

# Brain Injury in Justice-Involved Youth: A Hidden Disability

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Administration for Community Living (ACL).  
Contents are the responsibility of the authors and do not necessarily represent the  
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# Packet

- Pre-Test
- Handouts
- Post-Test
- Evaluation

*Please take a few minutes to complete your pre-test before we begin 😊*

# Learning Objectives

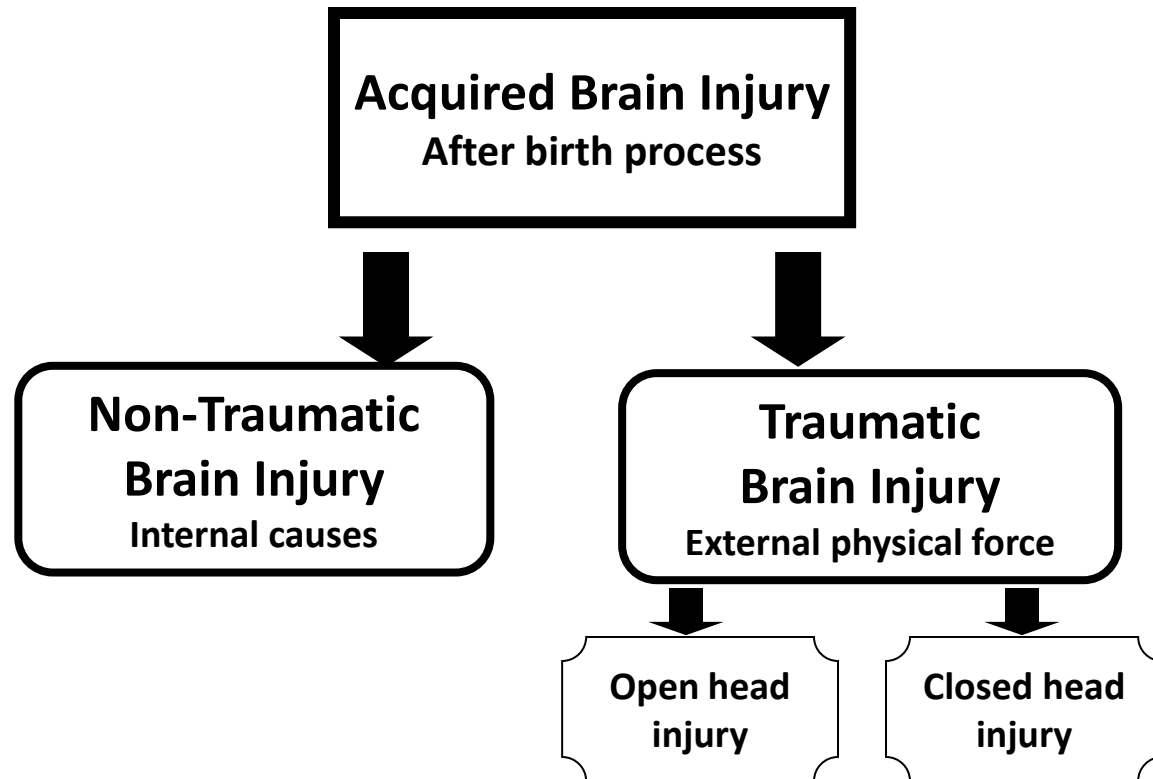
*Participants will be able to:*

- Describe a number of the physical, cognitive, and behavioral problems associated with brain injury.
- Discuss the prevalence of brain injury among youth involved in the juvenile justice.
- Describe methods for addressing this problem, including screening, intervention, and possible resource connections.



