



Traumatic Brain Injury (TBI): Overview

What is a Traumatic Brain Injury (TBI)?

The federal TBI Act of 1996 (Public Law 104-166), as amended, defines a TBI as acquired injury to the brain. Such term does not include brain dysfunction caused by congenital or degenerative disorders, nor birth trauma, but may include brain injuries caused by anoxia due to trauma. The Centers for Disease Control and Prevention's (CDC) Injury Center further defines a TBI as is caused by a bump, blow or jolt to the head or a penetrating head injury that disrupts the normal function of the brain. Not all blows or jolts to the head result in a TBI. The severity of a TBI may range from "mild," i.e., a brief change in mental status or consciousness to "severe," i.e., an extended period of unconsciousness or amnesia after the injury. States may define TBI more broadly to include other acquired brain injuries (ABI) or use ABI definition to include TBI for purposes of providing services and supports.

There are two types of traumatic brain injury: closed head injury and open head injury. A "closed head injury" refers to damage that occurs within the skull after a blow to the head. Although the skull may stop on impact, the brain will often continue to whip back and forth against the skull from within causing damage. An "open head injury" is a visible assault such as a gun shot wound.

What are the leading causes of TBI?

The CDC reports that falls account for the vast majority of TBIs when factoring in emergency department visits, hospitalizations, or death. The age groups at highest risk are the very young and the very old. The second leading cause is being hit by a object (unintentional blunt trauma). Motor vehicle crashes are the leading cause of hospitalization for adolescents and persons ages 15 – 44 years of age. Other causes include assaults, sports-related injuries, and war-related injuries among the military. Alcohol is frequently a contributing factor.

What is the magnitude of TBI?

In 2010, about 2.5 million Americans were admitted to emergency department (ED), hospitals, or died with a TBI -- either alone or in combination with other injuries, according to the CDC. The CDC reports that from 2001 to 2009, the rate of ED visits for sports and recreation-related injuries with a diagnosis of concussion or TBI, alone or in combination with other injuries, rose 57% among children (age 19 or younger). A TBI may have both short-term and long-term effects on individuals, their families, and society due to the financial cost of treatment, rehabilitation and care. Further impact to society includes injury-related work loss and disability; and lost income from premature death.

What are the common symptoms resulting from a TBI?

Symptoms from a TBI vary depending on the extent of the injury and the area of the brain that is injured. While some symptoms appear immediately, others may appear several days or even weeks or years later. A person with TBI may or may not lose consciousness and loss of consciousness is not always a sign of a severe TBI. A TBI may cause problems with cognition, emotions, physical mobility affecting how a person is able to return to school, work, home and community:

- **Cognition:** thinking and reasoning, understanding words, remembering things, paying attention, solving problems, thinking abstractly, judgment, planning and organizing, communication, and controlling impulses. Communication problems can cause individuals with TBI to have difficulty understanding and expressing information such as finding the right words, starting and following conversations, and understanding or misunderstanding jokes, humor and sarcasm.
- **Emotional/behavioral:** mood swings, changes in personality, depression, sexual inappropriateness.
- **Physical:** hearing loss, tinnitus (ringing or buzzing in the ears), headaches, seizures, dizziness, nausea, blurred vision, decreased smell or taste, and reduced strength and coordination in the body, arms, and legs.

Can a person recover after a TBI?

Many factors contribute to success in recovery after a TBI, including the age of the person at the time of injury; severity of the injury; pre-injury abilities; and the length of time a person is in a coma and duration of loss of memory following a coma. The individual may show improvements and recovery the first six months following the injury. Many will continue to improve for several years. The Rancho Los Amigos Levels of Cognitive Functioning (RLCF) is an evaluation tool used by a rehabilitation team to describe ten levels of cognitive (thinking). It is considered to be one of the best and most widely used ways of describing recovery from brain injury.

What is the rehabilitation process after a person sustains a TBI?

