2026 STATE OF BRAIN INJURY REPORT

Brain Injury Association of America

WHAT IS A BRAIN INJURY?

Acquired brain injuries affect millions of Americans across all ages. Brain injuries can be categorized as traumatic and non-traumatic.

ACQUIRED BRAIN INJURY (ABI)

Traumatic Brain Injury (TBI)

Caused by an **external force** to the head or neck (a blow, jolt, or penetrating injury that disrupts normal brain function)

Leading causes: Falls (especially among children and older adults), motor vehicle accidents, firearm-related injuries, assaults, sports, and blast exposures (e.g., from explosives detonated in combat or military training environments)

Non-traumatic Brain Injury

Caused by an **internal event** inside the brain (such as a stroke or brain tumor)

Leading causes: Stroke (blocked or ruptured blood vessels), anoxic/hypoxic injury (oxygen deprivation), brain infections (meningitis), brain tumors (glioblastoma), toxic exposure

AMERICANS AFFECTED ANNUALLY BY TRAUMATIC BRAIN INJURY (TBI)

2.8 MILLION
ANNUAL TBI INCIDENCE

1 IN 5
RECURRENT INJURIES AMONG ADULTS OCCUR WITHIN THE FIRST YEAR

11.4 MILLION
ADULTS LIVE WITH TBI-RELATED DISABILITY

COMMON SYMPTOMS ACROSS ALL BRAIN INJURIES

SYMPTOM CATEGORY	KEY SYMPTOMS	FUNCTIONAL IMPACT
Cognitive	Attention and memory deficits; slowed thinking; impaired problem-solving, organization, judgment, and insight	Difficulty managing medications, finances, and appointments; difficulty recalling, retaining, and applying new information; trouble with multi-step tasks; safety concerns; need for supervision
Emotional / Behavioral	Irritability; mood swings; depression or anxiety; apathy; impulsivity; reduced social awareness; personality changes	Strained family or friend relationships; barriers to work or group living; increased supervision due to impulsivity or poor self-control; poor self-care
Physical	Weakness or paralysis; poor balance or coordination; difficulty walking or transferring; fatigue; spasticity; dystonia	Increased fall risk; need for assistive devices; dependence for self-care and mobility; reduced endurance for work and community activities; possible bowel/bladder incontinence
Sensory / Communication	Vision loss or visual field cuts; light/sound sensitivity; slurred speech; speech and language difficulties; swallowing problems	Difficulty walking, driving, or working; trouble expressing needs or following instructions; social isolation; choking or aspiration risk
Medical / Other	Sleep disturbances; chronic pain or headaches; dizziness or vertigo; nausea	Limited tolerance for daily activities; frequent rest breaks; inability to sustain work or routine participation

