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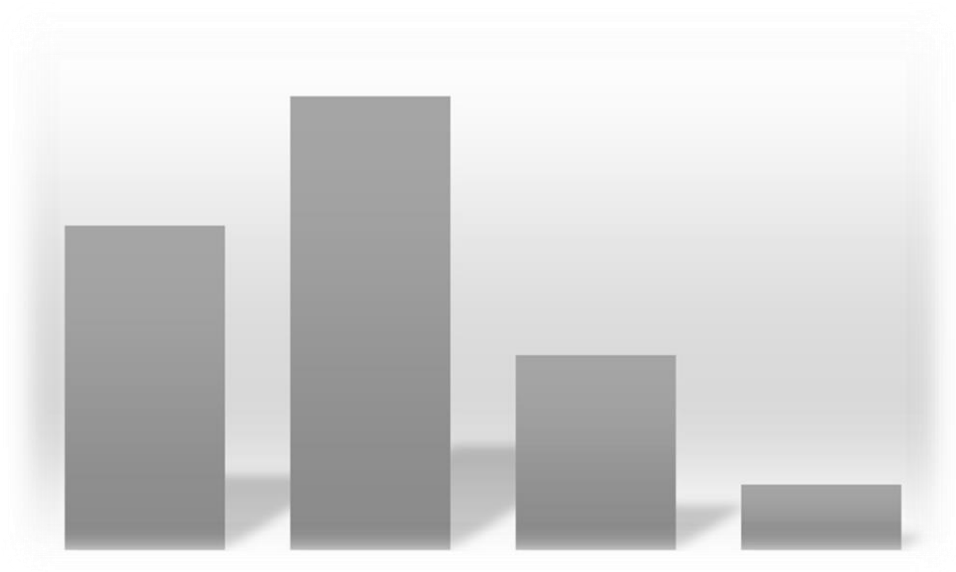
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2022

OHIO TRAUMA REGISTRY ANNUAL REPORT

**Ohio Department of Public Safety
Division of Emergency Medical Services**

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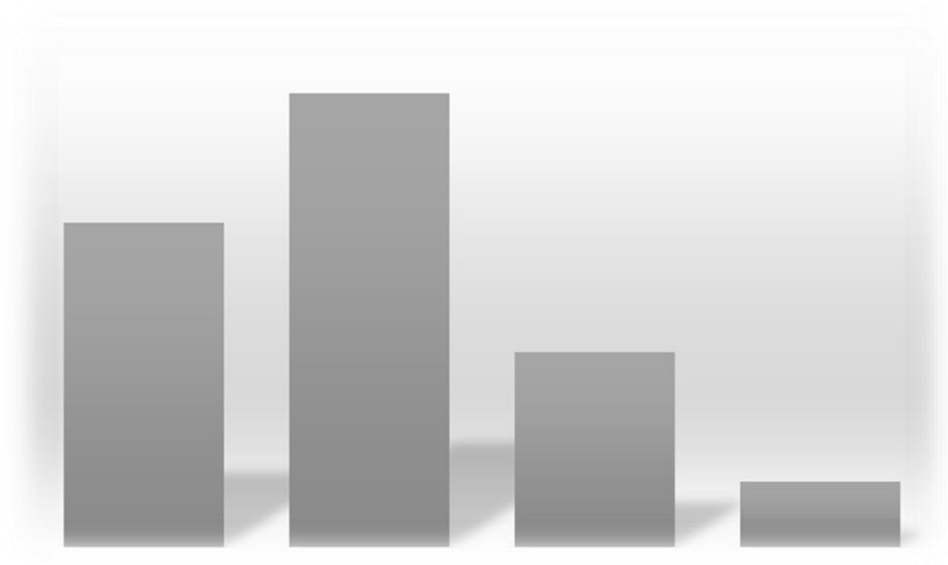


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FOREWORD

It has been said that life is comprised of a long past, a short present, and an unknown future. When we look at this statement in the light of the epidemic of injury, commonly known as trauma, it actually can offer us direction. Our past can be used in our present to improve our future.

This annual report, which highlights the incidence of trauma occurring in calendar year 2022, gives us a fantastic look at our past. As we peruse this report, it's as though a portrait is painted before us of the causes of injuries within our state during that year, the severity of those injuries, and where they occurred. A look at this piece of the past may help us set in motion some practices in the present to lessen the morbidity and mortality of our Ohio citizens and visitors to our state in the future.

Throughout our state, we are blessed with individuals who dedicate their professional careers to identify why traumatic events occur and develop practices and measures to mitigate some of those injuries. To them, we tip our hat, and are hopeful that some of the data presented in this document will be a tool in their hands as they continue their life saving, life changing mission of protecting our population from the devastation of injury.

A report of this nature does not assemble itself. It takes the work of many hands and the expertise of a committee of professionals to compile, analyze, and transform raw data into a product that offers us the guidance we need to enact change. Carrying the mantle of responsibility is the State Trauma Committee, a diverse group of EMS personnel, nurses, physicians, hospital administrators, and victim advocates who strive to impact the constituents of our state in terms of safety. This group serves in an advisory capacity to the State Board of Emergency Medical, Fire, and Transportation Services, passing along recommendations and guidance in relation to the epidemic of the injured. This Board works with and through this diverse group of trauma care providers to help improve safety in our state. The Board is assisted by the incredible behind-the-scenes work of the Ohio Department of Public Safety, the worker bees that keep the hive running. Many thanks to the Executive Director, the Deputy Director, the Epidemiologists, the Data Management team, and the Administrative Assistants, all of whom support those dedicated to this task of preventing injury from being bogged down in the minutia. Your contributions are the glue that binds us all together, and your work is so very appreciated.

The heavy lifters in this project, however, are the boots-on-the-ground in the streets, hospitals and healthcare facilities who provide care for the injured every single day around the clock. A substantial shout out to all the EMS Providers, Trauma Medical Directors, Trauma Program Managers, ED physicians, nurses, Trauma Registrars, and ancillary staff that provide the hands-on healing for these victims of trauma. It is your sweat and tears that sustain life, coordinate recovery and rehabilitation, and help make a better and safer Ohio!

Diane Simon RN, CEN

Diane Simon RN, CEN

Chair, State Trauma Committee

INTRODUCTION

The 2022 Ohio Trauma Registry (OTR) Annual Report presents an overview of data collected from patients who sustained traumatic injuries and arrived at an Ohio facility in Calendar Year (CY) 2022. The purpose of this report is to provide relevant information to healthcare professionals and to the public which describes Ohio's trauma patient load and an analysis of the traumatic injuries seen during this period.

In accordance with Ohio Revised Code (ORC) 4765.06(B), the State Board of Emergency Medical, Fire, and Transportation Services (Board) has the statutory authority to establish a state trauma registry to be used for the collection of information regarding the care of adult and pediatric trauma victims in Ohio. The registry provides for the reporting of adult and pediatric trauma-related deaths, identification of adult and pediatric trauma patients, monitoring of adult and pediatric trauma patient care data, determination of the total amount of uncompensated adult and pediatric trauma care provided annually by each facility that provides care to trauma victims, and collection of any other information specified by the Board. The Board has authority over the OTR, specifications for information that may be collected (ORC 4765.11(B) (1)), and supervision of its operation via the Board's Trauma Committee and associated workgroups.

The Board's Trauma Committee and composition is outlined in ORC 4765.04(B) (1 – 22). A total of twenty-four (24) members, representing a diverse group of stakeholders from urban and rural areas, various geographical areas of the state, and various schools of training who are involved with oversight and care of Ohio's trauma patients, are nominated by their respective organizations and appointed by the Director of the Ohio Department of Public Safety. Currently, no more than one Committee member who is employed by or practices at the same hospital, health system, or emergency medical service organization may be appointed to this Committee. The Committee advises and assists the Board in matters related to adult and pediatric trauma care and the establishment and operation of the OTR. In matters relating to the OTR, the Board and the Committee can consult with trauma registrars from adult and pediatric trauma centers in the state. The Committee may appoint subcommittees and create workgroups to advise and assist with the OTR. Under the general direction of the Committee these additional groups may include persons with expertise relevant to the OTR who are not members of the Board or Committee.

The OTR is operated and maintained by the Ohio Department of Public Safety, Division of Emergency Medical Services (EMS). This report was produced by the Ohio Department of Public Safety, Division of EMS, Trauma and Research Team, in conjunction with the Trauma Committee and its Performance Improvement Workgroup. The information contained herein is based on data that were reported for trauma patients who arrived at a facility in 2022. It is intended for descriptive purposes only. The inclusion requirements for the trauma registry and the associated data dictionary can be found in Appendix B. Questions or comments concerning the report should be directed to EMSData@dps.ohio.gov.

CONSIDERATIONS

- For this report, 2022 data were defined as records that had an arrival date between 1/1/2022 and 12/31/2022. These data are intended for descriptive purposes only.
- The data utilized for this report was extracted on 12/12/2023. Any data received and processed for calendar year 2022 after this date was not included in this annual summary.
- In the OTR, we do receive records where the injury occurred out of state. For the figures and tables that look at health outcomes/injury information by county or region, these records are not included. The other figures and tables do include records where the injury may have occurred out of state. This can help provide an overall picture of the type of injuries that come to and the care that is provided at hospitals and freestanding emergency departments in Ohio.
- For calculations involving state and county populations, this analysis used the 2022 population estimates provided from the census website (<https://www.census.gov/>).
- If a table or figure has a label of “Not Recorded,” that means that the corresponding records were blank for that field. If a table or figure has a label of “Not Valued,” that means that the corresponding records were populated with something that could not be attributed to a recognized value for that variable. For each table/graph where “Not Valued” is listed, there is a description of what those records were populated with.
- For tables that have percentages, the percentages may not add up to 100% due to rounding.
- Patients with the following isolated ICD-10-CM codes are EXCLUDED from the OTR: S00, S10, S20, S30, S40, S50, S60, S70, S80, S90
- It is important to note that when “region” is referenced in the data, the Division of EMS is referring to the Ohio Homeland Security Regions as displayed on the map in Appendix L, and not Ohio’s various regional trauma systems.
- 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: STATE DEMOGRAPHICS

Geography

The State of Ohio encompasses a land area of 40,952.6 square miles. Land usage is predominantly farmland with 36.7% used for cultivated crops and an additional 13.3% used for hay and pasture land. Another 32.4% is forested land. Developed land usage is divided into 2.49% lower intensity and 11.3% higher intensity categories. The population is distributed across Ohio with 80% of Ohioans living in metropolitan areas.

Population

Based on a updated 2018-2019 reports from the Ohio Department of Development (ODJ), Office of Research, Ohio's population was 11,689,442. Population growth in Ohio began to slow in the 1970s, increasing by only 3% since 2000 while the U.S. population has increased by 16.3% during the same timeframe. Ohio is the seventh most populous state and accounts for 3.6% of the nation's population (327,167,434). The median age of Ohio's population is 39.4 years of age and slightly higher than the nation's median age of 38.2 years. Since 2000, Ohio's median age has increased 3.2 years. Children ranging from 0 – 14 years of age make up 18.5% of the population. Teens and Adults ages 15 – 64 constitute 64.1% of the population and adults aged 65 and older account for 17.4%.

Education and Income

Based on a 2022 Fordham Institute study, statewide 87% of Ohio students graduated high school with the percentage exceeding 90% in suburban areas. Additionally, statewide 53% of students enrolled in a 2- or 4-year college program, with a higher average of 72% in suburban areas. Of these, 31% completed a degree within six years of leaving high school statewide, with a higher rate of 49% in suburban areas and lower 17% in urban areas. Based on the US Census Bureau's "Quick Facts", median annual income of Ohio households in 2020 was \$58,116.

Healthcare

There were approximately 237 registered hospitals. Of facilities designated as hospitals, 78 were identified acute care facilities. Of the total registered hospitals, 32 are identified as critical access hospitals. There were also approximately 51 freestanding emergency departments. There were 54 hospitals that met the American College of Surgeons Committee on Trauma criteria for registered trauma centers that are equipped to handle the more extreme traumatic injury cases. In Ohio there were 11 Level I Trauma Centers, 11 Level II Trauma Centers, and 27 Level III Trauma Centers. There were also 4 Level I Pediatric Trauma Centers and 4 Level II Pediatric Trauma Centers serving the state, three of which reside in the same facility as an adult trauma center. These registered trauma centers are located in the metropolitan areas of Akron, Cincinnati, Columbus, Cleveland, Dayton, and Toledo.

Emergency Medical Services

As of the end of December 2022, there were 41,411 individuals holding an active EMS provider certificate as either an Emergency Medical Responder, Emergency Medical Technician, Advanced Emergency Medical Technician, or Paramedic. EMS coverage throughout Ohio included a mixture of Emergency Medical Responder (4.5%), Emergency Medical Technician (45.5%), Advanced Emergency Medical Technician (4.0%), Paramedic (45.9%), and additional protocols for invasive skills/interventions/advanced life support procedures beyond Paramedic level services based on the highest level of approved operational protocols.

A total of 15 air medical service providers, many of which have one or more satellite locations, currently serve Ohio patients. The majority of air medical services are located in Ohio with a few having headquarter or satellite locations in Indiana, Kentucky, Alabama, Pennsylvania, and West Virginia. The system is comprised of 79 aircraft total, of which 9 aircrafts are fixed wing and 70 are rotor. Some headquarter locations and each satellite location have at least one aircraft stationed at their facility. The Ohio Department of Public Safety Division of EMS inspects and licenses all air medical aircraft on an annual basis. Appendix J identifies the location of these aircraft.

There were a total of 2,106,118 EMS runs reported to the Ohio EMS Incident Reporting System (EMSIRS) in 2022. Of those records 260,964 (12%) were categorized as injuries based on an assigned mechanism of injury within EMSIRS.

Trauma Services

Of all injuries treated by an emergency facility, 84,744 records met the inclusion criteria for submission to the, OTR. The inclusion criteria can be found in the “Trauma Acute Care Registry Data Dictionary,” prepared by the Ohio Department of Public Safety (http://www.publicsafety.ohio.gov/links/ems_OTR-TACR-Data-Dictionary-2021.pdf). For additional reference and context of these data, the Ohio Department of Health Injury Related Death Data, including a focus on the “External Injury Mechanism,” is included in this report (Appendix K).

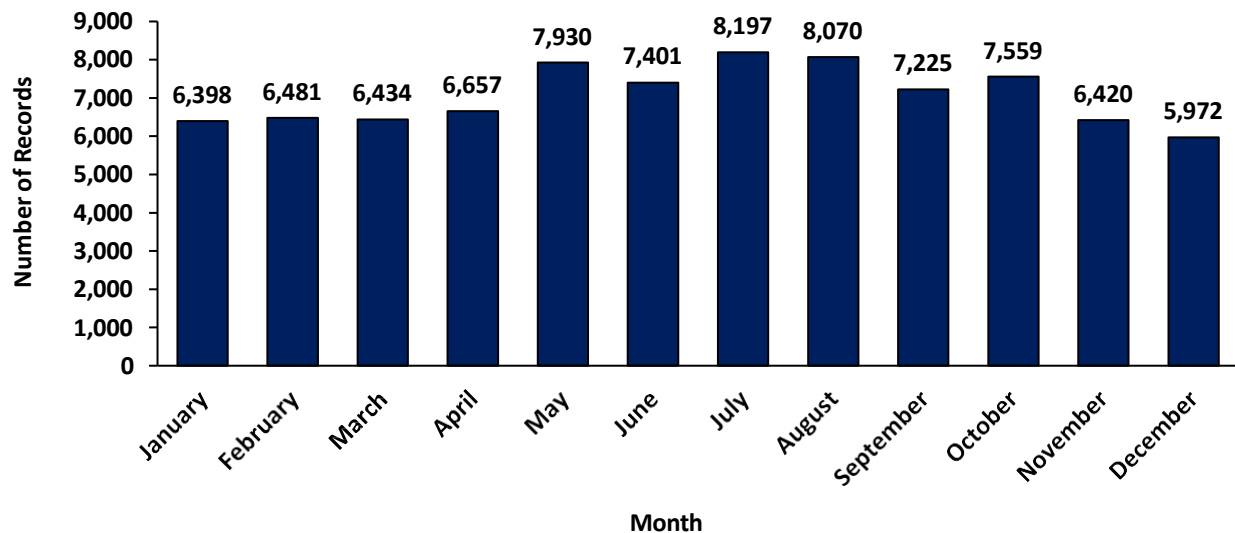
Regional Trauma Systems

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 disaster 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.