Rehabilitation starts at the time of injury with care usually provided by emergency medical services (EMS) personnel who stabilize the person and provide pre-hospital assessment and treatment. Depending on the level of severity, the individual may be transported to a trauma center for further treatment and acute rehabilitation followed by post-acute rehabilitation. Following injury a person may need to re-learn how to dress, bathe, eat, walk, talk and other activities of daily living. Post-acute rehabilitation may focus on cognitive, emotional, behavioral issues, as well as educational and vocational goals; and compensatory strategies to help individuals to reintegrate and to live as independently as possible in the community. These rehabilitation therapies may be provided in inpatient settings, outpatient settings, residential settings or in the home. Often the payment source, such as private insurance, will dictate the length of stay in programs, duration of rehabilitation, and rehabilitation settings.

What type of professionals generally provide TBI rehabilitation?

A multidisciplinary team of trained practitioners work together on goals for treatment and rehabilitation to help an individual with restoring functional abilities both in in-patient and out-patient settings, depending on the needs of the individual. The length of time for rehabilitation services may be determined by the severity of injury and/or payment source. Healthcare and rehabilitation professionals who may be involved include a:

- Physician or a physiatrist whose specialty is rehabilitation medicine
- Rehabilitation nurse
- Neurologist
- Physical therapist
- Occupational therapist
- Recreation therapist
- Social worker
- Speech/Language Therapist
- Nutritionist/Dietitian
- Neuropsychologist
- Psychologist
- Case manager/service coordinator

What are the services and supports which may be needed after rehabilitation?

Individuals with TBI may require short-term, long-term, crisis, or intermittent supports and services. These services and supports may be formal (paid) supports or natural supports, which involve relationships that occur in everyday life, including family, co-workers, neighbors, church family and acquaintances. Services and supports may include therapies to maintain functioning; counseling; in-home supports; personal care; transportation; home and vehicle modifications; substance use treatment; vocational counseling and training; and independent living skills training. These services are all designed to help individuals to reintegrate into community living and to live as independently as possible. Individuals may also need assistance with compensatory strategies to accommodate cognitive disabilities associated with a TBI.

Service coordinators, also known as case managers or care coordinators or resource facilitators, help individuals to plan for short-term and life-long goals and facilitate and coordinate resources necessary to achieve these goals. Service coordinators employ a person-centered planning approach, which empowers individuals to be in charge of defining the direction for their lives. It is an ongoing problem solving approach involving a "person-centered" team which meets to identify opportunities for individuals to develop personal relationships, participate in their community, increase control over their own lives, and develop the skills and abilities needed.

What is the role of State government with regard to services for individuals with TBI?

Families and individuals with TBI generally contact State government programs when their insurance has been exhausted or does not cover the types of assistance needed to assist with rehabilitation and day to day living. Finding that traditional State disability and health related programs did not address cognitive and behavioral needs associated with a TBI, States developed programs designed specifically for individuals with TBI-related disabilities in order to provide timely and appropriate services to help individuals to return to home, school, work and community living.

States may offer Information & Referral (I&R) services; administer service coordination programs to work directly with individuals in obtaining needed services and supports; and contract with providers for an array of rehabilitative and community services. Through these efforts, States coordinate policies and administer funds to provide seamless services from hospital discharge to home and community.

How do States pay for TBI services and supports?

States use a variety of resources to assist individuals with TBI and their families, including Medicaid, Vocational Rehabilitation, mental health/intellectual and developmental disabilities; and State revenue. About half of the States provide long-term services and supports through Medicaid Home and Community-Based Services programs designed to prevent unnecessary institutionalization or nursing home care as the only alternative. About half of the States have enacted legislation, generally referred to as a trust fund, which dedicates funding from a fine or fee, usually associated with traffic safety violation, for purposes of providing or supporting TBI services. Some States also receive general (State) revenue which is appropriated for TBI programs offering an array of services. Some States use as a combination of all of these funding resources. In addition, through the TBI Act of 1996, as amended, federal funds have been made available for competitive State grants to improve and enhance access to service delivery. Service coordinators also identify and access community and private resources and donations to assist an individual to live and work in the community.

