Definitions, Demographics, and Causes of TBI

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> "*The human brain is the most fascinating three pounds of matter on this planet, maybe even in the universe.*" - Pam Schiller

Brain Injury is the leading cause of disability and death among children and adolescents in the U.S. (CDC, 2006). Among those ages 0 to 19, each year an average of:

- 62,000 children sustain brain injury requiring hospitalization as a result of motor vehicle crashes, falls, sports injuries, physical abuse, and other causes.
- 564,000 children are seen in hospital emergency departments for TBI and released.
- Among children ages 0 to 14, TBI results in an estimated:
    - 2,685 deaths
    - 37,000 hospitalizations
    - 435,000 emergency department visits.
- Approximately 1,300 U.S. children experience severe or fatal brain trauma from child abuse every year.

Centers for Disease Control and Prevention

TBI: Get the Facts

- In 2012, ~329,290 children (age 19 and younger) were treated in U.S. emergency departments for sports and recreation-related injuries that included a diagnosis of concussion or TBI.
- Leading Causes of TBI (2006-2010):
    - Falls are the leading cause of TBI, across age groups, but disproportionately affecting the youngest (0-14) and oldest (65+).
    - Unintentional blunt trauma is the second leading cause of TBI, with motor vehicle accidents being the third leading cause.

    - Approximately 10% of TBIs are due to assaults, primarily in the 15-24 year old age group.
- TBI Risk Factors: (2006-2010)
    - TBI-related deaths:
        - Men are 3 times as likely to die as women.
        - Death rates are highest for age 65+.
        - Variation by age:
            - Falls are the leading cause of death for age 65+.
            - Motor vehicle crashes are the leading cause for children and young adults age 5-24.
            - Assaults are the leading cause for age 0-4.
    - Non-fatal injuries:
        - Falls are the leading cause of injury in all age groups, except for assaults in ages 15 to 24.
        - Motor vehicle accidents also resulted in the majority of hospitalizations for ages 15-44. Centers for Disease Control and Prevention: TBI: Get the Facts
- TBI does not discriminate:
    - Interestingly, the demographics DO NOT indicate increased risk factors for TBI except for gender.
        - Males are more likely to sustain TBI.
        - No socioeconomic impacts.
        - No evident racial disparities.
    - TBI does show disproportionate effects by age, affecting the youngest and the oldest.

In Virginia…

- The Virginia Department of Health estimates (between 2000-2009) 1,531 death and 7,503 hospitalizations in children under age 19 because of TBI.
- Half of all injury-related deaths in 15-19 year olds were due to TBI.
- Children under age of 1 had the second highest rate of hospitalization because of TBI.

Traumatic Brain Injury: a bump, blow, or jolt to the head or a penetrating head injury that disrupts the normal function of the brain.

TBI Causes

- Falls
- Motor vehicle accidents
- Pedestrian Accidents
- Physical abuse

    - Shaken Baby Syndrome/Abusive Head Trauma
- Recreational/sports injuries
    - Concussion
    - Bicycle accidents
    - Playground
- Assault
- Firearms
    - #1 cause of brain injury fatalities in United States (Sosin et al, 1995)

What is acquired brain injury?

An acquired brain injury (ABI) is an injury to the brain, which is not hereditary, congenital, degenerative, or induced by birth trauma. An acquired brain injury is an injury to the brain that has occurred after birth. – Brain Injury Association of America
*Much more inclusive category!

- *Trauma
- CVA/Stroke
- Brain Tumors
- Hypoxia/Anoxia
- Infections of the Brain
- Metabolic disorders
- Ingestion of toxic substances

Traumatic Brain Injury

When you see numbers associated with brain injury, remember that these are only **Traumatic** injuries. No other type of brain injury is counted! Traumatic Brain Injuries result from external causes.

2 Categories of TBI:

1. **Closed brain injuries**—a non-penetrating blow to the head.
    - Shearing/tearing, bruising and bleeding
    - Violent shaking
    - Scraping against skull
    - “diffuse axonal injury”
2. **Open brain injuries**—when the skull has been crushed or seriously fractured.

School Implications

"Traumatic brain injury" means an acquired injury to the brain caused by an external physical force, resulting in total or partial functional disability or psychosocial impairment, or both, that adversely affects a child's educational performance. Traumatic

brain injury applies to open or closed head injuries resulting in impairments in one or more areas, such as cognition; language; memory; attention; reasoning; abstract thinking; judgment; problem-solving; sensory, perceptual, and motor abilities; psychosocial behavior; physical functions; information processing; and speech. Traumatic brain injury does not apply to brain injuries that are congenital or degenerative, or to brain injuries induced by birth trauma. (34 CFR 300.8(c)(12)) - IDEA 1990

Brain Injury presents a spectrum of disorder

- Not every brain injury is the same and not every person brings the same brain to the accident.
- …leaves memory problems, emotional dyscontrol, impaired thinking skills, and physical challenges.
- …manifests differently from moment to moment
- …many children look so “normal”

Brain Injury and the Schools: A Guide for Educators

Not all brain injuries are classified as such in the educational system; traumatic injuries that occur as a result of external force are, but those due to non-traumatic causes…are not, creating an epidemic of unclassified and therefore improperly managed head injuries. Even though the numbers of students with TBI are likely underreported, the schools are the single largest provider of services to students with brain injury.

Additional Considerations

- Rehabilitation process.
- Brain injury as a lasting “dynamic and chronic” health condition. (Corrigan & Hammond, American Congress of Rehabilitation Medicine, 2013.)
- Multiple areas of functional impact.
- Lack of brain injury awareness, information and resources.

Educational Challenges

- Immediate and long-term changes, noted immediately or may not occur for several years after injury
- …vary greatly from student to student; no two will be alike.
- …changes are unlikely to disappear fully over time…partial recovery
- Negative consequences may not be seen immediately but only emerge when developmental demands reveal deficits and problems.
- An injured brain is less likely to meet the increasingly complex tasks all children face as they get older.

- Students with TBI…
    - …return to school with their learning difficulties unrecognized due to poor transition services
    - …less severe injuries
    - …lack of appropriate psychoeducational assessment…"old learning" remains intact
    - Incorrect educational classification
        - Learning disabilities
        - Emotional disabilities
    - Deficits secondary to TBI are not always immediately apparent…
        - Developmental process
        - Higher-level cognitive functions

"Students with Traumatic Brain Injury: Identification, Assessment and Classroom Accommodations", Hibbard et al.. (2001)

- TBI as a significantly underrecognized disability.
- Totals for Students with Disabilities by Disability and Age (0-22+): Virginia Department of Education (2015) 409 students

"*Children with brain injury are intelligent, creative, loving, funny, and add greatly to the tapestry of those we serve.*" – Ron Savage, 2001

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