SECTION 2: RECORDS OF HOSPITAL PATIENT CONTACT

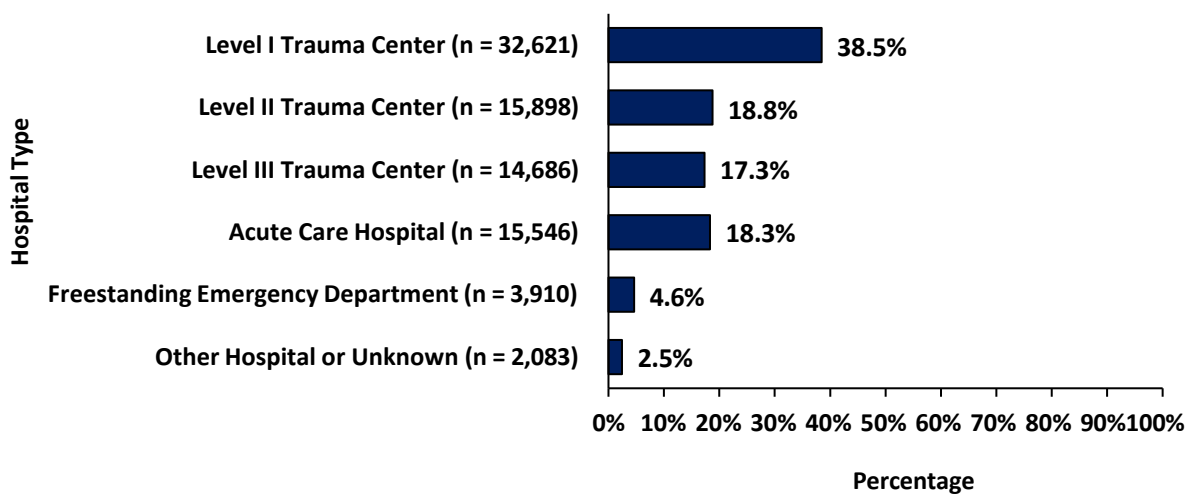
❖ **Figure 1. Total records submitted to the Ohio Trauma Registry by month of arrival, 2022**

This figure displays the number of trauma records submitted to the OTR by month of patient arrival during 2022. A total of 84,744 records met the inclusion criteria based on date of arrival in 2022. An average of 7,062 records were received by the OTR each month.



❖ **Figure 2. Total records submitted to the Ohio Trauma Registry by hospital type, 2022**

This figure shows the number and percentage of records that were submitted to the OTR by hospital type. The records most frequently came from Level I Trauma Centers (32,621; 38.5%).



❖ **Table 1. Rates of injuries by county of injury, Ohio, 2022**

This table displays the rate of injuries by the county where the injury occurred. Clark (1,056.9 per 100,000 residents) and Miami (1,052.2 per 100,000 residents) counties reported the highest rates of injuries. For this table, records where the injuries occurred out of state were not included in the analysis.

County	Count	Population	Rate per 100,000	County	Count	Population	Rate per 100,000
Adams	202	27,420	736.7	Logan	371	46,040	805.8
Allen	402	101,115	397.6	Lorain	1,735	316,268	548.6
Ashland	249	52,181	477.2	Lucas	2,338	426,643	548.0
Ashtabula	367	97,014	378.3	Madison	334	43,540	767.1
Athens	435	58,979	737.6	Mahoning	1,353	225,636	599.6
Auglaize	230	45,948	500.6	Marion	576	64,642	891.1
Belmont	74	65,509	113.0	Medina	582	183,512	317.1
Brown	207	43,680	473.9	Meigs	71	21,969	323.2
Butler	2,490	388,420	641.1	Mercer	188	42,348	443.9
Carroll	80	26,659	300.1	Miami	1,160	110,247	1,052.2
Champaign	325	38,709	839.6	Monroe	25	13,234	188.9
Clark	1,425	134,831	1,056.9	Montgomery	4,392	533,892	822.6
Clermont	1,080	210,805	512.3	Morgan	100	13,668	731.6
Clinton	366	41,964	872.2	Morrow	189	35,339	534.8
Columbiana	363	100,511	361.2	Muskingum	769	86,113	893.0
Coshocton	271	36,571	741.0	Noble	66	14,335	460.4
Crawford	289	41,522	696.0	Ottawa	356	39,978	890.5
Cuyahoga	7,146	1,236,041	578.1	Paulding	31	18,757	165.3
Darke	375	51,529	727.7	Perry	366	35,480	1,031.6
Defiance	231	38,187	604.9	Pickaway	484	60,023	806.4
Delaware	1,185	226,296	523.7	Pike	157	27,005	581.4
Erie	326	74,501	437.6	Portage	1,049	161,745	648.6
Fairfield	893	162,898	548.2	Preble	259	40,596	638.0
Fayette	195	28,839	676.2	Putnam	169	34,334	492.2
Franklin	8,875	1,321,820	671.4	Richland	1,069	125,319	853.0
Fulton	241	42,171	571.5	Ross	670	76,606	874.6
Gallia	102	29,068	350.9	Sandusky	174	58,667	296.6
Geauga	601	95,469	629.5	Scioto	365	72,194	505.6
Greene	1,105	168,456	656.0	Seneca	388	54,632	710.2
Guernsey	353	38,098	926.6	Shelby	320	47,671	671.3
Hamilton	4,080	825,037	494.5	Stark	1,918	372,657	514.7
Hancock	279	74,861	372.7	Summit	2,667	535,882	497.7
Hardin	174	30,416	572.1	Trumbull	1,415	200,643	705.2
Harrison	45	14,378	313.0	Tuscarawas	253	91,937	275.2
Henry	118	27,512	428.9	Union	460	66,898	687.6
Highland	240	43,391	553.1	Van Wert	20	28,769	69.5
Hocking	224	27,858	804.1	Vinton	42	12,565	334.3
Holmes	87	44,390	196.0	Warren	1,719	249,778	688.2
Huron	481	58,218	826.2	Washington	395	58,901	670.6
Jackson	116	32,586	356.0	Wayne	281	116,559	241.1
Jefferson	101	64,330	157.0	Williams	55	36,652	150.1
Knox	341	63,183	539.7	Wood	524	131,592	398.2
Lake	1,319	231,842	568.9	Wyandot	205	21,567	950.5
Lawrence	50	56,653	88.3	Not Recorded	4,326		
Licking	829	181,359	457.1	Out of Ohio	--		

❖ **Table 2. Rates of injuries resulting in death by county of injury, Ohio, 2022**

This table displays the rate of injuries resulting in death by the county of injury. Hocking (46.7 per 100,000 residents) and Meigs (31.9 per 100,000 residents) counties reported the highest rates of injuries resulting in death. For this table, records where the injuries occurred out of state were not included in the analysis.

County	Number of Fatal Injuries	Population	Rate per 100,000	County	Number of Fatal Injuries	Population	Rate per 100,000
Adams	5	27,420	18.2	Logan	10	46,040	21.7
Allen	7	101,115	6.9	Lorain	48	316,268	15.2
Ashland	11	52,181	21.1	Lucas	79	426,643	18.5
Ashtabula	10	97,014	10.3	Madison	8	43,540	18.4
Athens	6	58,979	10.2	Mahoning	55	225,636	24.4
Auglaize	8	45,948	17.4	Marion	12	64,642	18.6
Belmont	1	65,509	1.5	Medina	19	183,512	10.4
Brown	8	43,680	18.3	Meigs	7	21,969	31.9
Butler	48	388,420	12.4	Mercer	3	42,348	7.1
Carroll	5	26,659	18.8	Miami	14	110,247	12.7
Champaign	6	38,709	15.5	Monroe	0	13,234	0.0
Clark	33	134,831	24.5	Montgomery	110	533,892	20.6
Clermont	30	210,805	14.2	Morgan	2	13,668	14.6
Clinton	11	41,964	26.2	Morrow	10	35,339	28.3
Columbiana	13	100,511	12.9	Muskingum	21	86,113	24.4
Coshocton	3	36,571	8.2	Noble	1	14,335	7.0
Crawford	6	41,522	14.5	Ottawa	9	39,978	22.5
Cuyahoga	282	1,236,041	22.8	Paulding	1	18,757	5.3
Darke	12	51,529	23.3	Perry	4	35,480	11.3
Defiance	5	38,187	13.1	Pickaway	10	60,023	16.7
Delaware	32	226,296	14.1	Pike	2	27,005	7.4
Erie	5	74,501	6.7	Portage	30	161,745	18.5
Fairfield	16	162,898	9.8	Preble	8	40,596	19.7
Fayette	3	28,839	10.4	Putnam	8	34,334	23.3
Franklin	324	1,321,820	24.5	Richland	31	125,319	24.7
Fulton	11	42,171	26.1	Ross	19	76,606	24.8
Gallia	3	29,068	10.3	Sandusky	4	58,667	6.8
Geauga	12	95,469	12.6	Scioto	9	72,194	12.5
Greene	21	168,456	12.5	Seneca	8	54,632	14.6
Guernsey	8	38,098	21.0	Shelby	7	47,671	14.7
Hamilton	156	825,037	18.9	Stark	67	372,657	18.0
Hancock	8	74,861	10.7	Summit	86	535,882	16.0
Hardin	2	30,416	6.6	Trumbull	35	200,643	17.4
Harrison	2	14,378	13.9	Tuscarawas	6	91,937	6.5
Henry	7	27,512	25.4	Union	10	66,898	14.9
Highland	6	43,391	13.8	Van Wert	1	28,769	3.5
Hocking	13	27,858	46.7	Vinton	0	12,565	0.0
Holmes	3	44,390	6.8	Warren	21	249,778	8.4
Huron	15	58,218	25.8	Washington	10	58,901	17.0
Jackson	3	32,586	9.2	Wayne	9	116,559	7.7
Jefferson	3	64,330	4.7	Williams	3	36,652	8.2
Knox	11	63,183	17.4	Wood	19	131,592	14.4
Lake	31	231,842	13.4	Wyandot	2	21,567	9.3
Lawrence	1	56,653	1.8	Not Recorded	28		
Licking	26	181,359	14.3	Out of Ohio	--		

❖ **Table 3. Duration of hospital stay by mechanism of injury, Ohio Trauma Registry, 2022**

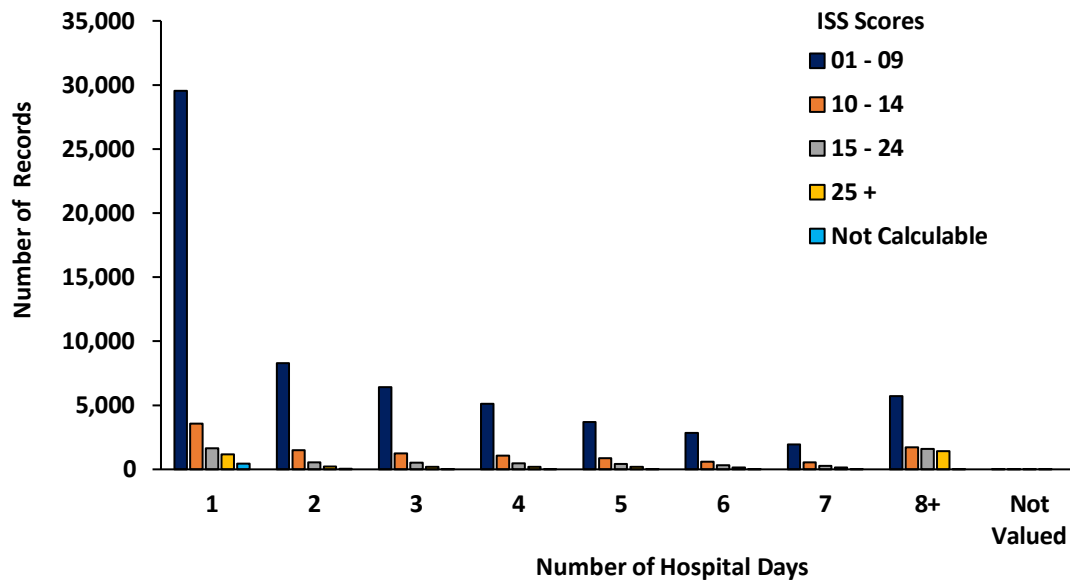
This table shows the distribution of the length of hospital stay (in days) by the mechanism of injury. The mechanism of injury is based on the reported ICD-10 code. Among all injury mechanisms reported, patients most frequently stayed one day at the hospital. Falls constituted the majority (61.8%) of traumatic injuries that occurred in 2022. Case fatality rate data are presented later in this report. Records labeled as “Not Classified” were populated with that text. Records labeled as “Not Valued” were populated with “-”.

Mechanism of Injury	Duration of Hospital Stay (Days)								Not Recorded	Total	Total %
	1 day	2 days	3 days	4 days	5 days	6 days	7 days	8 + days			
Abuse	163	74	32	20	16	9	3	43	0	360	0.4
Cut or Pierce	1,265	237	121	83	64	39	32	112	1	1,954	2.3
Drowning or Submersion	61	7	2	2	0	2	1	8	0	83	0.1
Electrical	48	4	1	3	0	0	1	5	0	62	0.1
Explosion	139	16	11	7	5	4	3	10	0	195	0.2
Fall	18,643	6,361	6,023	5,219	4,037	3,054	2,218	6,839	16	52,410	61.8
Fire or Flame	345	36	24	17	10	13	8	123	0	576	0.7
Firearm	1,373	300	195	127	91	90	85	492	1	2,754	3.2
Hot Object or Substance	436	59	27	21	14	16	10	70	0	653	0.8
Machinery	408	85	43	15	8	12	9	33	0	613	0.7
Mechanical	356	59	20	25	6	7	4	18	0	495	0.6
MVC** - Motorcyclist	746	283	179	116	98	88	42	378	0	1,930	2.3
MVC** - Occupant	3,953	1,171	711	537	417	317	264	1,334	4	8,708	10.3
MVC** - Other	27	1	3	0	0	1	2	1	0	35	0.0
MVC** - Pedal Cyclist	145	46	19	21	10	6	9	41	0	297	0.4
MVC** - Pedestrian	317	107	88	49	47	37	23	175	0	843	1.0
MVC** - Unspecified	309	72	35	29	17	11	19	50	0	542	0.6
Natural or Environmental	943	144	95	46	26	24	13	53	0	1,344	1.6
Other Land Transport	1,629	449	216	161	101	63	57	269	0	2,945	3.5
Other Specified, Classifiable	75	16	8	13	3	3	2	11	0	131	0.2
Other Specified, Not Elsewhere Classifiable	334	57	31	22	20	19	14	50	0	547	0.6
Other Transport	41	7	7	5	3	3	2	6	0	74	0.1
Overexertion	124	55	31	25	19	9	8	22	0	293	0.3
Pedal Cyclist, Other	506	141	72	51	19	15	11	34	1	850	1.0
Pedestrian Conveyance	491	145	55	35	17	14	11	42	0	810	1.0
Pedestrian, Other	131	41	21	15	15	10	9	40	0	282	0.3
Poisoning	52	3	2	2	1	2	0	8	0	70	0.1
Struck by or Against	3,037	565	286	181	110	72	40	151	0	4,442	5.2
Suffocation/Asphyxiation	56	14	8	4	10	1	3	6	0	102	0.1
Not Classified	84	18	10	2	4	3	2	13	0	136	0.2
Not Valued	124	14	14	13	7	7	11	18	0	208	0.2
TOTAL	36,361	10,587	8,390	6,866	5,195	3,951	2,916	10,455	23	84,744	100.0

** MVC is an abbreviation for Motor Vehicle Collision

❖ **Figure 3. Duration of hospital stay by Injury Severity Score (ISS), Ohio Trauma Registry, 2022**

The Injury Severity Score (ISS) is an assessment of the patient's injury severity. ISS scores range from 0 to 75, where a higher ISS score indicates a more severe injury. This graph displays the duration of hospital stays (in days) based on the ISS. A description on how the ISS is calculated is located in the Glossary. Records labeled as "Not Valued" were populated with "-".