AMERICANS AFFECTED ANNUALLY BY STROKES

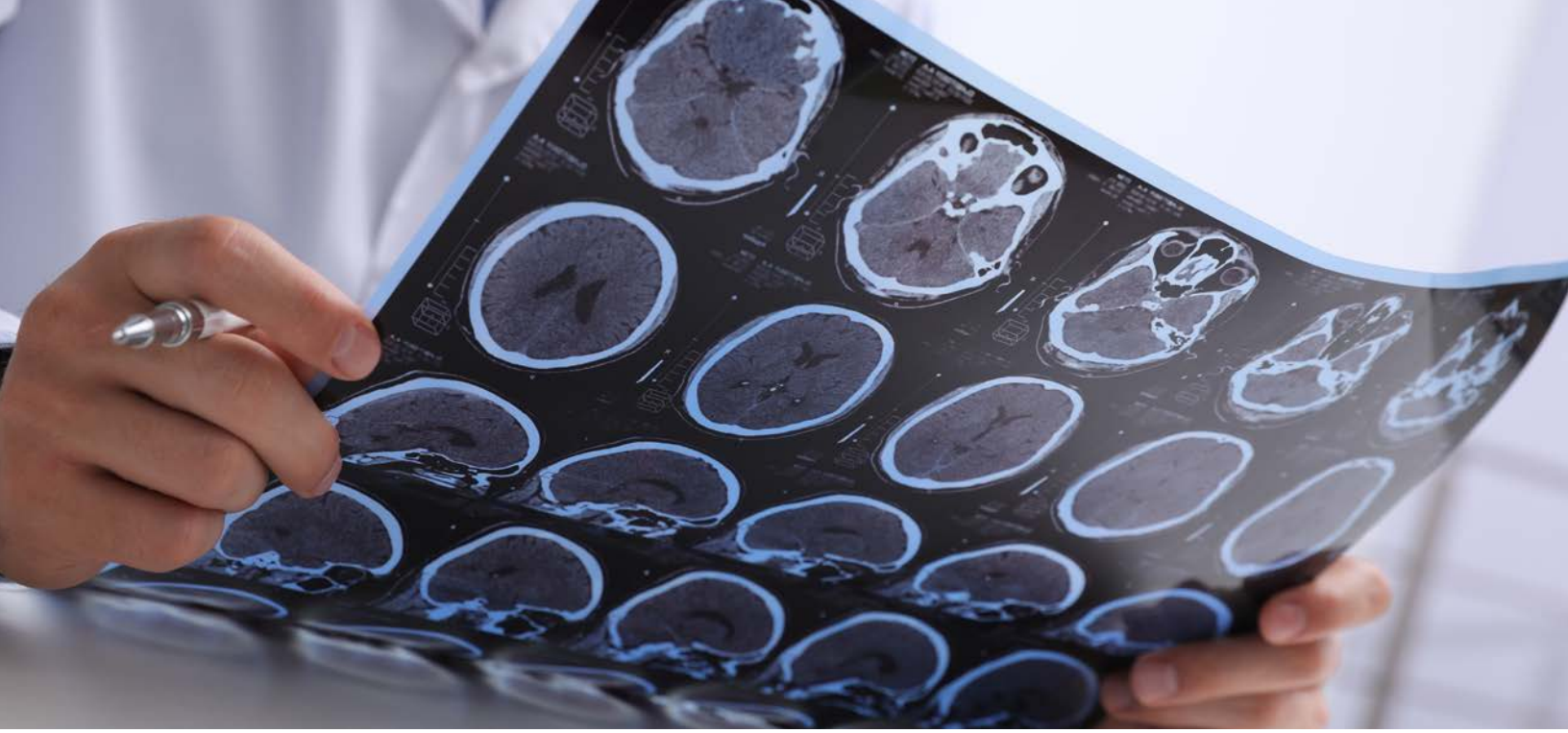
795,000
ANNUAL STROKE INCIDENCE

1 IN 4
STROKE SURVIVORS HAVE A SECOND STROKE

7.8 MILLION
ADULTS HAVE HAD A STROKE

POPULATIONS DISPROPORTIONATELY AFFECTED BY BRAIN INJURY

POPULATION	KEY SYMPTOMS
Children	► 475,000 children (age 0-14) experience TBI annually, many from falls or playing contact sports. ► 25-35 per 100,000 infants experience abusive head trauma per year. ► 1.2-13 per 100,000 children are diagnosed with stroke annually. ► Brain and spinal cord tumors are the second most common childhood cancers.
Older Adults	► 9-13% of older adults (65+ years old) sustained a TBI over an 18 year time period. ► 12% of older Medicare beneficiaries with TBI experience recurrent TBI within five years. ► Approximately 14% of adults 80+ have had a stroke.
Under-represented Racial and Ethnic Groups	► Stroke prevalence is more common in American Indian/Alaska Native (5.3% prevalence), Native Hawaiian/Pacific Islander (4.4%), and Black (4.3%) populations. ► Native Americans have the highest death rates for TBI across all demographics, while Black and Hispanic groups are less likely to access rehabilitation for TBI than other groups.
Military/Veterans	► More than 500,000 Service Members have been diagnosed with TBI since 2000. ► 24.5% of all Veterans screen positive for TBI.
People Experiencing Homelessness	► People experiencing homelessness have a lifetime TBI prevalence of 53.1%, at least 2.5 times higher than the general population. ► 90% of people experiencing homelessness sustained their first TBI prior to becoming unhoused.
Incarcerated People	► Nearly half of incarcerated Americans have sustained a TBI, with one-third of those injuries being classified as moderate-to-severe.
Survivors of Domestic and Intimate Partner Violence (DV/ IPV)	► One in four women and one in 10 men experience IPV. ► Anywhere from 19-100% of IPV/DV survivors sustain a brain injury, but unique challenges related to reporting and screening prevent accurate estimates. ► 50-70% of IPV/DV survivors experience repeated brain injury. ► Strangulation causes under-recognized hypoxic injury.
Rural Populations	► The death rate for TBI is higher (27-28 per 100,000) in rural populations than it is for urban populations (17-18 per 100,000), including more hypoxic brain injuries. Rural populations also have higher rates of hypoxic injuries.