# Acquired Brain Injury

# Types of Brain Injury

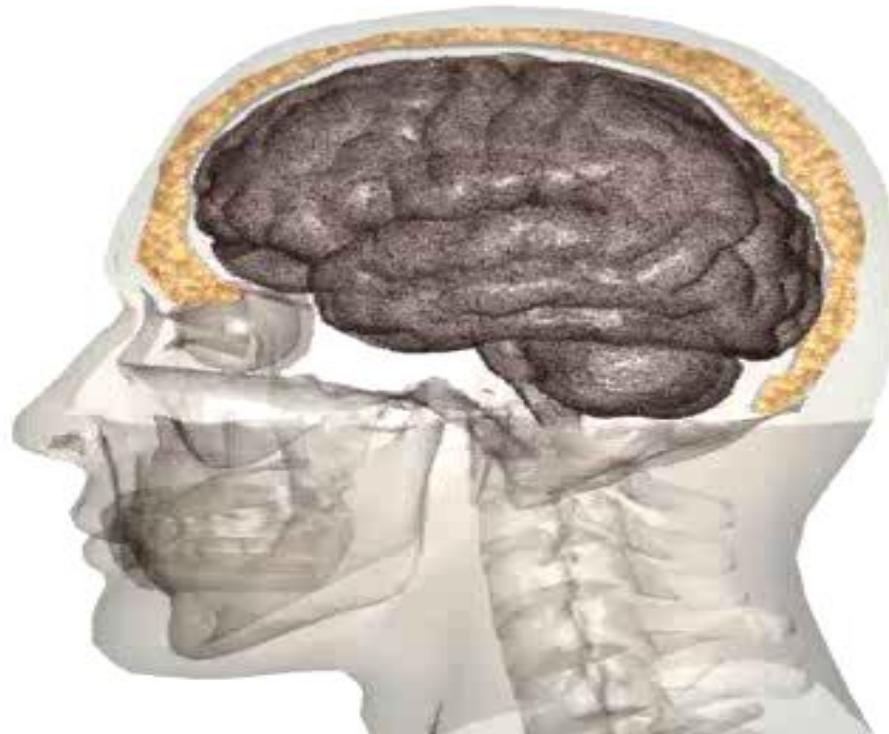


# ➤ Non-Traumatic Brain Injury

– An insult to the brain resulting from internal causes:

- Brain Tumors
- Anoxia/Hypoxia
- Infections of the Brain
  - Meningitis or Encephalitis
- Cerebral Vascular Accidents
  - Hemorrhaging
  - Aneurysms
- Ingestion of Toxic Substances
  - Inhalation of organic solvents
  - Alcohol and drug abuse
  - Ingestion of heavy metals

# ▶ Brain Hemorrhage



BRAIN INJURY AWARENESS

## DID YOU KNOW?

Not everyone dies from an overdose;  
some people live with a brain injury.

#ChangeYourMind

Learn more at [www.biausa.org](http://www.biausa.org)



BRAIN INJURY  
ASSOCIATION  
1-800-444-6443



BRAIN INJURY  
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pennsylvania  
DEPARTMENT OF HEALTH



# Traumatic Brain Injury

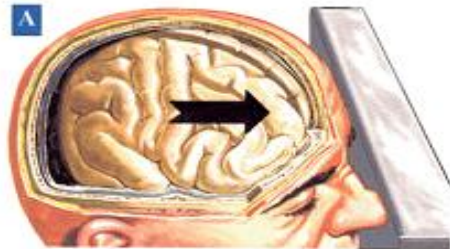
- An insult to the brain caused by external physical force
- Not all blows or jolts to the head result in a TBI
- Severity range
  - ▀ **Mild** with a brief change in mental status or consciousness
  - ▀ **Severe** with an extended period of unconsciousness or amnesia after injury

# Who is most at risk?

- Age groups most likely to sustain a TBI:
  - **0-4**
  - **15-19**
  - >65
- TBI rates are usually higher for males than females
- Males aged 0-4 years have the highest rates of TBI-related emergency department visits, hospitalizations and deaths combined

# ▶ Traumatic Brain Injury

## Closed Head Injury



When the head crashes into an immovable object, the forward motion of the skull comes to a sudden stop. The brain continues moving forward, striking the skull.