Further Information on TBI – Online Training Modules

- Iowa Department of Human Services: <https://secureapp.dhs.state.ia.us/iowatbi/>
- Michigan TBI Online Training: <https://www.mitbitraining.org/>
- Ohio State University, Ohio Valley Center for Brain Injury Prevention and Rehabilitation: <https://tbi.osu.edu/modules>

Acronyms Associated with TBI and State/Federal Governmental Programs

ABI -- Acquired Brain Injury

ACA – Affordable Care Act

ACL – US Administration for Community Living

ADA – Americans with Disabilities Act

ADL – Activities of Daily Living

ADRC – Aging and Disability Resource Center

AoA – US Administration on Aging

BIAA -- Brain Injury Association of America

BIP – Balancing Incentive Program

CAP – Client Assistance Program

CDC -- Centers for Disease Control and Prevention

CHAP -- Child Health Assurance Program

CHIP – Children’s Health Insurance Program

CMS – US Centers for Medicare and Medicaid Services

DHHS -- US Department of Health and Human Services

DD -- Developmental Disabilities

DoD – Department of Defense

DCoE – Defense Centers of Excellence for Psychological Health

HCBS – Home and Community Based Services

HRSA – US Health Resources and Services Administration

ID -- Intellectual Disability

IDEA – Individuals with Disabilities Education Act
IEP – Individualized Education Plan
ILC – Independent Living Center
IWRP – Individualized Written Rehabilitation Program or Plan
LRE – Least Restrictive Environment
LTSS – Long-term Services and Supports
MCH – Maternal and Child Health
MFP – Money Follows the Person
MTBI – Mild Traumatic Brain Injury
MSKTC – Model Systems Knowledge Translation Center
NASHIA – National Association of State Head Injury Administrators
NDRN – National Disability Rights Network
NIDILRR – National Institute on Disability, Independent Living, and Rehabilitation Research
NIH – National Institutes of Health
OSERS – US Office of Special Education and Rehabilitative Services
PASS -- Plans for Achieving Self -- Support
PCA -- Personal Care Attendant
PCP – Person Centered Planning
PFP – Personal Futures Planning
PL – Public Law
P&A – Protection & Advocacy
RSA – US Rehabilitation Services Administration
SAMHSA – US Substance Abuse and Mental Health Services Administration
SCHIP – State Children’s Health Insurance Program
SEA – State Education Agency or State Education Act
SSA – Social Security Administration
SSI -- Supplemental Security Income
SSDI -- Social Security Disability Insurance
TBI -- Traumatic Brain Injury
TBI Act – Traumatic Brain Injury Act of 1996, as amended
TBIMS – Traumatic Brain Injury Model Systems
USBIA -- United States Brain Injury Alliance
VA – Veterans Administration
VR -- Vocational Rehabilitation
WIOA -- Workforce Innovation and Opportunity Act

References:

- **Basic Information About TBI and Concussion.** Centers for Disease Control and Prevention, National Injury Center for Prevention and Control webpage: <http://www.cdc.gov/traumaticbraininjury/basics.html>
- **NASHIA website:** www.nashia.org
- **“Understanding TBI: Part 3 - The Recovery Process”.** Fact Sheet. Model Systems Translation Center: <http://www.msktc.org/tbi/factsheets/Understanding-TBI/The-Recovery-Process-For-Traumatic-Brain-Injury>

About NASHIA

The National Association of State Head Injury Administrators (NASHIA) is a nonprofit organization created to help States plan, implement and administer an array of public programs and services for individuals with brain injury and their families. NASHIA’s mission is to assist State government in promoting partnerships and building systems to meet the needs of individuals with brain injuries and their families. Members include State government employees, private and public professionals, providers, family members, and individuals with brain injury. Visit NASHIA’s website for additional information on TBI and public services: www.nashia.org.

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