

# Uncovering the Connection: Why Understanding the connection between a History of Problematic Substance Use and Brain Injury Matters in Overdose Fatality Review

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2021



# Why is important for Overdose Fatality Review Team members and other Behavioral Health professionals to have a working understanding of brain injury?

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- Brain Injury is a common and often unrecognized factor in the trajectory of an individual's life that ends due to a fatal overdose
- Becoming familiar with the link between both traumatic and acquired brain injury and use of opioids and overdose(s) can help teams make recommendations to identify and support those who may be at risk of fatal overdose

# Recognizing Brain Injury

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People with TBI are over-represented:

- Among the incarcerated
- Among the homeless
- In addiction services
- In mental health services
- Among those impacted by Intimate Partner Violence
- Native Americans and African Americans
- Individuals impacted by racial and economic disparities
- Among those who serve/have served in the Armed Forces\*
- Athletes—professional and amateur

\*Most service-related TBIs are not combat-related; they occur during training exercises, and during accidents on and off base

# Brain Injury Fast Facts

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- In 2013, 2.8 million Americans were treated in Emergency Departments (ED), hospitalized, or died as a result of a TBI.
- The brain reaches its adult weight of 3 pounds by the age of 12.
- The adult brain reaches cognitive maturity by the mid-20s.
- The last part of the brain to develop is the frontal lobe.
  - **Males 2:1** more than female
  - **Very young and very old** due to falls
  - **Adolescents and young adults** due to intentional injuries (e.g., falls, unintentional poisoning, self-harm, assault and moving vehicle crashes)

# Traumatic Brain Injury vs. Acquired Brain Injury

TBI Defined	ABI Defined
<p><b>Traumatic Brain Injury (TBI)</b> is an insult to the brain caused by an external physical force, such as a fall, motor vehicle accident, assault, sports-related incident, or improvised explosive device (IED) exposure</p>	<p><b>Acquired Brain Injury (ABI)</b> is an insult to the brain that has occurred after birth, such as TBI, stroke, near suffocation, infections in the brain, or anoxia <b>and opioid overdose(s)</b></p>

\*Both mechanisms of injury can result in a chronic disability that may get worse with age.

# Brain Injury Severity

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## Distribution of severity:

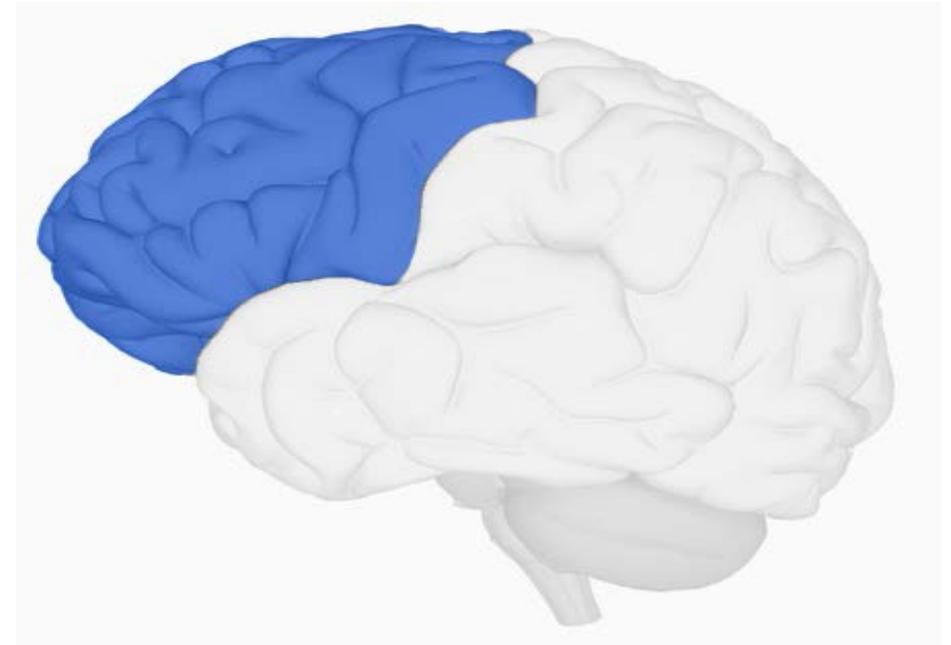
- **Mild injuries = 80 percent**  
(Loss of consciousness (LOC) < 30 minutes, post traumatic amnesia (PTA) < 1 hour)
- Moderate = 10–13 percent  
(LOC 30 minutes to 24 hours, PTA 1 to 24 hours)
- Severe = 7–10 percent  
(LOC >24 hours, PTA >24 hours)