After the initial impact, the head recoils. The brain again moves in reaction to the head action. When the skull comes to a sudden rest, the brain again strikes the skull.

## Open Head Injury



# What happens during an open head injury?



# Skull Anatomy

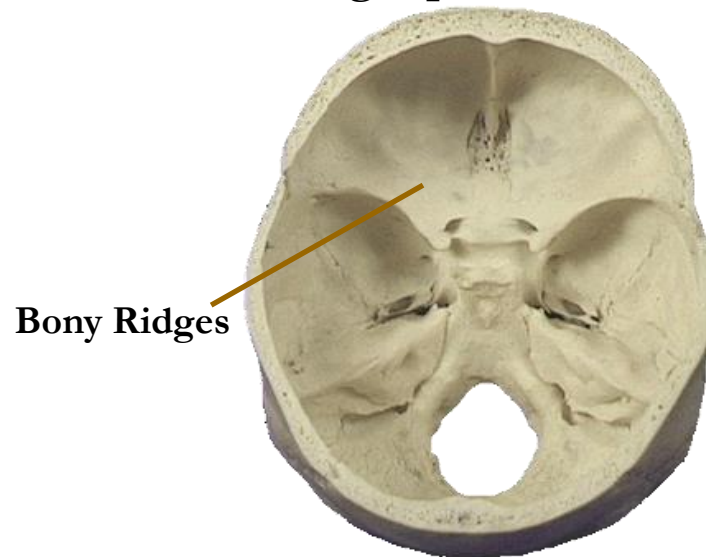
Dr. Mary Pepping of the University of Idaho's presentation *The Human Brain: Anatomy, Functions, and Injury*

The skull is a rounded layer of bone designed to protect the brain from penetrating injuries

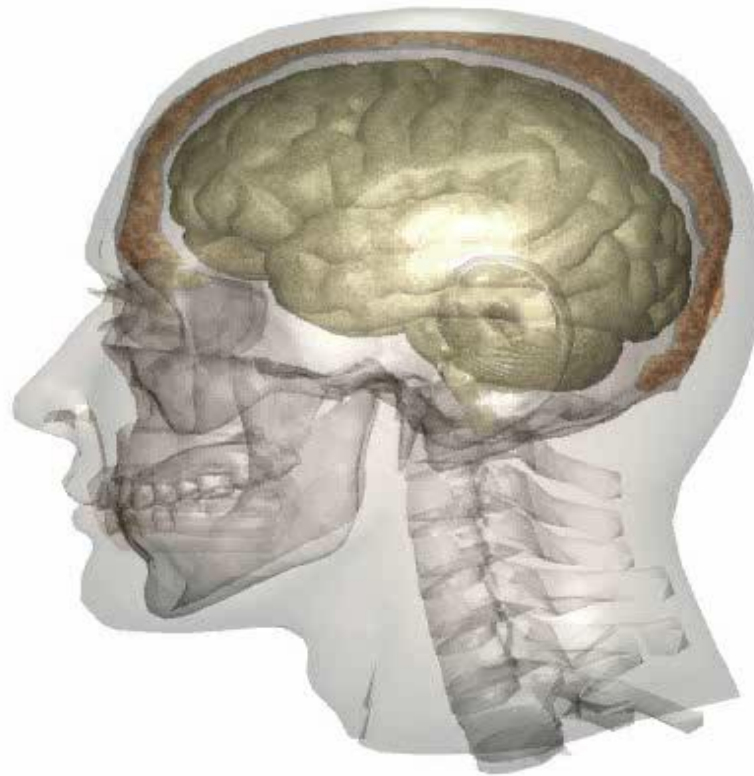


The base of the skull is rough, with many bony protuberances

These ridges can result in injury to the temporal and frontal lobes of the brain during rapid acceleration