❖ **Table 4. Duration of hospital stay by Injury Severity Score (ISS), Ohio Trauma Registry, 2022**

Records labeled as "Not Valued" were populated with "-". Persons with an ISS score between 01 and 09 were more likely to spend one day at the hospital following injury compared to other hospital stay durations. Persons with an ISS score of 25+ were most likely to spend eight days or more at the hospital following injury compared to other hospital stay durations. Case fatality rate data are presented later in this report.

Hospital Days	Injury Severity Score (ISS)					Total
	01 - 09	10 - 14	15 - 24	25 +	Not Calculable	
1	29,534	3,559	1,639	1,176	453	36,361
2	8,281	1,494	545	218	49	10,587
3	6,410	1,242	522	195	21	8,390
4	5,124	1,076	461	188	17	6,866
5	3,700	865	427	187	16	5,195
6	2,848	603	332	156	12	3,951
7	1,956	549	263	144	4	2,916
8+	5,705	1,716	1,590	1,428	16	10,455
Not Valued	18	2	2	1	0	23
Total	63,576	11,106	5,781	3,693	588	84,744

❖ **Table 5. Number of transfers out of emergency departments by hospital type, Ohio Trauma Registry, 2022**

This table looks at the number of instances where a patient was transferred out of a hospital based on the hospital type. This report looks at five different hospital types: Level I, II, and III Trauma Centers, freestanding emergency departments, and acute care hospitals.

The majority (43.3%) of transfers out of the hospital were by acute care hospitals. Among the trauma centers, most (3,653) of the transfers out came from Level III Trauma Centers.

Hospital Type	Transfers	
	#	%
Level I Trauma Center	259	1.5
Level II Trauma Center	765	4.3
Level III Trauma Center	3,653	20.5
Free Standing Emergency Department	3,863	21.7
Acute Care Hospital	7,712	43.3
Other Hospital or Unknown	1,553	8.7
Total	17,805	100.0

❖ **Table 5a. Destinations of emergency department transfers out of Level I Trauma Centers, Ohio Trauma Registry, 2022**

Though comprising the smallest percentage, 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.

Of the 259 emergency department transfers that came from Level I Trauma Centers, most went to other Level I Trauma Centers (91, 35.1%).

Hospital Type	Transfers	
	#	%
Level I Trauma Center	91	35.1
Level II Trauma Center	72	27.8
Level III Trauma Center	31	12.0
Acute Care Hospital	13	5.0
Free Standing Emergency Department	2	0.8
Other Hospital or Unknown	50	19.3
Total	259	100.0

❖ **Table 5b. Destinations of emergency department transfers out of acute care hospitals, Ohio Trauma Registry, 2022**

The majority of emergency department transfers came from acute care hospitals. The table below identifies the destination by hospital type for these transfers.

The majority of emergency department transfers that came from acute care hospitals went to Level I Trauma Centers (5,184, 67.2%).

Hospital Type	Transfers	
	#	%
Level I Trauma Center	5,184	67.2
Level II Trauma Center	1,724	22.4
Level III Trauma Center	346	4.5
Acute Care Hospital	299	3.9
Free Standing Emergency Department	7	0.1
Other Hospital or Unknown	152	2.0
Total	7,712	100.0

❖ **Table 5c. Destinations of pediatric emergency department transfers out of acute care hospitals, Ohio Trauma Registry, 2022**

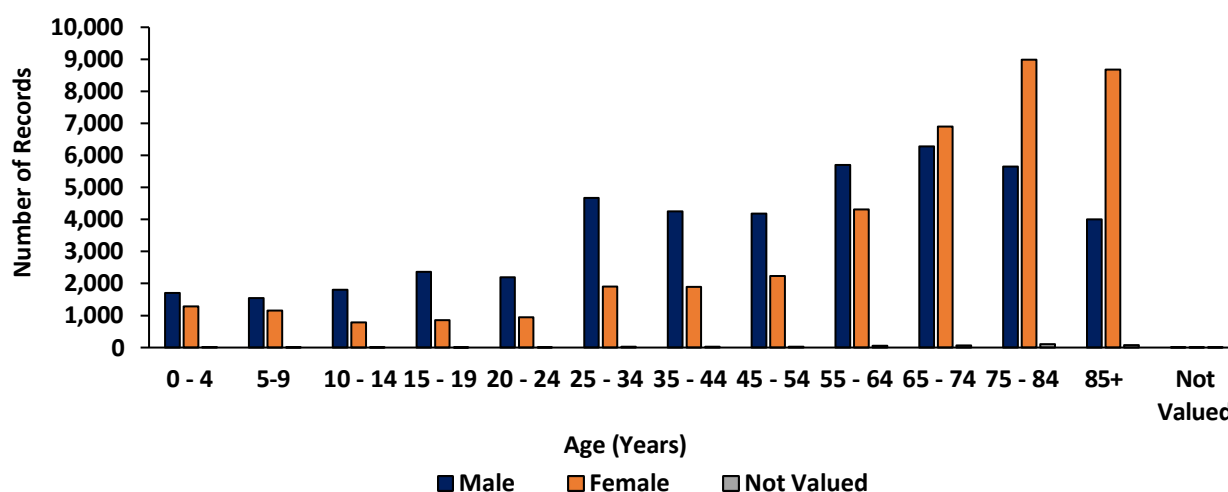
The table below identifies the destination by hospital type for pediatric transfer cases that come from acute care hospitals. The majority (79.4%) of pediatric transfer cases from acute care hospitals went to pediatric level I trauma centers.

Hospital Type	Transfers	
	#	%
Pediatric Level I Trauma Center	1,029	79.4
Pediatric Level II Trauma Center	187	14.4
Adult Level I Trauma Center	26	2.0
Adult Level II Trauma Center	9	0.7
Acute Care Hospital	21	1.6
Other Hospital or Unknown	24	1.9
Total	1,296	100.0

SECTION 3: PATIENT CHARACTERISTICS

❖ **Figure 4. Demographics by sex and age group, Ohio Trauma Registry, 2022**

This graph, along with Table 6 below, looks 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. Records where gender is labeled as “Not Valued” were populated with “U”. Records where the age category is labeled as “Not Valued” were populated with “-”. There are 14 records where age was not value



❖ **Table 6. Demographics by sex and age group, Ohio Trauma Registry, 2022**

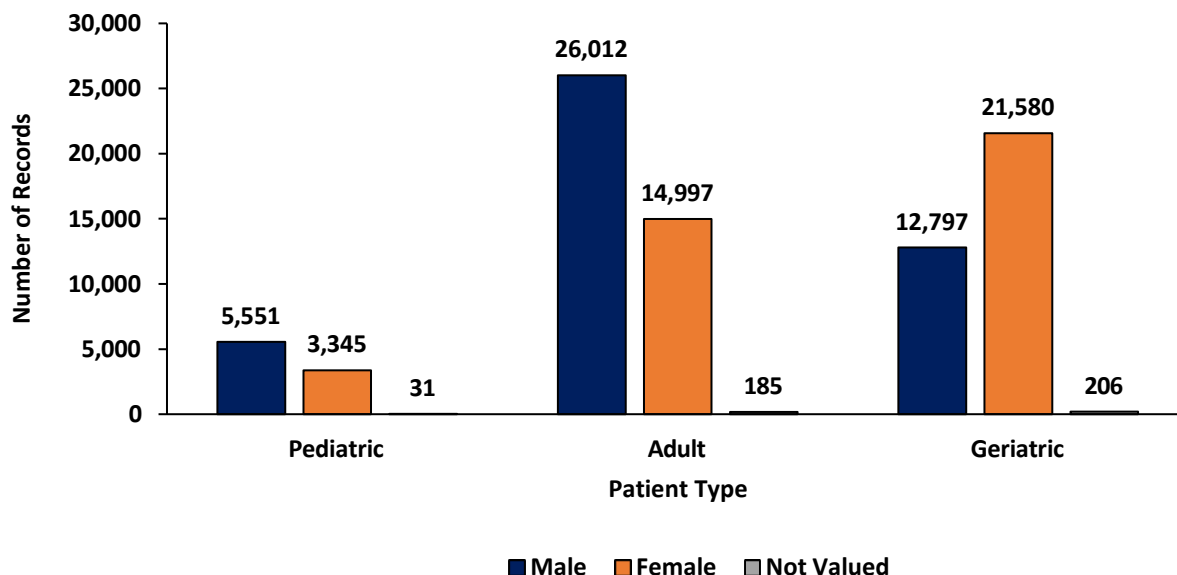
The most common age group among males was 65 – 74. The most common age group among females was 75-84. Records where gender is labeled as “Not Valued” were populated with “U”. Records where the age category is labeled as “Not Valued” were populated with “-”.

Age (Years)	Male		Female		Not Valued		Total	
	#	%	#	%	#	%	#	%
0 - 4	1,706	3.8	1,283	3.2	14	3.3	3,003	3.5
5-9	1,544	3.5	1,156	2.9	9	2.1	2,709	3.2
10-14	1,801	4.1	788	2.0	8	1.9	2,597	3.1
15 - 19	2,365	5.3	856	2.1	11	2.6	3,232	3.8
20 - 24	2,199	5.0	950	2.4	9	2.1	3,158	3.7
25 - 34	4,676	10.5	1,902	4.8	25	5.9	6,603	7.8
35 - 44	4,253	9.6	1,890	4.7	23	5.4	6,166	7.3
45 - 54	4,185	9.4	2,239	5.6	25	5.9	6,449	7.6
55 - 64	5,700	12.8	4,309	10.8	52	12.2	10,061	11.9
65 - 74	6,282	14.2	6,903	17.3	71	16.7	13,256	15.6
75 - 84	5,651	12.7	8,993	22.5	102	23.9	14,746	17.4
85 and over	3,998	9.0	8,679	21.7	73	17.1	12,750	15.0
Not Valued	9	0.0	1	0.0	4	0.9	14	0.0
Total	44,369	100.0	39,949	100.0	426	100.0	84,744	100.0

❖ **Figure 5. Demographics by patient type and sex, Ohio Trauma Registry, 2022**

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 graph below shows the number of records based on type of patient (i.e. pediatric, adult, or geriatric) and patient sex. There were 14 records where age was not valued (records were populated with “-”) and therefore patient type could not be calculated. These records were not included in this analysis. Records where gender is labeled as “Not Valued” were populated with “U”.



❖ **Table 7. Demographics by patient type and sex, Ohio Trauma Registry, 2022**

The table below shows the number of patients based on type of patient (i.e. pediatric, adult, or geriatric) and patient sex. There were 14 records where age was not valued (records were populated with “-”) and patient type could not be determined. These records were not included in the table. Records where gender is labeled as “Not Valued” were populated with “U”.

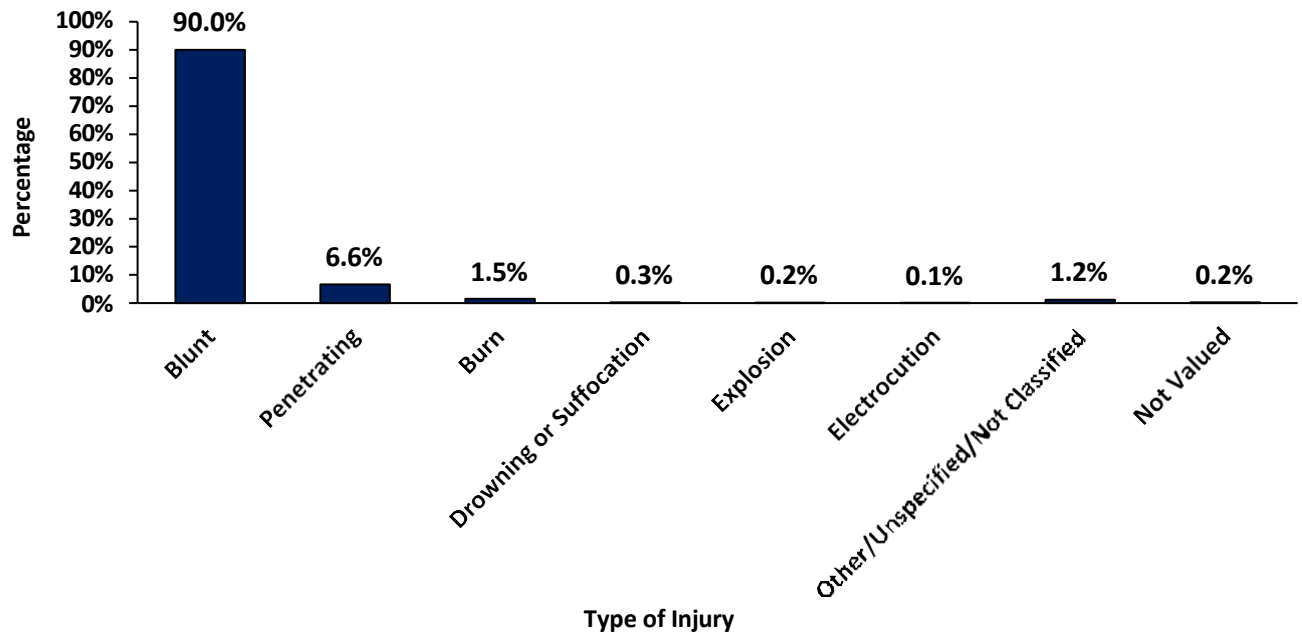
The majority of pediatric (62.0%) and adult (63.1%) records involved males. The majority (62.4%) of geriatric records involved females.

Sex	Type of Patient							
	Pediatric		Adult		Geriatric		Total	
	#	%	#	%	#	%	#	%
Male	5,551	62.0	26,012	63.1	12,797	37.0	44,360	52.4
Female	3,371	37.7	14,997	36.4	21,580	62.4	39,948	47.1
Not Valued	31	0.3	185	0.4	206	0.6	422	0.5
Total	8,953	100.0	41,194	100.0	34,583	100.0	84,730	100.0

SECTION 4: INJURY CHARACTERISTICS

❖ Figure 6. Types of injuries, Ohio Trauma Registry, 2022

This graph shows the types of injuries sustained in 2022. The type of injury is based on the reported ICD-10 code. Records where the type of injury was labeled as “Not Valued” were populated with “-”. Blunt injuries were the most common injury type identified, comprising 90.0% of the reported injuries.



❖ Table 8. Types of injuries, Ohio Trauma Registry, 2022

This table shows the types of injuries sustained by the patient in 2022. Records where the type of injury was labeled as “Not Valued” were populated with “-”. The most common type of injury was blunt (90.0%), followed by penetrating (6.6%).

Type of Injury	Injuries	
	#	%
Blunt	76,253	90.0
Penetrating	5,607	6.6
Burn	1,266	1.5
Drowning or Suffocation	218	0.3
Explosion	130	0.2
Electrocution	62	0.1
Other/Unspecified/Not Classified	1,000	1.2
Not Valued	208	0.2
Total	84,744	100.0

❖ **Table 9. Intent of injury, Ohio Trauma Registry, 2022**

This table shows the intent of the injury sustained in 2022. The categories of intent of injury were based on the reported ICD-10 code. Records where the intent of injury was labeled as “Not Valued” were populated with “-”. The majority (92.2%) of the injuries were unintentional.

