



Traumatic Brain Injury Surveillance and Program Report 2020-2021

**Division of Family Health and Wellness
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Introduction



In 1993, the Tennessee General Assembly passed legislation establishing the Traumatic Brain Injury (TBI) Program within the Department of Health to address the unique needs of persons with brain injury and their families. The legislation outlines components of the program which includes the appointment of a program coordinator and the development of a state TBI Registry. Tennessee legislation also calls for the submission of an Annual Report summarizing TBI Registry statistics, administration of the program and recommendations for improving service delivery for people with brain injury.

The TBI Registry collects data on a calendar year while the TBI Program operates on a fiscal year. Therefore, this report contains data from calendar year January 2020 – December 2020 and program information from fiscal year July 2020 – June 2021.

Analysis of TBI Registry data provides the foundation of program activities; this report first presents data followed by TBI Program progress and other program components.

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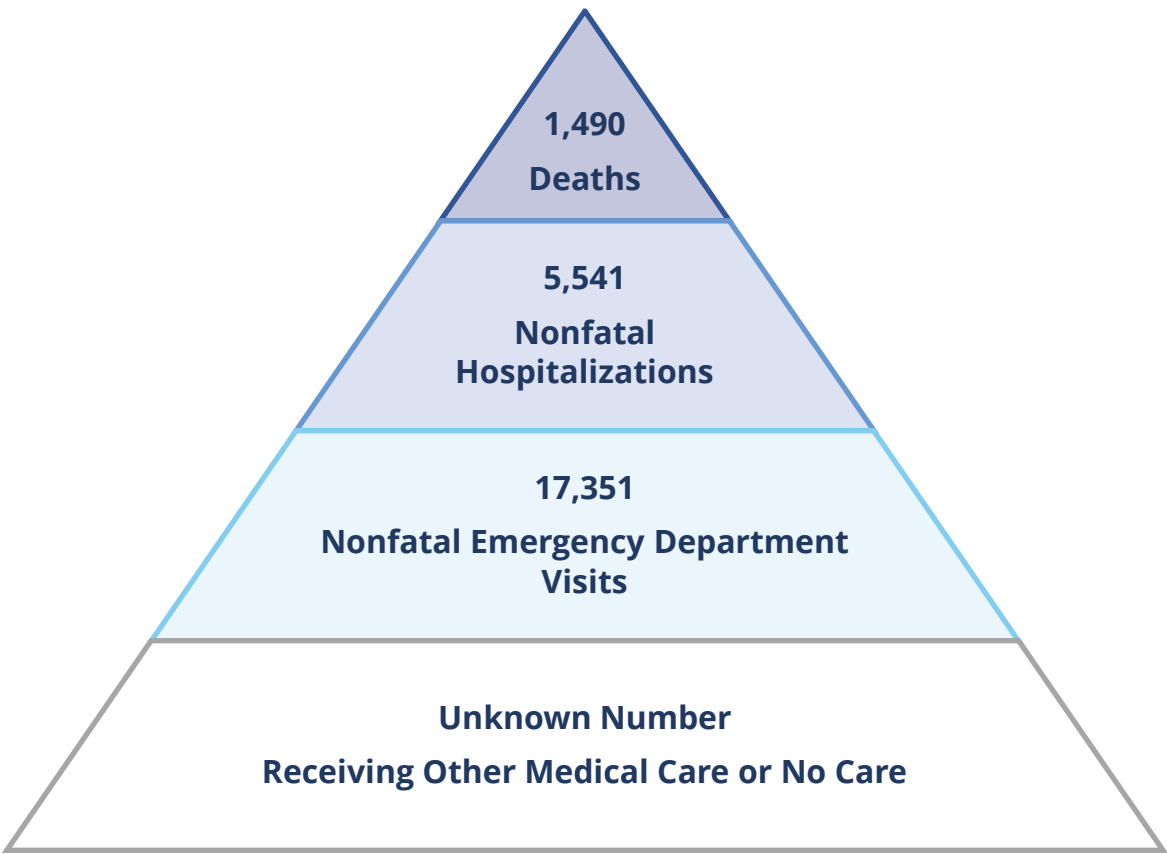
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Background of TBI in Tennessee

A traumatic brain injury (TBI) is a disruption in the normal function of the brain that can be caused by a bump, blow, or jolt to the head, or penetrating head injury. Due to their nature, TBIs are a major cause of death and disability, making these injuries a significant public health problem across the United States. In Tennessee, 24,382 TBI-related ED visits, hospitalizations and deaths occurred during 2019.

TBI-Related Deaths, Hospitalizations and ED Visits in 2019 ¹



Note: The figure describes the burden of TBI deaths and injuries in Tennessee based on latest (2019) and finalized hospitalization and death records.

The numbers of TBI-related deaths, hospitalizations, and ED visits in the pyramid above come from the state Vital Statistics and Hospital Discharge databases. These data sources play a key role in TBI surveillance in Tennessee but are significantly delayed in availability, limiting their usefulness in allowing for timely identification of persons who have sustained TBIs and may benefit from services.

Data Source

1. Tennessee Department of Health, Office of Vital Records and Vital Statistics; Tennessee Department of Health, Office of Population Health Surveillance.

Introduction

The Tennessee General Assembly established the Tennessee Traumatic Brain Injury registry in 1993. The registry began collecting brain injury data in 1996 with the core purpose of connecting persons with brain injury to resources available to them during their recovery.

All non-federal hospitals are mandated to report any TBI-related inpatient hospitalization or death that occurs either at or during transport to the hospital. Patients meeting these criteria must be reported to the registry, regardless of residence, although only Tennessee residents receive a letter from the program.

TBI-related deaths that occur outside the purview of the hospital (e.g., fatal gunshot wounds of the head that are declared dead at the scene) are not reported to the registry. TBI-related emergency department visits are increasingly reported but are not compulsory.

In the data hospitals submit to the registry, diagnoses are captured in the International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) coding system. The table below includes the ICD-10-CM diagnosis codes used for traumatic brain injury surveillance. If one or more of these diagnoses codes appears in a patient's record, the patient must be reported to the TBI registry.

Surveillance Case Definition for Traumatic Brain Injury

ICD-10-CM Code	Description
S02.0, S02.1	Fracture of skull
S02.80, S02.81, S02.82, S02.91	Fracture of other specified skull and facial bones; unspecified fracture of skull
S04.02, S04.03, S04.04	Injury of optic chiasm; injury of optic tract and pathways; injury of visual cortex
S06	Intracranial injury
S07.1	Crushing injury of skull
T74.4	Shaken infant syndrome

*Cases included only if the 7th character of the code is A, B, or missing (reflects initial encounter, active treatment)

The data within this report describe the causes of TBIs in Tennessee and support the planning and implementation of initiatives to reduce these injuries throughout the state. Information presented in this surveillance summary is based on final data collected by the Tennessee TBI registry for the calendar year of 2020. Many of the graphs in the report depict the highest proportions, counts and rates in dark blue.

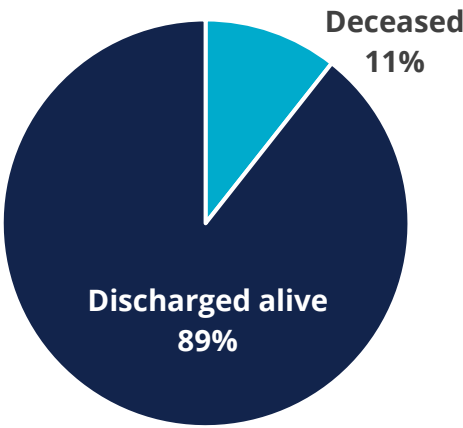
Snapshot of TBI Registry Patients

In 2020, 8,227 TBI patients were reported to the registry

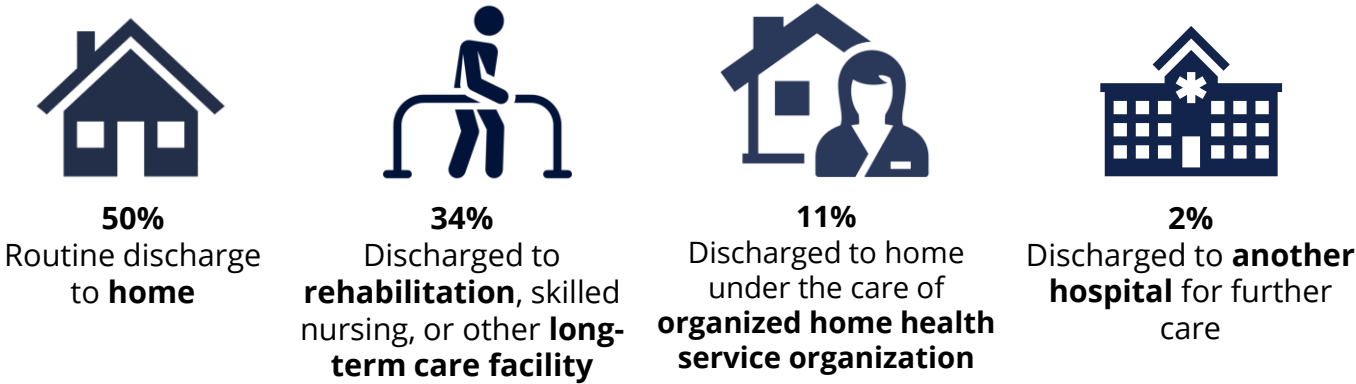
Breakdown by Mortality

As stated in the Introduction, hospitals are mandated to report all TBI-related hospitalizations and deaths that occur at or during transport to the hospital. TBI-related deaths that occur outside of the hospital are not included in the registry.

