusion injuries that were transferred in/out for treatment of injuries or died because of injuries would be included.
- It is important to note that when “region” is referenced in the data, Ohio Homeland Security Regions as displayed on the map in Appendix C, and not Ohio’s various regional trauma systems in Appendix D.
- Considerations should be made when evaluating the number of injuries and deaths that are reported for counties near and on the border with other states. These patients could have been transported out of Ohio where the injury occurred to be treated by a closer facility in a neighboring state. These injuries and any deaths resulting from these injuries would not be reflected in this report.



Section 1: Records Submitted

The data has been collated to assure that at least three trauma centers are always included in aggregate representation of the data. In 2018, the data includes two adult and one pediatric Level I center, two adult Level II trauma centers and two adult Level III trauma centers. In 2019, 2020 and 2021, with the addition of The Ohio State University Hospital East as a Level III, the three Level I centers (Adult and Pediatric) were combined with the two Level II trauma centers and the three Level III centers were reported together as their own category.

Figure 1. Total records submitted to the COTS Trauma Registry by month of arrival and year

This figure displays the number of trauma records submitted to the COTS trauma registry by month/year of patient arrival. Since all records are counted this may include two records for some patients if they were treated at more than one facility due to being transferred out for a higher level of care.

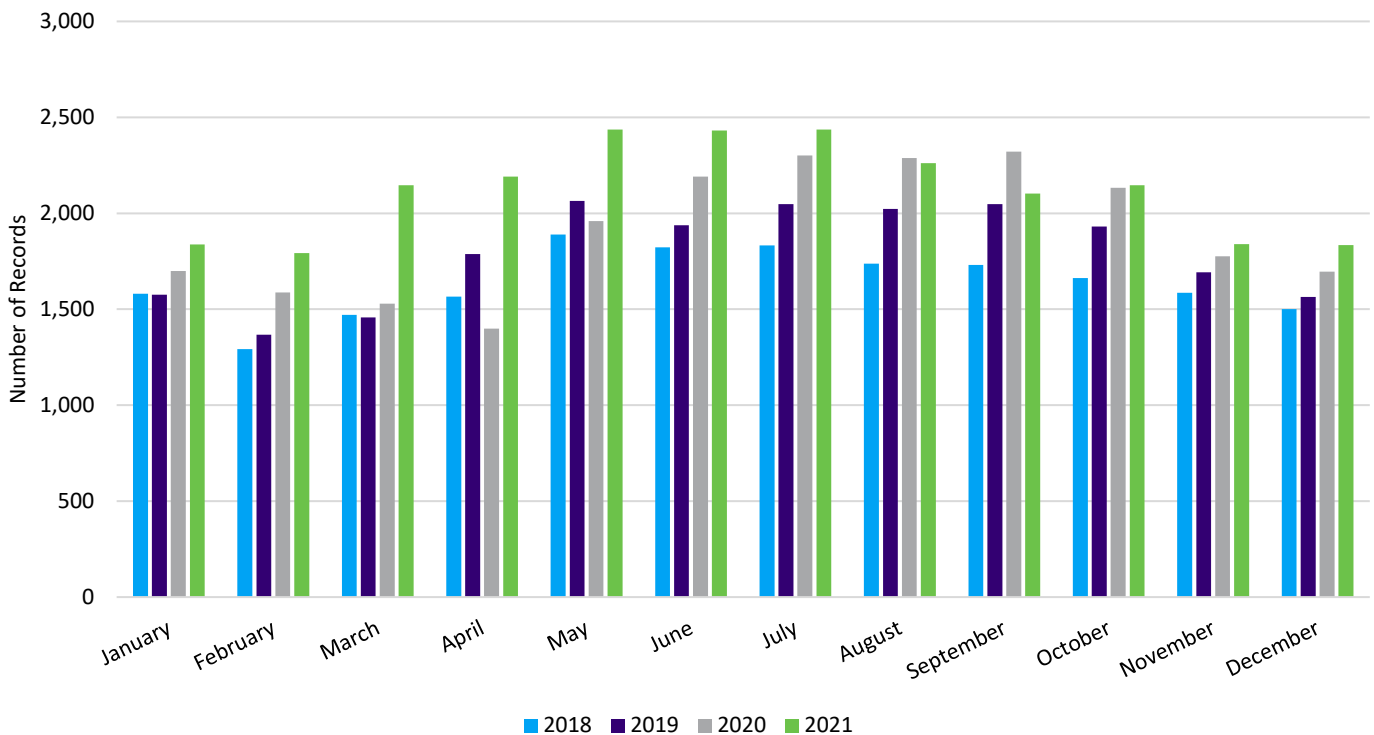


Table 1. Total records submitted to the COTS Trauma Registry by month of arrival and year

Month	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
January	1,580	8.0	1,574	7.3	1,700	7.4	1,838	7.2
February	1,292	6.6	1,367	6.4	1,587	6.9	1,793	7.0
March	1,471	7.5	1,458	6.8	1,529	6.7	2,147	8.4
April	1,565	7.9	1,788	8.3	1,399	6.1	2,192	8.6
May	1,889	9.6	2,065	9.6	1,960	8.6	2,436	9.6
June	1,822	9.2	1,937	9.0	2,191	9.6	2,432	9.6
July	1,832	9.3	2,048	9.5	2,302	10.1	2,437	9.6
August	1,737	8.8	2,023	9.4	2,288	10.0	2,261	8.9
September	1,731	8.8	2,047	9.5	2,322	10.1	2,103	8.3
October	1,662	8.4	1,931	9.0	2,133	9.3	2,146	8.4
November	1,586	8.0	1,692	7.9	1,776	7.8	1,839	7.2
December	1,550	7.9	1,564	7.3	1,696	7.4	1,835	7.2
Total	19,717	100.0	21,494	100.0	22,883	100.0	25,459	100.0

Figure 2. Total records submitted to the COTS Trauma Registry by facility type and year

This figure displays the number of trauma records submitted to the COTS trauma registry by year of patient arrival and facility type. Since all records are counted this may include two records for some patients if they were treated at more than one facility due to being transferred out for a higher level of care. Over the last few years several acute care hospitals and FSEDs have joined COTS adding additional data to these types of facilities. Since the trauma numbers have gone up at acute care hospitals and FSEDs the percentages within the trauma centers decreased although the total numbers stayed relatively stable.

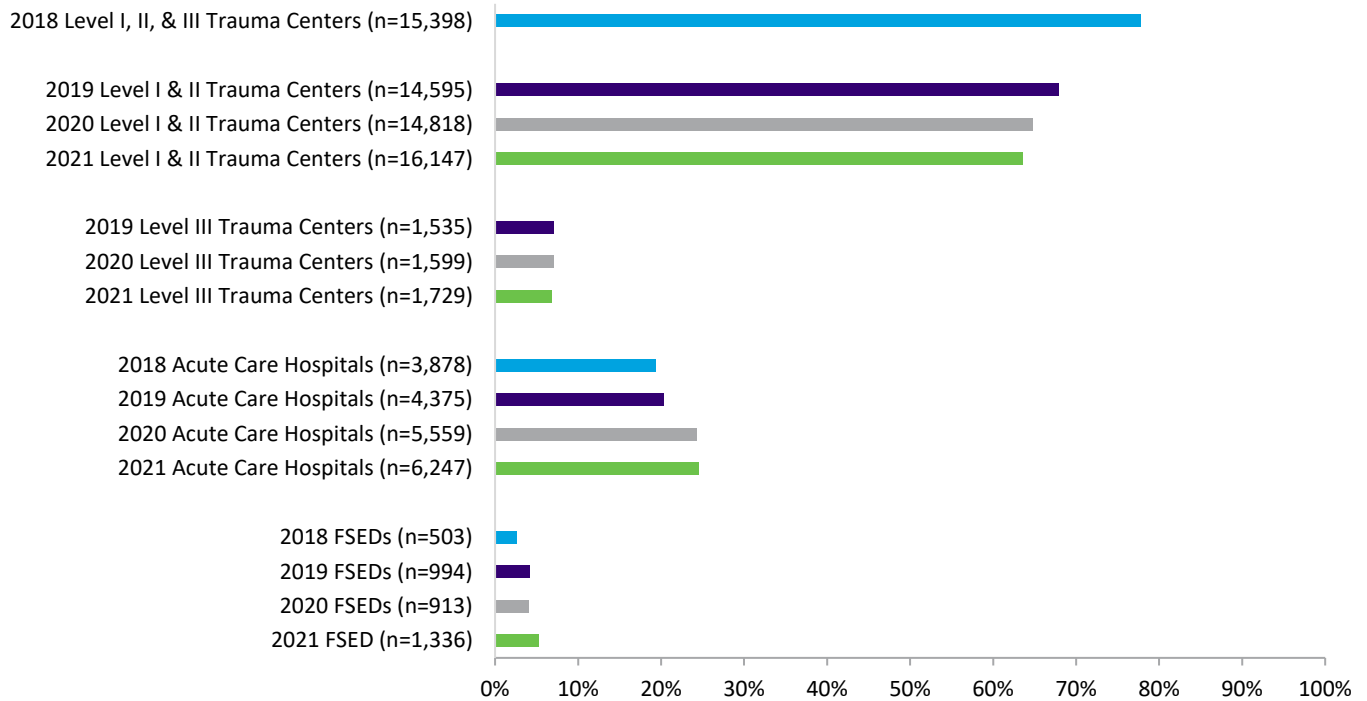


Table 2. Total records submitted to the COTS Trauma Registry by facility type and year

Hospital Type	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
Trauma Centers Level I, II, & III	15,338	77.8	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Trauma Centers Level I & II	Not Available	Not Available	14,595	67.9	14,818	64.7	16,147	63.4
Trauma Centers Level III	Not Available	Not Available	1,535	7.1	1,599	7.0	1,729	6.8
FSEDs	503	2.6	994	4.2	913	4.0	1,336	5.3
Acute Care Hospitals	3,878	19.7	4,375	20.7	5,559	24.3	6,247	24.5
Total	19,719	100.0	21,499	100.0	22,889	100.0	25,459	100.0

Table 3. Duration of hospital stay by top mechanism of injury (MOI)

The table below only includes admitted patients. ED deaths, ED transfers out, left against medical advice from ED, or discharged from the ED are excluded. A review of this data demonstrates an increase in falls from 8,230 (53.3%) in 2018 to 10,498 (57.0%) in 2021. The firearms data demonstrates the highest number (641) in 2021, although overall the percentages only changed by 0.5% over the last four years.

Mechanism of Injury	≤ 5 days	≥ 6 days	Total Count	Total %
2018				
Fall	6,296	1,934	8,230	53.3
MVC – Occupant, Motorcyclist, Pedal Cyclist, Pedestrian, Other, Unspecified	1,938	551	2,489	16.1
Struck by or Against	1,200	108	1,308	8.5
Other Land Transport	774	211	985	6.4
Cut/Pierce	382	54	436	2.8
Firearm	252	110	362	2.3
All Other/Unk MOIs	1,324	312	1,636	10.6
Total	12,166	3,280	15,446	100.0
2019				
Fall	6,659	2,114	8,773	54.5
MVC – Occupant, Motorcyclist, Pedal Cyclist, Pedestrian, Other, Unspecified	1,963	545	2,508	15.6
Struck by or Against	1,149	125	1,274	7.9
Other Land Transport	756	158	914	5.7
Cut/Pierce	352	60	412	2.6
Firearm	287	103	390	2.4
All Other/Unk MOIs	1,488	334	1,822	11.3
Total	12,654	3,439	16,093	100.0
2020				
Fall	7,151	2,458	9,609	56.3
MVC – Occupant, Motorcyclist, Pedal Cyclist, Pedestrian, Other, Unspecified	1,949	509	2,458	14.4
Struck by or Against	991	91	1,082	6.3
Other Land Transport	837	178	1,015	5.9
Firearm	429	168	597	3.5
Cut/Pierce	401	59	460	2.7
All Other/Unk MOIs	1,521	325	1,846	10.8
Total	13,279	3,788	17,067	100.0
2021				
Fall	7,328	3,170	10,498	57.0
MVC – Occupant, Motorcyclist, Pedal Cyclist, Pedestrian, Other, Unspecified	2,240	764	3,004	16.3
Struck by or Against	961	119	1,080	5.9
Other Land Transport	843	230	1,073	5.8
Firearm	450	191	641	3.5
Cut/Pierce	342	77	419	2.3
All Other/Unk MOIs	1,330	375	1,705	9.3
Total	13,494	4,926	18,420*	100.0

*4 records excluded from table due to no length of stay

Figure 3. Number of transfers out of emergency departments by hospital type

This table looks at the number of instances where a patient was transferred out of a hospital based on the hospital type. The table below identifies the destination by hospital type for these transfers.