Intent of Injury	Injuries	
	#	%
Unintentional	78,123	92.2
Self-inflicted	836	1.0
Assault	4,641	5.5
Undetermined	376	0.4
Other	54	0.1
Not Valued	714	0.8
Total	84,744	100.0

❖ **Table 10. Intent of injury by patient type, Ohio Trauma Registry, 2022**

This table shows the intent of injury sustained by patient type (i.e. pediatric, adult, geriatric). This analysis defines pediatric patients as being between the ages of 0 and 15 years, adult patients as being between the ages of 16 and 69 years, and geriatric patients as being ages 70 and older. There were 14 records where age was not valued (records were populated with “-”) and patient type could not be calculated. These records were not included in the table. Records where the intent of injury was labeled as “Not Valued” were populated with “-”.

Across all patient types, the majority (Pediatric: 92.5%; Adult: 86.2%; Geriatric: 99.3%; Overall: 92.2%) of the injuries were unintentional.

Intent of Injury	Patient Type							
	Pediatric		Adult		Geriatric		Total	
	#	%	#	%	#	%	#	%
Unintentional	8,283	92.5	35,498	86.2	34,330	99.3	78,111	92.2
Self-inflicted	51	0.6	729	1.8	55	0.2	835	1.0
Assault	173	1.9	4,384	10.6	84	0.2	4,641	5.5
Undetermined	39	0.4	317	0.8	19	0.1	375	0.4
Other	0	0.0	50	0.1	4	0.01	54	0.1
Not Valued	407	4.5	216	0.5	91	0.3	714	0.8
Total	8,953	100.0	41,194	100.0	34,583	100.0	84,730	100.0

❖ **Table 11. Intent of injury by region, Ohio, 2022**

This table shows the intent of the injuries sustained in 2022 based on region where the injury occurred. Regions were based on the eight out-of-hospital emergency medical services regions that the State Board of Emergency Medical, Fire, and Transportation Services geographically divided the state for purposes of overseeing the delivery of adult and pediatric out-of-hospital emergency medical services. A state map of these eight Homeland Security regions is located in Appendix L. For this table, records where the injuries occurred out of state were not included in the analysis. Records where the intent of injury was labeled as “Not Valued” were populated with “-”.

Across all regions, the majority (94.4% in Region 1; 89.8% in Region 2; 94.9% in Region 3; 90.9% in Region 4; 94.4% in Region 5; 92.9% in Region 6; 93.0% in Region 7; 95.5% in Region 8) of the injuries were unintentional.

Intent	Region 1		Region 2		Region 3		Region 4		Region 5	
	#	%	#	%	#	%	#	%	#	%
Unintentional	6,182	94.4	10,029	89.8	8,880	94.9	13,998	90.9	10,725	94.4
Self-Inflicted	79	1.2	105	0.9	55	0.6	178	1.2	124	1.1
Assault	213	3.3	841	7.5	314	3.4	1,061	6.9	409	3.6
Undetermined	29	0.4	46	0.4	54	0.6	71	0.5	41	0.4
Other	3	0.05	5	0.04	2	0.02	10	0.1	9	0.1
Not Valued	45	0.7	142	1.3	56	0.6	82	0.5	58	0.5
Total	6,551	100.0	11,168	100.0	9,361	100.0	15,400	100.0	11,366	100.0

Intent	Region 6		Region 7		Region 8		Not Recorded		Total	
	#	%	#	%	#	%	#	%	#	%
Unintentional	9,642	92.9	2,417	93.0	2,100	95.5	3,920	90.6	67,893	92.6
Self-Inflicted	141	1.4	27	1.0	22	1.0	24	0.6	755	1.0
Assault	458	4.4	122	4.7	61	2.8	278	6.4	3,757	5.1
Undetermined	27	0.3	10	0.4	2	0.1	29	0.7	309	0.4
Other	8	0.1	2	0.1	2	0.1	0	0.0	41	0.1
Not Valued	108	1.0	20	0.8	12	0.5	75	1.7	598	0.8
Total	10,384	100.0	2,598	100.0	2,199	100.0	4,326	100.0	73,353	100.0

❖ **Table 12. Rates of injury intent by region of injury, Ohio, 2022**

This table displays the rates of different intents of injury per 100,000 population by the region where the injury occurred. A state map of these eight Homeland Security regions is located in Appendix L. For this table, records where the injuries occurred out of state were not included in the analysis. Records where the county of injury was not valued (and so a region of injury could not be determined) were not included in this analysis. Records where the intent of injury was labeled as “Not Valued” were populated with “-”.

Across all regions, the highest rates of injury intent were for unintentional injuries. The highest rate of unintentional injury was in Region 3, whereas the highest rate of injury by assault was in Region 4.

Region	Unintentional		Self-Inflicted		Assault		Undetermined	
	Number of Injuries	Rate per 100,000	Number of Injuries	Rate per 100,000	Number of Injuries	Rate per 100,000	Number of Injuries	Rate per 100,000
Region 1	6,182	463.1	79	5.9	213	16.0	29	2.2
Region 2	10,029	507.4	105	5.3	841	42.5	46	2.3
Region 3	8,880	788.7	55	4.9	314	27.9	54	4.8
Region 4	13,998	584.6	178	7.4	1,061	44.3	71	3.0
Region 5	10,725	479.3	124	5.5	409	18.3	41	1.8
Region 6	9,642	526.7	141	7.7	458	25.0	27	1.5
Region 7	2,417	536.0	27	6.0	122	27.1	10	2.2
Region 8	2,100	518.3	22	5.4	61	15.1	2	0.5
Total	63,973	544.2	731	6.2	3,479	29.6	280	2.4

Region	Other		Not Valued		Total	
	Number of Injuries	Rate per 100,000	Number of Injuries	Rate per 100,000	Number of Injuries	Rate per 100,000
Region 1	3	0.2	45	3.4	6,551	490.8
Region 2	5	0.3	142	7.2	11,168	565.0
Region 3	2	0.2	56	5.0	9,361	831.4
Region 4	10	0.4	82	3.4	15,400	643.2
Region 5	9	0.4	58	2.6	11,366	507.9
Region 6	8	0.4	108	5.9	10,384	567.3
Region 7	2	0.4	20	4.4	2,598	576.1
Region 8	2	0.5	12	3.0	2,199	542.8
Total	41	0.3	523	4.4	69,027	587.2

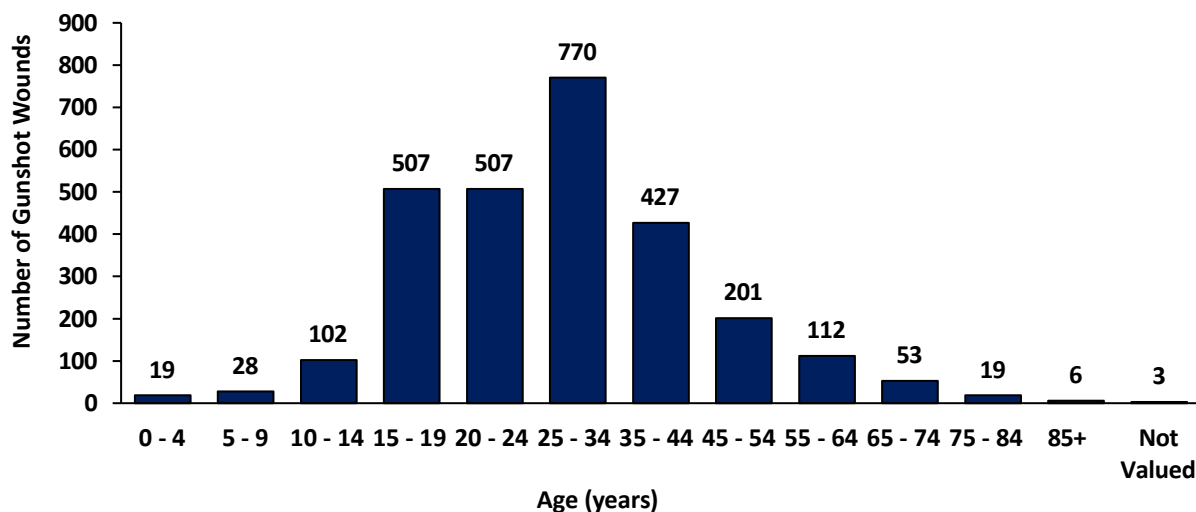
❖ **Table 13. Intent of injury by urban and rural areas, Ohio, 2022**

This table shows the intent of injuries sustained in 2022 by urban and rural areas. For this table, records where the injuries occurred out of state were not included in the analysis. Records where the intent of injury was labeled as “Not Valued” were populated with “-”. Counties in Ohio were assigned an urban or rural classification based on the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties (Appendix M). Unintentional injuries were the most common intent of injury in both rural and urban areas. A higher percentage of assaults occurred in urban areas compared to the percentage in rural areas.

Intent	Rural		Urban		Not Recorded		Total	
	#	%	#	%	#	%	#	%
Unintentional	12,328	95.8	51,645	92.0	3,920	90.6	67,893	92.6
Self-Inflicted	127	1.0	604	1.1	24	0.6	755	1.0
Assault	296	2.3	3,183	5.7	278	6.4	3,757	5.1
Undetermined	27	0.2	253	0.5	29	0.7	309	0.4
Other	6	0.05	35	0.1	0	0.0	41	0.1
Not Valued	82	0.6	441	0.8	75	1.7	598	0.8
Total	12,866	100.0	56,161	100.0	4,326	100.0	73,353	100.0

❖ **Figure 7. Gunshot wounds by age group, Ohio Trauma Registry, 2022**

This graph shows the distribution of gunshot wounds in the Ohio Trauma Registry by age group. Records where the age category is labeled as “Not Valued” were populated with “-”. In 2022, gunshot wounds occurred most frequently among persons 25 – 34 years of age. Air guns were included in the ICD-10 codes that defined gunshot wounds for this analysis. This analysis only includes gunshot wounds that were sent to a facility.



❖ **Table 14. Gunshot wounds by region, Ohio, 2022**

This table shows the distribution of gunshot wounds where the injury occurred by Ohio Homeland Security Region. A state map of these eight regions is located in Appendix L. For this table, records where the injuries occurred out of state were not included in the analysis. This analysis only includes gunshot wounds that were sent to a facility. Gunshot wounds occurred most frequently in Region 2 (666, 28.6%).

Region	#	%
Region 1	154	6.6
Region 2	666	28.6
Region 3	185	8.0
Region 4	529	22.8
Region 5	256	11.0
Region 6	321	13.8
Region 7	34	1.5
Region 8	28	1.2
Not Recorded	152	6.5
Total	2,325	100.0

❖ **Table 15. Rate of gunshot wounds by county of injury, Ohio, 2022**

This table displays the rate of gunshot wounds by the county where the injury occurred. For this table, records where the injuries occurred out of state were not included in the analysis. This analysis only includes gunshot wounds that were sent to a facility. Cuyahoga County (with 48.5 per 100,000 population) and Clark County (with 38.6 per 100,000 population) reported the highest rates of gunshot wounds during this reporting period. Among the injuries with identified counties, the statewide rate of gunshot wounds was 26.1 per 100,000 residents.

County	Number of gunshot wounds	Population	Rate per 100,000	County	Number of gunshot wounds	Population	Rate per 100,000
Adams	6	27,420	21.9	Logan	5	46,040	10.9
Allen	13	101,115	12.9	Lorain	45	316,268	14.2
Ashland	2	52,181	3.8	Lucas	113	426,643	26.5
Ashtabula	7	97,014	7.2	Madison	6	43,540	13.8
Athens	7	58,979	11.9	Mahoning	43	225,636	19.1
Auglaize	1	45,948	2.2	Marion	10	64,642	15.5
Belmont	0	65,509	0.0	Medina	3	183,512	1.6
Brown	5	43,680	11.4	Meigs	3	21,969	13.7
Butler	55	388,420	14.2	Mercer	0	42,348	0.0
Carroll	1	26,659	3.8	Miami	5	110,247	4.5
Champaign	5	38,709	12.9	Monroe	0	13,234	0.0
Clark	52	134,831	38.6	Montgomery	105	533,892	19.7
Clermont	12	210,805	5.7	Morgan	1	13,668	7.3
Clinton	6	41,964	14.3	Morrow	5	35,339	14.1
Columbiana	2	100,511	2.0	Muskingum	9	86,113	10.5
Coshocton	0	36,571	0.0	Noble	2	14,335	14.0
Crawford	3	41,522	7.2	Ottawa	0	39,978	0.0
Cuyahoga	599	1,236,041	48.5	Paulding	0	18,757	0.0
Darke	4	51,529	7.8	Perry	1	35,480	2.8
Defiance	1	38,187	2.6	Pickaway	10	60,023	16.7
Delaware	4	226,296	1.8	Pike	4	27,005	14.8
Erie	5	74,501	6.7	Portage	11	161,745	6.8
Fairfield	6	162,898	3.7	Preble	1	40,596	2.5
Fayette	3	28,839	10.4	Putnam	4	34,334	11.7
Franklin	448	1,321,820	33.9	Richland	13	125,319	10.4
Fulton	0	42,171	0.0	Ross	9	76,606	11.7
Gallia	0	29,068	0.0	Sandusky	4	58,667	6.8
Geauga	0	95,469	0.0	Scioto	4	72,194	5.5
Greene	8	168,456	4.7	Seneca	2	54,632	3.7
Guernsey	5	38,098	13.1	Shelby	5	47,671	10.5
Hamilton	216	825,037	26.2	Stark	54	372,657	14.5
Hancock	3	74,861	4.0	Summit	74	535,882	13.8
Hardin	5	30,416	16.4	Trumbull	45	200,643	22.4
Harrison	0	14,378	0.0	Tuscarawas	3	91,937	3.3
Henry	0	27,512	0.0	Union	2	66,898	3.0
Highland	4	43,391	9.2	Van Wert	0	28,769	0.0
Hocking	3	27,858	10.8	Vinton	2	12,565	15.9
Holmes	0	44,390	0.0	Warren	17	249,778	6.8
Huron	6	58,218	10.3	Washington	6	58,901	10.2
Jackson	0	32,586	0.0	Wayne	5	116,559	4.3
Jefferson	5	64,330	7.8	Williams	1	36,652	2.7
Knox	3	63,183	4.7	Wood	1	131,592	0.8
Lake	15	231,842	6.5	Wyandot	3	21,567	13.9
Lawrence	1	56,653	1.8	Not Recorded	152		
Licking	16	181,359	8.8	Out of Ohio	--		

The national average rate of fatal firearm injuries from CY 2010 – 2012 was 10.23 per 100,000, and the average rate of non-fatal firearm injuries was 21.6 per 100,000. ¹ Fatal firearm injuries were most commonly reported within the 25 – 34 age group, while those ages 15 – 24 were the most common age group in which non-fatal firearm injuries occurred. ¹

In 2017, the age-adjusted death rate for firearm-related injuries in the United States was 12.0 per 100,000. The highest death rate was reported in the 25 – 34 age group (18.5 per 100,000), followed by the 15 – 24 age group (17.7 per 100,000). ²

Sources:

¹ Fowler KA, Dahlberg LL, Haileyesus T, Annest JL. Firearm injuries in the United States. *Prev Med.* 2015 Oct;79:5-14. doi: 10.1016/j.ypmed.2015.06.002. Epub 2015 Jun 24. PMID: 26116133; PMCID: PMC4700838.

² Kochanek KD, Murphy SL, Xu J, Arias E. Deaths: Final Data for 2017. *Natl Vital Stat Rep.* 2019 Jun;68(9):1-77. PMID: 32501199.

SECTION 5: 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, transfer between different level facilities, final discharge disposition, and mortality.

❖ Table 16. Emergency department disposition of trauma cases, Ohio Trauma Registry, 2022

This table shows the disposition of patients after arriving at the emergency department. The most frequent ED disposition was being admitted to the floor (40.3%).