Of 8,227 TBI patients reported to the registry in 2020, 7,353 were discharged from the hospital alive and the remaining 874 were deceased. The average length of hospital stay amongst all TBI registry patients was 7.1 days.



Discharge Status of Nonfatal Injuries



Of the 7,353 patients who were discharged from the hospital alive, half had routine discharges to home, but the remaining half required extended care following their hospitalization. Approximately 2% of patients had discharge status classified as other—this includes patients who left the hospital against medical advice and patients who were discharged to jail.

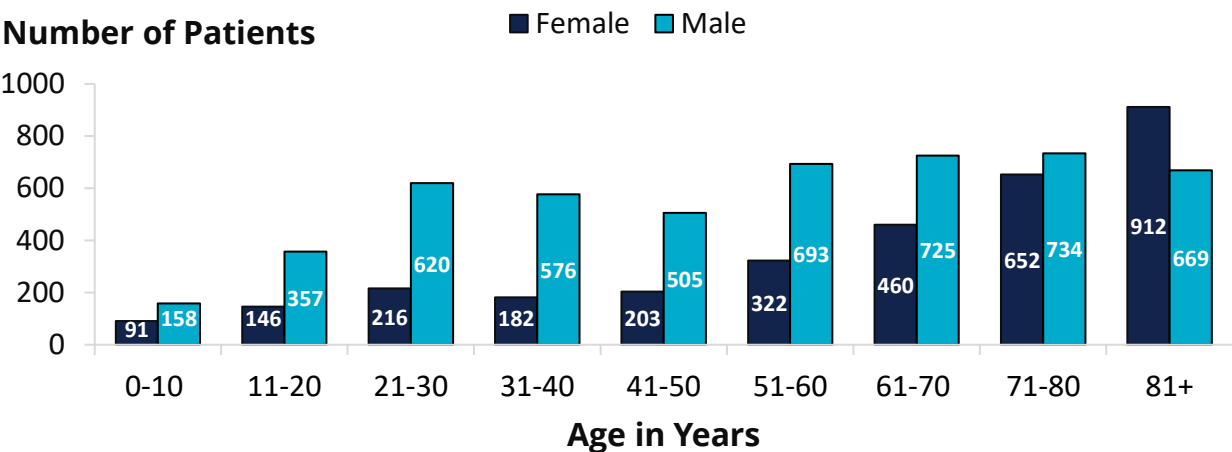
Key Points

- Though the most common discharge status of TBI registry patients was routine discharge to home, many patients required further care after being released from the hospital.
- About a third of patients were discharged to rehabilitation, skilled nursing, or other long-term care facilities.

Demographic Characteristics of TBI Patients

2020 TBI Registry Patients by Age Group and Sex

The majority of traumatic brain injuries reported to the registry occurred in the older adult population: 63% of patients were over 50 years of age. More males (61%) sustained traumatic brain injuries than females, and this difference was seen within nearly all age groups. However, within the oldest age group, age 81 and over, the trend changed, and most patients were female.



Among TBI patients less than 65, the vast majority were male

Excluding the senior population, the gender difference widened. There were over two times as many male patients as female patients.

For TBI patients aged 0-64, there were **7 males...**



The age group with the largest gender gap was from 31 to 40 years, where the number of male patients was over three times that of female patients.

...for every **3 female patients**



Key Points

- The number of TBI patients increased with patient age. The 81+ age group had the highest number of TBI patients.
- Males outnumbered females in every age group except for the oldest category (81+).
- The gender difference was especially wide for the younger age groups, where most patients were male.

Demographic Characteristics of TBI Patients

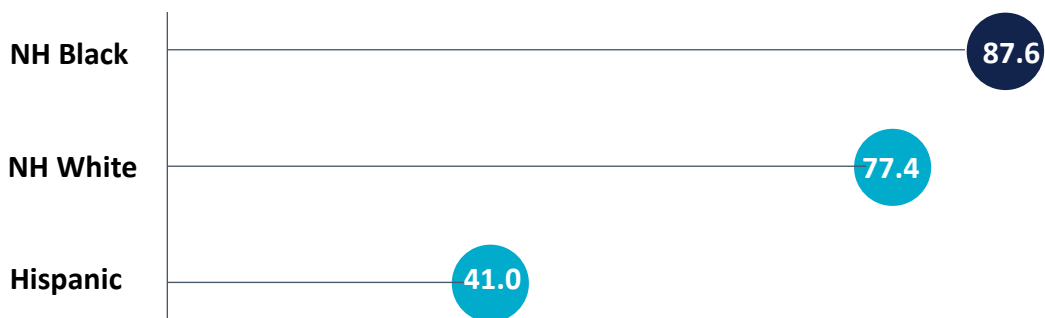
2020 TBI Registry Patients by Race and Ethnicity

The racial/ethnic demographics of the TBI Registry patients reflect the demographics of Tennessee as a whole. Overall, 75% of patients were non-Hispanic (NH) White.



Age-Adjusted Rate by Race/Ethnicity (per 100,000 people)

Rates take into account the size of the underlying population in Tennessee, after adjusting for age to make for a fairer comparison. For NH Black Tennesseans, there were 88 patients reported to the Registry for every 100,000 people in the population, compared to 77 per 100,000 for NH Whites. The rate was lowest for Hispanics at just 41 TBI Registry patients per 100,000 people in the population.



Key Points

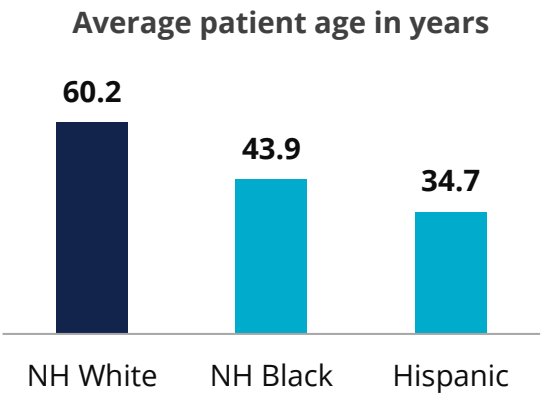
- Though the number of TBI patients was highest for NH Whites, the age-adjusted rate was highest for the NH Black population. This means that after accounting for the size of the population in Tennessee, NH Black Tennesseans were most affected.

Demographic Characteristics of TBI Patients

Key differences existed across the three main racial/ethnic groups

By age

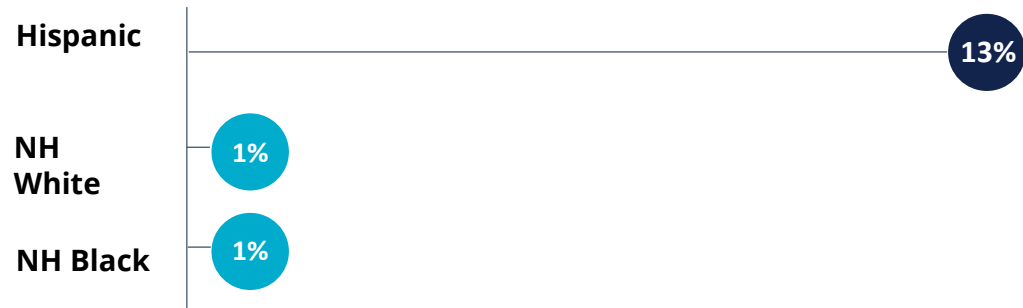
NH White patients were significantly older on average than NH Black or Hispanic patients. The average age of NH White TBI Registry patients was **over 60** compared to approximately **44** for NH Black patients and **35** for Hispanic patients.



Over half (52%) of NH White patients were 65 or older, compared to just 21% of NH Black patients and 10% of Hispanic patients.

By whether injuries were work-related

13% of Hispanic patients had work-related injuries, compared to just **1%** of NH White and NH Black patients.