Most transfers out of the hospital were by acute care hospitals. Among the trauma centers, most of the transfers out came from Level III Trauma Centers.

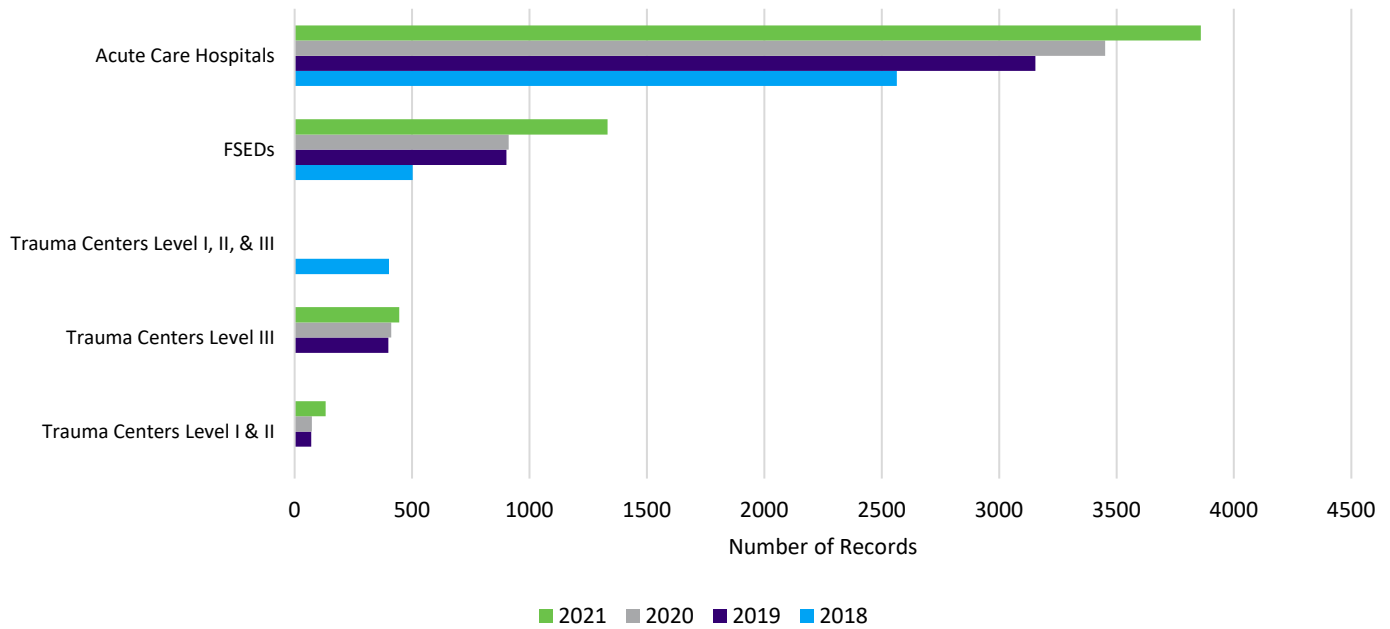


Table 4. Number of transfers out of emergency departments by hospital type

Hospital Type	2018 Transfers		2019 Transfers		2020 Transfers		2021 Transfers	
	#	%	#	%	#	%	#	%
Trauma Centers Level I, II, & III	402	11.5	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Trauma Centers Level I & II	Not Available	Not Available	70	1.5	73	1.5	132	2.3
Trauma Centers Level III	Not Available	Not Available	399	8.7	411	8.5	445	7.7
FSEDs	503	14.4	902	19.8	911	18.8	1,332	23.1
Acute Care Hospitals	2,580	73.7	3,194	70.0	3,451	71.2	3,859	66.9
Total	3,485	100.0	4,565	100.0	4,846	100.0	5,768	100.0

Table 4a. Destinations of emergency department transfers out of Level I Trauma Centers

There are a small number of transfers from emergency departments that come from Level I Trauma Centers. The table below identifies the destination by hospital type for these transfers.

Hospital Type	2018 Transfers		2019 Transfers		2020 Transfers		2021 Transfers	
	#	%	#	%	#	%	#	%
Trauma Centers	24	96.0	30	96.8	29	100.0	40	95.2
Acute Care Hospitals	0	0.0	1	3.2	0	0.0	0	0
Out of State	0	0.0	0	0.0	0	0.0	0	0
Other	1	4.0	0	0.0	0	0.0	2	4.8
Total	25	100.0	31	100.0	29	100.0	42	100.0

Table 4b. Destinations of emergency department transfers out of acute care hospitals

The majority of emergency department transfers out of acute care hospitals are transferred to Level I Trauma Centers. The table below identifies the destination by hospital type for these transfers.

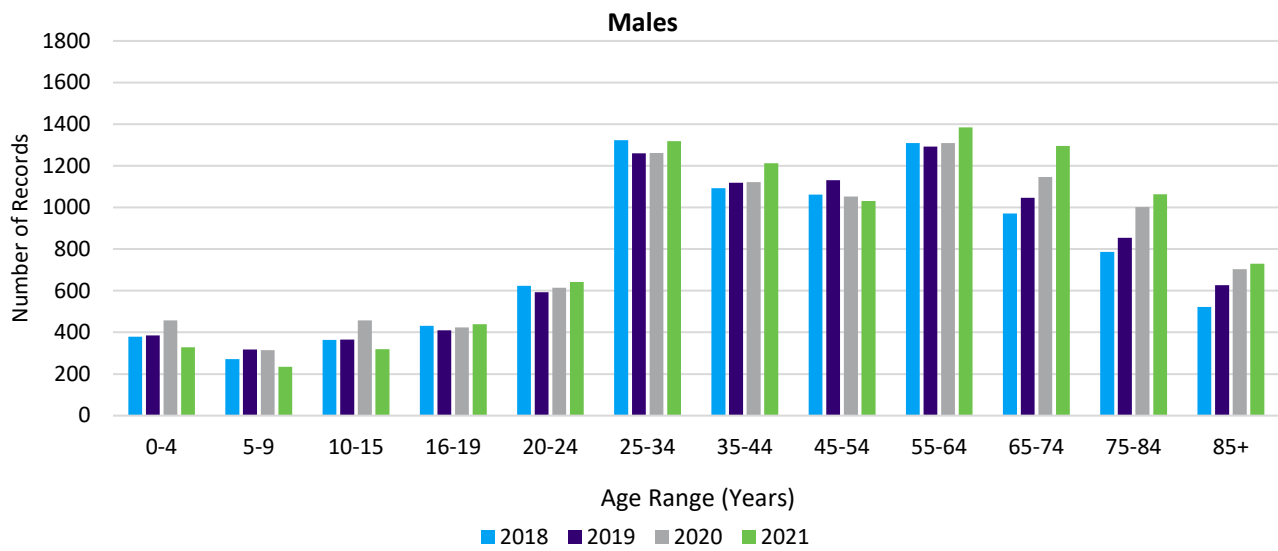
While the number of transfers from acute care hospitals to Level I and II Trauma Centers has steadily increased over the four years, the number transferred to Level III Trauma Centers has stayed relatively stable. The patients transferred from an acute care hospital to another acute care hospital are mainly transferred within a hospital system for single system injuries. As more facilities join COTS from southeast Ohio we see a slight increase of patients transferred out of state.

Hospital Type	2018 Transfers		2019 Transfers		2020 Transfers		2021 Transfers	
	#	%	#	%	#	%	#	%
Level I Trauma Centers	1,681	65.5	1,998	63.3	2,267	65.7	2,546	66.0
Level II Trauma Centers	771	30.0	1,030	32.7	1,022	29.6	1,132	29.3
Level III Trauma Centers	39	1.5	55	1.7	57	1.7	61	1.6
Acute Care Hospitals	64	2.5	67	2.1	97	2.8	79	2.1
FSEDs	0	0.0	1	0.0	0	0.0	2	0.1
Other	0	0.0	1	0.0	0	0.0	1	0.0
Out of State	4	0.2	0	0.0	6	0.2	22	0.6
Unknown	8	0.3	2	0.1	2	0.1	16	0.4
Total	2,567	100.0	3,154	100.0	3,451	100.0	3,859	100.0

Section 2: Patient Characteristics

Figure 4. Demographic by sex and age group

Figure 4, along with Table 5 below, look at the demographics of the records submitted to the trauma registry by sex and age group. From birth to age 64, males outnumbered females in each age group. Females accounted for a larger number of records compared to males from age 65 and older. The most common age group among males was 55 – 64. The least common age group overall was 5-9. The most common age group among females was 75-84. ED transfers out excluded.



1 male in 2020 excluded from chart due to missing age

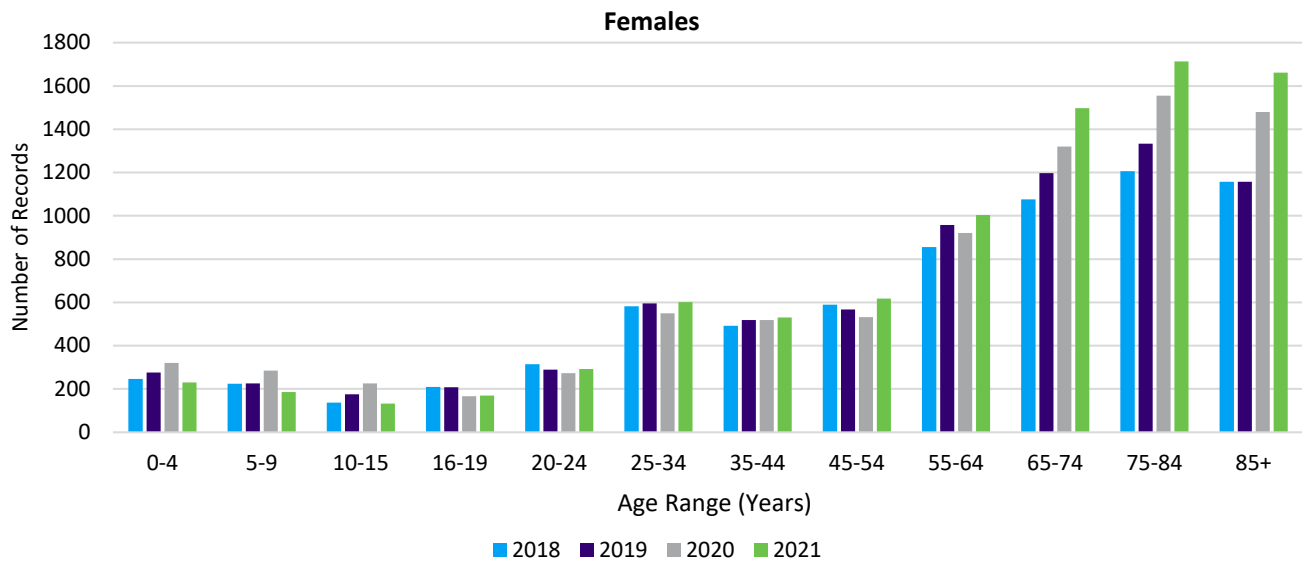


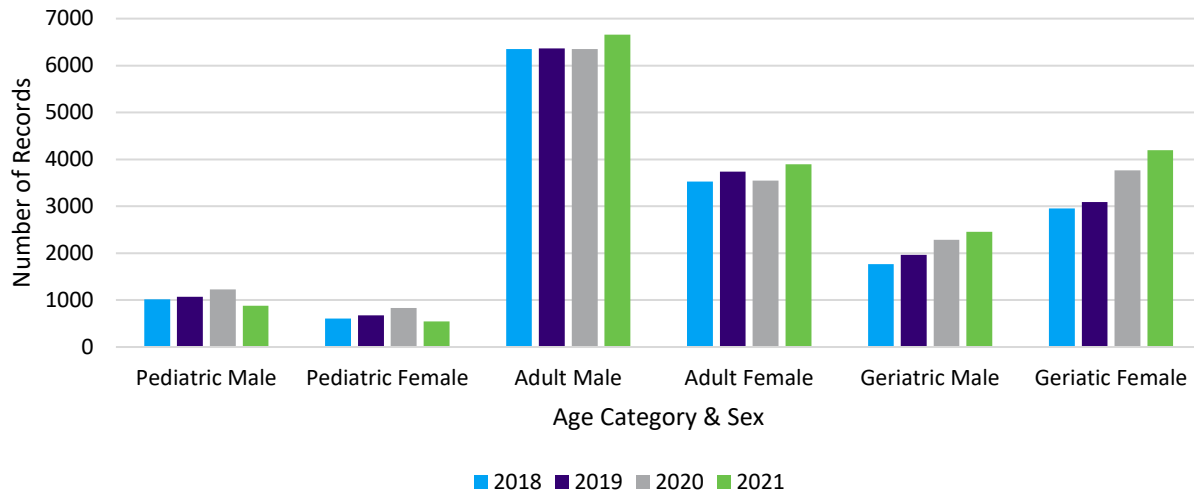
Table 5. Demographics by sex and age group