COMORBIDITIES & HEALTH RISKS AFTER INJURY

CONDITION	INCREASED RISK AFTER TBI	INCREASED RISK AFTER STROKE
Dementia	> 4x higher risk	> 3x higher risk (ischemic) > 4.5x high risk (hemorrhagic)
Seizures	> 3x higher risk	> 7x higher risk
Subsequent traumatic brain injury	> 6x higher risk	> 2.8x higher risk
Depression	> 3-7x higher risk	> 3x higher risk
Suicide attempt	> 2-3x higher risk	> 2x higher risk
Diabetes, obesity, high cholesterol	> 1-3x higher risk	*
Stroke, hypertension, coronary artery disease	> 2x higher risk	*

Note: For TBI, increased risks are present even with mild TBI/concussion.
* High risk factors for stroke; unable to determine risk for new onset conditions post-stroke

MORTALITY

TRAUMATIC BRAIN INJURY (TBI)	STROKE	OTHER ACQUIRED BRAIN INJURY
Approximately 60,000 Americans die from TBI annually (~18-25 per 100,000 population).	Approximately 163,000 Americans die from stroke annually (39.0 per 100,000 in 2023).	There are more than 400,000 cardiac arrests annually, many resulting in fatal anoxic brain injury.
One in five people with clinically significant TBI die within five years of injury.	Approximately 66% of stroke deaths occurred outside of an acute care hospital.	There were more than 63,000 drug overdose-related deaths annually.
People who survive one year after TBI have approximately nine years shorter lifespan.	Approximately every three minutes, someone dies of stroke in the U.S.	More than 10 out of every 100 people who contract meningitis will die.
Children ages 0-17 years account for approximately 4.5% of all TBI-related deaths.	Females accounted for 56.4% of U.S. stroke deaths in 2023.	The median survival time of glioblastomas is eight months without treatment.

OTHER ACQUIRED BRAIN INJURIES

400,000
ADULTS SURVIVE CARDIAC ARREST ANNUALLY

~95,000
NEW BRAIN/CENTRAL NERVOUS SYSTEM TUMORS PER YEAR

8,000
NEAR-FATAL DROWNINGS ANNUALLY

WHAT TRENDS ARE CONCERNING?

- **AGING AMERICA:** By 2030, the number of older adults affected by brain injury, and at the age of greatest dementia risk, will be at its highest ever.
- **TBI:** Fall-related TBIs are increasingly common among older adults, resulting in rising rates of emergency visits, hospitalizations, and deaths.
- **STROKE:** Annual stroke prevalence increased 7.8% from 2011-2013 to 2020-2022, reversing a previous decline.
- **YOUNGER ADULTS:** The number of strokes occurring in younger adults is on the rise, with a 14.6% increase among adults ages 18-44 and a 15.7% increase among adults ages 45-64.
- **BRAIN INFECTIONS:** From 2022-2023, there has been a surge in pediatric intracranial infections, with some areas of the U.S. seeing a tenfold increase.

WHILE ADVANCES IN ACUTE CARE TRIAGING, STROKE AWARENESS, AND COMBAT CARE MEAN THAT MORE PEOPLE ARE SURVIVING BRAIN INJURIES THAN EVER, SURVIVORS OFTEN REQUIRE CHRONIC OR LIFELONG CARE.