# The Frontal Lobe

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**The frontal lobe** is the area of the brain responsible for our “executive skills,” or higher cognitive functions. These skills include:

- Problem solving
- Spontaneity
- Memory
- Language
- Motivation
- Judgment
- Impulse control
- Social and sexual behavior



# Frontal Lobe Injury Consequences

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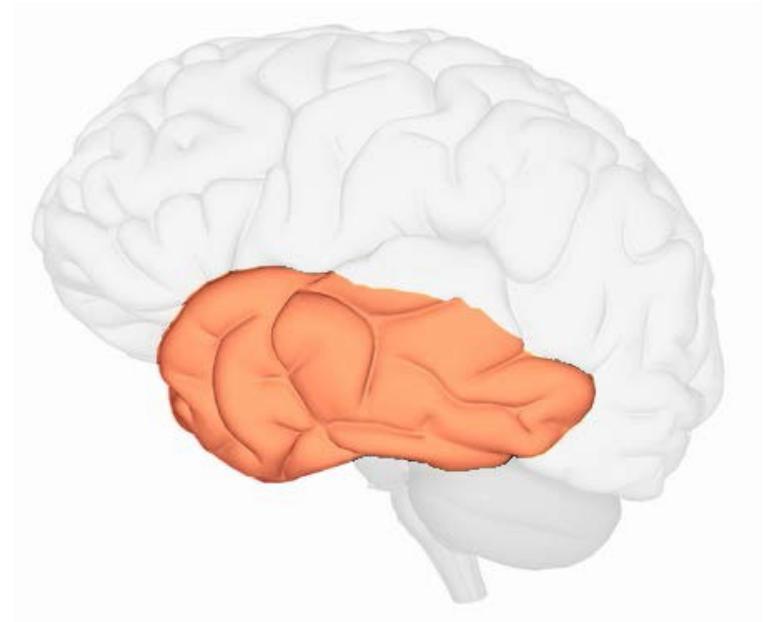
- Frontal lobe injuries, even those that occur in childhood, can cause long term problems in thinking and behavioral regulation capabilities
- It's important for Behavioral Health professionals and other human services professionals to know this since it can explain some behaviors professionals may observe
- Signs of brain injury can look a lot like other behavioral health conditions

# The Temporal Lobe

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The **temporal lobe** plays a role in emotions and is also responsible for smelling, tasting, perception, memory, understanding music, **aggressiveness, and sexual behavior.**

The temporal lobe also contains the **language area** of the brain.



*Source: Adapted from Dr. Mary Pepping of the University of Idaho's presentation "The Human Brain: Anatomy, Functions, and Injury"*

# Brain Injury

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**The behavioral impact of damage to the frontal and temporal lobes can be a factor during interactions with people who otherwise appear “normal.”**

# Common Physical Challenges after Brain Injury

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<b>Injury-related problem</b>	<b>How it may affect a person functionally</b>
Coordination	Unsteady gait, poor eye-hand coordination, slow or slurred speech, tremors, paralysis
Visual Deficits	Staring or poor eye contact, blurred or double vision, reduced ability to follow an object with the eyes, visual field cut
Additional Physical Challenges	Seizures, deaf or hard of hearing, fatigue

# Common Cognitive Challenges after Brain Injury

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## Injury-related problem

## How it may affect a person functionally

Memory

Trouble following directions, providing requested information, making appointments

Processing (receptive)

Understanding what is being said and read

Processing (expressive)

Trouble putting thoughts into words — tip of the tongue syndrome

Problem solving  
(related to frontal lobe and temporal tip injury)

Impulsive, easily frustrated, sexually disinhibited, verbally/physically combative, interpersonally inflexible, poorly organized

# Common Behavioral Challenges after Brain Injury

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<b>Injury-related problem</b>	<b>How it may affect a person functionally</b>
Depression	Flat affect, lack of initiation, sadness, irritability
Unawareness	Unable to take social cues from others, can't keep their thoughts to themselves
Confabulation	"Making up stories"
Perservation	Gets "stuck" on a topic of conversation or physical action
Anxiety	Can exacerbate other cognitive/behavioral problems

# Reduced or NO Awareness of the functional implications of injury imposed barriers

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For example, the injury has left the person with difficulty moving the right side of their body, they drag their right foot and their fingers can't grasp objects. Despite what seems to be an obvious disability, they insist they can drive without any accommodations or modifications to their car.