Year	Age Range (Years)	Male		Female		Total	
		#	%	#	%	#	%
2018	0 - 4	379	4.1	246	3.5	625	3.9
	5-9	272	3.0	225	3.2	497	3.1
	10-14	363	4.0	137	1.9	500	3.1
	15 - 19	432	4.7	209	2.9	641	4.0
	20 - 24	623	6.8	314	4.4	937	5.8
	25 - 34	1,323	14.5	582	8.2	1,905	11.7
	35 - 44	1,093	12.0	492	6.9	1,585	9.8
	45 - 54	1,062	11.6	590	8.3	1,652	10.2
	55 - 64	1,309	14.3	855	12.1	2,164	13.3
	65 - 74	971	10.6	1,076	15.2	2,047	12.6
	75 - 84	786	8.6	1,206	17.0	1,992	12.3
	85 and over	522	5.7	1,157	16.3	1,679	10.3
	Not Valued	0	0.0	0	0.0	0	0.0
Total		9,135	100.0	7,089	100.0	16,224	100.0
2019	0 - 4	386	4.1	276	3.7	662	3.9
	5-9	317	3.4	226	3.0	543	3.2
	10-14	365	3.9	176	2.3	541	3.2
	15 - 19	410	4.4	208	2.8	618	3.7
	20 - 24	593	6.3	289	3.9	882	5.2
	25 - 34	1,260	13.4	596	7.9	1,856	11.0
	35 - 44	1,118	11.9	518	6.9	1,636	9.7
	45 - 54	1,131	12.0	568	7.6	1,699	10.1
	55 - 64	1,293	13.8	958	12.8	2,251	13.3
	65 - 74	1,046	11.1	1,198	16.0	2,244	13.3
	75 - 84	854	9.1	1,333	17.8	2,187	12.9
	85 and over	627	6.7	1,157	15.4	1,784	10.6
	Not Valued	0	0.0	0	0.0	0	0.0
Total		9,400	100.0	7,503	100.0	16,903	100.0
2020	0 - 4	458	4.6	320	3.9	778	4.3
	5-9	314	3.2	285	3.5	599	3.3
	10-14	458	4.6	226	2.8	684	3.8
	15 - 19	423	4.3	167	2.0	590	3.3
	20 - 24	614	6.2	273	3.4	887	4.9
	25 - 34	1,262	12.8	549	6.7	1,811	10.1
	35 - 44	1,122	11.4	519	6.4	1,641	9.1
	45 - 54	1,052	10.7	532	6.5	1,584	8.8
	55 - 64	1,309	13.3	921	11.3	2,230	12.4
	65 - 74	1,146	11.6	1,320	16.2	2,466	13.7
	75 - 84	1,002	10.2	1,555	19.1	2,557	14.2
	85 and over	704	7.1	1,480	18.2	2,184	12.1
	Not Valued	1	0.0	0	0.0	1	0.0
Total		9,865	100.0	8,147	100.0	18,012	100.0
2021	0 - 4	329	3.2	230	2.7	559	3.0
	5-9	235	2.4	186	2.2	421	2.3
	10 - 14	319	3.2	132	1.5	451	2.4
	15 - 19	439	4.4	169	1.96	608	3.3
	20 - 24	642	6.4	292	3.4	934	5.0
	25 - 34	1,319	13.2	602	7.0	1,921	10.3
	35 - 44	1,213	12.1	531	6.1	1,744	9.4
	45 - 54	1,031	10.3	618	7.2	1,649	8.9
	55 - 64	1,385	13.9	1,004	11.6	2,389	12.8
	65 - 74	1,296	13.0	1,498	17.3	2,794	15.0
	75 - 84	1,063	10.6	1,714	19.8	2,777	14.9
	85 and over	729	7.3	1,661	19.2	2,390	12.8
	Not Valued	0	0.0	0	0.0	0	0.0
Total		10,000	100.0	8,637	100.0	18,637*	100.0

*1 Records had unknown sex and was excluded from this table

Figure 5. Demographics by patient type and sex

This analysis defines pediatric patients as those between the ages of 0 to 15 years, adult patients as those between the ages of 16 to 69 years, and geriatric patients as those ages 70 and older. The chart below shows the number of records based on type of patient (i.e., pediatric, adult, or geriatric) and patient sex. Adult males outnumber females in all categories except geriatric patients. The number of injuries in the geriatric patients for both sexes progressively increase over the four years.



2020: 1 male excluded from chart due to no age value.
 2021: 1 records had unknown sex and was exclude.

Table 6. Demographics by patient type and sex

Sex	Type of Patient									
	Pediatric		Adult		Geriatric		Not Valued		Total	
	#	%	#	%	#	%	#	%	#	%
2018										
Male	1,014	62.5	6,351	64.3	1,770	37.5	0	0.0	9,135	56.3
Female	608	37.5	3,530	35.7	2,951	62.5	0	0.0	7,089	43.7
Total	1,622	100.0	9,881	100.0	4,721	100.0	0	0.0	16,224	100.0
2019										
Male	1,068	61.2	6,366	63.0	1,966	38.9	0	0.0	9,400	55.6
Female	678	38.8	3,737	37.0	3,088	61.1	0	0.0	7,503	44.4
Total	1,746	100.0	10,103	100.0	5,054	100.0	0	0.0	16,903	100.0
2020										
Male	1,230	59.7	6,352	64.2	2,282	37.7	1	100.0	9,865	54.8
Female	831	40.3	3,549	35.8	3,767	62.3	0	0.0	8,147	45.2
Total	2,061	100.0	9,901	100.0	6,049	100.0	1	100.0	18,012	100.0
2021										
Male	883	61.7	6,661	63.1	2,456	36.9	0	0.0	10,000	53.7
Female	548	38.3	3,893	36.9	4,196	63.1	0	0.0	8,637	46.3
Total	1,431	100.0	10,554	100.0	6,652	100.0	0	0.0	18,637*	100.0

* 1 record had unknown sex and was excluded from this table

Figure 6. Demographics by race

The largest incidence is in Whites, followed by Blacks.

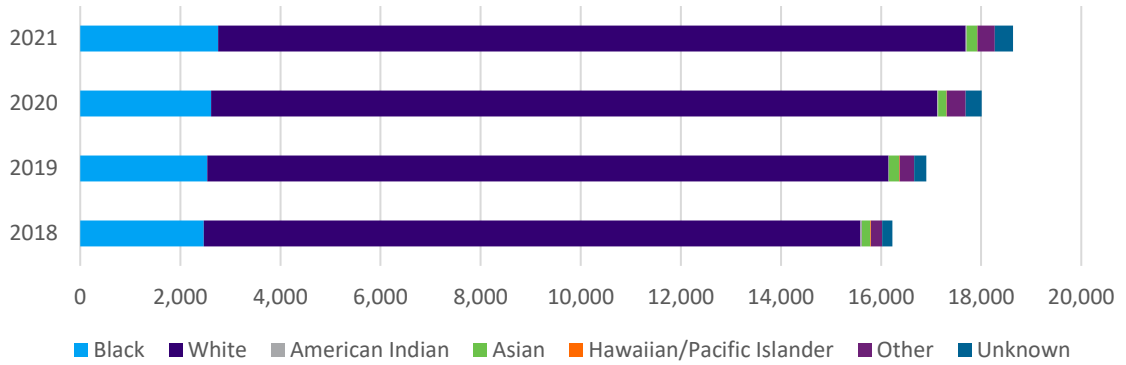


Table 7. Demographics by race

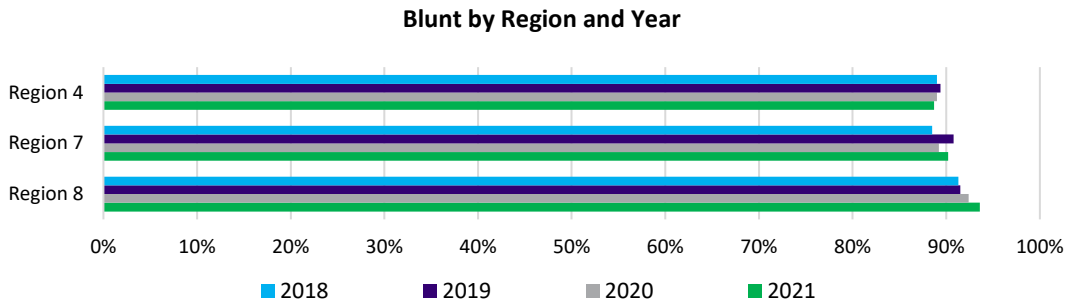
Race	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
American Indian	28	0.2	12	0.1	21	0.1	18	0.1
Asian	169	1.0	202	1.2	164	0.9	211	1.1
Black	2,471	15.2	2,541	15.0	2,612	14.5	2,753	14.8
Hawaiian/Pacific Islander	14	0.1	10	0.1	7	0.0	8	0.0
White	13,118	80.9	13,606	80.5	14,508	80.5	14,937	80.1
Other	224	1.4	287	1.7	378	2.1	345	1.9
Unknown	200	1.2	245	1.4	322	1.8	366	2.0
Total	16,224	100.0	16,903	100.0	18,012	100.0	18,638	100.0

Section 3: Injury Characteristics

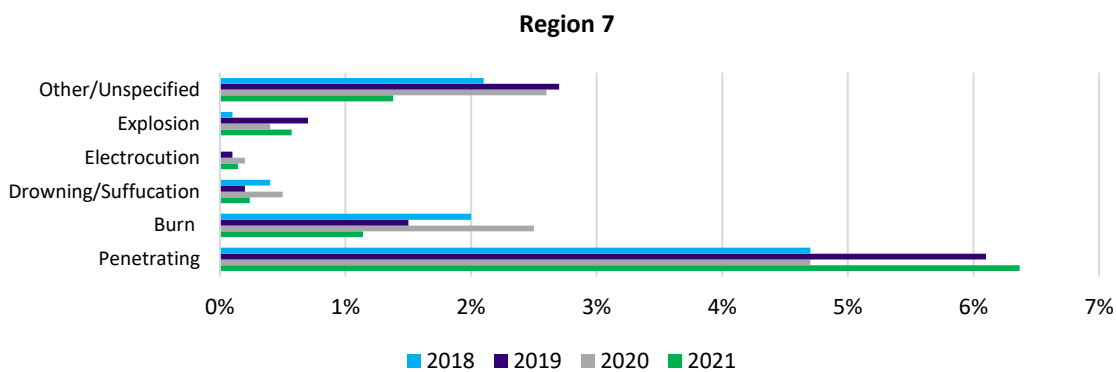
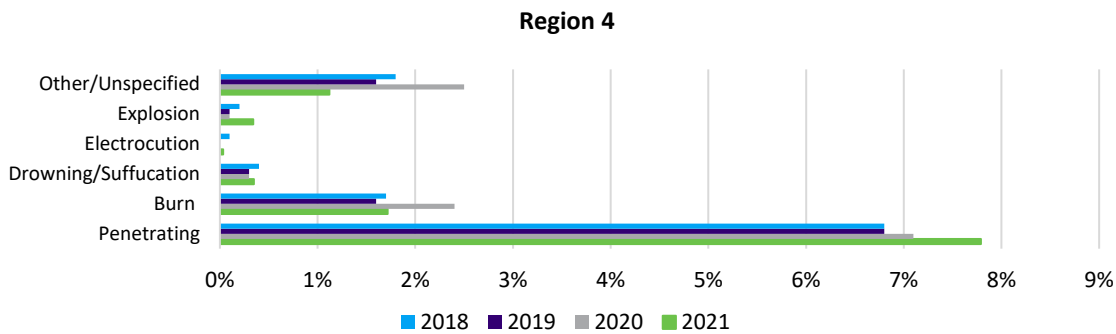
Figure 7. Types of injuries by year and region (4, 7, and 8)

Figure 7 demonstrates the types of injuries sustained yearly from 2018 through 2021 by specific regions. The type of injury is based on the reported ICD-10 code. Blunt injuries were the most common injury type identified in all four years, comprising 88.5% - 93.6% of all injury types depending on the year and region.