WHAT IS THE CURRENT STATE OF SCREENING & TREATMENT?

SYSTEMIC CHALLENGES:

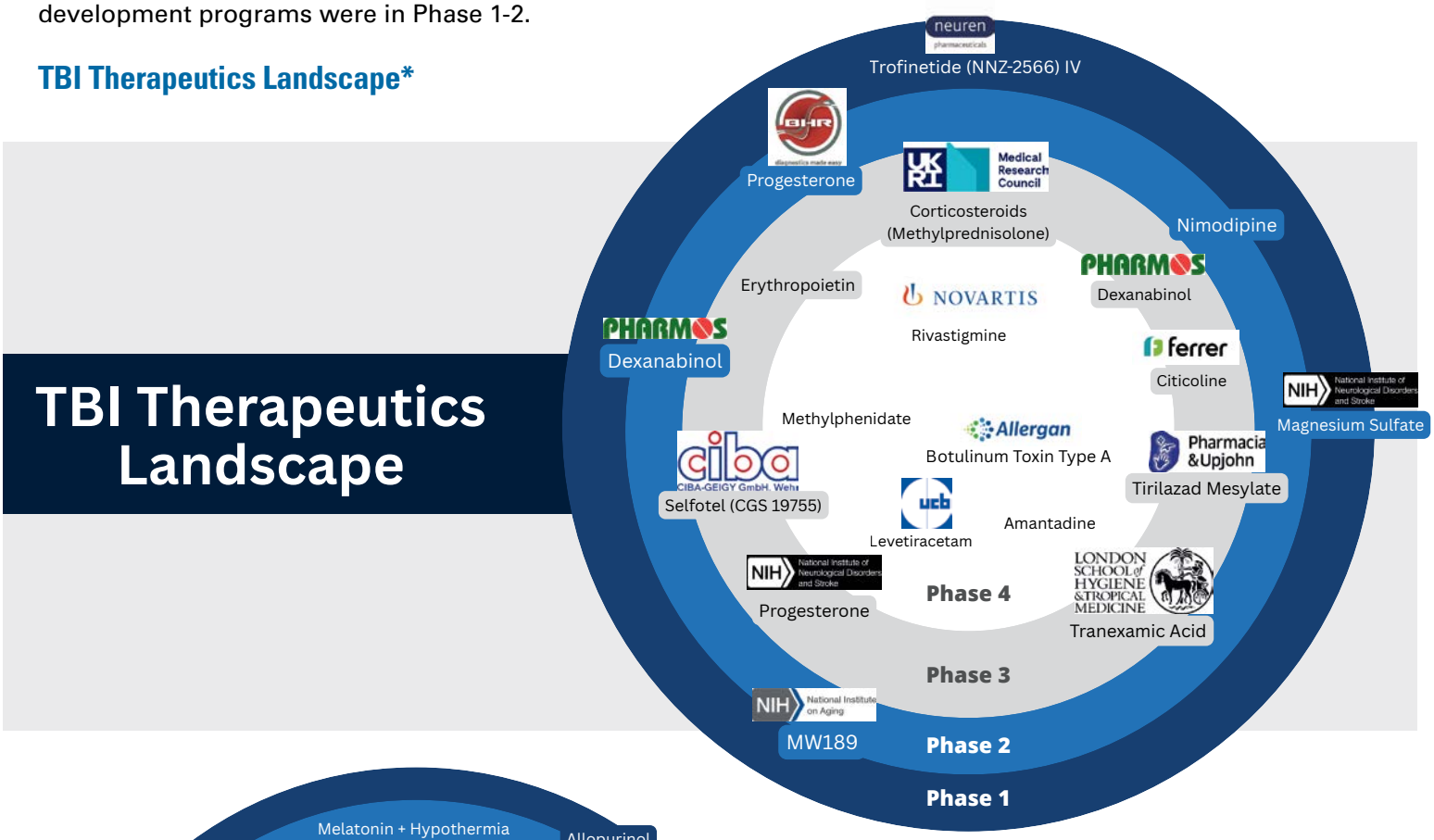
- **The Hidden Epidemic**: Undiagnosed cases
  - **"MILD" TBI:** 80% of reported TBIs are classified as "mild", yet studies show that mild TBI incidence is significantly underreported.
  - **MILITARY-RELATED TBI**: TBI sustained by Service Members are often unreported for fear of disclosure. Symptoms are often attributed instead to stress and psychological trauma rather than blast exposure and repetitive head impacts.
  - **IPV/DV**: Brain injury symptoms are often mistaken for emotional distress from abuse. Survivors may avoid healthcare or be prevented from accessing healthcare or accurately reporting brain injury exposure by abusive partners.
  - **OLDER ADULTS**: TBI symptoms are often missed in older adults and may overlap with or be attributed to dementia or normal aging.
  - **STROKE:** Only 38% of the population is aware of all major stroke symptoms and knows to call 9-1-1.
- Those with undiagnosed/ untreated TBI have equal or greater disability than those with diagnosed/treated TBI.
- CT scans are first-line assessments for suspected TBI but over 60% may be "normal" even when a brain injury is evident on more sophisticated imaging.
- Care is fragmented across acute, post-acute, and community settings.
- Most care costs are in acute care and focus on survival; many brain injury survivors can't access rehabilitation and specialty care that is essential for functional recovery.