By the percentage of patients that were male

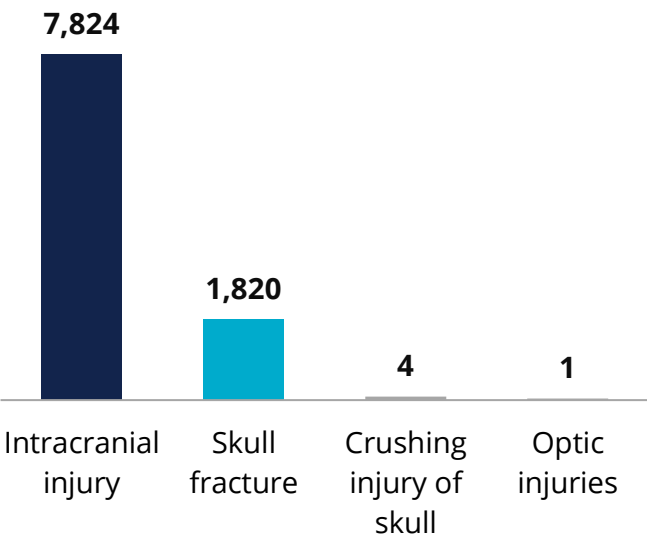


The **male majority** seen across all TBI patients was much more pronounced for NH Black and Hispanic patients. 59% of NH White patients were **male**, compared to 71% of NH Black patients and 81% of Hispanic patients.

Brain Injury Diagnoses

Number by TBI Registry Patients by Diagnosis Category

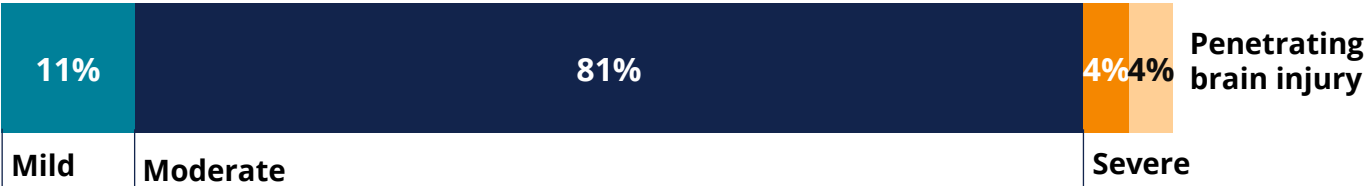
Every patient reported to the registry had at least one traumatic brain injury diagnosis, and many patients had multiple types of TBI. By far, the most common traumatic brain injuries reported were categorized as intracranial injuries. Although this may not have been the primary TBI diagnosis in each case, **95% (N=7,824)** of registry patients were diagnosed with at least one intracranial injury.



Skull fractures were the next most common type of TBI, diagnosed in **22% (N=1,820)** of registry patients. The other types of TBI were comparatively extremely uncommon.

Cases by Severity Level

The traumatic brain injuries reported to the registry are classified as mild, moderate, severe or penetrating. For patients with multiple types of TBI, the highest level of severity was assigned. For example, a patient diagnosed with one type of 'mild' TBI and another type of 'moderate' TBI would be classified as 'moderate'. **Most registry patients (81%) sustained moderate TBIs**, with smaller percentages diagnosed with mild (11%), severe (4%), and penetrating (4%) brain injuries.



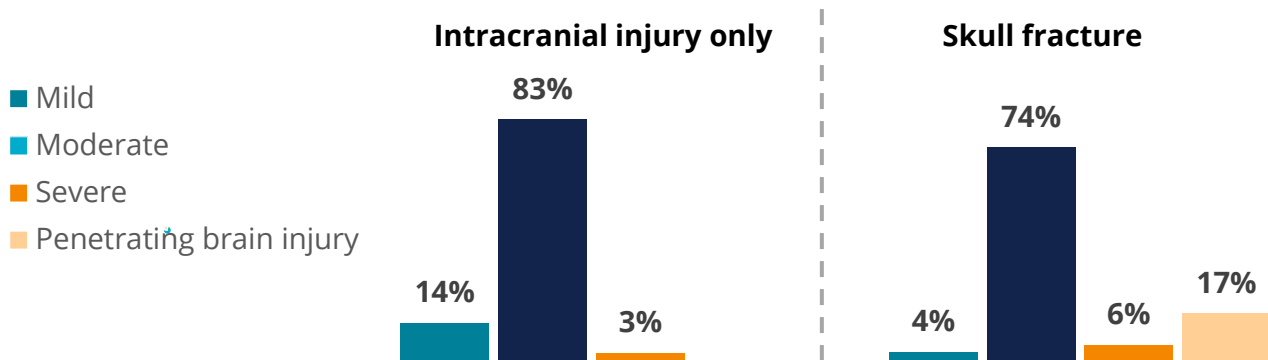
Key Points

- Intracranial injuries were by far the most common type of TBI diagnosed, present in 95% of TBI registry patients (sometimes in conjunction with other TBI diagnoses).
- Skull fractures were diagnosed in approximately 1 of 5 registry patients.
- Most (81%) TBI registry patients had moderately severe TBIs.

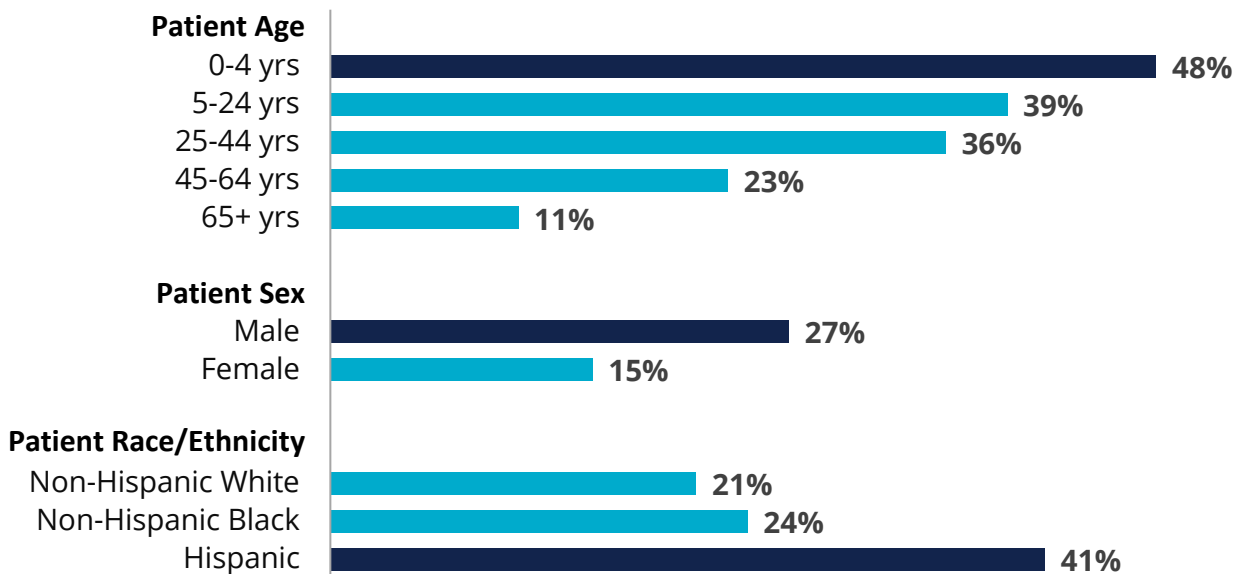
Brain Injury Diagnoses

Injury Severity by Diagnosis Type

Though patients with skull fractures represented a minority (22%) of TBI registry patients, they tended to have injuries that were more severe. Just **4%** of patients with skull fractures had injuries classified as **mild**, compared to **14%** for patients with only intracranial injuries.



Percent of Patients (n=8,227) with Skull Fractures



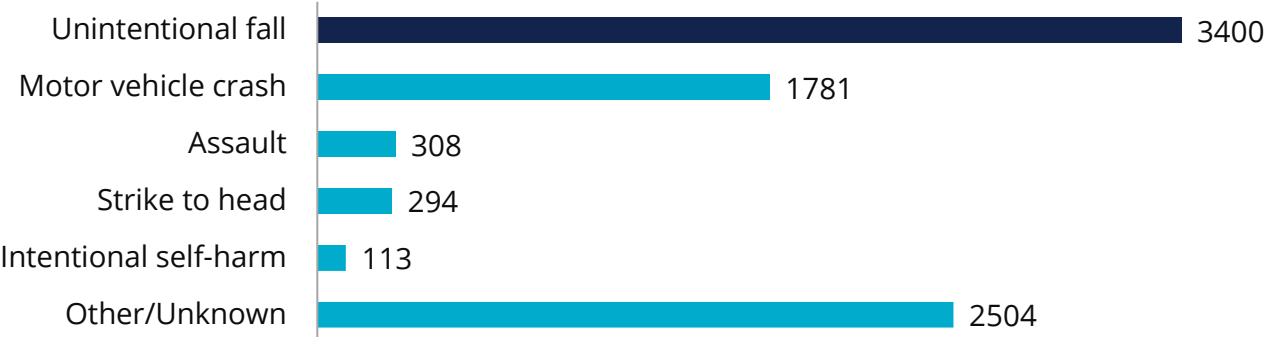
Key Points

- TBI registry patients diagnosed with skull fractures were more likely to have injuries classified as severe or as penetrating brain injuries.
- Certain demographic groups were more likely to be treated for skull fractures. These included patients who were younger in age, male, and of Hispanic ethnicity.
- Most skull fractures for ages 0-4 were due to unintentional falls (57%). A smaller proportion (13%) were due to assault.