The figure below only includes blunt injuries to allow for better visualization of the other injury types in later charts.



The figures below do not include blunt injuries to allow for better visualization of the other injury types.



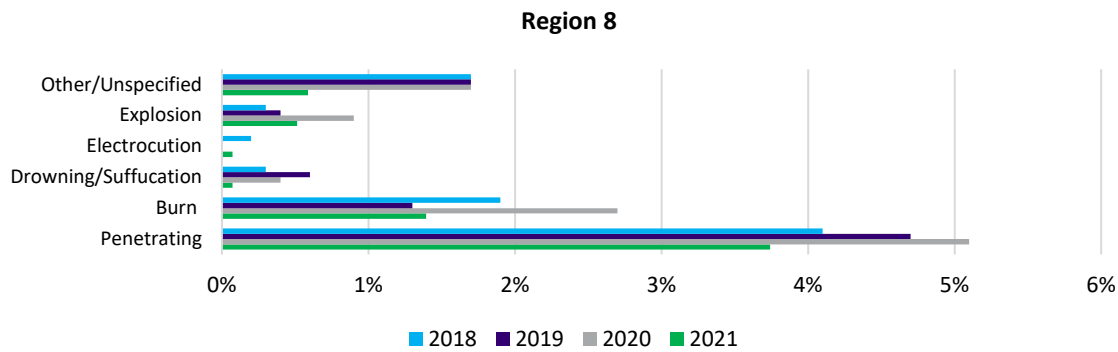


Table 8. Type of injuries by year and region (4, 7, and 8)

	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
Region 4								
Blunt	9,369	89.0	9,594	89.4	10,266	88.8	10,687	88.7
Penetrating	714	6.8	734	6.8	970	8.4	939	7.8
Burn	182	1.7	172	1.6	187	1.6	207	1.7
Drowning/Suffocation	46	0.4	37	0.3	33	0.3	42	0.4
Electrocution	11	0.1	3	0.0	2	0.0	4	0.0
Explosion	21	0.2	13	0.1	10	0.1	41	0.3
Other/Unspecified	186	1.8	173	1.6	97	0.8	135	1.1
Total	10,529	100.0	10,726	100.0	11,565	100.0	12,055	100.0
Region 7								
Blunt	1,455	88.5	1,533	90.8	1,907	89.2	1,898	90.2
Penetrating	101	6.1	80	4.7	142	6.6	134	6.4
Burn	25	1.5	33	2.0	23	1.1	24	1.1
Drowning/Suffocation	4	0.2	7	0.4	27	1.3	5	0.2
Electrocution	2	0.1	0	0.0	0	0.0	3	0.1
Explosion	12	0.7	1	0.1	3	0.1	12	0.6
Other/Unspecified	45	2.7	35	2.1	37	1.7	29	1.4
Total	1,644	100.0	1,689	100.0	2,139	100.0	2,105	100.0
Region 8								
Blunt	1,141	91.3	1,148	91.5	1,146	92.4	1,276	93.6
Penetrating	59	4.7	51	4.1	60	4.8	51	3.7
Burn	16	1.3	24	1.9	15	1.2	19	1.4
Drowning/Suffocation	8	0.6	4	0.3	4	0.3	1	0.1
Electrocution	0	0.0	3	0.2	0	0.0	1	0.1
Explosion	5	0.4	4	0.3	2	0.2	7	0.5
Other/Unspecified	21	1.7	21	1.7	13	1.0	8	0.6
Total	1,250	100.0	1,255	100.0	1,240	100.0	1,363	100.0

Figure 8. Mechanism of injury by year and region (4, 7, and 8)

A review of the data demonstrates that in region 4 and 7, injuries have increased from 2018 through 2021, but in Region 8 they have decreased. Falls are the major mechanism of injuries in all three regions.

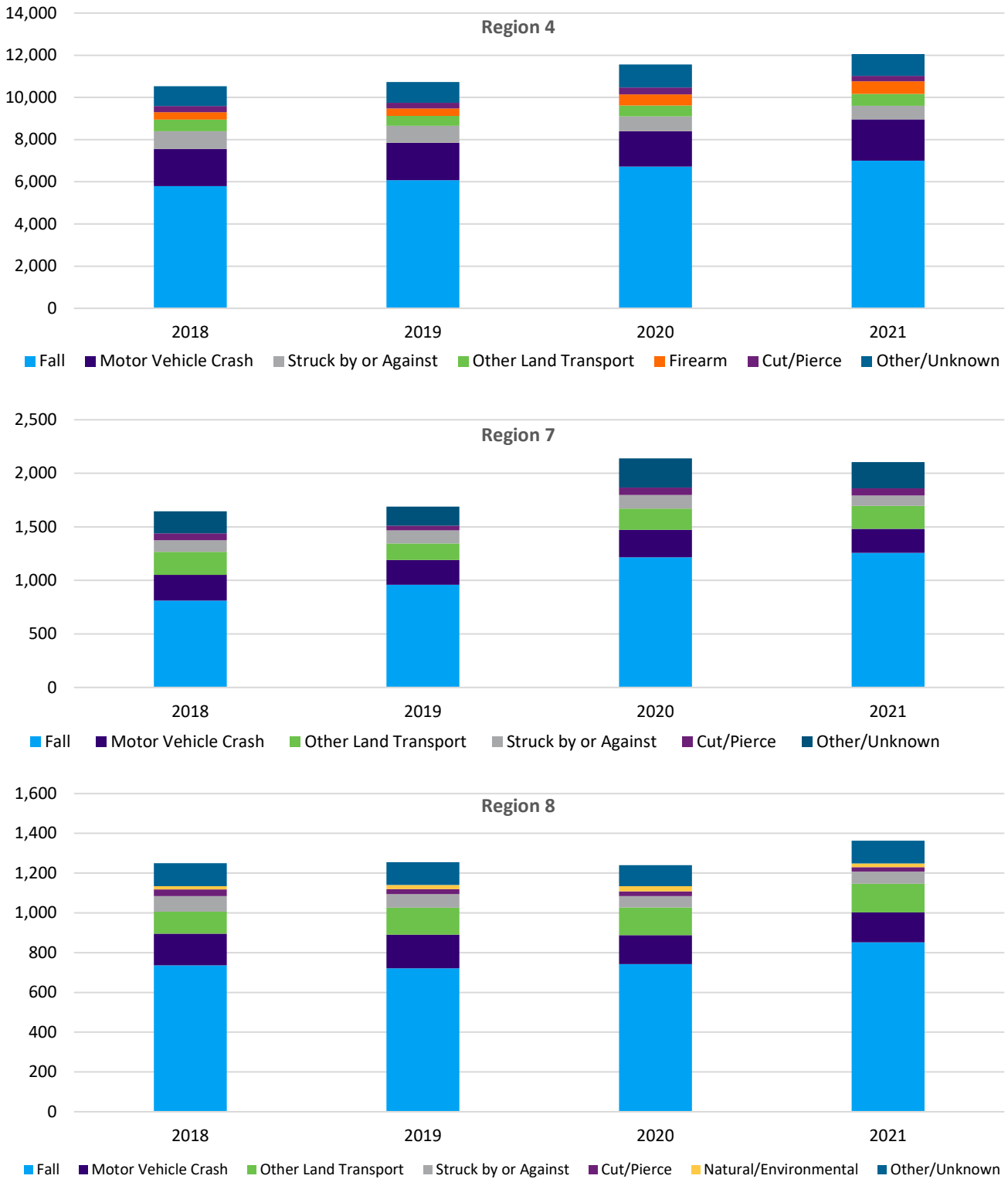


Table 9. Mechanism of injury by year and region (4, 7, and 8)

	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
Region 4								
Fall	5,792	55.0	6,077	56.7	6,718	58.1	6,997	58.0
MVC – Occupant, Motorcyclist, Pedal Cyclist, Pedestrian, Other, Unspecified	1,762	16.7	1,770	16.4	1,678	14.5	1,960	16.3
Struck by or Against	843	8.0	807	7.5	704	6.1	647	5.4
Other Land Transport	551	5.2	469	4.4	512	4.4	557	4.6
Firearm	349	3.3	347	3.2	532	4.6	605	5.0
Cut/Pierce	299	2.8	279	2.6	326	2.8	259	2.2
Other/Unknown	933	8.9	977	9.2	1,095	9.5	1,030	8.5
Total	10,529	100.0	10,726	100.0	11,565	100.0	12,055	100.0
Region 7								
Fall	811	49.3	960	56.8	1,216	56.8	1,257	59.7
MVC – Occupant, Motorcyclist, Pedal Cyclist, Pedestrian, Other, Unspecified	240	14.6	230	13.6	257	12.0	225	10.7
Other Land Transport	215	13.1	155	9.2	198	9.3	215	10.2
Struck by or Against	110	6.7	123	7.3	126	5.9	95	4.5
Cut/Pierce	64	3.9	42	2.5	69	3.2	69	3.3
Other/Unknown	204	12.4	179	10.6	273	12.8	244	11.5
Total	1,644	100.0	1,689	100.0	2,139	100.0	2,105	100.0
Region 8								
Fall	736	58.9	722	57.5	743	59.9	852	62.5
MVC – Occupant, Motorcyclist, Pedal Cyclist, Pedestrian, Other, Unspecified	160	12.8	169	13.5	145	11.7	150	11.0
Other Land Transport	110	8.8	135	10.8	139	11.2	145	10.6
Struck by or Against	79	6.3	68	5.4	58	4.7	61	4.5
Cut/Pierce	33	2.6	25	2.0	23	1.9	22	1.6
Natural/Environmental	16	1.3	21	1.7	26	2.1	19	1.4
Other/Unknown	116	9.3	115	9.2	106	8.5	114	8.4
Total	1,250	100.0	1,255	100.0	1,240	100.0	1,363	100.0

Table 10. Intent of injury

This table shows the intent of the injury sustained yearly from 2018 to 2021. The categories of intent of injury were based on the reported ICD-10 code. Most of the injuries were unintentional.