# **This lack of awareness extends into awareness of an individual's personal history of brain injury**

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This is why routine screening for a history of brain injury is so important, it can reframe what may appear to be personality or behavioral health issues

# Substance Use Disorders (SUD)

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Among adolescents engaged in residential treatment services for a SUD were screened for a history of TBI:

- First used at a younger age
- Have more severe Substance Use Related Disorder (worse use and more prior treatments)
- Have more co-occurring mental health problems
- Have poorer prognosis for successful treatment outcome (more so earlier the age at first TBI?)

Source: (Corrigan & Mysiw, 2012), courtesy of John Corrigan Ph.D

# Connecting the Dots:

## Brain Injury and Behavioral Health-1

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- Depression is frequent following TBI; individuals living with TBI are more likely to be suicidal
- Higher rates of anxiety disorders (generalized, Obsessive Compulsive Disorder and Post Traumatic Stress Disorder)
- Higher rates of psychosis among persons with TBI
- Some studies have found higher rates of personality disorders among persons with TBI
- **Childhood TBI** doubles likelihood of psychiatric disorder by early adulthood

# Connecting the Dots: Brain Injury and Behavioral Health-2

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Individuals with brain injury have increased vulnerability for misuse and addiction to substances:

- Over 40% of people in treatment for a substance use related disorder have had at least one TBI with a loss of consciousness
- “When all factors are considered, it would appear reasonable to expect **half of the adults under age 65 receiving inpatient rehabilitation for a primary diagnosis of TBI to have prior histories of either alcohol misuse or illicit drug use.**”
- 10-20% of people with TBI develop a new onset of a Substance Use Disorder

Source: <https://heller.brandeis.edu/ibh/research/inroads/publications-products.html>.  
<https://www.liebertpub.com/doi/abs/10.1089/neu.2019.6451>

# Connecting the Dots: Brain Injury and Behavioral Health-3

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- TBI often results in headaches & orthopedic injuries leading to prescriptions for opioids-**70-80% of all patients with TBI are discharged with a prescription for opioids**
- TBI often results in impairment of memory, leading people to forget when and how much they have taken of prescribed opioids
- TBI often results in impaired judgement and impulsivity which can also lead to overuse of pain medication
- TBI related cognitive and behavioral impairments and related social, community re- entry, and vocational challenges can contribute to the development of mood disorders, for which individuals may self medicate with opioids

*At present there are no opioid prescribing guidelines for people  
living with TBI*

Source: <https://acl.gov/sites/default/files/news%202018-05/20180502NIDILRROpioidRFIFindings.pdf>

# Acquired Brain Injury Secondary to Overdose

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## What is known and observed regarding the impact of opioid overdose and the brain:

- Sudden loss of oxygen to the brain has the greatest effect on parts of the brain that are high oxygen users such as the hippocampus, basal ganglia and frontal region among others
- These areas of the brain are oxygen “hogs” and are critical to memory, learning and attending to new information, problem solving and the ability to manage our emotions and impulses — in other words, they are responsible for our adult thinking skills aka “executive functioning”

# Consequences of Nonfatal Overdose

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- The frontal lobe is highly susceptible to brain hypoxia (reduced oxygen)
- Frontal lobe damage leads to potential loss of executive functions which are often required to participate, engage, and thrive in treatment
- As a result of frontal lobe damage, survivors of overdose may have issues with noncompliance, poor follow through, or a lack of engagement
- Decreased ability to participate and engage in substance treatment puts these individuals at increased risk for relapse

*Uncovering a hidden history of brain injury using  
Maryland's OFR Dashboard indicators*

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# **Local Overdose Fatality Review Case Report**