External Cause of Injury

Breakdown by External Cause

External cause refers to the mechanism by which the patient sustained their traumatic brain injury. Hospital reporters are not required to include this information, as the mechanism is often unknown, but they are encouraged to capture this whenever possible. For 2020, 77% of registry patients had information about the external cause of injury, a 2-percentage point decrease from 2019. Overall, **unintentional falls** were the most common cause of injury amongst TBI registry patients, accounting for **3,400 cases (41% of TBI registry patients)**.

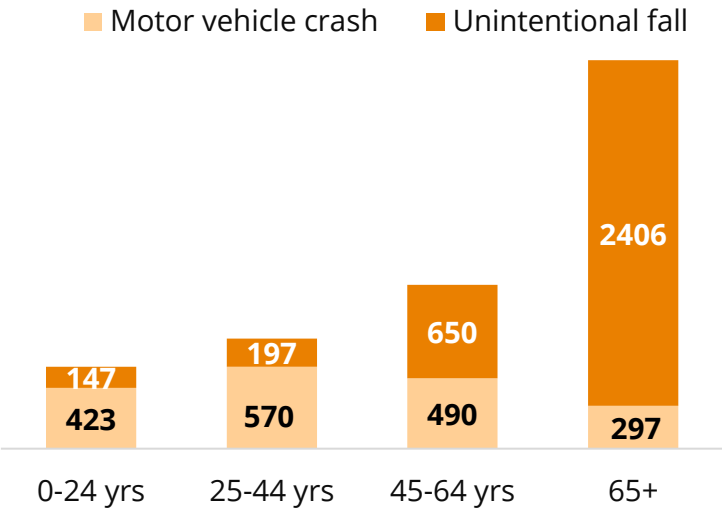


Unknown accounted for 1861 cases and 643 cases were “Other”. Other included causes such as firearm discharge, sport-related injuries and being thrown off/struck by a horse.

TBI Registry Patients by Leading External Causes and Age

Cause of injury differed greatly by age, with motor vehicle crashes accounting for most injuries in the younger age groups, and unintentional falls most common for the older age groups.

The number of motor vehicle crash-related TBIs remained roughly consistent across age groups, while the number of unintentional fall-related TBIs increased sharply for adults 65 and older.



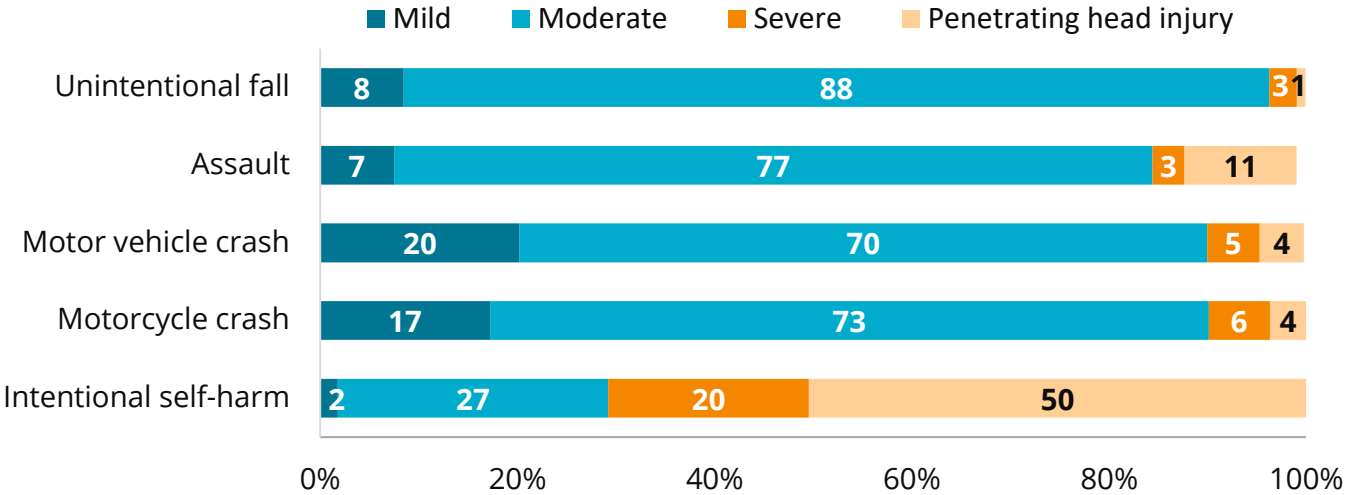
Key Points

- Unintentional falls were the leading cause of injury for TBI Registry patients overall, but motor vehicle crashes were the cause of injury for most patients under 65 years of age.

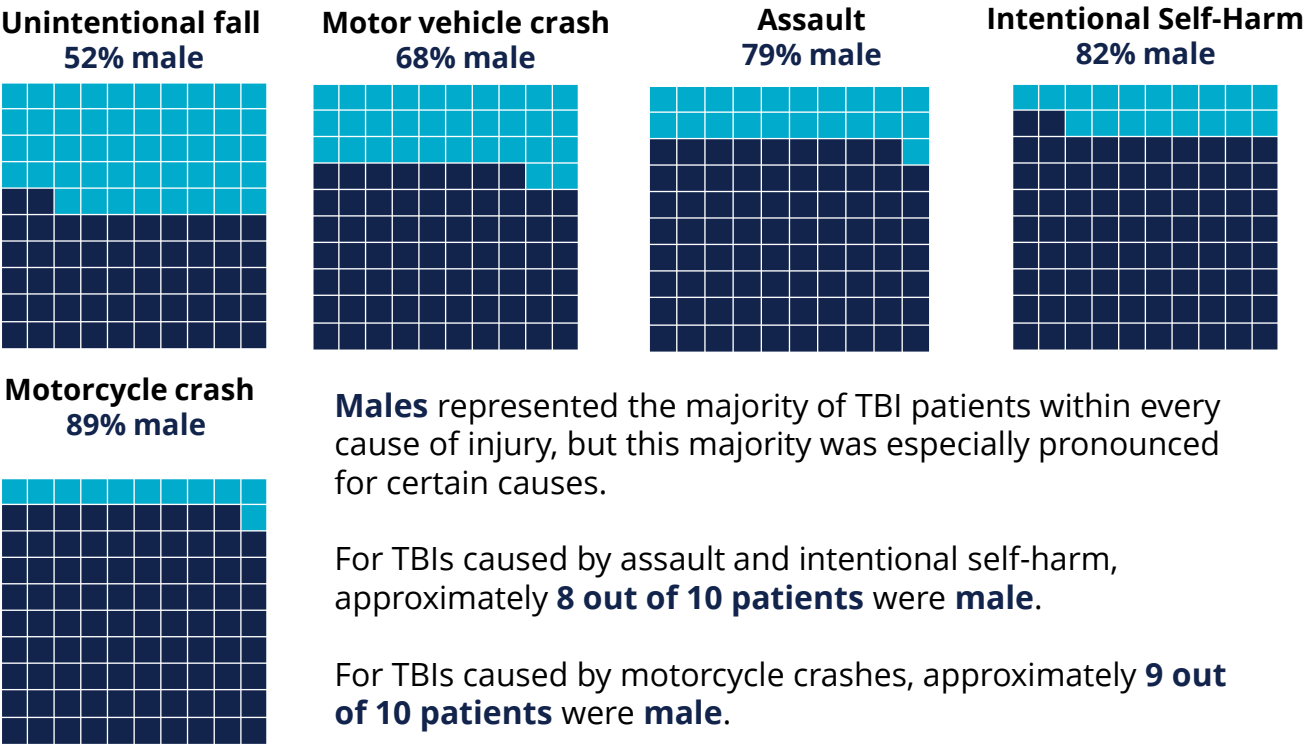
External Cause of Injury

Percentage of Patients by Severity Level For External Causes

Severity of injury varied by external cause. Although injuries caused by intentional self-harm represented just 1% (N=113) of TBI Registry patients overall, these injuries were most likely to be categorized as **severe** and as **penetrating brain injuries**. This increased lethality reflects the dominant method of self-harm amongst these cases: 76% involved a firearm.