Emergency Department Disposition	Patients	
	#	%
Floor	34,162	40.3
Transferred To Another Hospital	17,805	21.0
Intensive Care Unit (ICU)	8,628	10.2
Interventional Radiology (IR)	47	0.1
Telemetry/Step-Down Unit	7,121	8.4
Operating Room	6,143	7.2
Observation Unit	3,174	3.7
Home without Services	3,557	4.2
Morgue	680	0.8
Left Against Medical Advice	109	0.1
Other (Out of Hospital)	136	0.2
Home with Services	11	0.01
Direct Admissions to Hospital	3,171	3.7
Total	84,744	100.0

❖ **Table 17. Emergency department disposition of trauma cases by region, Ohio, 2022**

This table shows the disposition of patients after arriving at the emergency department by the region where the injury occurred. A state map of these eight Homeland Security regions is located in Appendix L. For this table, records where the injuries occurred out of state were not included in the analysis. For all regions, the most frequent emergency department disposition was getting admitted to the floor (43.4% in Region 1; 50.3% in Region 2; 35.8% in Region 3; 36.2% in Region 4; 42.4% in Region 5; 42.8% in Region 6; 32.5% in Region 7; 42.5% in Region 8).

Emergency Department Disposition	Region 1		Region 2		Region 3		Region 4		Region 5	
	#	%	#	%	#	%	#	%	#	%
Floor	2,842	43.4	5,619	50.3	3,353	35.8	5,570	36.2	4,820	42.4
Transferred To Another Hospital	1,289	19.7	1,599	14.3	2,487	26.6	3,647	23.7	2,031	17.9
Intensive Care Unit (ICU)	833	12.7	1,523	13.6	805	8.6	1,272	8.3	1,398	12.3
Interventional Radiology (IR)	6	0.1	3	0.03	4	0.04	13	0.1	7	0.1
Telemetry/Step-Down Unit	662	10.1	125	1.1	1,062	11.3	2,011	13.1	1,274	11.2
Operating Room	307	4.7	1,087	9.7	454	4.8	1,242	8.1	750	6.6
Observation Unit	286	4.4	452	4.0	341	3.6	771	5.0	187	1.6
Home without Services	122	1.9	373	3.3	127	1.4	494	3.2	278	2.4
Morgue	47	0.7	161	1.4	36	0.4	167	1.1	89	0.8
Left Against Medical Advice	3	0.05	6	0.1	3	0.03	19	0.1	8	0.1
Other (Out of Hospital)	6	0.1	42	0.4	6	0.1	21	0.1	7	0.1
Home with Services	0	0.0	0	0.0	1	0.01	2	0.01	0	0.0
Direct Admissions to Hospital Upon Arrival	148	2.3	178	1.6	682	7.3	171	1.1	517	4.5
Total	6,551	100.0	11,168	100.0	9,361	100.0	15,400	100.0	11,366	100.0

Emergency Department Disposition	Region 6		Region 7		Region 8		Not Recorded		Total	
	#	%	#	%	#	%	#	%	#	%
Floor	4,448	42.8	844	32.5	934	42.5	1,603	37.1	30,033	40.9
Transferred To Another Hospital	1,879	18.1	692	26.6	690	31.4	1,164	26.9	15,478	21.1
Intensive Care Unit (ICU)	956	9.2	201	7.7	122	5.5	345	8.0	7,455	10.2
Interventional Radiology (IR)	1	0.01	0	0.0	0	0.0	4	0.1	38	0.1
Telemetry/Step-Down Unit	458	4.4	293	11.3	129	5.9	77	1.8	6,091	8.3
Operating Room	801	7.7	178	6.9	134	6.1	221	5.1	5,174	7.1
Observation Unit	541	5.2	86	3.3	44	2.0	100	2.3	2,808	3.8
Home without Services	560	5.4	136	5.2	73	3.3	654	15.1	2,817	3.8
Morgue	99	1.0	14	0.5	14	0.6	15	0.3	642	0.9
Left Against Medical Advice	8	0.1	18	0.7	0	0.0	19	0.4	84	0.1
Other (Out of Hospital)	10	0.1	11	0.4	1	0.05	10	0.2	114	0.2
Home with Services	2	0.02	4	0.2	0	0.0	2	0.05	11	0.01
Direct Admissions to Hospital Upon Arrival	622	6.0	120	4.6	58	2.6	112	2.6	2,608	3.6
Total	10,385	100.0	2,597	100.0	2,199	100.0	4,326	100.0	73,353	100.0

❖ **Table 18. Hospital inpatient discharge disposition, Ohio Trauma Registry, 2022**

This table shows the disposition of patients at the time of their discharge. The most common hospital discharge disposition was going home or doing self-care as a routine discharge (33.6%).

Discharge Disposition	Patients	
	#	%
Home without Services	28,513	33.6
Skilled Nursing Facility	16,400	19.4
Home with Services	7,475	8.8
Inpatient Rehab or Designated Unit	4,807	5.7
Expired	1,617	1.9
Left Against Medical Advice or Discontinued Care	678	0.8
Hospice	846	1.0
Transferred to Another Hospital	796	0.9
Long Term Care Hospital (LTCH)	386	0.5
Psychiatric Hospital or Psychiatric Distinct Part of a Hospital	359	0.4
Court/Law Enforcement	229	0.3
Intermediate Care Facility	97	0.1
Another Type of Inpatient Facility Not Defined Elsewhere	57	0.1
Discharged from Emergency Department After Arrival	22,303	26.3
Not Valued	181	0.2
Total	84,744	100.0

❖ **Table 19. Hospital inpatient discharge disposition by region, Ohio, 2022**

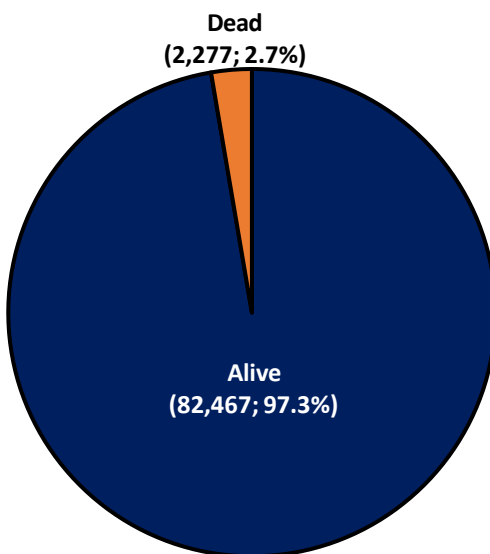
This table looks at the disposition of patients at the time of their discharge by the region where the injury occurred. A state map of these eight Homeland Security regions is located in Appendix L. Records where the injuries occurred out of state were not included in the analysis.

Discharge Disposition	Region 1		Region 2		Region 3		Region 4		Region 5	
	#	%	#	%	#	%	#	%	#	%
Home or Self Care (Routine Discharge)	2,260	34.5	3,097	27.7	2,890	30.9	5,613	36.4	3,482	30.6
Skilled Nursing Facility	1,460	22.3	3,022	27.1	1,880	20.1	2,526	16.4	2,770	24.4
Home with Services	420	6.4	1,241	11.1	880	9.4	1,538	10.0	973	8.6
Inpatient Rehab or Designated Unit	443	6.8	781	7.0	522	5.6	464	3.0	866	7.6
Expired	157	2.4	224	2.0	176	1.9	318	2.1	282	2.5
Left Against Medical Advice or Discontinued Care	35	0.5	92	0.8	71	0.8	146	0.9	144	1.3
Hospice	81	1.2	103	0.9	126	1.3	132	0.9	79	0.7
Transferred to Another Hospital	78	1.2	104	0.9	84	0.9	112	0.7	176	1.5
Long Term Care Hospital (LTCH)	55	0.8	43	0.4	18	0.2	48	0.3	69	0.6
Psychiatric Hospital or Psychiatric Distinct Part of a Hospital	41	0.6	38	0.3	26	0.3	65	0.4	73	0.6
Court/Law Enforcement	8	0.1	45	0.4	21	0.2	68	0.4	16	0.1
Intermediate Care Facility	35	0.5	9	0.1	4	0.04	12	0.1	11	0.1
Another Type of Inpatient Facility Not Defined Elsewhere	11	0.2	17	0.2	1	0.01	6	0.04	7	0.1
Discharged from Emergency Department After Arrival	1,467	22.4	2,180	19.5	2,660	28.4	4,351	28.3	2,415	21.2
Not Valued	0	0.0	172	1.5	2	0.02	1	0.01	3	0.03
Total	6,551	100.0	11,168	100.0	9,361	100.0	15,400	100.0	11,366	100.0

Discharge Disposition	Region 6		Region 7		Region 8		Not Recorded		Total	
	#	%	#	%	#	%	#	%	#	%
Home or Self Care (Routine Discharge)	2,866	27.6	900	34.6	674	30.7	1,591	36.8	23,373	31.9
Skilled Nursing Facility	2,547	24.5	352	13.5	394	17.9	299	6.9	15,250	20.8
Home with Services	957	9.2	212	8.2	189	8.6	266	6.1	6,676	9.1
Inpatient Rehab or Designated Unit	802	7.7	112	4.3	42	1.9	171	4.0	4,203	5.7
Expired	194	1.9	53	2.0	35	1.6	16	0.4	1,455	2.0
Left Against Medical Advice or Discontinued Care	68	0.7	18	0.7	4	0.2	38	0.9	616	0.8
Hospice	143	1.4	24	0.9	26	1.2	18	0.4	732	1.0
Transferred to Another Hospital	86	0.8	30	1.2	37	1.7	27	0.6	734	1.0
Long Term Care Hospital (LTCH)	68	0.7	4	0.2	6	0.3	13	0.3	324	0.4
Psychiatric Hospital or Psychiatric Distinct Part of a Hospital	41	0.4	10	0.4	6	0.3	11	0.3	311	0.4
Court/Law Enforcement	28	0.3	4	0.2	2	0.1	7	0.2	199	0.3
Intermediate Care Facility	17	0.2	2	0.1	4	0.2	1	0.02	95	0.1
Another Type of Inpatient Facility Not Defined Elsewhere	7	0.1	2	0.1	2	0.1	1	0.02	54	0.1
Discharged from Emergency Department After Arrival	2,558	24.6	875	33.7	778	35.4	1,867	43.2	19,151	26.1
Not Valued	2	0.02	0	0.0	0	0.0	0	0.0	180	0.2
Total	10,384	100.0	2,598	100.0	2,199	100.0	4,326	100.0	73,353	100.0

❖ **Figure 8. Discharge status of all reported trauma cases, Ohio Trauma Registry, 2022**

This pie chart shows the discharge status (i.e. alive or dead) of records with reported traumatic injuries.



❖ **Table 20. Discharge status of all reported trauma cases, Ohio Trauma Registry, 2022**

This table shows the discharge status (i.e. alive or dead) of records with reported traumatic injuries. The majority (97.3%) were alive at the time of discharge. The total case fatality rate is 2.7%. A table of case fatality rates across multiple demographic, injury, and patient disposition variables can be found on page 33.

Discharge Status	Patients	
	#	%
Alive	82,467	97.3
Dead	2,277	2.7
Total	84,744	100.0

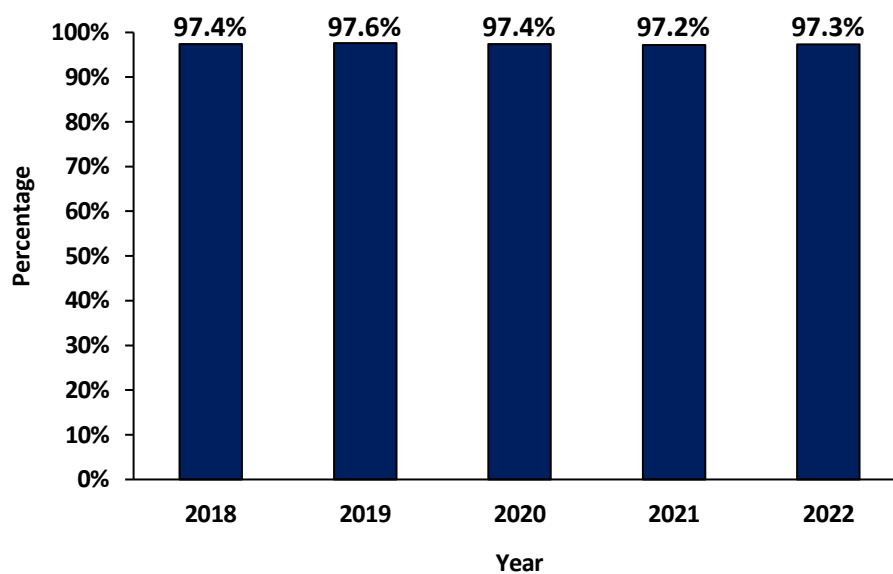
❖ **Table 21. Discharge status of all reported trauma cases, Ohio Trauma Registry, 2018-2022**

This table shows the discharge status (i.e. alive or dead) of records with reported traumatic injuries from 2018 to 2022. 2018-2021 discharge data are from previous trauma reports.

Year	Discharge Status		
	Alive	Dead	Total
2018	66,629	1,773	68,402
2019	70,316	1,762	72,078
2020	78,215	2,101	80,316
2021	82,115	2,398	84,513
2022	82,467	2,277	84,744

❖ **Figure 9. Percentage of reported trauma cases discharged alive, Ohio Trauma Registry, 2018-2022**

This table shows the percentage of records with reported traumatic injuries that were discharged alive from 2018 to 2022. 2018-2021 discharge data are from previous trauma reports.



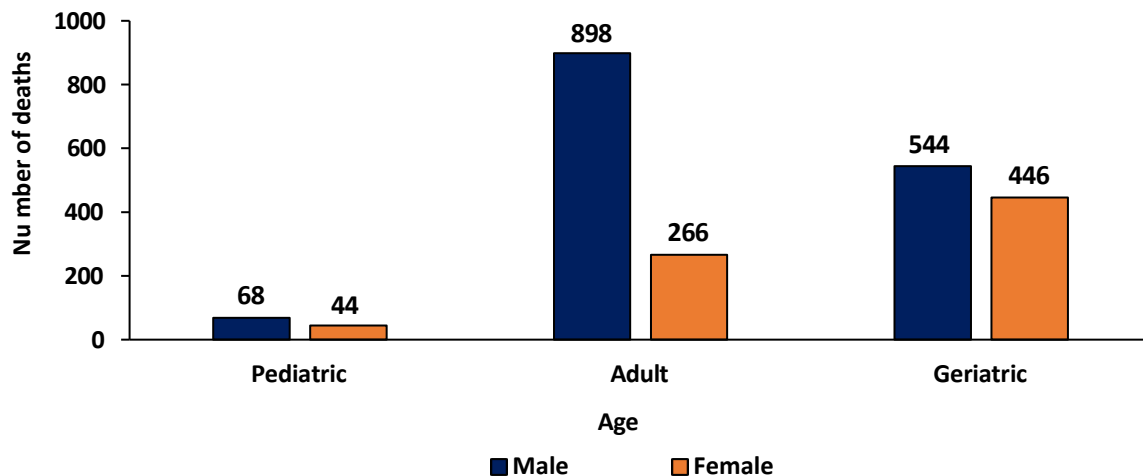
❖ **Table 22. Discharge status of all reported trauma cases by region, Ohio, 2022**

This table shows the discharge status of patients by region where the injury occurred. A state map of these eight Homeland Security regions is located in Appendix L. These regions are also used by the Regional Physician Advisory Board (RPAB). For this table, records where the injuries occurred out of state were not included in the analysis. Regions 2 and 5 had the highest percentage of patients discharged deceased.

Region	Alive	Dead	Total	% Discharged Dead
Region 1	6,350	201	6,551	3.1
Region 2	10,785	383	11,168	3.4
Region 3	9,150	211	9,361	2.3
Region 4	14,918	482	15,400	3.1
Region 5	10,996	370	11,366	3.3
Region 6	10,099	285	10,384	2.7
Region 7	2,531	67	2,598	2.6
Region 8	2,148	51	2,199	2.3
Not Recorded	4,298	28	4,326	0.6
Total	71,275	2,078	73,353	2.8

❖ **Figure 10. Number of injury related deaths by patient type and sex, Ohio Trauma Registry, 2022**

This graph shows the number of deaths related to injuries sustained by patients in 2022 by patient type and sex. There were six fatality records where age was not valued (records were populated with “-”) and patient type could not be determined. These records were not included in the table. Overall, deaths were more common among males than females.