Intent of Injury	2018 Injuries		2019 Injuries		2020 Injuries		2021 Injuries	
	#	%	#	%	#	%	#	%
Region 4								
Unintentional	9,218	87.5	9,488	88.5	10,215	88.3	10,685	88.6
Self-inflicted	131	1.2	119	1.1	133	1.2	137	1.1
Assault	1,120	10.6	1,073	10.0	1,162	10.0	1,169	9.7
Undetermined	36	0.3	39	0.4	44	0.4	46	0.4
Other	19	0.2	5	0.1	11	0.1	5	0.0
Not Valued	5	0.0	2	0.0	0	0.0	13	0.1
Total	10,529	100.0	10,726	100.0	11,565	100.0	12,055	100.0
Region 7								
Unintentional	1,500	91.2	1,541	91.2	1,993	93.2	1,985	94.3
Self-inflicted	18	1.1	18	1.1	14	0.7	25	1.2
Assault	117	7.1	126	7.5	127	5.9	86	4.1
Undetermined	5	0.3	3	0.2	3	0.1	5	0.2
Other	2	0.1	0	0.0	2	0.1	4	0.2
Not Valued	2	0.1	1	0.1	0	0.0	0	0.0
Total	1,644	100.0	1,689	100.0	2,139	100.0	2,105	100.0
Region 8								
Unintentional	1,158	92.6	1,181	94.1	1,174	94.7	1,306	95.8
Self-inflicted	20	1.6	12	1.0	11	0.9	7	0.5
Assault	71	5.7	58	4.6	50	4.0	49	3.6
Undetermined	1	0.1	3	0.2	2	0.2	1	0.1
Other	0	0.0	1	0.1	0	0.0	0	0.0
Not Valued	0	0.0	0	0.0	3	0.2	0	0.0
Total	1,250	100.0	1,255	100.0	1,240	100.0	1,363	100.0

Section 4: Outcome Measures

Outcome measures as defined by the World Health Organization are the “change in the health of an individual, group of people, or population that is attributable to an intervention or series of interventions.” For the purposes of this report, outcome measures include but are not limited to a patient’s initial disposition on arrival, final discharge disposition, and mortality (Ohio Department of Public Safety, Division of EMS 2019 Ohio Trauma Registry Annual Report).

Table 11. Emergency department disposition of trauma cases

These tables show the disposition of patients after arriving at the emergency department. The most frequent ED disposition for trauma centers was being admitted to the floor. For acute care hospitals and FSEDs the most frequent ED disposition was being transferred to another hospital. The tables count every record and may include two records for some patients if they were treated at more than one facility due to being transferred out for a higher level of care.

ED Disposition	2018 Injuries		2019 Injuries		2020 Injuries		2021 Injuries	
	#	%	#	%	#	%	#	%
Trauma Centers Level I, II, III								
Floor	5,965	38.9	Not available	Not available	Not available	Not available	Not available	Not available
Transfer To Another Hospital	402	2.6	Not available	Not available	Not available	Not available	Not available	Not available
Intensive Care Unit (ICU)	2,015	13.1	Not available	Not available	Not available	Not available	Not available	Not available
Telemetry/Step-Down Unit	2,285	14.9	Not available	Not available	Not available	Not available	Not available	Not available
Operating Room	1,104	7.2	Not available	Not available	Not available	Not available	Not available	Not available
Observation Unit	2,492	16.2	Not available	Not available	Not available	Not available	Not available	Not available
Home without Services	607	4.0	Not available	Not available	Not available	Not available	Not available	Not available
Morgue	117	0.8	Not available	Not available	Not available	Not available	Not available	Not available
Left Against Medical Advice	29	0.2	Not available	Not available	Not available	Not available	Not available	Not available
Other (Out of Hospital)	9	0.1	Not available	Not available	Not available	Not available	Not available	Not available
Home with Services	0	0.0	Not available	Not available	Not available	Not available	Not available	Not available
Direct Admissions to Hospital	313	2.0	Not available	Not available	Not available	Not available	Not available	Not available
Not Valued	0	0.0	Not available	Not available	Not available	Not available	Not available	Not available
Total	15,338	100.0	Not available	Not available	Not available	Not available	Not available	Not available
Trauma Centers Level I & II								
Floor	Not available	Not available	5,321	36.5	5,687	38.4	6,601	40.9
Transfer To Another Hospital	Not available	Not available	70	0.5	73	0.5	132	0.8
Intensive Care Unit (ICU)	Not available	Not available	1,978	13.6	1,916	12.9	2,054	12.7
Telemetry/Step-Down Unit	Not available	Not available	2,675	18.3	3,019	20.4	3,155	19.5
Operating Room	Not available	Not available	1,130	7.7	1,192	8.0	1,737	10.8
Observation Unit	Not available	Not available	2,439	16.7	1,831	12.4	1,081	6.7
Home without Services	Not available	Not available	646	4.4	768	5.2	909	5.6
Morgue	Not available	Not available	95	0.7	134	0.9	157	1.0
Left Against Medical Advice	Not available	Not available	24	0.2	5	0.0	49	0.3
Interventional Radiology*	Not available	Not available	Not available	Not available	Not available	Not available	13	0.1
Other (Out of Hospital)	Not available	Not available	7	0.0	2	0.0	18	0.1
Home with Services	Not available	Not available	0	0.0	1	0.0	3	0.0
Direct Admissions to Hospital	Not available	Not available	210	1.4	190	1.3	238	1.4
Not Valued	Not available	Not available	0	0.0	0	0.0	0	0.0
Total	Not available	Not available	14,595	100.0	14,818	100.0	16,147	100.0

*Interventional Radiology new option in 2021

ED Disposition	2018 Injuries		2019 Injuries		2020 Injuries		2021 Injuries	
	#	%	#	%	#	%	#	%
Trauma Centers Level III								
Floor	Not available	Not available	770	50.2	791	49.5	898	51.9
Transfer To Another Hospital	Not available	Not available	399	26.0	411	25.7	445	25.7
Intensive Care Unit (ICU)	Not available	Not available	70	4.6	75	4.7	48	2.8
Telemetry/Step-Down Unit	Not available	Not available	68	4.4	110	6.9	70	4.0
Operating Room	Not available	Not available	55	3.6	69	4.3	87	5.0
Observation Unit	Not available	Not available	46	3.0	29	1.8	25	1.4
Home without Services	Not available	Not available	10	0.7	0	0.0	1	0.1
Morgue	Not available	Not available	15	1.0	14	0.9	18	1.0
Left Against Medical Advice	Not available	Not available	0	0.0	0	0.0	0	0.0
Interventional Radiology	Not available	Not available	Not available	Not available	Not available	Not available	0	0.0
Other (Out of Hospital)	Not available	Not available	1	0.1	0	0.0	0	0.0
Home with Services	Not available	Not available	0	0.0	0	0.0	0	0.0
Direct Admissions to Hospital	Not available	Not available	101	6.6	100	6.3	137	7.9
Not Valued	Not available	Not available	0	0.0	0	0.0	0	0.0
Total	Not available	Not available	1,535	100.0	1,599	100.0	1,729	100.0
Acute Care Hospital								
Floor	1,044	26.9	1,005	22.5	1,555	28.0	1,624	26.0
Transfer To Another Hospital	2,580	66.5	3,194	71.6	3,451	62.1	3,859	61.7
Intensive Care Unit (ICU)	25	0.6	12	0.3	57	1.0	39	0.6
Telemetry/Step-Down Unit	60	1.5	38	0.9	186	3.3	309	5.0
Operating Room	45	1.2	17	0.4	31	0.6	65	1.0
Observation Unit	42	1.1	37	0.8	34	0.6	61	1.0
Home without Services	3	0.1	6	0.1	34	0.6	34	0.5
Morgue	24	0.6	20	0.4	22	0.4	35	0.6
Left Against Medical Advice	0	0.0	7	0.2	7	0.1	19	0.3
Interventional Radiology	Not available	Not available	Not available	Not available	Not available	Not available	0	0.0
Other (Out of Hospital)	1	0.0	23	0.5	29	0.5	13	0.2
Home with Services	0	0.0	1	0.0	1	0.0	7	0.1
Direct Admissions to Hospital	54	1.4	99	2.2	152	2.7	182	2.9
Not Valued	0	0.0	2	0.0	0	0.0	0.0	0.0
Total	3,878	100.0	4,461	100.0	5,559	100.0	6,247	100.0
FSEDS								
Floor	0	0.0	6	0.7	2	0.2	0	0
Transfer To Another Hospital	503	100.0	902	99.3	911	99.8	1,332	99.7
Intensive Care Unit (ICU)	0	0.0	0	0.0	0	0.0	0	0.0
Telemetry/Step-Down Unit	0	0.0	0	0.0	0	0.0	0	0.0
Operating Room	0	0.0	0	0.0	0	0.0	0	0.0
Observation Unit	0	0.0	0	0.0	0	0.0	0	0.0
Home without Services	0	0.0	0	0.0	0	0.0	0	0.0
Morgue	0	0.0	0	0.0	0	0.0	4	0.3
Left Against Medical Advice	0	0.0	0	0.0	0	0.0	0	0.0
Interventional Radiology	Not available	Not available	Not available	Not available	Not available	Not available	0	0.0
Other (Out of Hospital)	0	0.0	0	0.0	0	0.0	0	0.0
Home with Services	0	0.0	0	0.0	0	0.0	0	0.0
Direct Admissions to Hospital	0	0.0	0	0.0	0	0.0	0	0.0
Not Valued	0	0.0	0	0.0	0	0.0	0	0.0
Total	503	100.0	908	100.0	913	100.0	1,336	100.0

Table 12. Hospital inpatient discharge disposition

This table shows the disposition of patients at the time of their discharge and only includes patient admitted. For trauma centers the most common hospital discharge disposition was home. At acute care hospitals discharged to a skilled nursing facility was most frequent.

Discharge Disposition	2018 Injuries		2019 Injuries		2020 Injuries		2021 Injuries	
	#	%	#	%	#	%	#	%
Trauma Centers Level I, II, III								
Home	8,805	62.1	Not available	Not available	Not available	Not available	Not available	Not available
Skilled Nursing Facility	2,195	15.5	Not available	Not available	Not available	Not available	Not available	Not available
Home with Services	1,400	9.9	Not available	Not available	Not available	Not available	Not available	Not available
Inpatient Rehab or Designated Unit	675	4.8	Not available	Not available	Not available	Not available	Not available	Not available
Expired	358	4.8	Not available	Not available	Not available	Not available	Not available	Not available
Left AMA/Discontinued Care	241	2.5	Not available	Not available	Not available	Not available	Not available	Not available
Hospice	133	1.7	Not available	Not available	Not available	Not available	Not available	Not available
Transferred to Another Hospital	59	0.4	Not available	Not available	Not available	Not available	Not available	Not available
Long Term Care Hospital (LTCH)	93	0.7	Not available	Not available	Not available	Not available	Not available	Not available
Psychiatric Hospital (Inpatient)	99	0.7	Not available	Not available	Not available	Not available	Not available	Not available
Court/Law Enforcement	102	0.7	Not available	Not available	Not available	Not available	Not available	Not available
Intermediate Care Facility	6	0.0	Not available	Not available	Not available	Not available	Not available	Not available
Inpatient Facility Not Defined Elsewhere	8	0.1	Not available	Not available	Not available	Not available	Not available	Not available
Not Valued	0	0.0	Not available	Not available	Not available	Not available	Not available	Not available
Total	14,174	100.0	Not available	Not available	Not available	Not available	Not available	Not available
Trauma Centers Level I & II								
Home	Not available	Not available	8,705	63.3	8,593	62.1	8,962	60.2
Skilled Nursing Facility	Not available	Not available	1,962	14.3	1,917	13.9	2,256	15.2
Home with Services	Not available	Not available	1,461	10.6	1,661	12.0	1,699	11.4
Inpatient Rehab or Designated Unit	Not available	Not available	665	4.8	632	4.6	705	4.7
Expired	Not available	Not available	345	2.5	343	2.5	459	3.1
Left AMA/Discontinued Care	Not available	Not available	209	1.5	230	1.7	264	1.8
Hospice	Not available	Not available	145	1.1	175	1.3	165	1.1
Transferred to Another Hospital	Not available	Not available	35	0.3	39	0.3	65	0.4
Long Term Care Hospital (LTCH)	Not available	Not available	66	0.5	77	0.6	89	0.6
Psychiatric Hospital (Inpatient)	Not available	Not available	86	0.6	87	0.6	92	0.6
Court/Law Enforcement	Not available	Not available	70	0.5	69	0.5	87	0.6
Intermediate Care Facility	Not available	Not available	1	0.0	2	0.0	2	0.0
Inpatient Facility Not Defined Elsewhere	Not available	Not available	3	0.1	10	0.1	20	0.1
Not Valued	Not available	Not available	0	0.0	0	0.0	14	0.1
Total	Not available	Not available	13,753	100.0	13,835	100.0	14,879	100.0