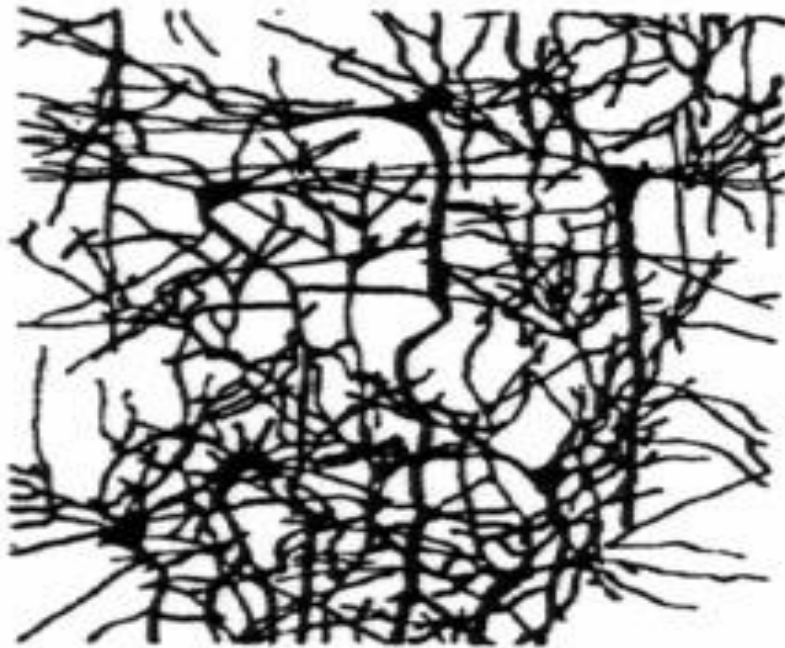
# What happens during a closed head injury?



# Effects of Trauma

Healthy Brain

With Injury



# Special Concerns for Children

- TBI is the leading killer and cause of disability in children
- Historically under-diagnosed
- Highest rates occur from:
  - ▾ Shaken baby syndrome/abuse
  - ▾ Falls (especially children 0-4yrs old)
  - ▾ Motor vehicle crashes
  - ▾ Sports and recreation injuries