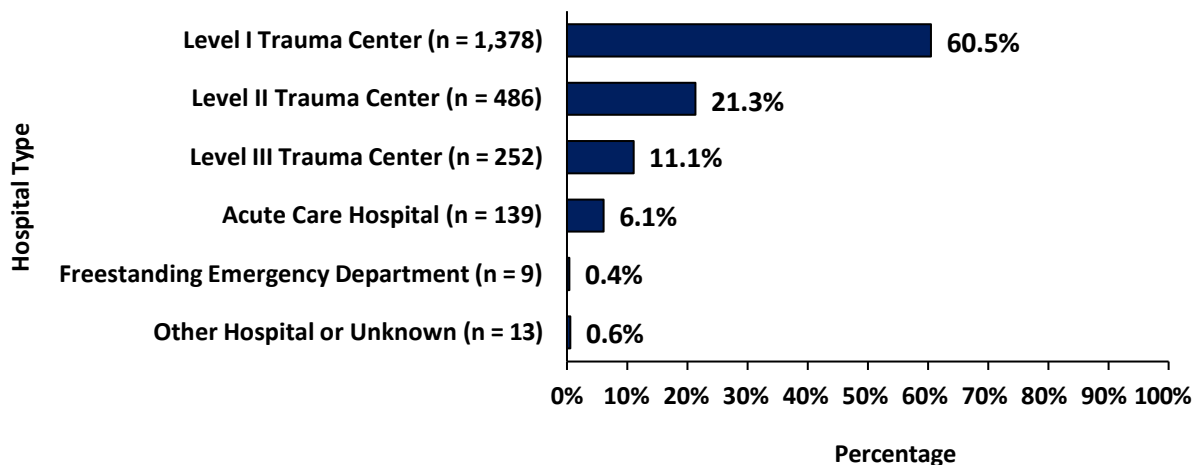
❖ **Table 23. GCS Documentation of head injuries with an Abbreviated Injury Scale (AIS) $\geq$ 3, Ohio Trauma Registry, 2022**

This table shows the number and percentages of patients with an AIS $\geq$ 3 who had a Glasgow Coma Scale (GCS) score reported prior to arrival at the hospital and once in the facility. Records where the GCS scores were labeled as “Not Valued or Recorded” were populated with “II”, “UU”, or nothing. Of the 9,945 records who had an AIS $\geq$ 3, 57.9% did not have a valued GCS score prior to arrival at the hospital. Of all patients, 6.6% did not have a valued GCS score in the hospital.

	Out of-Hospital GCS		In-Hospital GCS	
	#	%	#	%
GCS 3	453	4.6	1,029	10.3
GCS 4	52	0.5	50	0.5
GCS 5	48	0.5	50	0.5
GCS 6	65	0.7	119	1.2
GCS 7	54	0.5	108	1.1
GCS 8	70	0.7	62	0.6
GCS 9	66	0.7	89	0.9
GCS 10	85	0.9	115	1.2
GCS 11	98	1.0	116	1.2
GCS 12	132	1.3	152	1.5
GCS 13	216	2.2	319	3.2
GCS 14	621	6.2	1,350	13.6
GCS 15	2,224	22.4	5,728	57.6
Not Valued or Recorded	5,761	57.9	658	6.6
Total	9,945	100.0	9,945	100.0

❖ **Figure 11. Emergency department deaths by hospital type, Ohio Trauma Registry, 2022**

This graph shows the number and percentage of emergency department deaths by hospital type. The majority (60.5%) of deaths occurred at Level I Trauma Centers. This is likely due to the fact that by their nature, Level I Trauma Centers receive the most critical trauma cases.



SECTION 6: CASE FATALITY RATES

The Case Fatality Rate (CFR) is the proportion of deaths within a designated population or grouping of "cases" (people with a particular medical condition or hospital disposition) over the course of the disease. A CFR is conventionally expressed as a percentage.

❖ Table 24. Case fatality rate (CFR) by age group and sex, Ohio Trauma Registry, 2022

The table below looks at case fatality rates by age group and sex among the records submitted to the registry. Records where age was not valued (populated with "--") were not included in this analysis. Except for the 0-4 and 10-14 age categories, the case fatality rates were higher among males compared to females.

Age Group	CFR (%)			
	Male	Female	Not Reported	Total
0-4	1.8	2.2	0.0	2.0
5-9	0.6	0.5	0.0	0.6
10-14	0.9	1.0	0.0	1.0
15-19	3.2	2.1	0.0	2.9
20-24	4.8	2.6	11.1	4.1
25-34	4.1	2.3	0.0	3.6
35-44	3.4	1.7	0.0	2.9
45-54	3.1	1.3	8.0	2.5
55-64	2.6	1.7	0.0	2.2
65-74	3.6	1.6	1.4	2.6
75-84	4.2	1.8	0.0	2.7
85+	4.8	2.5	1.4	3.2
Not Valued	--	100.0	--	42.9
Total	3.4	1.9	1.2	2.7

❖ Table 25. Case fatality rate (CFR) by Injury Severity Score (ISS), Ohio Trauma Registry, 2022

The table below looks at case fatality rates by age group and sex among the records submitted to the registry. In 2022, the case fatality rate was the highest among those with an ISS of ≥ 25 (26.7%).

ISS	CFR (%)
01-09	1.1
10-14	2.0
15-24	5.9
25+	26.7
Not Calculable	2.6
Total	2.7

❖ **Table 26. Case fatality rate (CFR) by duration of hospital stay for Injury Severity Score (ISS) ≥ 25, Ohio Trauma Registry, 2022**

This table looks at case fatality rates for injuries with ISS ≥ 25 by duration of hospital days. For patients with an ISS ≥ 25, overall the case fatality rate decreased the longer they were hospitalized. The CFR was the highest (55.0%) for patients that stayed in the hospital for one day.

	Hospital stay (days)							
	1	2	3	4	5	6	7	8+
CFR (%)	55.0	38.0	26.7	13.8	16.6	12.9	13.2	7.5

❖ **Table 27. Case fatality rate (CFR) by intent of injury, Ohio Trauma Registry, 2022**

This table looks at case fatality rates by intent of injury. Records where the intent of injury was labeled as “Not Valued” were populated with “-”. In 2022, the case fatality rate was the highest among those with self-inflicted injuries (20.2%).

Intent	CFR (%)
Unintentional	2.3
Self-Inflicted	20.2
Assault	5.8
Undetermined	8.0
Other	14.8
Not Valued	4.3
Total	2.7

❖ **Table 28. Case fatality rate (CFR) by hospital type, Ohio Trauma Registry, 2022**

This table looks at case fatality rates by hospital type. In 2022, the case fatality rate was the highest in Level I Trauma Centers (4.2%).

Hospital Type	CFR (%)
Level I Trauma Center	4.2
Level II Trauma Center	3.1
Level III Trauma Center	1.7
Free Standing Emergency Department	0.2
Acute Care Hospital	0.9
Other Hospital or Unknown	0.6
Statewide	2.7

❖ **Table 29. Case fatality rate (CFR) by mechanism of injury, Ohio Trauma Registry, 2022**

This table looks at case fatality rates by mechanism of injury. Records labeled as “Not Classified” were populated with that text. Records labeled as “Not Valued” were populated with “-”. The case fatality rate was the highest among those who died by suffocation/asphyxiation (31.4%) and drowning/submersion (15.7%).

Mechanism of Injury	CFR (%)
Abuse	5.0
Cut or Pierce	1.4
Drowning/Submersion	15.7
Electrical	6.5
Explosion	2.1
Fall	2.1
Fire or Flame	7.1
Firearm	15.3
Hot Object or Substance	1.1
Machinery	0.3
Mechanical	1.0
Motor Vehicle Collisions	3.8
Natural or Environmental	0.5
Other Land Transport	1.5
Other Specified, Classifiable	13.0
Other Specified, Not Elsewhere Classifiable	3.5
Other Transport	8.1
Overexertion	0.0
Pedal Cyclist, Other	0.5
Pedestrian, Other	5.7
Pedestrian Conveyance	0.4
Poisoning	4.3
Struck by or Against	0.3
Suffocation/Asphyxiation	31.4
Not Classified/Not Valued	3.5
Statewide	2.7

Table 30. Case fatality rates (CFR) among motor vehicle collisions, Ohio Trauma Registry, 2022

The table below looks at CFR among different types of motor vehicle collisions. Pedestrian collisions had the highest CFR (8.4%).

Type of Motor Vehicle Collision (MVC)	CFR (%)
MVC - Motorcyclist	3.9
MVC - Occupant	3.4
MVC - Other	2.9
MVC - Pedal Cyclist	1.3
MVC - Pedestrian	8.4
MVC - Unspecified	3.0
Total	3.8

❖ **Table 31. Case fatality rate (CFR) by county, Ohio, 2022**

This table displays the case fatality rate by the county where the injury occurred. For this table, records where the injuries occurred out of state were not included in the analysis. The statewide CFR is 2.8%. Meigs (9.9%) and Carroll (6.3%) counties reported the highest CFRs in 2022.

County	Number of Deaths	CFR (%)	County	Number of Deaths	CFR (%)
Adams	5	2.5	Logan	10	2.7
Allen	7	1.7	Lorain	48	2.8
Ashland	11	4.4	Lucas	79	3.4
Ashtabula	10	2.7	Madison	8	2.4
Athens	6	1.4	Mahoning	55	4.1
Auglaize	8	3.5	Marion	12	2.1
Belmont	1	1.4	Medina	19	3.3
Brown	8	3.9	Meigs	7	9.9
Butler	48	1.9	Mercer	3	1.6
Carroll	5	6.3	Miami	14	1.2
Champaign	6	1.8	Monroe	0	0.0
Clark	33	2.3	Montgomery	110	2.5
Clermont	30	2.8	Morgan	2	2.0
Clinton	11	3.0	Morrow	10	5.3
Columbiana	13	3.6	Muskingum	21	2.7
Coshocton	3	1.1	Noble	1	1.5
Crawford	6	2.1	Ottawa	9	2.5
Cuyahoga	282	3.9	Paulding	1	3.2
Darke	12	3.2	Perry	4	1.1
Defiance	5	2.2	Pickaway	10	2.1
Delaware	32	2.7	Pike	2	1.3
Erie	5	1.5	Portage	30	2.9
Fairfield	16	1.8	Preble	8	3.1
Fayette	3	1.5	Putnam	8	4.7
Franklin	324	3.7	Richland	31	2.9
Fulton	11	4.6	Ross	19	2.8
Gallia	3	2.9	Sandusky	4	2.3
Geauga	12	2.0	Scioto	9	2.5
Greene	21	1.9	Seneca	8	2.1
Guernsey	8	2.3	Shelby	7	2.2
Hamilton	156	3.8	Stark	67	3.5
Hancock	8	2.9	Summit	86	3.2
Hardin	2	1.1	Trumbull	35	2.5
Harrison	2	4.4	Tuscarawas	6	2.4
Henry	7	5.9	Union	10	2.2
Highland	6	2.5	Van Wert	1	5.0
Hocking	13	5.8	Vinton	0	0.0
Holmes	3	3.4	Warren	21	1.2
Huron	15	3.1	Washington	10	2.5
Jackson	3	2.6	Wayne	9	3.2
Jefferson	3	3.0	Williams	3	5.5
Knox	11	3.2	Wood	19	3.6
Lake	31	2.4	Wyandot	2	1.0
Lawrence	1	2.0	Not Recorded	28	0.6
Licking	26	3.1	Statewide	2,078	2.8

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.

Case Fatality Rate (CFR) – the case fatality rate is the calculation derived from dividing the number of deaths from a specific injury over a defined period of time by the total number of individuals diagnosed with the same injury during the same time period; the resulting ratio is then multiplied by 100 to yield a percentage.

Critical Access Hospital – is a designation given to eligible rural hospitals by the Centers for Medicare and Medicaid Services (CMS). See Appendix F for locations of Ohio’s Critical Access Hospitals.

Dataset – a collection of related sets of information that are composed of separate elements but can be manipulated as a group to display relational information.

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.)

Division of Emergency Medical Services (DEMS) – the division where the State Board of Emergency Medical, Fire, and Transportation Services is housed within the Ohio Department of Public Safety.

Emergency Medical, Fire and Transportation Services Board – The state board responsible for: Establishing training and certification standards for emergency medical services personnel; accreditation of EMS training programs; approval of EMS continuing education sites; oversight of Ohio’s trauma system; oversight of the EMS grant program; providing grants for training, equipment and research; EMS for Children (EMSC) program coordination; licensing of Ohio’s medical transportation services; coordination of the Regional Physician Advisory Boards (RPABs); collection and analysis of data submitted to the EMS Incident Reporting System and the Ohio Trauma Registry and investigations to ensure compliance with the Ohio Revised and Administrative Codes.

Emergency Medical Services Incident Reporting System (EMSIRS) – the system used to collect out-of-hospital care data reported by Emergency Medical Service (EMS) providers to the State of Ohio.

Freestanding 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.

Glasgow Coma Scale (GCS) – an evaluation system developed to assess impairment and conscious levels in response to defined stimuli.

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 75 ¹. 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).

Ohio Trauma Registry (OTR) – the system used to collect trauma-related patient data reported by emergency facilities and trauma centers to the State of Ohio.

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 Ohio Trauma Acute Care Registry.

Region – as defined and used in this report refers to one of eight Ohio Homeland Security Regions a county is assigned. The Regional Physician Advisory Board (RPAB) utilizes this same regional mapping. See Appendix L.

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 disaster 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. See Appendix O.

Rural – a county designation based on lower population densities and larger amounts of agricultural and undeveloped land. See Appendix M.

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). See Appendix C and D for locations of Ohio’s Trauma Centers.

Level I Trauma Centers are a comprehensive regional resource that is a tertiary care facility central to the trauma system. A Level I Trauma Center is capable of providing total care for every aspect of injury – from prevention through rehabilitation.

Level II Trauma Centers are able to initiate definitive care for all injured patients.

Level III Trauma Centers have demonstrated an ability to provide prompt assessment, resuscitation, surgery, intensive care and stabilization of injured patients and emergency operations.

These descriptions above are provided by the American Trauma Society. A detailed description of the patient care offered at each service level can be found in the ACS document, “Resources for Optimal Care of the Injured Patient.”²

Urban – a county designation based on higher population densities. See Appendix M.

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

² <https://www.facs.org>

Appendix B: Ohio Trauma Registry Inclusion Criteria and Data Dictionary

TRAUMA PATIENT DEFINITION

To ensure consistent data collection across the State of Ohio and to follow the National Trauma Data Standard, a trauma patient is defined as a patient sustaining a traumatic injury within 14 days of initial hospital encounter and meeting the following:

PATIENT INCLUSION CRITERIA

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

The patient must have incurred 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.)

THE PATIENT MUST ALSO IN ADDITION TO THE ABOVE INCLUSION CRITERIA

- Death resulting from the traumatic injury (independent of hospital admission or hospital transfer status);
OR
- Patient transfer from one acute care hospital* to another acute care hospital;
OR
- Patients directly admitted to your hospital (exclude patients with isolated injuries admitted for elective and/or planned surgical intervention);
OR
- Patients who were an in-patient admission and/or observed.

PATIENT EXCLUSION CRITERIA

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

- **S00, S10, S20, S30, S40, S50, S60, S70, S80, S90** (Patients with these isolated injuries that were not transferred in/out or died would be excluded.);
- **7th character modifiers of D through S** (Late effects)
- More information on the trauma inclusion or exclusion criteria and the full 2021 data dictionary can be found at https://www.ems.ohio.gov/links/ems_OTR-TACR-Data-Dictionary-2021.pdf .