Discharge Disposition	2018 Injuries		2019 Injuries		2020 Injuries		2021 Injuries	
	#	%	#	%	#	%	#	%
Trauma Centers Level III								
Home	Not available	Not available	512	46.1	544	46.3	563	44.5
Skilled Nursing Facility	Not available	Not available	298	26.8	286	24.4	377	29.8
Home with Services	Not available	Not available	190	17.3	203	17.3	193	15.3
Inpatient Rehab or Designated Unit	Not available	Not available	17	1.5	20	1.6	22	1.7
Expired	Not available	Not available	10	0.9	18	1.2	24	1.9
Left AMA/Discontinued Care	Not available	Not available	9	0.8	22	1.4	17	1.3
Hospice	Not available	Not available	14	0.1	25	1.7	14	1.1
Transferred to Another Hospital	Not available	Not available	45	4.1	41	3.8	40	3.2
Long Term Care Hospital (LTCH)	Not available	Not available	2	0.2	2	0.2	4	0.3
Psychiatric Hospital (Inpatient)	Not available	Not available	8	0.7	10	0.8	7	0.6
Court/Law Enforcement	Not available	Not available	4	0.4	3	0.3	2	0.2
Intermediate Care Facility	Not available	Not available	1	0.1	0	0.0	0	0.0
Inpatient Facility Not Defined Elsewhere	Not available	Not available	0	0.0	0	0.0	2	0.2
Not Valued	Not available	Not available	0	0.0	0	0.0	0	0.0
Total	Not available	Not available	1,110	100.0	1,174	100.0	1,265	100.0
Acute Care Hospital								
Home	384	30.2	328	26.8	468	22.8	501	22.0
Skilled Nursing Facility	580	45.6	570	46.6	893	43.4	1029	45.1
Home with Services	203	15.9	216	17.6	447	21.7	422	18.5
Inpatient Rehab or Designated Unit	31	2.4	17	1.4	51	2.5	114	5.0
Expired	18	1.4	11	0.9	35	1.7	37	1.6
Left AMA/Discontinued Care	6	0.5	18	1.5	22	1.1	14	0.6
Hospice	8	0.6	8	0.7	38	1.8	43	1.9
Transferred to Another Hospital	25	2.0	44	3.6	64	3.1	76	3.3
Long Term Care Hospital (LTCH)	3	0.2	0	0.0	7	0.3	4	0.2
Psychiatric Hospital (Inpatient)	7	0.5	3	0.2	15	0.7	10	0.4
Court/Law Enforcement	1	0.1	1	0.1	0	0.0	1	0.0
Intermediate Care Facility	4	0.3	6	0.5	3	0.1	20	0.9
Inpatient Facility Not Defined Elsewhere	2	0.2	0	0.0	2	0.1	6	0.3
Not Valued	0	0.0	2	0.2	11	0.5	3	0.1
Total	1,272	100.0	1,224	100.0	2,056	100.0	2,280	100.0
FSEds								
Home	0	0.0	6	100.0	2	100.0	0	0.0
Skilled Nursing Facility	0	0.0	0	0.0	0	0.0	0	0.0
Home with Services	0	0.0	0	0.0	0	0.0	0	0.0
Inpatient Rehab or Designated Unit	0	0.0	0	0.0	0	0.0	0	0.0
Expired	0	0.0	0	0.0	0	0.0	0	0.0
Left AMA/Discontinued Care	0	0.0	0	0.0	0	0.0	0	0.0
Hospice	0	0.0	0	0.0	0	0.0	0	0.0
Transferred to Another Hospital	0	0.0	0	0.0	0	0.0	0	0.0
Long Term Care Hospital (LTCH)	0	0.0	0	0.0	0	0.0	0	0.0
Psychiatric Hospital (Inpatient)	0	0.0	0	0.0	0	0.0	0	0.0
Court/Law Enforcement	0	0.0	0	0.0	0	0.0	0	0.0
Intermediate Care Facility	0	0.0	0	0.0	0	0.0	0	0.0
Inpatient Facility Not Defined Elsewhere	0	0.0	0	0.0	0	0.0	0	0.0
Not Valued	0	0.0	0	0.0	0	0.0	0	0.0
Total	0	0.0	6	100.0	2	100.0	0	0.0

Figure 9. Discharge status of reported trauma cases

This figure shows the percentage of records with reported traumatic injuries by outcome by year from 2018 to 2021. Patients transferred out are not included in this data

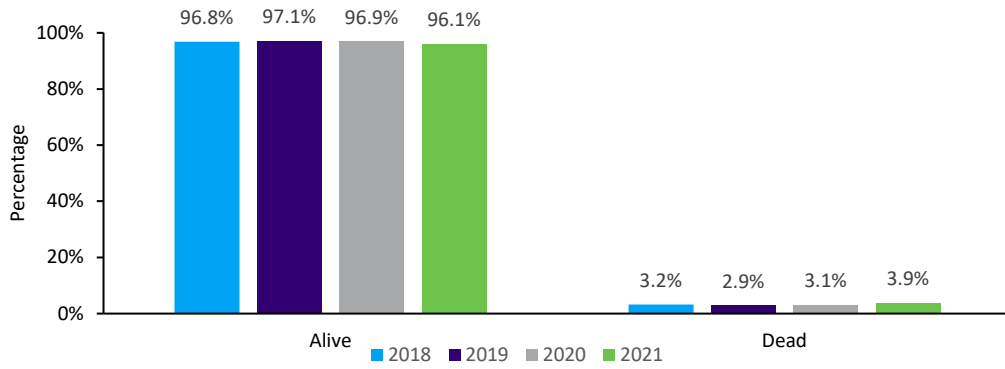


Table 13. Discharge status of reported trauma cases

This table shows the discharge status (i.e., alive or dead) of records with reported traumatic injuries from 2018 to 2021. Patients transferred out are not included in this data.

Year	Discharge Status					
	Alive		Dead		Total	
	#	%	#	%	#	%
2018	15,709	96.8	515	3.2	16,224	100.0
2019	16,409	97.1	494	2.9	16,903	100.0
2020	17,448	96.9	564	3.1	18,012	100.0
2021	17,907	96.1	731	3.9	18,638	100.0

Figure 10. Emergency department deaths by hospital type

This graph shows the number and percentage of emergency department deaths by hospital type. Most deaths occurred at Level I and II Trauma Centers. Level I Trauma Centers receive the most critical trauma cases therefore would have the most deaths. In 2019 and 2020, there were more deaths reported at acute care hospitals than at Level III Trauma Centers although this represents emergency department deaths only. There were no deaths at FSEDs until 2021.

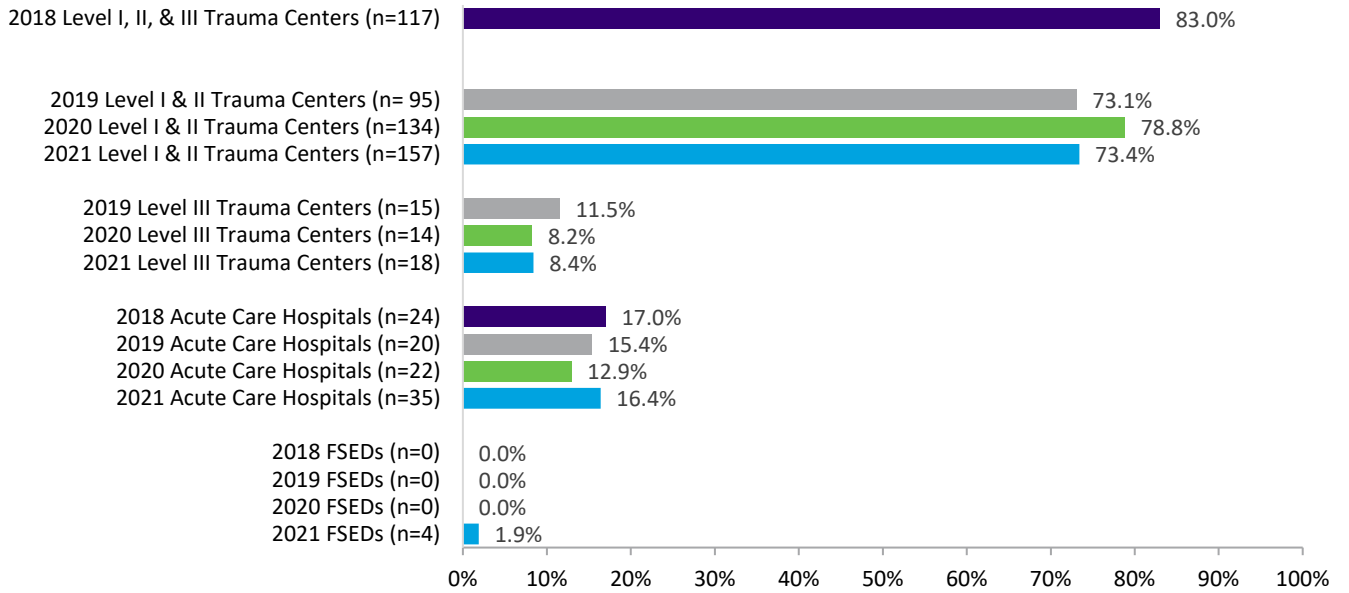


Table 14. Emergency department deaths by hospital type

Hospital Type	2018 Transfers		2019 Transfers		2020 Transfers		2021 Transfers	
	#	%	#	%	#	%	#	%
Trauma Centers Level I, II, & III	117	83.0	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
Trauma Centers Level I & II	Not Available	Not Available	95	73.1	134	78.8	157	73.4
Trauma Centers Level III	Not Available	Not Available	15	11.5	14	8.2	18	8.4
FSEDs	0	0.0	0	0.0	0	0.0	4	1.9
Acute Care Hospitals	24	17.0	20	15.4	22	12.9	35	16.4
Total	141	100.0	130	100.0	170	100.0	214	100.0

Section 5: Four-Year Trend of Firearm Injuries

Table 15. Firearm injuries by region of occurrence

This table shows the distribution of firearm injuries by region where the injury occurred by year. This table excludes ED transfers out to not double count patients. In 2020 and 2021 there was an increase in firearm injuries, mainly reflected by the increase in Region 4. It should be noted that in Region 7 the number of firearm injuries doubled from 2019 to 2020.

Region	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
Region 4	341	81.4	333	77.8	524	79.0	605	82.8
Region 7	23	5.5	19	4.4	40	6.0	30	4.1
Region 8	16	3.8	14	3.3	17	2.6	15	2.1
Other Regions/Not Valued	39	9.3	62	14.5	82	12.4	81	11.1
Total	419	100.0	428	100.0	663	100.0	731	100.0

Table 16. Firearm injuries by region of occurrence and intent

This table shows the distribution of firearm injuries by region and intent by year. This table excludes ED transfers out to not double count patients treated at two facilities. In 2021 in Region 4 the assault category increased to the highest number of occurrences, 480. Additionally in 2020, in Region 7 the number of assaults doubled (20) but in 2021 decreased by half (9).

Intent	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
Region 4								
Unintentional	29	8.5	39	11.7	61	11.6	65	10.7
Self-Inflicted	22	6.5	26	7.8	26	5.0	29	4.8
Assault	253	74.2	241	72.4	401	76.5	480	79.3
Undetermined	25	7.3	25	7.5	29	5.5	27	4.5
Other	12	3.5	2	0.6	7	1.3	4	0.7
Total	341	100.0	333	100.0	524	100.0	605	100.0
Region 7								
Unintentional	13	56.5	5	26.3	16	40.0	15	50.0
Self-Inflicted	3	13.0	5	26.3	4	10.0	5	16.7
Assault	6	26.1	9	47.4	20	50.0	9	30.0
Undetermined	1	4.3	0	0.0	0	0.0	0	0.0
Other	0	0.0	0	0.0	0	0.0	1	3.3
Total	23	100.0	19	100.0	40	100.0	30	100.0
Region 8								
Unintentional	6	37.5	4	28.6	4	23.5	7	46.7
Self-Inflicted	8	50.0	3	21.4	6	35.3	2	13.3
Assault	2	12.5	6	42.9	7	41.2	5	33.3
Undetermined	0	0.0	1	7.1	0	0.0	1	6.7
Other	0	0.0	0	0.0	0	0.0	0	0.0
Total	16	100.0	14	100.0	17	100.0	15	100.0

Table 17. Firearm injuries by region of occurrence and ISS range

This table shows the distribution of firearm injuries by region where the injury occurred by ISS range and year. This table excludes ED transfers out to not double count patients treated at two facilities. The majority of firearm injuries had an ISS between 1-9 for all three regions.