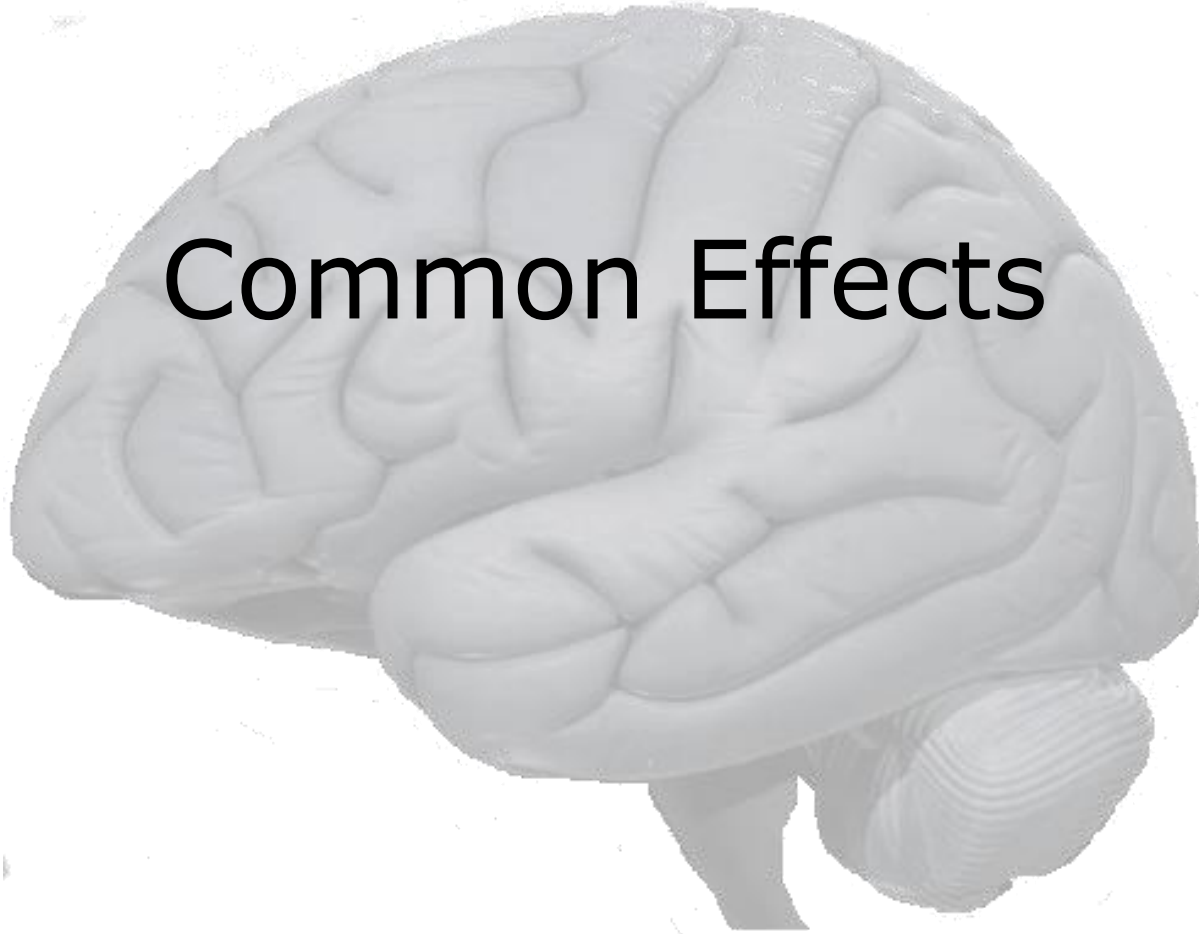
# ▶ A Child's Brain

- Underdeveloped
  - The younger the child → less developed is their brain
- Brain needs time & experience to mature
- Undifferentiated
  - Specialization develops as learning occurs
- The earlier the injury → The more pervasive the impact
- **Effects of brain injury in childhood may not be seen until later years, "latent"**



# ▶ Brain Injury

## Common Effects



# Brain Behavior Relationships

## Parietal Lobe

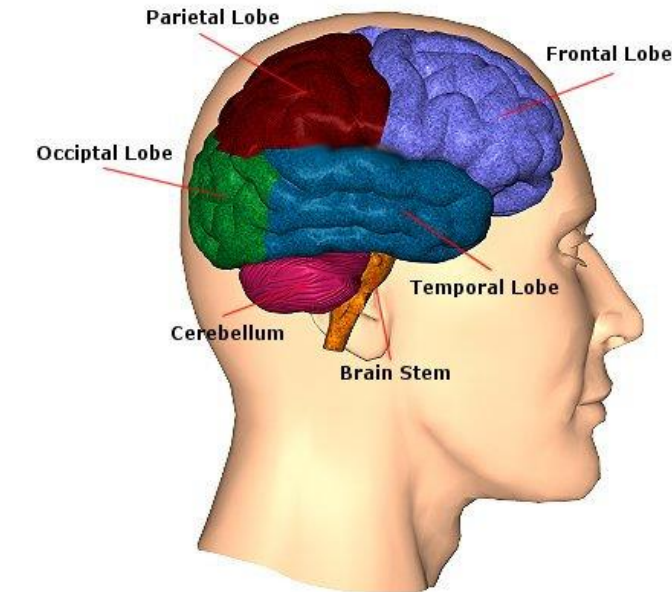
- Sense of touch
- Differentiation: size, shape, color
- Spatial perception
- Visual perception

## Occipital Lobe

- Vision

## Cerebellum

- Balance
- Coordination
- Skilled motor activity



## Brain Stem

- Breathing
- Heart rate
- Arousal/consciousness
- Sleep/wake functions
- Attention/concentration