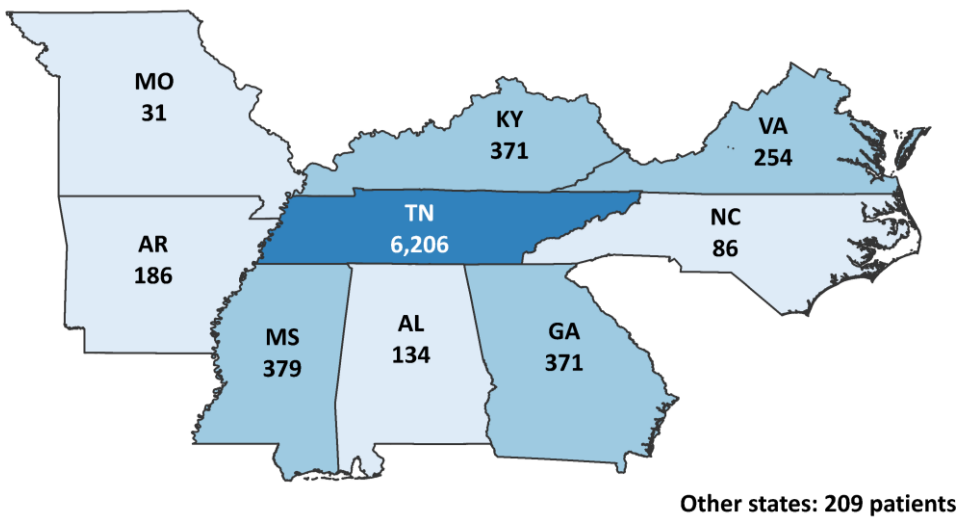
Percentage of Patients that were Male



Patient Residence by State and County

Number of TBI Registry Patients by Resident State

Of the 8,227 total patients reported to the TBI registry in 2020, 6,206 (75%) were Tennessee residents. The remaining 25% of patients were non-residents, primarily from the 8 border states.



Top Ten Tennessee Counties by Rate

The ten Tennessee counties shown below had the highest rates of TBI registry patients per 100,000 residents, after adjusting for the counties' age distribution to make for a fair comparison.



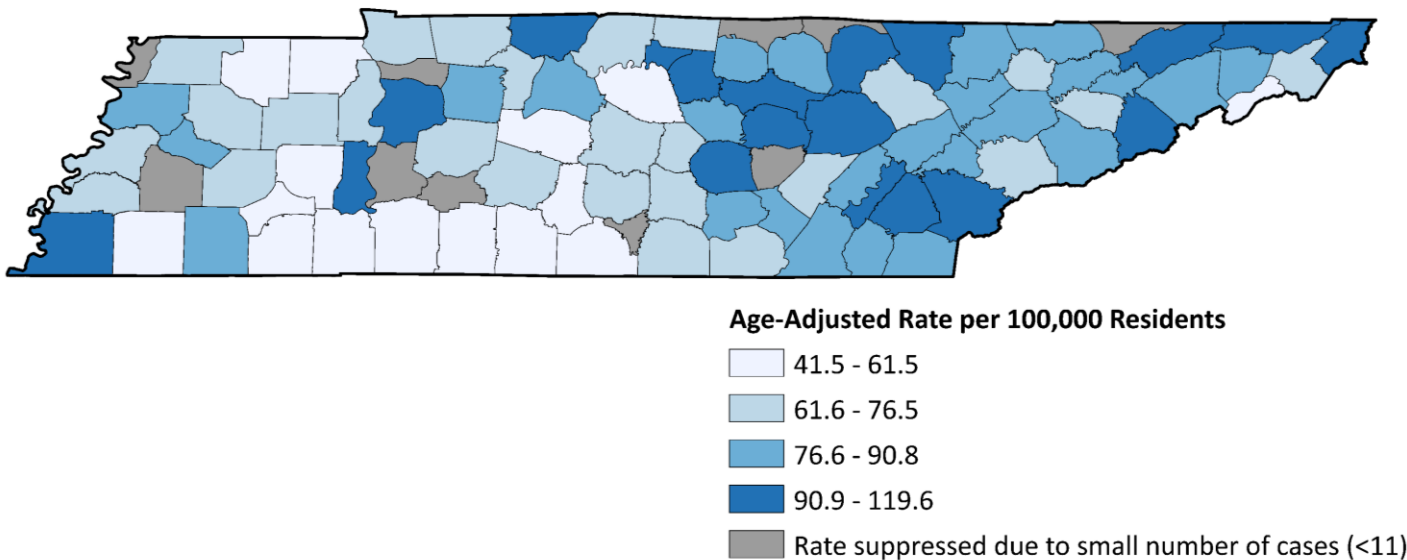
Key Points

- Three out of four patients reported to the TBI registry were Tennessee residents, with most out-of-state residents from neighboring states.
- Humphreys was the Tennessee county with the highest rate of TBI registry patients for 2020.

Tennessee County Maps

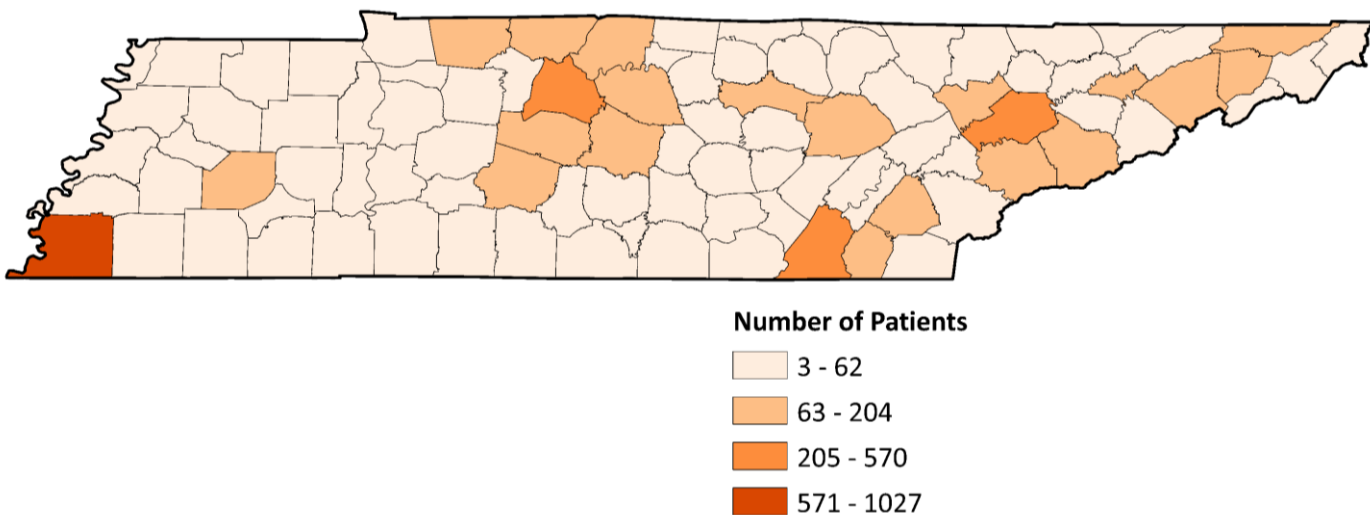
By Age-Adjusted Rate per 100,000 Residents

The counties shaded in the darkest blue are those with the highest rates of TBI patients. The map shows several areas with multiple high-rate counties clustered together, including in the Northeast, Southeast, and Upper Cumberland regions.



By Number of TBI Registry Patients

Unsurprisingly, the counties with the highest numbers of TBI patients were the most populous counties, including the metros (Shelby, Davidson, Knox, Hamilton, Madison, and Sullivan). Shelby had by far the highest number of patients at 1,027, nearly twice that of the second ranking county, Davidson at 570. Notably, as shown above, Shelby also had one of the highest statewide rates.