ISS Range	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
Region 4								
1-9	169	49.6	161	48.3	279	53.2	334	55.2
10-14	61	17.9	57	17.1	77	14.7	83	13.7
15-24	41	12.0	43	12.9	59	11.3	75	12.4
≥ 25	70	20.5	71	21.3	106	20.2	113	18.7
Not Valued	0	0.0	1	0.6	3	0.4	0	0.0
Total	341	100.0	333	100.0	524	100.0	605	100.0
Region 7								
1-9	17	73.9	14	73.7	28	70.0	16	53.3
10-14	1	4.3	2	10.5	5	12.5	4	13.3
15-24	3	13.0	0	0.0	4	10.0	5	16.7
≥ 25	2	8.7	3	15.8	3	7.5	5	16.7
Not Valued	0	0.0	0	0.0	0	0.0	0	0.0
Total	23	100.0	19	100.0	40	100.0	30	100.0
Region 8								
1-9	7	43.8	6	42.9	7	41.2	11	73.3
10-14	3	18.8	5	35.7	3	17.6	1	6.7
15-24	0	0.0	1	7.1	2	11.8	0	0.0
≥ 25	6	37.5	2	14.3	5	29.4	3	20.0
Not Valued	0	0.0	0	0.0	0	0.0	0	0.0
Total	16	100.0	14	100.0	17	100.0	15	100.0

Table 18. Firearm injuries by region of occurrence and outcome

This table shows the distribution of firearm injuries by region where the injury occurred by year and outcome. This table excludes ED transfers out to not double count patients treated at two facilities. Although the number of firearms increased in Region 4 in 2021, the overall percentage of mortality did not change. The mortality rate in Region 7 decreased over the 4 years and fluctuated in Region 8.

Outcome	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
Region 4								
Alive	274	80.4	266	79.9	422	80.5	479	79.2
Dead	67	19.6	67	20.1	102	19.5	126	20.8
Total	341	100.0	333	100.0	524	100.0	605	100.0
Region 7								
Alive	19	82.6	17	89.5	36	90.0	27	90.0
Dead	4	17.4	2	10.5	4	10.0	3	10.0
Total	23	100.0	19	100.0	40	100.0	30	100.0
Region 8								
Alive	11	68.8	12	85.7	12	70.6	11	73.3
Dead	5	31.3	2	14.3	5	29.4	4	26.7
Total	16	100.0	14	100.0	17	100.0	15	100.0

Table 19. Length of stay for firearm injuries

A majority of firearm injuries in all three regions have a less than 5-day length of stay. Does not include ED deaths.

Length of Stay	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
Region 4								
≤ 5	241	70.7	247	74.2	388	74.0	444	73.4
≥ 6	100	29.3	86	25.8	136	26.0	161	26.6
Total	341	100.0	333	100.0	524	100.0	605	100.0
Region 7								
≤ 5	22	95.7	15	78.9	32	80.0	24	80.0
≥ 6	1	4.3	4	21.1	8	20.0	6	20.0
Total	23	100.0	19	100.0	40	100.0	30	100.0
Region 8								
≤ 5	14	87.5	11	78.6	12	70.6	12	80.0
≥ 6	2	12.5	3	21.4	5	29.4	3	20.0
Total	16	100.0	14	100.0	17	100.0	15	100.0

Table 20. Firearm injuries by age group

Historically the most firearm injuries are found in the 25-34 age range (all regions in registry). This table does not include ED deaths.

Age Range	2018		2019		2020		2021	
	#	%	#	%	#	%	#	%
0-15	15	3.6	19	4.4	51	7.7	60	8.2
16-19	52	12.4	68	15.9	105	15.8	111	15.2
20-24	82	19.6	76	17.8	120	18.1	137	18.7
25-34	134	32.0	128	29.9	188	28.4	209	28.6
35-44	63	15.0	55	12.9	101	15.2	108	14.8
45-54	38	9.1	37	8.6	41	6.2	48	6.6
55-64	18	4.3	22	5.1	31	4.7	36	4.9
65-74	11	2.6	17	3.9	18	2.7	14	1.9
75-84	5	1.2	5	1.2	4	0.6	4	0.6
≥85	1	0.2	1	0.2	3	0.5	4	0.6
Not Valued	0	0.0	0	0.0	1	0.2	0	0.0
Total	419	100.0	428	100.0	663	100.0	731	100.0

COTS Member Hospitals & Free-Standing Emergency Departments

- Adena Fayette Medical Center, Washington Court House, Ohio
- Adena Greenfield Medical Center, Greenfield, Ohio
- Adena Pike Medical Center, Waverly, Ohio
- Adena Regional Medical Center, Chillicothe, Ohio
- Coshocton Regional Medical Center, Coshocton, Ohio
- Diley Ridge Medical Center, Canal Winchester, Ohio
- East Ohio Regional Hospital, Martins Ferry, Ohio
- Fairfield Medical Center, Lancaster, Ohio
- Fairfield Medical Center River Valley Campus, Lancaster, Ohio
- Genesis Coshocton Medical Center, Coshocton, Ohio*
- Genesis Hospital, Zanesville, Ohio
- Genesis Perry County Medical Center, Somerset, Ohio*
- Hocking Valley Community Hospital, Logan, Ohio*
- Holzer Gallipolis, Gallipolis, Ohio*
- Holzer Medical Center - Jackson, Jackson, Ohio*
- Holzer Meigs Emergency Department, Pomeroy, Ohio*
- King's Daughters Medical Center, Portsmouth, Ohio*
- Knox Community Hospital, Mt. Vernon, Ohio
- Licking Memorial Hospital, Newark, Ohio
- Madison Health, London, Ohio
- Marietta Belpre Medical Campus, Belpre, Ohio
- Marietta Memorial Hospital, Marietta, Ohio
- Marietta Selby General Hospital Campus, Marietta, Ohio
- Mary Rutan Hospital, Bellefontaine, Ohio*
- Memorial Health, Marysville, Ohio
- Morrow County Hospital, Mt. Gilead, Ohio
- Mount Carmel East, Columbus, Ohio
- Mount Carmel Franklinton, Columbus, Ohio
- Mount Carmel Grove City, Grove City, Ohio
- Mount Carmel Lewis Center, Delaware, Ohio
- Mount Carmel New Albany, New Albany, Ohio
- Mount Carmel Reynoldsburg, Reynoldsburg, Ohio
- Mount Carmel St. Ann's, Westerville, Ohio
- Nationwide Children's Hospital, Columbus, Ohio
- Nationwide Children's Lewis Center, Delaware, Ohio
- OhioHealth Berger Health System, Circleville, Ohio
- OhioHealth Doctors Hospital, Columbus, Ohio
- OhioHealth Dublin Methodist Hospital, Dublin, Ohio
- OhioHealth Emergency Care - Hilliard, Hilliard, Ohio
- OhioHealth Emergency Care - New Albany, New Albany, Ohio
- OhioHealth Emergency Care - Obetz, Columbus, Ohio
- OhioHealth Emergency Care - Powell, Powell, Ohio
- OhioHealth Emergency Care - Reynoldsburg, Reynoldsburg, Ohio
- OhioHealth Grady Memorial Hospital, Delaware, Ohio
- OhioHealth Grant Medical Center, Columbus, Ohio
- OhioHealth Grove City Methodist Hospital, Grove City, Ohio



- OhioHealth Hardin Memorial Hospital, Kenton, Ohio
- OhioHealth Lewis Center Health Center, Delaware, Ohio
- OhioHealth Marion General Hospital, Marion, Ohio
- OhioHealth O'Bleness Hospital, Athens, Ohio
- OhioHealth Pickerington Emergency Care Center, Pickerington, Ohio
- OhioHealth Riverside Methodist Hospital, Columbus, Ohio
- OhioHealth Southeastern Medical Center, Cambridge, Ohio
- OhioHealth Westerville Emergency Care Center, Westerville, Ohio
- The Ohio State University Wexner Medical Center, Columbus, Ohio
- The Ohio State University Wexner Medical Center East Hospital, Columbus, Ohio
- Southern Ohio Medical Center, Portsmouth, Ohio
- Trinity Medical Center West, Steubenville, Ohio
- Wyandot Memorial Hospital, Upper Sandusky, Ohio

**Future reports will include data from facility*

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To learn more about the mission of COTS, visit www.cotshealth.org or contact one of our associates.

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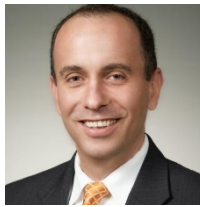
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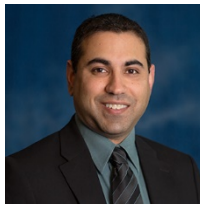
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Ohio Department of Public Safety; Division of EMS, 2019 Ohio Trauma Registry Annual Report - Published data with permission from the ODPS, Division of EMS



Appendix A: Glossary of Terms

Abbreviated Injury Scales (AIS) – is an anatomically-based, global severity scoring system that classifies each injury by body region according to its relative importance. AIS is the basis for the Injury Severity Score (ISS) calculation of the multiply injured patient.

Acute Care Hospital – a facility providing a level of health care in which a patient is treated for a brief but severe episode of illness, for conditions that are the result of disease or trauma, and during recovery from surgery.

Adult – is defined and used in this report to describe an individual whose age ranges from 16 to 69 years of age.

Disposition - The final place or setting to which the patient was discharged on the day of discharge (i.e. home, hospice, acute care facility, etc.)

Free-standing Emergency Department (FSED) – is an emergency facility that is structurally separate and distinct from a hospital and provides emergency care.

Geriatric – is defined and used in this report to describe an individual whose age is 70 years of age or greater.

Injury Severity Score (ISS) - an evaluation system developed to predict the outcomes of traumas, including mortality and length of hospital stay. The score is based on the Abbreviated Injury Scale (AIS), another scoring system for injury severity. When a patient is injured, each area of the body is assigned an AIS score depending on the injury severity. An ISS is calculated by squaring the AIS score from the three most severely injured body areas and adding them together. ISS scores range from 0 to 75¹. The higher the ISS score, the more severe the injury.

Mechanism of Injury (MOI) – refers to the method by which damage (trauma) to the body occurred.

Motor Vehicle Collision (MVC) – also referred to as a Motor Vehicle Accident (MVA).

Outcome measures – as defined by the World Health Organization are the “change in the health of an individual, group of people, or population that is attributable to an intervention or series of interventions.” For the purposes of this report, outcome measures include but are not limited to a patient’s initial disposition on arrival, transfer between different level facilities, final discharge disposition, and mortality.

Pediatric – is defined and used in this report to describe an individual whose age ranges from 0 to 15 years of age.

Record – is used to reference an individual incident as reported to the COTS Regional Registry.

Region – as defined and used in this report refers to one of eight Ohio Homeland Security Regions a county is assigned. (Appendix C)

Regional Trauma System – is an organized, coordinated effort in a defined geographic area that delivers the full range of care to all injured patients and works together with emergency services and emergency preparedness making efficient use of health care resources to improve patient outcomes in the state of Ohio. Membership is voluntary and not generally restricted by facility location.

Trauma Center – an emergency medical facility that can provide a higher-level treatment and surgical care to trauma patients than other types of emergency facilities. In Ohio, the designation of “trauma center” and its level of service is based on assessment and verification by the American College of Surgeons (ACS).



The descriptions of Level I, II and III trauma centers can be found in the ACS document, “Resources for Optimal Care of the Injured Patient.”²

¹ <http://www.trauma.org/archive/scores/iss.html>

² <https://www.facs.org>



Appendix B: Trauma Registry Inclusion Criteria and Data Dictionary 2021

TRAUMA PATIENT DEFINITION

To ensure consistent data collection across the Central, Southeast, Southeast Central Ohio and the State of Ohio and to follow the National Trauma Data Standard, a trauma patient is defined as a patient sustaining a traumatic injury and meeting the patient inclusion criteria described below.