## Frontal Lobe

- Initiation
- Problem solving
- Judgment
- Inhibition of behavior
- Planning/anticipation
- Self-monitoring
- Motor planning
- Personality/emotions
- Awareness of abilities/limitations
- Mental flexibility
- Speaking (expressive language)

## Temporal Lobe

- Memory
- Hearing
- Understanding language (receptive language)
- Organization and sequencing

# Possible Physical Changes

- Seizures
- Headaches and Pain
- Smell/Taste
- Sensitivity to Light and Noise
- Motor Skills/Balance
- Spasticity/Tremors
- Swallowing/Speech
- Fatigue/Weakness



# Cognition

*The act of knowing or thinking and includes the ability to choose, understand, remember, and use information*

- Includes:
  - ▣ Attention and concentration
  - ▣ Processing and understanding information
  - ▣ Memory
  - ▣ Communication
  - ▣ Executive functioning

# Attention

*Ability to remain alert, aware of environment, and to focus on the important aspects of a situation, activity or thought*

Impacts arousal, learning and memory, and can be perceived as disrespect



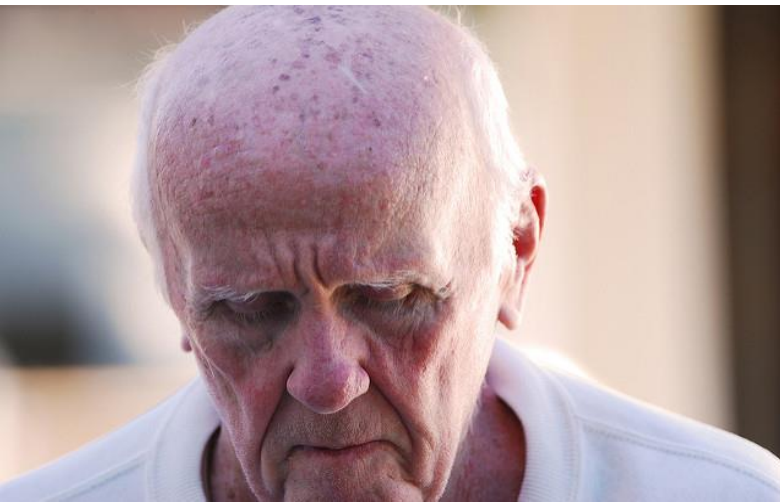
# Information Processing

*The brain is responsible for getting information in and ready to use...*

- Decreased processing speed can affect:
  - ▣ Keeping up with conversations
  - ▣ Following lessons, discussions, events in every day life
  - ▣ Getting things done in the time expected
  - ▣ Being able to complete as much as expected
  - ▣ The ability to tolerate noise, crowds, etc.
- Can be perceived as disinterest or disrespect
- Can lead to cognitive fatigue

# Cognitive Fatigue

- Fatigue is one of the most common effects after TBI
- Cognitive fatigue comes from the extra effort it takes to think
  - Many common tasks take much more concentration than they did before
  - Working harder to think and stay focused can make people mentally tired
  - Can lead to headache and irritability





# Memory

Not a unitary function: Multiple types of memory:

- Working Memory (Buffer) – holding on to information while processing other information
- Memory for New Information – ability to store, access, and retrieve new or novel information
- Memory for Old Information – store and access information from the past
- Prospective Memory – remembering into the future; remembering to do the things you intend to do

# Speech and Language

- Expressive language impairments
  - Speaking and writing
- Receptive language impairments
  - Misunderstanding what is said or written
- Misinterpretation of non-verbal cues
  - Tone of voice
  - Body language



# Executive Function



*A higher order cognitive construct involved in planning, initiation, and regulation of goal-directed behavior*

*(Lezak, 1983; Luria, 1980)*

## Executive Functions include:

- ▼ Initiation
- ▼ Planning and Organization
- ▼ Mental Flexibility and Problem-Solving
- ▼ Inhibition
- ▼ Judgment
- ▼ Self-Monitoring or Awareness