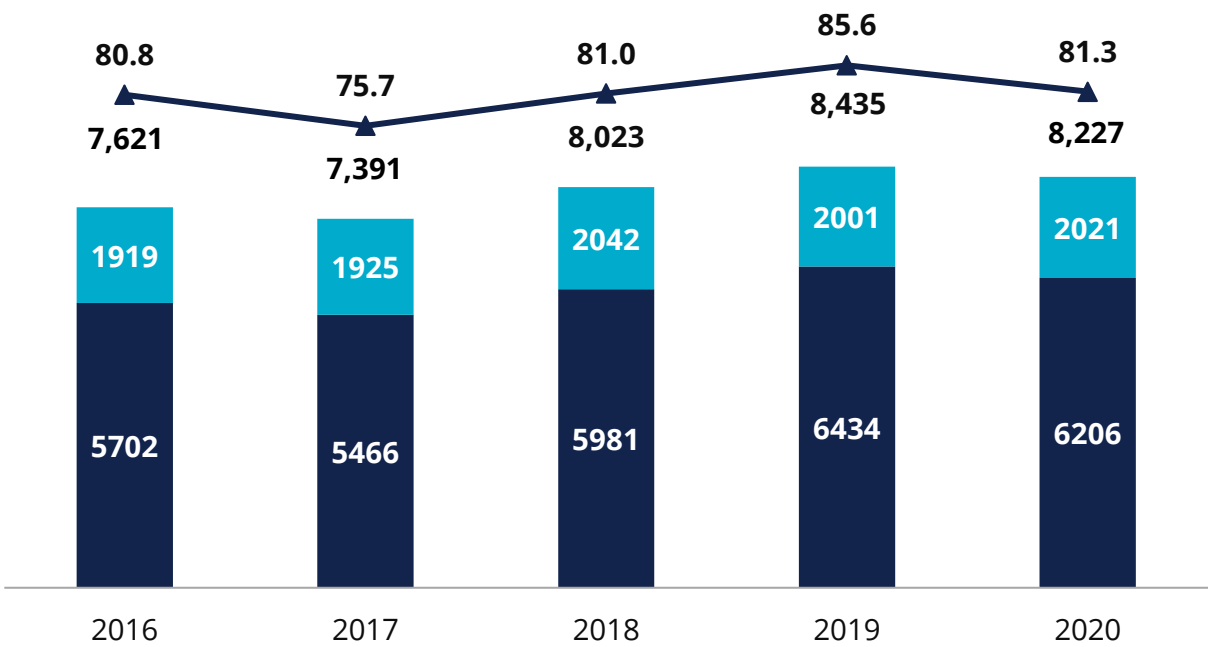


Annual Trend

Number and Rate of TBI Registry Patients, 2016-2020

From 2016-2020, approximately 8,000 patients were reported to the TBI registry each year. The number of patients increased by 14% from 2017 to 2019, and then decreased slightly (by 2%) from 2019 to 2020. The percentage of total registry patients who were **Tennessee residents** was consistent at approximately 75%.

■ TN Resident Patients ■ Non-TN Resident Patients ▲ Rate per 100,000 State Residents





Traumatic Brain Injury Program Report

July 2020 – June 2021

Executive Summary

In 1993, the Tennessee General Assembly passed legislation establishing the Traumatic Brain Injury (TBI) Program within the Department of Health. TBI Program, with guidance from a nine-member, Governor-appointed Advisory Council, is charged with expanding and revising existing state plans and services for people with traumatic brain injury.

This report contains specific information concerning the progress made from July 2020 through June 2021 in each of the major components of the Traumatic Brain Injury Program.

People with TBI may experience impairments that affect their physical, cognitive and behavioral functioning, which impacts their ability to return to home, school and work. Regardless of the cause, people with brain injury and their families may experience emotional and economic stress. The enabling legislation charges the TBI Program with improving services for people with brain injury and their families.

The focus of the TBI Program is to improve services for people with brain injury and their families.

Each year, about 6,000 Tennesseans are reported to the TBI Registry with a TBI-related hospitalization or death.

Key Accomplishments

- There were 120 participants in the TBI Family Support Program, which provided direct financial assistance to people with TBI.
- TBI Service Coordinators each provided case management services to an average of 50 individuals.
- Service Coordinators collectively provided information on TBI to over 9,404 callers.
- TBI Service Coordinators collectively conducted 93 educational presentations to a total of 2,010 individuals.
- Supportive living services were provided to ten people with TBI living in two affordable and accessible apartment facilities in Memphis.
- Personal care services were provided to 23 residents of Crumley House Brain Injury Rehabilitation Center.
- Brain Links staff provided 81 virtual training to 11,639 participants.

Program Report

The enabling legislation calls for the establishment of a state TBI Registry and a TBI Trust Fund and describes the duties of the Coordinator (Program Director). Each program area is addressed by first citing the Tennessee Code Annotated (T.C.A.) followed by a description of activities and progress.

Part 1. T.C.A 68-55-102 to 103. Advisory Council Established: Composition – Duties.

The TBI Advisory Council was organized in accordance with the legislation to provide advice and guidance to the TBI Program staff. The nine-member Council is appointed by the Governor and includes representatives from the Departments of Education, Department of Mental Health and Substance Abuse Services, Department of Intellectual and Developmental Disabilities and Department of Human Services. An additional member represents health care professionals. Five of the nine members represent the category of TBI survivor, family member or primary caregiver. The Council was organized in 1994 and has met quarterly since that time.

During FY21, the TBI Advisory Council was comprised of the following members:

Council Member	Representation Category
Joanna Bivins	Department of Education
Amy Boulware	Survivor, Family member, Primary Caregiver
Pam Bryan	Survivor, Family member, Primary Caregiver
Avis Easley	Department of Mental Health and Substance Abuse Services
	Department of Intellectual and Development Disabilities
Alicia Fitts	Survivor, Family Member, Primary Caregiver
Mark Heydt, <i>Chair</i>	Health Care Professional
Kaylin Moss	Department of Human Services, Vocational Rehab
Brian Potter	Survivor, Family Member, Primary Caregiver
Michelle Stanton	Survivor, Family Member, Primary Caregiver

The duties of the Council are to advise the TBI Program Director, make recommendations and perform other duties as necessary for the implementation of a state-wide plan to assist people with TBI and their families. The Advisory Council is comprised of individuals dedicated to improving the lives of TBI survivors in Tennessee. Their recommendations have been invaluable to the development of the TBI Program.

Program Report

Part 2. T.C.A. 68-55-201. TBI Coordinator to be designated.

The commissioner shall create a full-time position within the department and designate a person as the TBI Coordinator to supervise and coordinate the development, implementation and enhancement of a registry and services system for persons with TBIs and provide sufficient staff to accomplish the effect and intent of this chapter. The TBI Coordinator shall, to the fullest extent possible, utilize the services of the advisory council in fulfilling the duties and responsibilities required by this chapter.

A full-time TBI Coordinator (Program Director) has been in place since the program was developed and the current coordinator has been in place since November 2019, supervising and directing the program as described in this report. The TBI Registry was established in 1994 along with the service system for people with TBI. TBI Program staff includes the Program Director and Epidemiologist that oversees the TBI Registry. The Program Director along with other Tennessee Department of Health staff consults with TBI Advisory Council members at least quarterly to secure advice and guidance.

T.C.A. 68-55-202. Duties.

The TBI coordinator shall:

- 1. Aggressively seek and obtain funding, on an ongoing basis, from all available sources, including but not limited to, Medicaid waivers and for expansion of the Medicaid program, private and federal funds needed to implement new state plans and services, and to expand and revise existing state plans and services for persons with TBIs, including case management.*

Medicaid Waiver: The TBI community continues to promote the idea of a TBI-specific Medicaid waiver which many states have implemented. Currently, TennCare has an existing home and community-based waiver to serve the elderly and disabled for which survivors of brain injury may be eligible.

Federal Grant Award: The grant program that ended June 2021 was focused on training the workforce; including pediatricians and school professionals that serve people with brain injury across the lifespan. In May 2021, the Traumatic Brain Injury Program submitted a proposal for a five-year grant to the Administration of Community Living to aid in expanding the statewide coordinated system of TBI services by building upon existing state infrastructure.

Expansion of Services: The expansion of services for people with TBI is accomplished through the grants program as outlined in Section 68-55-402 below. In FY21, the TBI Program continued the TBI Family Support Program which provides funding directly to eligible families and survivors to cover costs not covered by other resources. In addition, program staff collaborates with other relevant agencies such as the Tennessee Disability Coalition, the Brain Injury Association of Tennessee and Disability Rights Tennessee to improve services for all people with disabilities in the state.

Program Report

Case Management: Through the TBI Program's case management program, known as Service Coordination, eight (8) service coordinators assist people with brain injury and their families in all 95 Tennessee counties through contract arrangements with non-profit agencies. Each agency has established a Brain Injury Support Center in its service area to assist children and adults with TBI. These services include:

- (1) Providing information and education on traumatic brain injury;
- (2) Developing a comprehensive plan of care;
- (3) Providing referrals to available resources;
- (4) Coordinating services for individual client advocacy;
- (5) Assisting in applying for and access services;
- (6) Overseeing local area support groups; and
- (7) Developing new programs, services and referral sources.

The role of the service coordinator is to work with people with brain injury to assess needs and coordinate resources within the community on behalf of clients. The eight (8) service coordinators each serve an average caseload of 50 survivors and families. During FY21, the service coordinators collectively provided information on TBI to over 9,404 individuals.