ROUGHLY 40% OF CHILDREN AND 60% OF ADULTS WHO EXPERIENCE TBI NEVER RECEIVE CARE.

TBI THERAPEUTICS LANDSCAPE (AS OF 2022)

KEY TAKEAWAY: No precision treatments have ever been FDA-approved specifically for TBI; most development programs were in Phase 1-2.

TBI Therapeutics Landscape*



BREAKTHROUGH ADVANCES

The CBI-M framework (2024) represents a recent advancement in brain injury diagnosis, though it is not yet recognized by the federal government or adopted into practice. This four-pillar approach includes:

- **CLINICAL ASSESSMENT:** International experts recommend detailed clinical exams and uniform medical coding to ensure TBI severity characteristics are well documented.
- **BLOOD-BASED BIOMARKERS**: Scientists have discovered two FDA-approved laboratory tests that can detect TBIs.
- **IMAGING:** Standard CT scans are widely available, and more advanced neuroimaging can identify microscopic brain injuries, brain activity, and function, and identify consciousness even when people are in a coma.
- **MODIFIERS:** Experts recommend considering personal and social factors that can affect TBI diagnosis and outcomes (e.g., age, injury mechanism, mental health, access to care, social and geographic environment).

Acute Care Innovations

- **TBI:** Secondary brain injury prevention (hypoxia, hypotension, and coagulopathy); non-invasive early detection of intracranial hypertension, integrated intracranial pressure-management algorithms, evidence-based decompressive craniectomy, neurorestorative care
- **STROKE:** Intravenous thrombolysis, mechanical thrombectomy for large-vessel occlusions; CDC Paul Coverdell program tracking care quality

REHABILITATION ADVANCES

High-quality guidelines show rehabilitation recommendations are largely shared across TBI, stroke, and other acquired brain injuries. Promising and effective rehabilitation approaches across care needs are available, but most individuals who sustain ABI do not receive these treatments. Though tele-rehablitation has improved access, other barriers to care remain.

CARE NEED	EVIDENCE-BASED TREATMENTS AVAILABLE
Physical Disability	Physical therapy, occupational therapy, assistive devices (wheelchairs, walkers, canes, robotics, exoskeletons), management of spasticity, trunk control issueancers
Cognitive Changes	Cognitive rehabilitation, speech therapy, assistive technology for communication and for cognition (cognitive prosthesis, such as memory aids), noninvasive brain stimulation
Neurological Conditions	Long-term management of spasticity, seizures, chronic headaches, sleep disorders, movement disorders, fall prevention, noninvasive brain stimulation, virtual reality and robotics
Mental Health	Behavioral health interventions for mental health and emotional dysregulation support, counseling, medication management for depression, anxiety, PTSD, substance abuse treatment, tele-rehabilitation, virtual reality
Medical Comorbidities	Primary care screening and monitoring for elevated chronic disease risks (cardiovascular, diabetes, stroke recurrence)