PATIENT INCLUSION CRITERIA

To be included in the Trauma Acute Care Registry (TACR),

1. The patient must have incurred, no more than 30 days prior to presentation for initial treatment, at least one of the injury diagnostic codes defined in the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM):
 - **J70.5 with character modifier of A ONLY** (Respiratory conditions due to smoke inhalation – initial encounter)
 - **S00-S99 with 7th character modifier of A, B or C ONLY** (Injuries to specific body parts – initial encounter)
 - **T07** (Unspecified multiple injuries)
 - **T14** (Injury of unspecified body region)
 - **T20-T28 with 7th character modifier of A ONLY** (Burns by specified body parts – initial encounter)
 - **T30-T32** (Burn by TBSA percentage)
 - **T33 with character modifier of A ONLY** (Superficial frostbite – initial encounter)
 - **T34 with character modifier of A ONLY** (Frostbite with tissue necrosis – initial encounter)
 - **T67 with character modifier of A ONLY** (Effects of heat and light – initial encounter)
 - **T68 with character modifier of A ONLY** (Hypothermia – initial encounter)
 - **T69 with character modifier of A ONLY** (Other effects of reduced temperature – initial encounter)
 - **T70.4 with character modifier of A ONLY** (Effects of high-pressure fluids – initial encounter)
 - **T70.8 with character modifier of A ONLY** (Other effects of air pressure and water pressure – initial encounter)
 - **T70.9 with character modifier of A ONLY** (Effect of air pressure and water pressure, unspecified – initial encounter)
 - **T71 with character modifier of A ONLY** (Asphyxiation – initial encounter)
 - **T74.1 with character modifier of A ONLY** (Physical abuse, confirmed – initial encounter)
 - **T74.4 with character modifier of A ONLY** (Shaken infant syndrome – initial encounter)
 - **T75.0 with character modifier of A ONLY** (Effects of lightning – initial encounter)
 - **T75.1 with character modifier of A ONLY** (Unspecified effects of drowning and nonfatal submersion – initial encounter)
 - **T75.4 with character modifier of A ONLY** (Electrocution – initial encounter)
 - **T79.A1-T79.A9 with 7th character modifier of A ONLY** (Traumatic compartment syndrome – initial encounter)
 - **S00, S10, S20, S30, S40, S50, S60, S70, S80, S90** (Patients with these isolated injuries that were transferred in/out or died.)
2. The patient **MUST ALSO**
 - On initial presentation for treatment of an injury, be admitted to a hospital or hospital observation unit, as defined by a physician order regardless of the length of stay; **AND/OR**
 - Be transferred via EMS transport (including air ambulance) from one hospital (or free-standing emergency department) to another hospital regardless of the patient's length of stay or admission status; **AND/OR**
 - Have an outcome of death resulting from the traumatic injury (independent of hospital admission or hospital transfer status).

PATIENT EXCLUSION CRITERIA

Patients with the following isolated ICD-10-CM codes are **EXCLUDED** from the TACR:

- **S72.00-S72.14**, fracture of head/neck of femur ONLY IF age >70 AND it resulted from slipping, tripping, stumbling or a same level fall (W01.0, W18.30, W18.31, W18.39);
- **S00, S10, S20, S30, S40, S50, S60, S70, S80, S90** (Abrasion or Contusion injuries. Patients with abrasion or contusion injuries that were transferred in/out for treatment of injuries or died because of injuries would be included in the registry)
- 7th character modifiers of D through S (Late effects)

More information on the trauma inclusion or exclusion criteria and the full 2021 data dictionary.

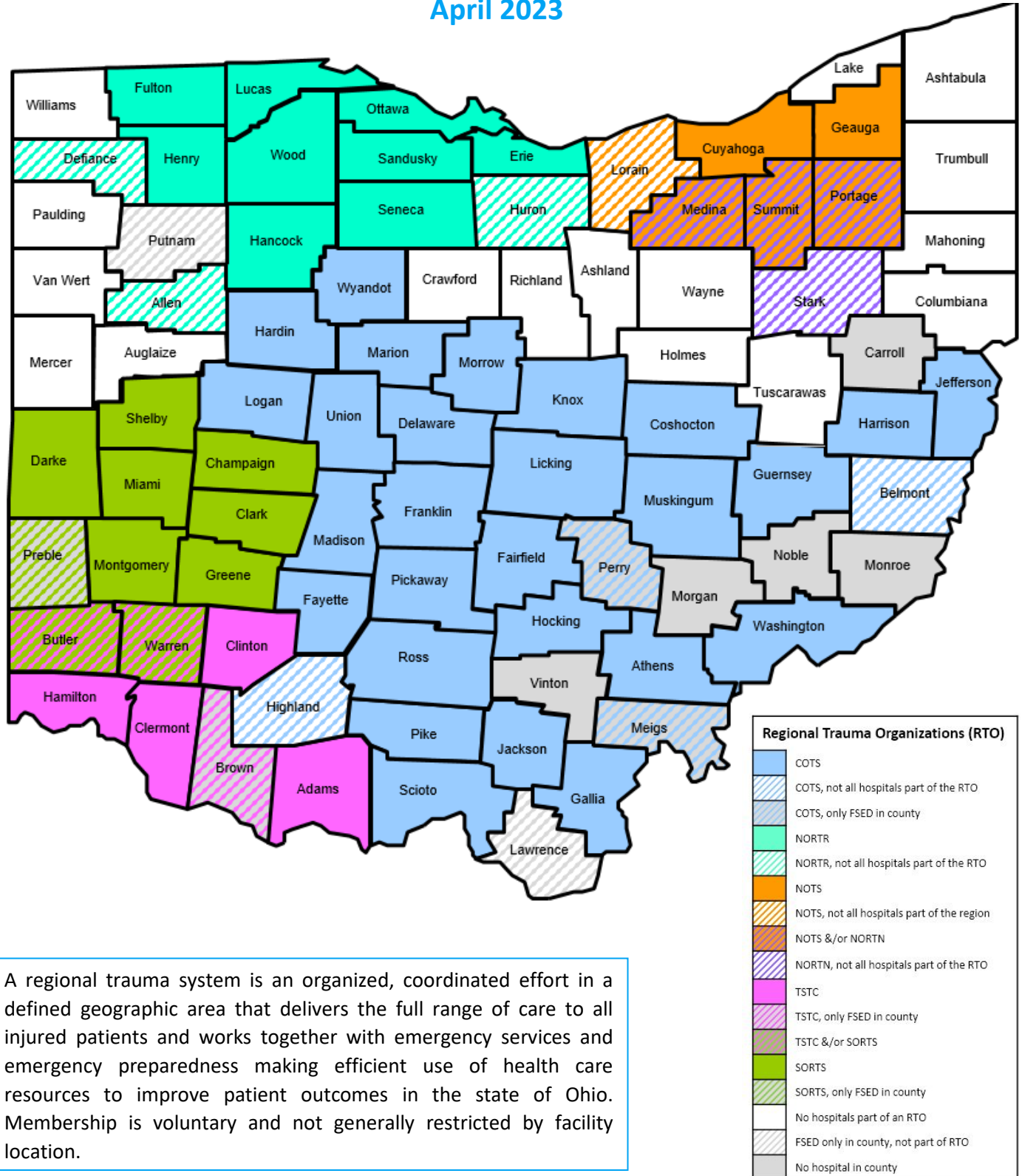


Appendix C: Map of Ohio Homeland Security Regions



Appendix D: Ohio Regional Trauma Systems Map

Regional Trauma Organizations April 2023

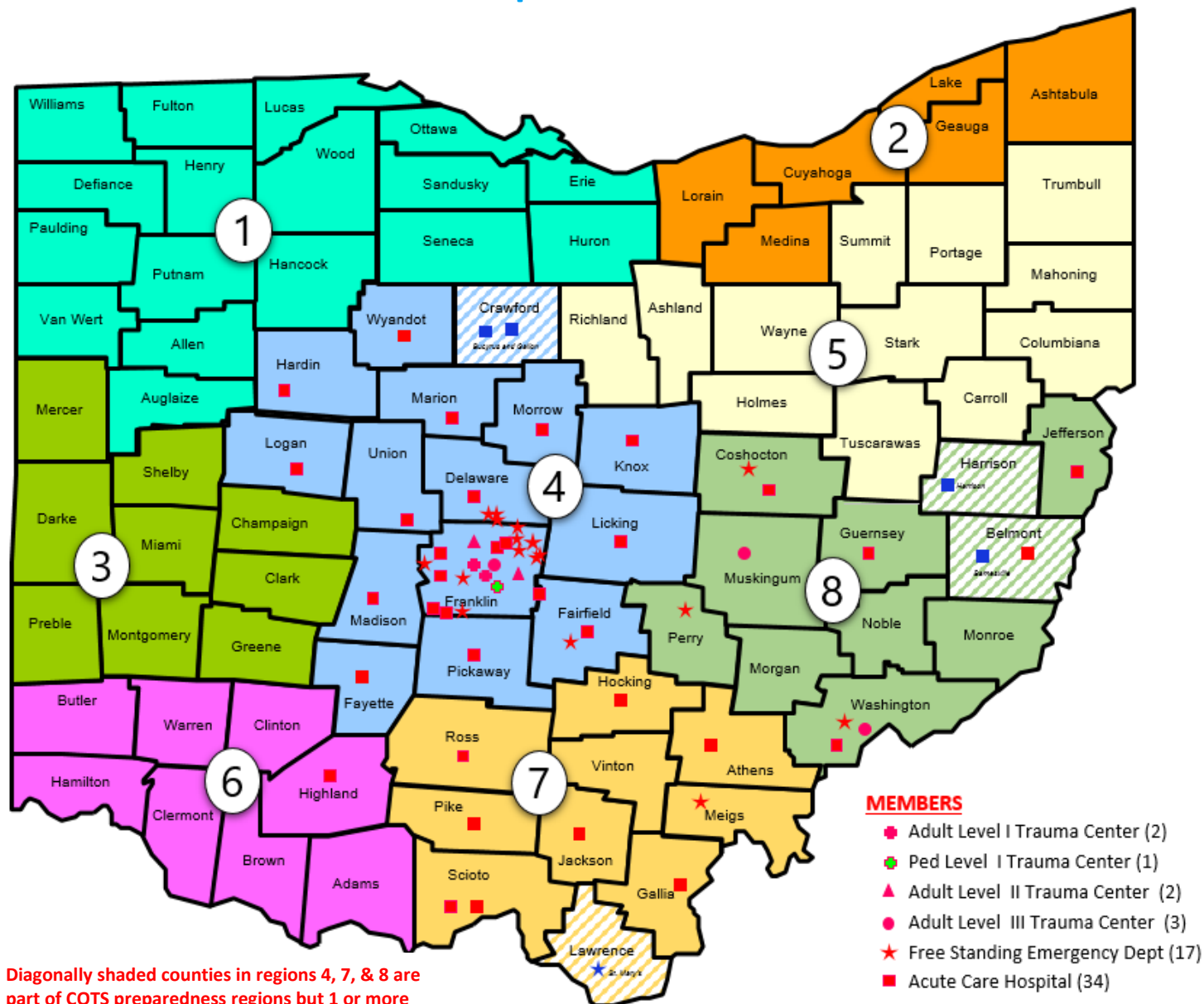


A regional trauma system is an organized, coordinated effort in a defined geographic area that delivers the full range of care to all injured patients and works together with emergency services and emergency preparedness making efficient use of health care resources to improve patient outcomes in the state of Ohio. Membership is voluntary and not generally restricted by facility location.



Appendix E: COTS Map

Referral Area April 2023



Diagonally shaded counties in regions 4, 7, & 8 are part of COTS preparedness regions but 1 or more hospital or free-standing ED in the county is not a paying member of COTS.

MEMBERS

- ◆ Adult Level I Trauma Center (2)
- ◆ Ped Level I Trauma Center (1)
- ▲ Adult Level II Trauma Center (2)
- Adult Level III Trauma Center (3)
- ★ Free Standing Emergency Dept (17)
- Acute Care Hospital (34)

NON-MEMBERS

- Acute Care Hospital (4)
- ★ Free Standing Emergency Dept (1)

As of April 2023, COTS has fifty-nine member facilities however not all are providing data at the time of this report. In 2018 thirty facilities provided data to COTS, in 2019 thirty-seven, in 2020 forty-three, and in 2021 fifty.



Columbus Medical Association & Affiliates

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