- 2. Seek funding, on an ongoing basis, and in conjunction with other state agencies, prepare, coordinate and advocate for state appropriations needed to fund and to develop services to implement the state plan.*

The TBI Program Director and the TBI Advisory Council seek funding on an ongoing basis. The Council includes representatives from other state departments that also serve people with brain injury including Education, Mental Health and Substance Abuse Services, Human Services and Intellectual and Developmental Disabilities. Each state department provides a mechanism for cooperation and collaboration.

- 3. Identify available programs and services and compile a comprehensive directory of identified programs and services.*

A comprehensive resource directory, *Traumatic Brain Injury Services Directory and Resource Information Guide* is updated annually and is distributed statewide. This resource has served to increase awareness of the TBI Program and other programs and services that can be utilized by eligible people with traumatic brain injuries. The directory is available on the program website: <https://www.tn.gov/health/health-program-areas/fhw/vipp/tbi.html>. In addition, all TBI service coordinators develop resource directories for their local service areas.

Program Report

4. *Provide technical assistance and define gaps in service delivery and spearhead the development of those services needed for a comprehensive system of service delivery.*

The Traumatic Brain Injury Program provides technical assistance as requested by consumers, families and providers. Examples include providing information on services and programs, referrals to rehabilitation programs, referrals to local area service coordinators, providing state and local data and making connections to support groups. The state TBI Program office also conducts annual technical assistance site visits with all program contractors.

5. *Implement, oversee and receive surveillance data from the Tennessee Brain Trauma Registry to use in developing and revising the state plan to meet the changing needs of this population.*

TBI Registry data has been a valuable tool in documenting the need for TBI services and program planning. Data from the TBI Registry enabled the successful application for the federal grant award that resulted in the new grant for Brain Links beginning FY22.

Registry data on sports concussions highlighted a problem in the state and, as a result, Tennessee became the 44th state to pass a sports-concussion law designed to reduce youth sports concussions and increase awareness of traumatic brain injury. In FY21, the Department of Health collaborated with Vanderbilt Medical Center and other professionals to update the *Return to Learn/Return to Play: Concussion Management Guidelines* which are available on the Department of Health website. The document is a resource for educators, coaches, health care providers, families and athletes.

TBI Registry data is one of the data sources being used to identify areas of need for concussion education/management.



Program Report

- Evaluate surveillance data regarding the quality of services provided and outcome and impact on the quality of life of this population, including reintegration and productivity in the community.*

Surveillance data in the TBI Registry does not capture the quality of services provided, the TBI Program conducts a satisfaction survey of the recipients of the TBI Family Support Program which provides insight into the quality of life and productivity. For the 2020 report, there were 120 surveys mailed with 24 responses for a 20% response rate. Overall, the survey respondents indicated great satisfaction with the program and gratitude for the availability of the funds. Families and people with traumatic brain injuries used the funding to address a variety needs including expenses related to respite, transportation and medical expenses not covered by other payers (i.e., insurance). At least half of the respondents noted that without the funds they would not have been able to pay for personal care services, obtain medications or travel to medical appointments.

- Promote research on the causes, effects, prevention, treatment and rehabilitation of head trauma injuries.*

Relevant information on the causes, effects, prevention, treatment and rehabilitation of traumatic brain injuries are distributed to key stakeholders. In FY21, the *Center for Disease Control (CDC) Pediatric Mild Traumatic Brain Injury Guidelines* were distributed to members of the Tennessee American Academy of Pediatrics, Tennessee Academy of Family Physicians, Cumberland Pediatric Foundation and the Children's Emergency Care Alliance to promote information on treatment of mild TBI.

In FY21, the Traumatic Brain Injury Program distributed approximately 71 emails to the TBI Community Listserv promoting research on the causes, effects, prevention, treatment and rehabilitation of traumatic brain injuries.



Program Report

8. *Serve as a clearinghouse for the collection and dissemination of information collected on available programs and services. A state-wide, toll-free telephone line shall be established and operated during normal business hours for the express purpose of providing such information to callers.*

The TBI Clearinghouse has been operational since 1994 and is accessible via a toll-free number (1-800-882-0611) or via the state Traumatic Brain Injury Program website at <https://www.tn.gov/health/health-program-areas/fhw/vipp/tbi/html>. Information is routinely updated on available programs and services across the state.

- b) Utilizing the services and expertise of the advisory council to the greatest extent possible and in cooperation with the advisory council, the TBI Coordinator shall:*
 - 1) *Develop a coordinated case management system, a short-term state plan, a long-term state plan, affordable and accessible home and community-based services, and criteria to identify training needs and priorities for all persons serving TBI clients.*

The case management system, known as the TBI Service Coordination Program, described in T.C.A. 68-55-202 (a) (1) serves all 95 counties in the state. The Advisory Council and the TBI Program Director have developed short-term and long-term goals and objectives for the program following the mandates in the legislation. Efforts to provide affordable and accessible home and community-based services are ongoing through the TennCare CHOICES Program. Currently, the TBI Program has a contract to provide personal care services on a limited basis in select facilities in Memphis and Johnson City.

Training needs of people serving TBI clients are being identified and addressed in the federal grant with funded partner, Brain Links. The TBI Service Coordinators also provide training to health care professionals in their service areas.

- 2) *Establish and provide for the centralized organization of a state-wide family clearinghouse of information, including availability of services, education and referral to survivors, professionals, and family members during the early stages of injury in the acute hospital setting.*

The TBI Program staff have made contacts in the hospitals where acute care is provided through the establishment of the TBI Registry and the development of the Traumatic Brain Injury Services Directory and Resource Information Guide. The Service Coordinators have developed referral relationships with their local hospitals. Each year, copies of the updated Resource Information Guide are distributed to facilities statewide. These efforts serve to make assistance available to people with traumatic brain injury and their families in the early stage of injury and across the lifespan.

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- 3) *Assure statewide compliance with licensure, if any, and performance standards through regular service monitoring, site visitation, and self-appraisal.*
- 4) *If licensure is required, monitor and update licensure requirements specific to this populations.*

The Department of Health oversees the certification and licensure of healthcare facilities in Tennessee. The Traumatic Brain Injury Program Director also works with appropriate staff to ensure licensure compliance and monitor and update licensure requirements specific to this population, as needed.

- 5) *Seek funding and other resources to assure that state personnel working with this disability group are properly trained and provided, at least annually, an opportunity to attend formal or informal education programs through colleges, workshops, seminars, or conferences.*

In FY21, the Traumatic Brain Injury Program collaborated with the Brain Injury Association of Tennessee (BIAT) to plan and present an annual statewide conference, the 31st Annual TBI Survivor, Family and Caregiver Event. Due to COVID-19, the annual statewide conference was held virtually with approximately 45 TBI survivors, family members, caregivers and service professionals in attendance.

The Tennessee Department of Health has been a recipient of the Center for Disease Control (CDC) Core Violence and Injury Prevention Grant since 2005. In 2017, TBI prevention was included as a focus area for the grant and has continued to be a focus area. As a result, TBI is an educational topic at each of the quarterly injury prevention stakeholder meetings. The meetings are attended by state staff and other key stakeholders that serve the TBI community.

Traumatic Brain Injury Service Coordinators, as well as Brain Links, regularly present at seminars, workshops, conferences and events enhancing the ability of service professionals to meet the needs of people with TBI and their families. During FY21, TBI Service Coordinators collectively made 93 educational presentations to a total of 2,010 health care professionals and community members. Brain Links provided 81 virtual trainings to a total of 11,639 attendees that included clinical/medical professionals, coaches and other athletic personnel, homeless service organizations, people with traumatic brain injury, in-home services and support staff, school staff and other non-healthcare related individuals. Provided training topics included: TBI and aging, behavioral health, substance use, neurobehavioral aspects of TBI, brain health, cognition and other TBI-related issues.

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In FY20, Brain Links launched a YouTube Training Channel to provide free and accessible training on various traumatic brain injury topics and toolkits. During FY21, Brain Links staff added twelve (12) free additional recorded training opportunities and each training is available at the Brain Links website: <https://www.tndisability.org/webinars-and-podcasts>.

Training is provided to the TBI service coordinators that work directly with families and people with traumatic brain injury. The annual Service Coordination Retreat was held virtually and included speakers on suicide prevention, substance abuse services, TBI resources and services and understating implicit bias. The retreat allowed time for service coordinators to discuss challenges they encountered and valuable resources to address those challenges to better serve people with TBI and their families.

In addition, the TBI Program Director attended the National Association of State Health Injury Administrators (NASHIA) Conference to learn new information, resources and services within the TBI field. Attending this conference aided the TBI program director to better educate other pertinent personnel working within the TBI field in the state.