BARRIERS TO CARE

System Factors

- Some insurances will not cover medically necessary inpatient rehabilitation.
- Insurance coverage is limited for long-term rehabilitation and not does align with person-centered priorities.
- There is a shortage of providers specializing in brain injury.
- Providers will sometimes prescribe symptom-suppressing medications without identifying the underlying causes of those symptoms.
- Academic curricula for clinicians lack brain injury-specific training.
- Brain injury screening is not routine across clinical settings and not included in clinical training.

Individual Factors

- Cognitive impairments can affect an individual's ability to manage appointments and medications.
- Survivors can face transportation challenges, especially in rural areas, often due to the inability to drive.
- Many survivors face financial constraints and cannot afford out-of-pocket costs.
- There is variability in opportunities for individuals with brain injuries to receive and access care when they need it.
- Many brain injury survivors do not receive the diagnoses and assessments necessary to qualify for care and services.
- Many survivors lack family or other caregiver support.

WHAT DOES BRAIN INJURY COST? (SELECTED U.S. ESTIMATES)

The financial burden of brain injury is staggering.

- Direct medical costs from acute care through rehabilitation
- Significant Medicare and Medicaid expenditures for long-term care
- Indirect costs from lost productivity, reduced workforce participation
- Cost of untreated/undertreated brain injury far exceeds investment in post-acute care
- Family caregiving represents substantial unpaid economic contribution

Annual total cost estimates (direct + indirect):

- **TBI**: $48.3 billion to $76.5 billion annually (including indirect costs), estimated lifetime financial costs per severe TBI case range from approximately $600,000 to $1.8 million
- **STROKE:** $56.2 billion total costs (2019-2020); projected to increase from approximately $393 billion in 2020 to $1.49 trillion in 2050

By comparison:

- **Alzheimer's disease** and related dementias: Approximately $345 billion annually
- **Parkinson's disease**: Approximately $52 billion annually
- **ALS**: Approximately $1 billion annually

Total Annual TBI Cost Estimate

$48.3 billion to $76.5 billion

Estimated Lifetime TBI Cost Estimate

Approximately $600,000 to $1.8 million

Medicare Fee-for-Service Payments for Acquired Brain Injury (2023)**

Medicare spends ~$22.5B annually on TBI alone.

Medicaid spends ~$8B annually on TBI alone.

ACUTE INPATIENT CARE (SELECTED ABI CATEGORIES):

CATEGORY	FFS STAYS (2023)	AVG PAYMENT PER STAY	MEDICARE FFS EXPENDITURES
Brain surgery *(hemorrhagic stroke/vascular procedure/craniotomy)*	58,460	$44,412	$2,186,065,030
Stroke & related cerebrovascular conditions	246,828	$12,430	$2,449,697,710
Traumatic & nontraumatic stupor/coma *(including anoxic brain dysfunction)*	51,286	$15,626	$658,806,887
Concussion	2,184	$11,237	$19,277,111

POST-ACUTE INPATIENT REHABILITATION FACILITIES (IRF):

IRF IMPAIRMENT GROUP	FFS STAYS (2023)	AVG PAYMENT PER STAY	MEDICARE FFS PAYMENTS
Stroke	65,340	$28,119	$1,815,121,047
Traumatic brain injury	13,344	$24,981	$328,214,347
Non-traumatic brain injury	33,766	$23,713	$787,252,160

***Note: These figures reflect only Medicare FFS spending and exclude Medicare Advantage. Including Medicare Advantage would substantially increase totals; a recent MEDPAC report estimates the federal government spends about 20% more per beneficiary, adding roughly $84 billion in spending.*

IMPACT ON CAREGIVERS

>6 MILLION

Informal Caregivers

SUPPORTING A PERSON WITH ABI

23% of the 60-65 million informal caregivers provide care for someone with brain disorder/injury.