Appendix C: List of Ohio Adult Trauma Centers in 2022

Level 1

MetroHealth Main Campus Medical Center
UH Cleveland Medical Center
The Ohio State University Wexner Medical Center
Grant Medical Center
University of Cincinnati Medical Center
Mercy Health - St. Vincent Medical Center & Nationwide Children's Hospital -Toledo
ProMedica Toledo Hospital
Mercy Health - St. Elizabeth Youngstown Hospital
Miami Valley Hospital
Summa Health System - Akron Campus
Akron General

Level 2

Riverside Methodist Hospital
Kettering Health Main Campus
Hillcrest Hospital
Mount Carmel East
Lima Memorial Hospital
Mercy Health - St. Rita's Medical Center
Fairview Hospital
University of Toledo Medical Center
Mansfield Hospital
Aultman Hospital
Mercy Hospital

Level 3

Mercy Health - St. Joseph Warren Hospital
UH Geauga Medical Center
UH Parma Medical Center
Mercy Health - Lorain Hospital
Bethesda North Hospital
UH St. John Medical Center
Atrium Medical Center
Kettering Health Hamilton
Southwest General Health Center
ProMedica Defiance Regional Hospital
Firelands Regional Medical Center
The Ohio State University Hospital East
Blanchard Valley Hospital
Fisher-Titus Medical Center
UH Elyria Medical Center
Mercy Health - St. Charles Hospital
Upper Valley Medical Center
Kettering Health Dayton
Genesis Hospital
UH Portage Medical Center
Western Reserve Hospital
West Chester Hospital
Trumbull Regional Medical Center
Marietta Memorial Hospital
Miami Valley Hospital South Campus
Emergency and Trauma Center
Soin Medical Center - Kettering Health
Parma Medical Center

Appendix D: List of Ohio Pediatric Trauma Centers in 2022

Level 1

UH Rainbow Babies & Children's Hospital
Nationwide Children's Hospital
Cincinnati Children's Hospital - Burnet Campus
Dayton Children's - Main Campus

Level 2

MetroHealth Main Campus Medical Center
Mercy Health - St. Vincent Medical Center &
Nationwide Children's Hospital -Toledo
ProMedica Toledo Hospital
Akron Children's Hospital

Appendix E: List of Ohio Burn Centers in 2022

ABA Verified

MetroHealth Medical Center

Children's Hospital Medical Center of Akron

The Ohio State University Wexner Medical
Center

Nationwide Children's Hospital

Non-ABA

St. Vincent's Hospital Burn Center

Miami Valley Hospital Regional Adult Burn
Center

University of Cincinnati Medical Center

Shriners Children's Ohio Burn Center

Appendix F: List of Ohio Critical Access Hospitals in 2022

Harrison Community Hospital
Adams County Regional Medical Center
Blanchard Valley Hospital - Bluffton Campus
UH Conneaut Medical Center
UH Geneva Medical Center
Barnesville Hospital
Mercy Health - Urbana Hospital
Bucyrus Hospital
Galion Hospital
Community Memorial Hospital
Adena Fayette Medical Center
Fulton County Health Center
Promedica Fostoria Community Hospital
Hardin Memorial Hospital
Highland District Hospital
Henry County Hospital

Adena Greenfield Medical Center
Hocking Valley Community Hospital
Mercy Health - Willard Hospital
Mercy Health - Allen Hospital
Akron General Lodi Hospital
Morrow County Hospital
Magruder Hospital
Paulding County Hospital
MedCentral Health System - Shelby Hospital
Twin City Medical Center
Selby General Hospital
Aultman Orrville Hospital
Montpelier Hospital
Wyandot Memorial Hospital
Adena Pike Medical Center
Holzer Medical Center - Jackson

Appendix G: List of Acute Care Hospitals in 2022

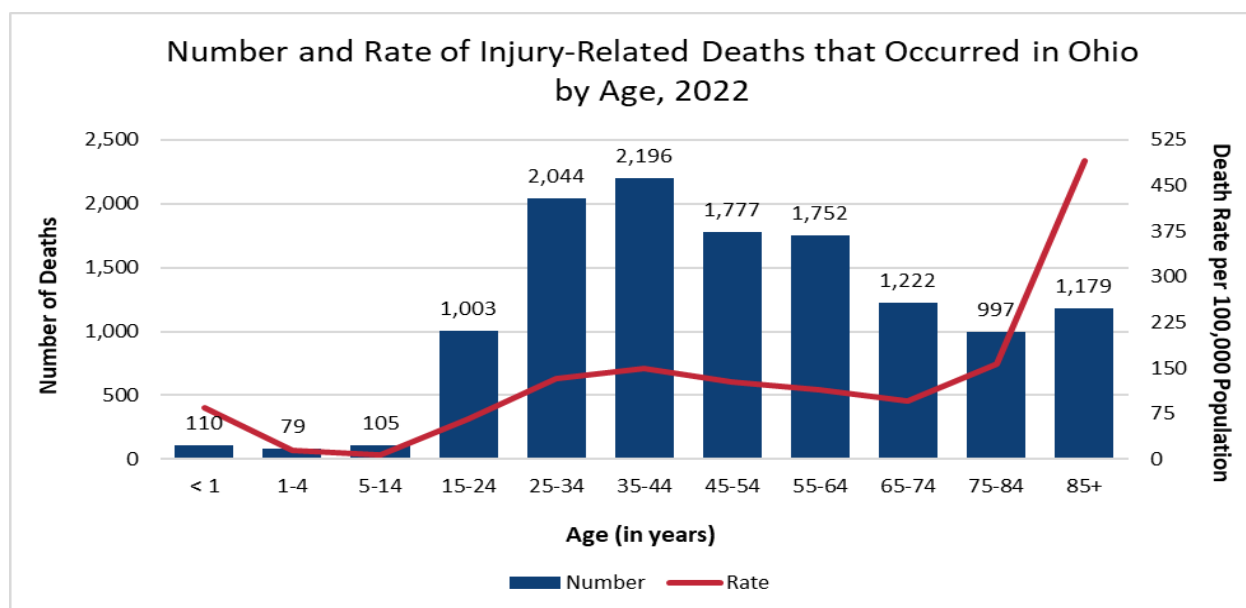
The Jewish Hospital - Mercy Health	Mary Rutan Hospital
Trinity Medical Center West	McLaren St. Luke's Hospital
UH Lake West Medical Center	Promedica Flower Hospital
Madison Health	Marion General Hospital
Avon Hospital at Richard E Jacobs	Medina Hospital
Doctors Hospital	Mercer County Community Hospital - Coldwater
Holzer Gallipolis	Berger Hospital
Mercy Health - Clermont Hospital	The Bellevue Hospital
Adena Regional Medical Center	ProMedica Memorial Hospital
Knox Community Hospital	Southern Ohio Medical Center
Kettering Health Miamisburg (formerly	Mercy Health - Tiffin Hospital
Sycamore Med Ctr.	Wilson Health
Mercy Health - Fairfield Hospital	Aultman Alliance Community Hospital
Kettering Health Washington Twp	Summa Health System - Barberton Campus
UH Samaritan Medical Center	Dublin Methodist Hospital
Ashtabula County Medical Center	Union Hospital
O'Bleness Hospital	Memorial Hospital
Joint Township District Memorial Hospital	Van Wert Health
McCullough-Hyde Memorial Hospital	Akron Children's Hosp Beeghly Campus,
Mercy Health - Springfield Regional Medical	Boardman
Center	Wooster Community Hospital
Clinton Memorial Hospital	Bryan Hospital
Salem Regional Medical Center	Wood County Hospital
East Liverpool City Hospital	South Pointe Hospital
Coshocton Regional Medical Center	Mercy Health - St. Anne Hospital
Euclid Hospital	Mount Carmel New Albany
Marymount Hospital	Mercy Health - Defiance Hospital
Lutheran Hospital	Mercy Health - St. Elizabeth Boardman Hospital
Cleveland Clinic Main Campus	UH Ahuja Medical Center
Wayne Hospital	Mercy Health - West Hospital
Grady Memorial Hospital	Mount Carmel St. Ann's
Fairfield Medical Center	Diley Ridge Medical Center
Promedica Bay Park Hospital	King's Daughters Medical Center - Ohio
Southeastern Medical Center	Kettering Health Troy
The Christ Hospital	Cincinnati Children's Hospital - Liberty Campus
Good Samaritan Hospital (Cincinnati)	Bethesda Butler Hospital
Mercy Health - Anderson Hospital	Miami Valley Hospital North Campus
Pomerene Hospital	The Christ Hospital Medical Center - Liberty Twp
Ontario Hospital	Mercy Health - Perrysburg Hospital
TriPoint Medical Center	Mount Carmel Grove City
Licking Memorial Hospital	

Appendix H: List of Freestanding Emergency Departments in 2022

Lakewood Family Health Center ED
Mount Carmel Franklinton (FSED)
Summa Health Wadsworth-Rittman Medical Center
Cleveland Heights Medical Center
Bethesda Medical Center at Arrow Springs
Mercy Health - Harrison Medical Center
Mercy Health - Mt. Orab Medical Center
Brunswick Medical Center
Good Samaritan Medical Center - Western Ridge
CC - Akron General H&W Ctr – West
Madison Health Center
Akron General H&W Ctr – North
Summa Health Green Medical Center
St. Mary's Medical Center - Ironton Campus
Kettering Health Huber
Twinsburg Fam Health & Surg Ctr
Westerville Medical Campus
Akron General H&W Ctr – Green
St. Elizabeth Emergency & Diagnostic Center (Austintown Medical Ctr)
Mercy Health - Putnam County Emergency Services
Miami Valley Hospital Jamestown Emergency Center
Marietta Memorial - Belpre Medical Campus
Kettering Health Preble
Kettering Health - Franklin Emergency Center
OhioHealth Pickerington Methodist Hospital
Mount Carmel Lewis Center
Brecksville Health and Surgery Center

Lewis Center Health Center
Dayton Children's - South Campus ED
Lewis Center Close to Home Center and ED
Genesis Perry County Medical Center
Miami Valley Hospital Austin Blvd Emergency Center
OhioHealth Emergency Care - Reynoldsburg
OhioHealth Emergency Care – Powell
Grove City Methodist Hospital
OhioHealth Emergency Care - New Albany
Kettering Health Middletown ED
Beachwood Medical Center
Fairfield Medical Ctr. - River Valley Campus
Mercy Health - Dayton Springfield Emergency Center
Aultman Massillon
OhioHealth Emergency Care – Ashland
Kettering Health Piqua
OhioHealth Emergency Care – Hilliard
Mount Carmel Reynoldsburg
OhioHealth Emergency Care – Ontario
OhioHealth Emergency Care – Obetz
Holzer Meigs - Emergency Department
Promedica Toledo Hospital Emergency and Urgent Care – Maumee Campus
Miami Valley Hospital Beavercreek Emergency Center
Kettering Health Springfield

Appendix I: Ohio Department of Health Injury-Related Death Data



Source: Ohio Department of Health (ODH) Bureau of Vital Statistics; analysis conducted by ODH Violence and Injury Epidemiology and Surveillance Section

Number and Age-Adjusted Rate of Injury-Related Deaths that Occurred in Ohio by Sex, 2020-2022**

Year	Female		Male		Total	
	Number	Age- Adjusted Rate	Number	Age- Adjusted Rate	Number	Age- Adjusted Rate
2020 **	3,934	61.2	8,215	142.3	12,149	101.1
2021 **	4,088	63.1	8,683	150.0	12,771	106.2
2022 **	3,993	61.4	8,471	144.7	12,464	102.3

Includes injury-related deaths of individuals that died in Ohio regardless of their state of residence (underlying). Age-adjusted rates are based on the 2000 U.S. standard population and are calculated per 100,000 population.

**At the time of this report, population files from the federal government reflecting new national standards and methodologies were available for 2020 through 2022 only. Because of this change, the Ohio Department of Health (ODH) advises caution in comparing these rates to those from years prior to 2020 cause of death ICD-10 codes *U01-*U03, V01-Y36, Y85-Y87, Y89).

Source: ODH Bureau of Vital Statistics; analysis conducted by ODH Violence and Injury Epidemiology and Surveillance Section.

Number and Percentage of Injury-Related Deaths that Occurred in Ohio by Mechanism, All Intent, 2022

External Injury Mechanism	Female		Male		Total	
	Number	Percentage	Number	Percentage	Number	Percentage
Cut or Pierce	26	1%	90	1%	116	1%
Drowning	41	1%	76	1%	117	1%
Drug Poisoning	1,655	41%	3,489	41%	5,144	41%
Fall	995	25%	991	12%	1,986	16%
Fire or Flame	100	3%	110	1%	210	2%
Firearm	254	6%	1,559	18%	1,813	15%
Hot Object or Substance	2	0%	5	0%	7	0%
Machinery	1	0%	31	0%	32	0%
MV-Motorcyclist	22	1%	164	2%	186	1%
MV-Occupant	72	2%	149	2%	221	2%
MV-Other	0	0%	2	0%	2	0%
MV-Pedal Cyclist	1	0%	7	0%	8	0%
MV-Pedestrian	59	1%	128	2%	187	2%
MV-Unspecified	237	6%	488	6%	725	6%
Natural or Environmental	33	1%	49	1%	82	1%
Non-Drug Poisoning	47	1%	123	1%	170	1%
Other Land Transport	8	0%	45	1%	53	0%
Other Specified, classifiable and NEC	57	1%	167	2%	224	2%
Other Transport	1	0%	18	0%	19	0%
Overexertion	1	0%	0	0%	1	0%
Pedal Cyclist, Other	0	0%	7	0%	7	0%
Pedestrian, Other	2	0%	11	0%	13	0%
Struck by or against	5	0%	37	0%	42	0%
Suffocation	235	6%	552	7%	787	6%
Unspecified	139	3%	173	2%	312	3%
Total	3,993		8,471		12,464	

Includes injury-related deaths of individuals that died in Ohio regardless of their state of residence (underlying cause of death ICD-10 codes *U01-*U03, V01-Y36, Y85-Y87, Y89).

All intent includes unintentional, suicide, homicide, legal intervention or war, and undetermined.

MV – motor vehicle crash

NEC – Not elsewhere classifiable

Source: ODH Bureau of Vital Statistics; analysis conducted by ODH Violence and Injury Epidemiology and Surveillance Section.