6) Ensure updates and compliance standards from the National Health Injury Foundation's quality standards committee are made available to professionals and providers, on a timely basis, to help educate providers and professionals regarding the latest technology available to this disability group.

In addition, to regularly scheduled training and the annual conference, the TBI Program has developed a TBI Community Listserv to provide information on the latest technology, training, workshops, information and research available for the TBI community. During FY21, a total of 119 emails were distributed via the TBI Community Listserv.



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- 7) *Oversee the efforts to better educate the general public concerning the need for head injury prevention programs and the need for early intervention, including but not limited to, developing plans and programs for affordable post-acute rehabilitation services, long-term care programs, respite services, and day treatment programs to deal with those who have lifelong disabilities as well as developing plans and programs to deal effectively with TBI students in the educational system.*

Education is provided to the general public through several different avenues, including:

- (1) The TBI Program contracted with the Brain Injury Association of Tennessee to present an annual conference focusing on current topics, including prevention and the need for early intervention;
- (2) The TBI service coordinators provided prevention programs, trainings and conferences in their respective services areas;
- (3) The TBI program director regularly provided educational presentations on brain injury to the state injury prevention stakeholder groups and TBI Advisory Council; and
- (4) Information on post-acute rehabilitation services, respite services and day programs were included in the TBI Clearinghouse and the *TBI Directory and Resource Information Guide*.

- 8) *Work with vocational rehabilitation and other state agencies to offer incentives and to obtain cooperation of private industries to initiate on-the-job training and supported employment for TBI persons.*

The TBI Program staff and TBI service coordinators work with vocational rehabilitation counselors located throughout the state, helping to promote incentives and to encourage private industries to initiate on-the-job training and supported employment opportunities for people with traumatic brain injuries. A representative of the Vocational Rehabilitation Program serves on the TBI Advisory Council, which furthers collaborative opportunities. In addition, TBI staff is available to provide technical assistance, as requested.



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- 9) *Assist in obtaining grant funding and provide technical assistance for the Tennessee Health Injury Association (THIA) to develop policies and procedures to maximize self-determination and self-advocacy of a person suffering a TBI.*

The TBI Program has provided technical assistance to staff of the Brain Injury Association of Tennessee (BIAT) – formally Tennessee Head Injury Association. In FY21, the TBI Program continued to support BIAT's work with people with traumatic brain injury and their families by providing a grant to fund a full-time executive director. The executive director serves as an advocate to improve services benefiting people with traumatic brain injury. TBI Program staff have provided guidance and technical assistance to the executive director on multiple occasions through FY21 to improve services for people with traumatic brain injury.

T.C.A. 68-55-202. Duties.

The commissioner shall establish and maintain a central registry of persons who sustain traumatic brain injury. The purpose of the registry is to: (1) collect information to facilitate the development of injury prevention, treatment and rehabilitation programs and (2) ensure the provision to persons with traumatic brain injury of information regarding appropriate public or private agencies that provide rehabilitation services so that injured persons may obtain needed services to alleviate injuries and avoid secondary problems.

The TBI Registry is a mechanism for collecting data on brain injury in the state. In the calendar year 2020, 8,227 patients were reported to the TBI Registry with at least one (1) brain injury diagnosis; 7,353 of these patients were hospitalized and discharged alive while the remaining 874 patients died as a result of their injuries. Accidental falls were the leading cause of injury amongst patients included in the TBI Registry at 41% of all causes.

The TBI Registry is supported by an Epidemiologist housed in the Tennessee Department of Health – Division of Family Health and Wellness. Data collection officially began with patients discharged in 1996. Reporting hospitals submit data on inpatients or any deceased patients with TBI-specific ICD-10 diagnosis codes; patients seen in emergency rooms who were sent home the same day are not included in the TBI Registry. Hospitals are required to report within six (6) weeks of the end of the quarter. All hospitals in the state are currently in compliance with this legislation.

The TBI Registry serves to connect people with traumatic brain injury with needed services. All Tennessee residents reported to the Registry receive a letter and TBI Service Coordination Program brochure to inform them of the services available through the TBI Program. During FY21, 8,227 letters were mailed to TBI Registry patients. For many, the letter is the first link to information regarding needed resources and services.

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Part 3 & 4. T.C.A. 68-55-401. Traumatic Brain Injury Fund.

There is hereby established a general fund reserve to be allocated by the General Appropriations Act which shall be known as the “traumatic brain injury fund” hereafter referred to as the fund. Money from the fund may be expended to fund the registry, the TBI coordinator position, and additional staff requirements and other expenditures and grants under the provisions of this chapter.

The TBI Fund has been established in the Department of Health and revenues have been deposited into the fund as they have been received. The fund balance as of June 30, 2020, was \$241,788.20. TBI Funds are utilized for central office staff positions and to fund program contracts.

In FY17, the TBI Advisory Council was approved to utilize available resources in the TBI Fund for the benefit of people with TBI. The TBI Advisory Council developed a five-year plan to use these funds to directly assist people with TBI and their families by implementing a TBI Family Support Program, modeled on the existing state Family Support Program in the Department of Intellectual and Developmental Disabilities. Due to a decrease in the TBI Fund, the TBI Family Support Program was not renewed for FY22.



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T.C.A. 68-55-402. Grant Programs.

From the revenues deposited in the traumatic brain injury fund, the Department of Health is authorized to provide grants to county and municipal governments and/or not-for-profit organizations for home and community-based programs to serve the needs of TBI persons and their families. The department is authorized to establish such grant programs and to develop criteria for eligible applicants.

In accordance with the legislation, the TBI Program has awarded numerous grants for a variety of projects since 1995. In FY21, through competitively awarded grants the following services were provided:

- Tennessee Community Resource Services Agency (TNCSA) provided personal care services to ten (10) individuals with TBI who live in two accessible, affordable apartment buildings in Memphis.
- Crumley House Brain Injury Rehabilitation Center offered respite and personal care assistance to 23 residents with traumatic brain injury.
- TBI service coordinators provided case management services to people with TBI and their families; each served an average caseload of 50 clients. They collectively provided information on TBI to over 9,404 individuals.
- TBI service coordinators collectively made 93 educational presentations to a total of 2,010 individuals.
- Arc of Davidson County and Greater Nashville provided TBI Family Support Program services to 120 participants.
- Easter Seals Tennessee was unable to provide camp and recreational opportunities for adults and youth with TBI due COVID-19.
- Brain Injury Association of Tennessee (BIAT) employed a full-time executive director.
- Tennessee Disability Coalition, Brain Links, aided in managing and implementing the Administration for Community Living (ACL) federal grant.
- Brain Links staff provided 81 virtual trainings to 11,639 participants.

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Part 5. T.C.A. 68-55-501-503. Youth Sport-Related Injuries.

Tennessee is one (1) of 50 states that have passed legislation aimed at reducing youth sports concussion and increasing awareness of traumatic brain injury. Both public and private school sports and recreational leagues for children under age 18 that require a fee are affected by the law which covers all sports. The required educational materials are free of charge and readily available from the Tennessee Department of Health website:

<https://www.tn.gov/health/health-program-areas/fhw/vipp/tbi/tn-sports-concussion.html>.

To provide needed resources on concussion, the Department of Health collaborated with Vanderbilt Medical Center and other professionals to develop *Return to Learn/Return to Play: Concussion Management Guidelines* which have been printed and distributed. The resource has also been made available on the department website. The document is a valuable resource for educators, coaches, health care providers, families and athletes. During FY21, the Department of Health and the Tennessee Disability Coalition, Brain Links, worked collectively to update and add new resources to the *Return to Learn/Return to Play: Concussion Management Guidelines*.

The TBI Program Director also promotes the Safe Stars Initiative, a collaboration between the Tennessee Department of Health and the Program for Injury Prevention in Youth Sports at The Monroe Carell Jr. Children's Hospital at Vanderbilt. The Safe Stars Initiative recognizes youth sports leagues throughout Tennessee for providing the highest level of safety for their young athletes. Safe Stars involves the implementation of policies on concussion education as well as topics such as weather safety and injury prevention. The goal of Safe Stars is to provide resources and opportunities for every youth sports league to enhance its safety standards.



Conclusion and Recommendations

Although much has been accomplished, injuries persist. Work must continue to address the needs of all people with brain injury in the state, particularly in the areas of Medicaid waivers, residential services, day programs, long-term care and rehabilitation.

The Council respectfully recommends that the legislature continue to support making home and community-based services available as an alternative to institutional care. The TBI Advisory Council commends the legislature for maintaining the universal motorcycle helmet law that has resulted in lives saved and injuries avoided.

The Council extends their gratitude for the opportunity to work to improve the lives of people with traumatic brain injury throughout Tennessee.