Unpaid caregiving is associated with multiple psychological and physical health consequences, often resulting in high caregiver burnout and declining health. Many caregivers are unable to work and experience social isolation.

WHAT ARE THE LONG-TERM CONSEQUENCES OF BRAIN INJURY?

Brain Injury as a Chronic Condition

Contemporary research across TBI, stroke, and other ABI converges on a paradigm shift: brain injury is a chronic, dynamic condition—not a one-time event. Long-term data show persistent or evolving impairments, elevated mortality, and increased risk of later neurological disease.

Some people living with ABI require comprehensive multidisciplinary care to optimize functional independence and engagement in productive activity.

Brain Injury Recognized as a Chronic Condition in Federal Policy

In 2024, CMS added TBI to the list of chronic conditions used for Medicare Advantage Chronic Special Needs Plans (C-SNPs), with the change taking effect January 1, 2025 (Federal Register final rule). Stroke has long been recognized as a chronic condition. Though the idea of a chronic condition applies primarily to adults at this time, children who have a history of ABI will grow to be adults continuing to manage chronic effects of their injuries. Chronic care needs must be met to optimize health and function while minimizing long-term costs.

SOCIETAL ECONOMIC IMPACT

- The total annual healthcare cost of nonfatal TBIs was more than $40.6 billion.
- Total labor income losses following stroke are estimated at $63.6 billion annually.
- Non-fatal TBI causes productivity losses estimated at $19.1 billion annually.
- The value of lost productivity is tenfold higher than medical costs for TBI.
- For stroke, total productivity losses are projected to increase 54% from 2020 to 2050, from $234 billion to $361 billion.
- Employed caregivers have lost productivity, with estimates suggesting productivity declines by one-third (equivalent to $5,600 per employed caregiver per year in lost productivity).

OUR PROPOSED PATH FORWARD

Brain injury, whether from trauma, stroke, or other causes, is a major public health challenge with immense personal, societal, and economic impacts. Thanks to advances in science and care in the past decade, **more people than ever are surviving and striving after brain trauma**. There are six Key Priorities to ensure that all Americans can get the care they need and that the United States leads the world in brain injury research and care standards:

- **TREATING BRAIN INJURY AS A CHRONIC CONDITION**: Unlocking chronic-disease benefits, Medicare/Medicaid coverage structures, and long-term support systems across all brain injury types and recognizing that those with a history of childhood brain injury need support as adults. National Coverage Determinations need to be established.
- **ENHANCED RESEARCH:** Standardized outcome measurement, longitudinal studies beyond five to 10 years, multimodal studies incorporating autopsy endpoints to identify novel therapy targets to prevent post-brain injury dementia, cost-effectiveness analyses, scalable care models across TBI, stroke, and other ABI.
- **IMPROVED PREVENTION & SCREENING:** Better tools for proactive surveillance and monitoring, earlier detection, and targeted interventions for all brain injury types.
- **SUPPORT FOR CAREGIVERS**: Caring for caregivers through training, respite care, financial assistance, and mental health services, improving not only their health and well-being but also optimizing health and independence for brain injury survivors.
- **ADDRESS CARE GAPS**: Expanding access to services and treatment for those disproportionately impacted by brain injury would have significant public health and economic impact. This includes targeted strategies for socioeconomically disadvantaged, racial/ethnic minorities, rural populations, and vulnerable groups.
- **FORCE MULTIPLICATION OF BRAIN INJURY CARE**: Expand training for clinicians across disciplines to improve awareness of brain injury and unique care needs; get evidence-based treatments into the community so they can benefit those who need them most.

Every community is affected by brain injury. With continued research, investment in care systems, and recognition of brain injury as a chronic condition requiring sustained support, we can improve outcomes and quality of life for the millions of Americans living with brain injuries from all causes.

Data sources: Centers for Disease Control and Prevention, National Institutes of Health, Department of Veterans Affairs, peer-reviewed research, National Academies of Sciences, Engineering, and Medicine.

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