# Maryland's OFR Dashboard ABI Question

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**“Acquired Brain Injury”**: If team member reports a history of acquired brain injury, mark the checkbox. If reports do not indicate a history of acquired brain injury or status is unknown, do not check the checkbox. Acquired brain injuries include concussions and other traumatic brain injuries, strokes, and other brain damage incurred in events after birth. Neurodegenerative disorders or congenital disorders including fetal alcohol syndrome are NOT considered to be acquired brain injuries”

# ***“Absence of Evidence is NOT Evidence of Absence”***

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John Corrigan, Ph.D., Ohio State University, TBI Model  
Systems Program

# Hypothetical ODFR case review through a Brain Injury Informed Lens-1

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Often when a case is chosen for review, there isn't a lot of information regarding the decedent's history before the team meets. However, there may be some information that the team is given in advance that can prompt questions to bring up during the ODFR meeting that might offer some clues that the individual was living with a history of brain injury. Knowing a positive history of brain injury in an individual's life, can lead to strategies to mitigate the risk of overdose among those living with a history of brain injury.

# Hypothetical ODFR case review through a Brain Injury Informed Lens-2

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A 49 year old man passed was found unresponsive in his room by a housemate. The roommate initiated CPR and called 911. First responders arrived and were unable to restore breathing. The roommate told the first responders he had been drinking the night before and the roommate believed he had snorted heroin as well. Additional information about the decedent's past and recent history include a bout of meningitis at the age of 10 that required hospitalization, poor academic performance that began in middle school. Around this time his parents reported he began using alcohol and marijuana. In high school he was involved in a car accident, the driver of the vehicle died and he was hospitalized with a serious concussion.

# Hypothetical ODFR case review through a Brain Injury Informed Lens-3

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Additional information available to the ODFRT

- Dropped out of high school
- Worked periodically as a delivery driver for local florists and pharmacies as well as a auto part company
- Maryland case search reveals several short term stays in the county detention center for theft, assault and battery
- On several occasions he entered outpatient treatment but left prematurely, on at least one of those occasions it was reported he had conflicts with fellow group members

**Given what we have covered thus far, what are some possible clues that this individual may have been living with a history of brain injury/injuries?**

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Enter your thoughts in chat.

# Asking Brain Injury Informed Questions-1

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- Any health or learning related challenges before the age of 10
- Did his family and health care providers notice any changes in his academic or social functioning following his hospitalization for meningitis?
- Similarly, were any changes noted in his academic or social functioning after the car accident in high school?

# Asking Brain Injury Informed Questions-2

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- Are there any reports/records regarding specific areas of his brain that were affected in the accident?
- Did he have any pain/chronic pain following the car accident, headaches, orthopedic pain? Trouble sleeping, was he prescribed any medications
- Is there anything known about prior survived overdose(s)

# Brain Injury Facts pertinent to this case

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- Bacterial Meningitis can cause an acquired brain injury (ABI) According to the Centers for Disease Control and Prevention, “Meningitis is an inflammation (swelling) of the protective membranes of the brain and spinal cord” and can cause long term academic problems, motor and visual challenges, as well as behavioral health problems such as anxiety disorders and attention deficit hyperactivity disorder (ADHD)
- Traumatic Brain Injury (TBI) is an insult to the brain caused by an external force, such as that which occurs in a motor vehicle accident

# Brain Injury Informed Recommendations -1

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- Screen everyone who comes into services for a history of brain injury
- If the screen is positive, refer to specialized services and/or implement supports and strategies with the individual to improve day to day functioning
- Educate individuals about the relationship between opioid overdose and brain injury

# Brain Injury Informed Recommendations -2

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- Always ask what they are already doing to accommodate any brain injury related challenges (“put my keys on a hook by the door”), build upon their preferences and...
- Use the “Accommodating the Symptoms of TBI” as a starting point and a reference, find the link to this resource in the Brain Injury Resources handout
- Hint, the suggestions offered in SAMHSA’s guide to Trauma Informed Environments work great for individuals living with brain injury (and people in general)

# Best Practices

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- Screen for a history of brain injury
- Supports offered are guided by the person's preferences
- Cognitive Behavioral Therapy
- Motivational Interviewing
- Stages of Change Model approach

Name: \_\_\_\_\_ Current Age: \_\_\_\_\_ Interviewer Initials: \_\_\_\_\_ Date: \_\_\_\_\_

### Lifetime History of Traumatic Brain Injury (from the OSU TBI-ID) and other Acquired Brain Injuries

1. Please think about injuries you have had during your entire lifetime, especially those that affected your head or neck. It might help to remember times you went to the hospital or emergency department. Think about injuries you may have received from a car or motorcycle wreck, bicycle crash, being hit by something, falling down, being hit by someone, playing sports or an injury during military service.

a. Thinking about any injuries you have had in your lifetime, were you ever knocked out or did you lose consciousness?