Number of Injury-Related Deaths that Occurred in Ohio by Mechanism and Intent, 2022

External Injury Mechanism	Intent					Total
	Unintentional	Suicide	Homicide	Legal Intervention or War	Undetermined	
Cut or Pierce	13	36	66	0	1	116
Drowning	97	9	3	...	8	117
Drug Poisoning	4,927	158	9	...	50	5,144
Fall	1,957	24	2	...	3	1,986
Fire or Flame	175	11	8	...	16	210
Firearm	14	1,031	736	23	9	1,813
Hot Object or Substance	7	0	0	...	0	7
Machinery	32	...	...	...	...	32
MV-Motorcyclist	186	...	...	...	...	186
MV-Occupant	221	...	...	...	...	221
MV-Other	2	...	...	...	...	2
MV-Pedal Cyclist	8	...	...	...	...	8
MV-Pedestrian	187	...	...	...	...	187
MV-Unspecified	725	...	...	...	...	725
Natural or Environmental	82	...	...	...	...	82
Non-Drug Poisoning	122	46	0	0	2	170
Other Land Transport	40	6	6	...	1	53
Other Specified, classifiable and NEC	154	17	37	9	7	224
Other Transport	19	...	0	0	...	19
Overexertion	1	...	...	...	...	1
Pedal Cyclist, Other	7	...	...	...	...	7
Pedestrian, Other	13	...	...	...	...	13
Struck by or against	34	0	8	0	0	42
Suffocation	343	432	8	...	4	787
Unspecified	260	2	42	0	8	312
Total	9,626	1,772	925	32	109	12,464

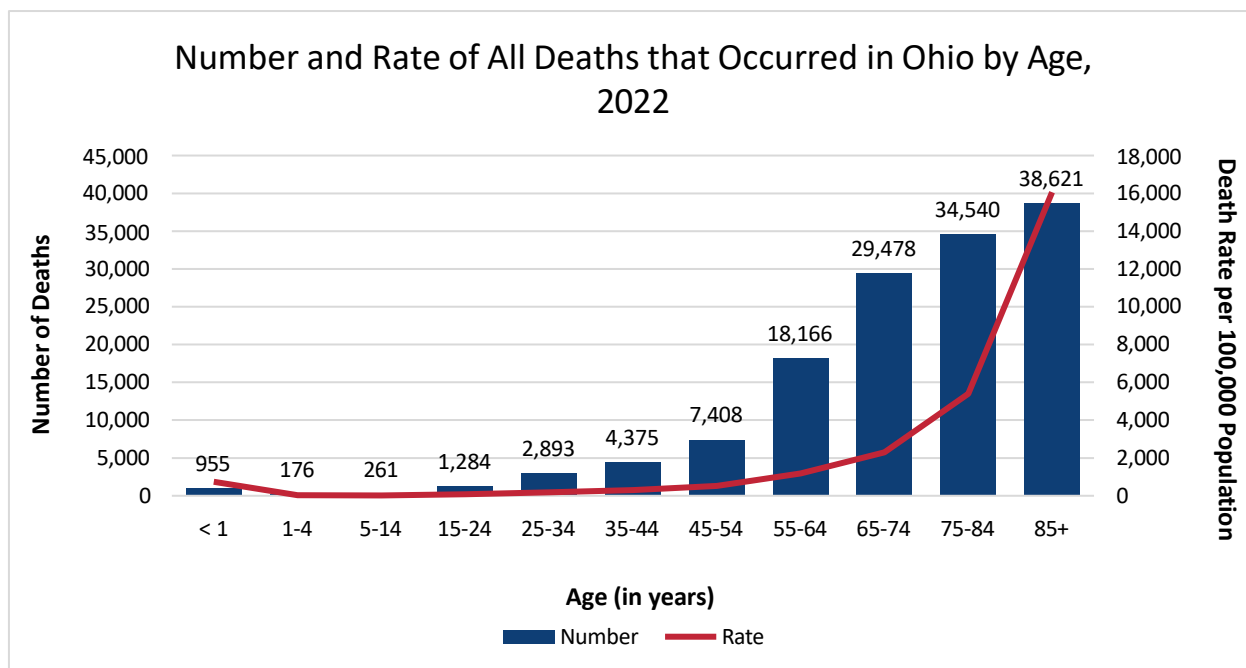
Includes injury-related deaths of individuals that died in Ohio regardless of their state of residence (underlying cause of death ICD-10 codes *U01-*U03, V01-Y36, Y85-Y87, Y89).

... Category not applicable.

MV – motor vehicle traffic

NEC – Not elsewhere classifiable

Source: ODH Bureau of Vital Statistics; analysis conducted by ODH Violence and Injury Epidemiology and Surveillance Section.



Source: ODH Bureau of Vital Statistics; analysis conducted by ODH Violence and Injury Epidemiology and Surveillance Section.

Number and Age-Adjusted Rate of All Deaths that Occurred in Ohio by Sex, 2020-2022**

Year	Female		Male		Total [†]	
	Number	Age- Adjusted Rate	Number	Age- Adjusted Rate	Number	Age- Adjusted Rate
2020 **	70,338	812.9	73,610	1,155.5	143,949	966.7
2021 **	70,627	825.2	76,951	1,196.9	147,581	992.6
2022 **	66,867	770.5	71,289	1,095.9	138,157	916.9

Includes all deaths of individuals that died in Ohio regardless of their state of residence.

Age-adjusted rates are based on the 2000 U.S. standard population and are calculated per 100,000 population.

[†] Includes cases with unknown sex.

** At the time of this report, population files from the federal government reflecting new national standards and methodologies were available for 2020 through 2022 only. Because of this change, the Ohio Department of Health (ODH) advises caution in comparing these rates to those from years prior to 2020.

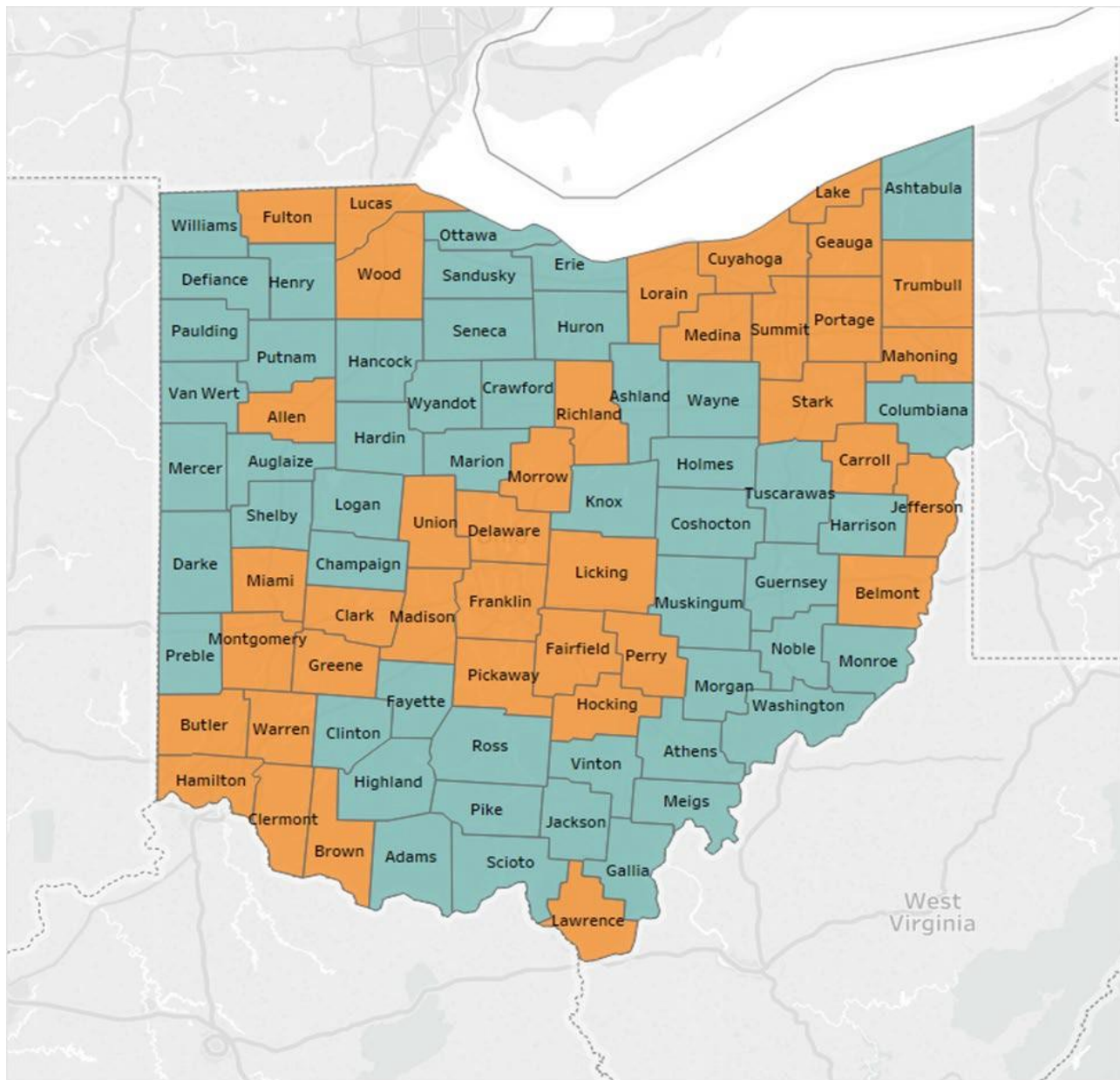
Source: ODH Bureau of Vital Statistics; analysis conducted by ODH Violence and Injury Epidemiology and Surveillance Section.

Appendix J: Map of Ohio Homeland Security Regions Utilized by the Regional Physician Advisory Board (RPAB)



* Unless otherwise stated, the Ohio Homeland Security Regions shown in the map above are the 'regions' referred to in this annual report. These are the same regions utilized by the Regional Physician Advisory Board (RPAB).

Appendix K: Map of Ohio Counties, Urban and Rural Designations



County Type

☐ Rural

Urban

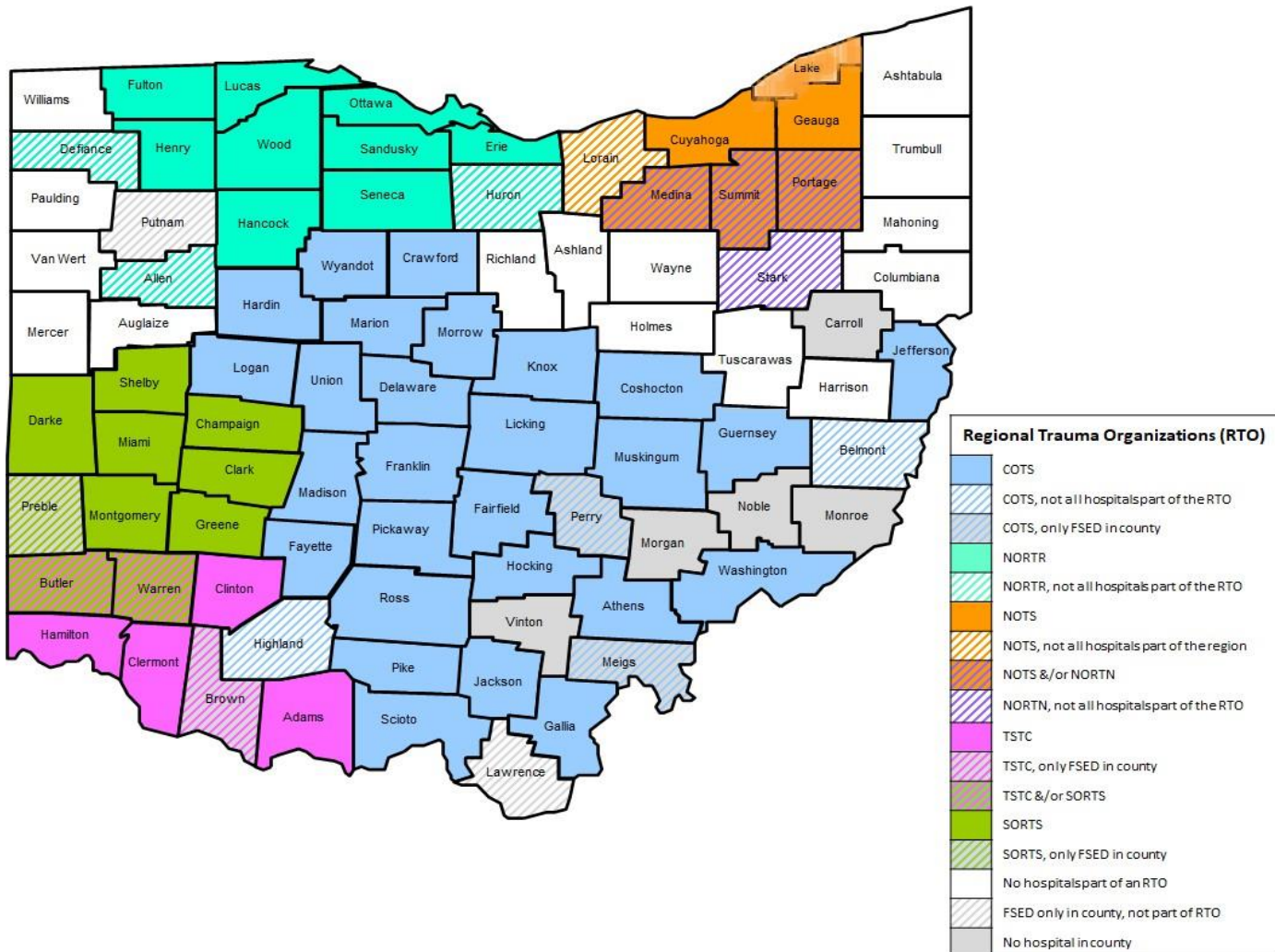
Source: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, 2013 NCHS Urban-Rural Classification Scheme for Counties.

There are minor classification changes from the 2017 annual report where the USDA Economic Research Service classification system was used. Erie, Ottawa, Preble and Washington counties are reclassified from “urban” to “rural.” Hocking and Perry counties are reclassified from “rural” to “urban.”

APPENDIX L: Summary of 2021 – 2022 Trauma Related EMS Grants

Ohio EMS SFY 2021-2022 Priority 2-5 Research Grants	
Recommended Projects for Funding	Amount
Impact of Community Paramedicine Program on Geriatric Fall Readmissions	\$67,500
Total	\$67,500

APPENDIX M: Ohio Regional Trauma Systems Map as of September 2021



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 disaster 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 N: Members of the Board, Trauma Committee, Trauma Registry Advisory Workgroup (TRAW), Performance Improvement (PI) Workgroup, and EMS Prehospital Workgroup

<u>Board</u> Thomas Allenstein Kent Appelhans Dorothy Battles Karen Beavers Geoffrey J. Dutton Patrick Ferguson Jeffery Jackson Pradeesh George, DO Brian Hathaway Ruda Jenkins Mark Marchetta Deana Pace Matthew Phillips Amy Raubenolt, MD Mark N. Resanovich Darin Robinaugh Hamilton P. Schwartz, MD Kevin Uhl John Weimer Dudley Wright	<u>Trauma Registry Advisory Workgroup</u> <u>(TRAW)</u> Deanah Moore (Co-Chair) Sara Arida Brandi Cario Sarah Christophel Wendi Dean Caroline Eckles Danielle Dell Michelle Doll Roxanna Giambri Kelly Harrison Lita Holdeman Vanessa Isler Jessica Johnson Taunya Kessler Victoria Kreckman Jillian Kuethe Alysia Lazear Jessica Mazzocco Pam Owen Alana Prosser Karen Silberhorn Diane Simon Halina Sliwinski Catherine Smith Shannon Swader Jennifer Talkington Pamela Tanner	Monica Rozzell Valerie Stoker Dan Swords Diane Simon
<u>Trauma Committee</u> Diane Simon (Chair) Laurie Johnson, MD (Vice Chair) Michael Beltran, MD Steven Berry II Erik Evans, MD Stephen Feagins, MD Brian Fletcher Kent Harshbarger, MD Timothy Hake, MD Aaron Jennings Shaheed Koury, MD Andrea Light, RN Deanah Moore Mary Moran, PhD Bradley Raetzke, MD Darin Robinaugh James Sauto, Jr., MD Michael Shannon, MD M. Chance Spalding, DO Rajan Thakkar, MD Staci Trudo, RN Rachel Velasquez Julie Warholic, RN	<u>Performance Improvement (PI)</u> <u>Workgroup</u> Lee Ann Wurster (Chair) Richard George, MD (Co-Chair) Sara Arida Sahithi Aurand Tod Baker Melody Campbell Alex Carpenter Michelle Doll Emma Fox Sherri Kovach Roxanna Giambri Lauren Phipps Danielle Rossler	<u>EMS Prehospital Workgroup</u> Ashish Panchal, M.D. Brian Anderson Brian Bemiller Herb de la Porte Joel Dickinson Mark Huckaby James Sauto, M.D. Tammy Wilkes Jamie Wilson Paul Zeeb, M.D. <u>ODPS/Division of EMS</u> Carol A. Cunningham, MD, State Medical Director Robert L. Wagoner, Executive Director Sahithi Aurand, MPH, Chief, Research & Analysis Section Haydi Labib, MPH, Human Services Program Consultant Heidi Piccininni, Human Services Program Consultant

**Ohio Department of Public Safety
Division of Emergency Medical Services**

2022 Trauma Annual Report