# Initiation and Intentional Behavior

*The brain lacks ability to generate what should occur next and implement the plan via action.*

- Has trouble getting started
- Needs frequent prompts to complete a task
- Can identify a goal but cannot achieve it
- Appears passive or unmotivated
- May be thought of as depression
- May be perceived as lazy

# Impulsivity and Disinhibition

*The brain lacks ability to think ahead, anticipate consequences or automatically employ rules.*

- May say or do things without thinking
- May not know when to stop
- May not regard safety
- May not follow directions or rules
- May dominate conversations
- May be perceived as rude

# ▶ Planning and Organization

*The brain has difficulty figuring out how things fit together and/or sequencing things.*

- May be late for or miss appointments
- May have trouble remembering things to be done in the future
- May have messy rooms, backpacks, etc.
- May give up easily on complicated or multi-step tasks
- May communicate in a non-linear or circuitous way



# Mental Flexibility

*The brain has difficulty shifting, seeing multiple options, or gets stuck easily.*

- May have difficulty thinking on the spot
- May get stuck on one idea or way of thinking
- May not be able to see another person's perspective
- Has difficulty adjusting to the unexpected
- Has difficulty solving problems
- May be perceived as stubborn, inflexible, selfish,, unempathetic, and/or anti-social.



# Self-Awareness and Insight

*An individual may not easily recognize their abilities and limitations or accurately perceive how they are performing or coming across.*

- Denies or underestimates problems
- Sets unrealistic goals
- Unable to identify or alter inappropriate behaviors
- Blames others for their problems
- Anosognosia
- May be perceived as “not taking responsibility for one’s actions”

# Emotional and Behavioral Issues

- Lability
  - ▣ Lack of emotional control, unpredictable mood swings
- Alexithymia
  - ▣ Lack of awareness of emotions in self or others
- Irritability
- Disinhibition and Aggression
  - ▣ Behaves without regard for norms, without thinking
  - ▣ Can be anger-related or sexual
- Anxiety
- Depression

# ➤ These problems can result in:

- Difficulties in living independently
- Disrupted relationships
- Substance abuse problems
- Mental health challenges
- Employment issues
- Financial hardship
- Justice involvement



# Many brain injuries in justice-involved youth are undiagnosed...



# Impact on justice-involved populations



# Highlights from Past Research

- 60% of inmates have a history of brain injury prior to incarceration (Shiroma, et al., 2010)
- Criminal behavior appears to increase after TBI (Farrer & Hedges, 2011; Brooks et al., 1986; Fazel et al., 2011; McIsaac et al., 2016; Timonen et al., 2002; Elbogen et al., 2015; Ryan et al., 2015)
- Rate of TBI is 3 to 8 times higher among juvenile offenders (Hughes et al., 2015)
- Half of youth offenders have a history of loss of consciousness, with repeat injuries being very common (Davies et al., 2012; Kaba et al., 2013)

# TBI Among Justice-Involved Youth

- Youth with TBI display:
  - Significantly more psychiatric distress
  - Earlier onset of criminal behavior
  - Earlier onset of substance misuse
  - More lifetime substance abuse and suicidality
- Lifetime prevalence of TBI will continue to climb as youth enter early and middle adulthood (Perron & Howard, 2008; Walker et al., 2003)
- History of TBI is also associated with increased risk of recidivism (Ray & Richardson, 2017)



# Brain Injury Education, Training and Consultation Project

Bucks County Youth Detention Center  
Montgomery County Youth Detention Center  
Loysville Youth Development Center  
Butler County Juvenile Probation  
2014-2018  
Technical Assistance  
2018-2021