Yes

No (IF NO, GO TO QUESTION 2)

b. What was the longest time you were knocked out or unconscious? (Choose just one; if you are not sure please make your best guess.)

knocked out or lost consciousness for less than 30 minutes

knocked out or lost consciousness between 30 minutes and 24 hours

knocked out or lost consciousness for 24 hours or longer

c. How old were you the first time you were knocked out or lost consciousness?

\_\_\_\_\_ years old

2. Have you ever had a period of time in which you experienced multiple, repeated impacts to your head (e.g., history of abuse, contact sports, military duty)?

Yes

No (IF NO, GO TO QUESTION 3)

a. How old were you when these repeated injuries began?

\_\_\_\_\_ years old

b. How old were you when these repeated injuries ended?

\_\_\_\_\_ years old

3. Have you ever lost consciousness from a drug overdose or being choked or strangled?

Yes

No (IF NO, GO TO QUESTION 4)

a. How many times from a drug overdose?

\_\_\_\_\_ overdose(s)

b. How many times from being choked?

\_\_\_\_\_ choked or strangled

c. What was the longest time you have been unconsciousness from an overdose, or incident of being choked or strangled? (If you are not sure please make your best guess.)

\_\_\_\_\_ minutes

4. Have you EVER been told by a doctor or other health professional that you had any of the following?

Epilepsy or seizures

A stroke, cerebral vascular disease or a transient ischemic attack

A tumor of the brain

Swelling of the brain (edema)

Toxic effects or poisoning by substances – like from lead poisoning, alcohol, prescription medications or recreational drugs

Infection like meningitis or encephalitis

A brain bleed or hemorrhage

Child or adult maltreatment syndrome

Loss of oxygen to the brain - like from a time when you stopped breathing, had a near drowning or experienced a strangulation

Encephalopathy due to endocrine, nutritional, renal or liver disorders

#### Interpreting Findings

The validity of this tool is not based on elicitation of a perfect accounting for a person's lifetime history of brain injury. Instead, it provides a means to estimate the likelihood that consequences have resulted from one's lifetime exposure. A person may be more likely to have ongoing problems if they have any of the following:

- **WORST:** one moderate or severe TBI
- **FIRST:** TBI with loss of consciousness before age 20
- **ANOXIC:** a single incident of prolonged loss of consciousness from an overdose or being choked or strangled.
- **MULTIPLE:** multiple instances of blows to the head or multiple overdoses or incidents of being choked or strangled.
- **OTHER SOURCES:** any ABI combined with another way their brain function has been impaired or any brain injury diagnosed by a doctor or other health professional.

Complete this screening to determine if a person may have had a brain injury. It is important to note that this screening does not result in a diagnosis, is not intended to be used for eligibility determination and DOES NOT replace a face-to-face evaluation and assessment with a trained professional. This information should be treated as Protected Health Information. Deidentified data may be analyzed for program evaluation.



# Substance Use Screening Tools

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- CAGE Questionnaire
- Brief Michigan Alcoholism Screening Test (BMAST)
- AUDIT
- 12-item form of the Screener & Opioid Assessment for Patients with Pain Revised (recommended by TBI Model System Researchers for use during inpatient rehabilitation stays to help determine risk factors)
- The Tobacco, Alcohol, Prescription Medication, and other Substance use Tool (TAPS)

These instruments are recommended for use by behavioral health *and* brain injury professionals as they are brief and concrete.

Source adapted from:  
*Bombardier and Davis*  
2001

# Wrap Up

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- Questions
- Comments

# Thank you!!!

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“This project was supported, in part by grant number 90TBSG0027-01-00 from the U.S. Administration for Community Living, Department of Health and Human Services, Washington, D.C. 20201. Grantees undertaking projects with government sponsorship are encouraged to express freely their findings and conclusions. Points of view or opinions do not, therefore, necessarily represent official ACL policy.” 2021