# Summary of Findings: Adult Corrections

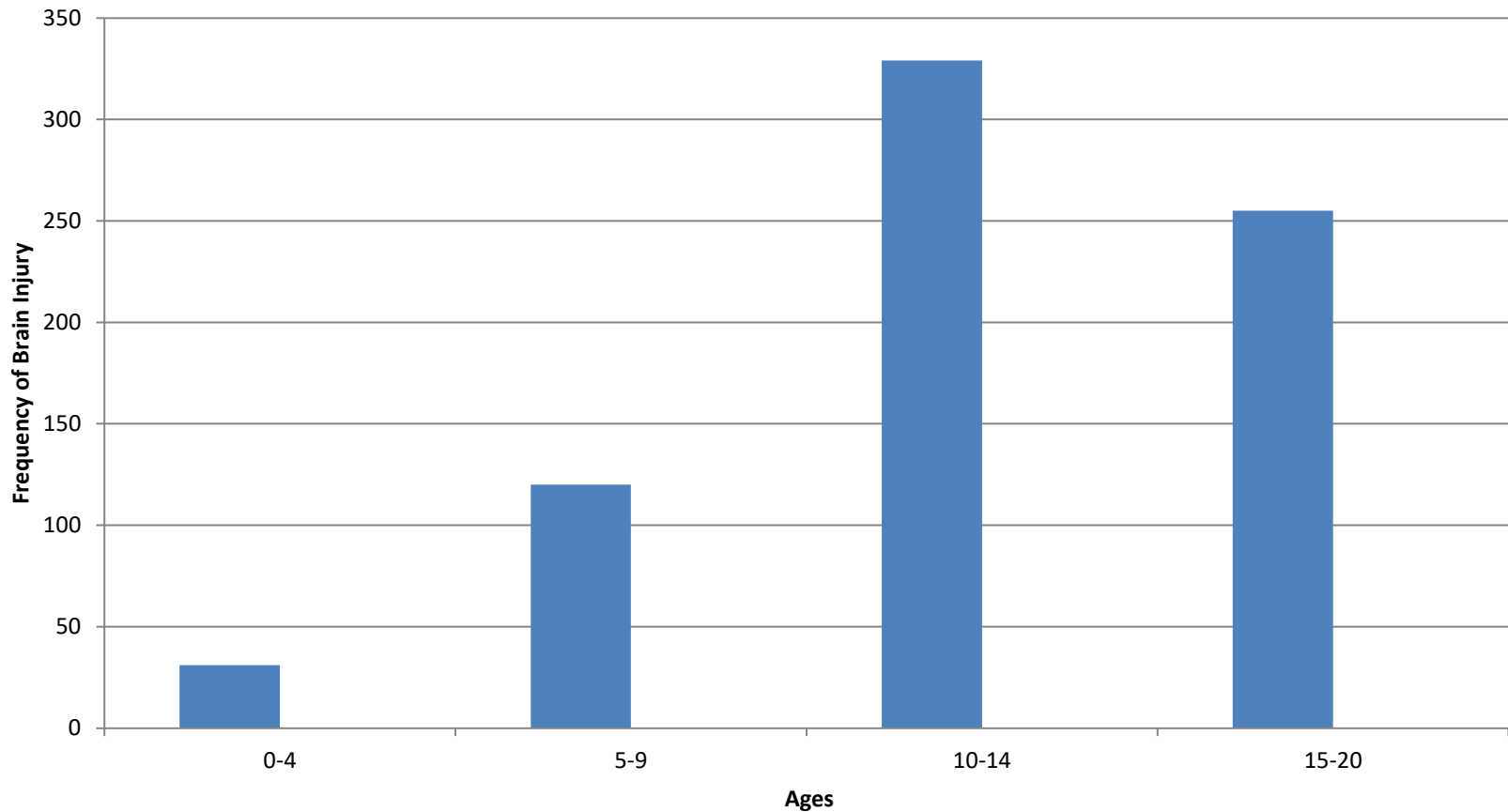
PA 2013-2015	N=164
Screened Positive Events that could have caused a Brain Injury	<b>75.95%</b>
Average Number of Events per Individual	4.1
Percentage of Events that Occurred before age 21	75%
Showed Evidence of Neurocognitive Impairments on Standardized Testing	71.59%

# JUVENILE Summary of Data

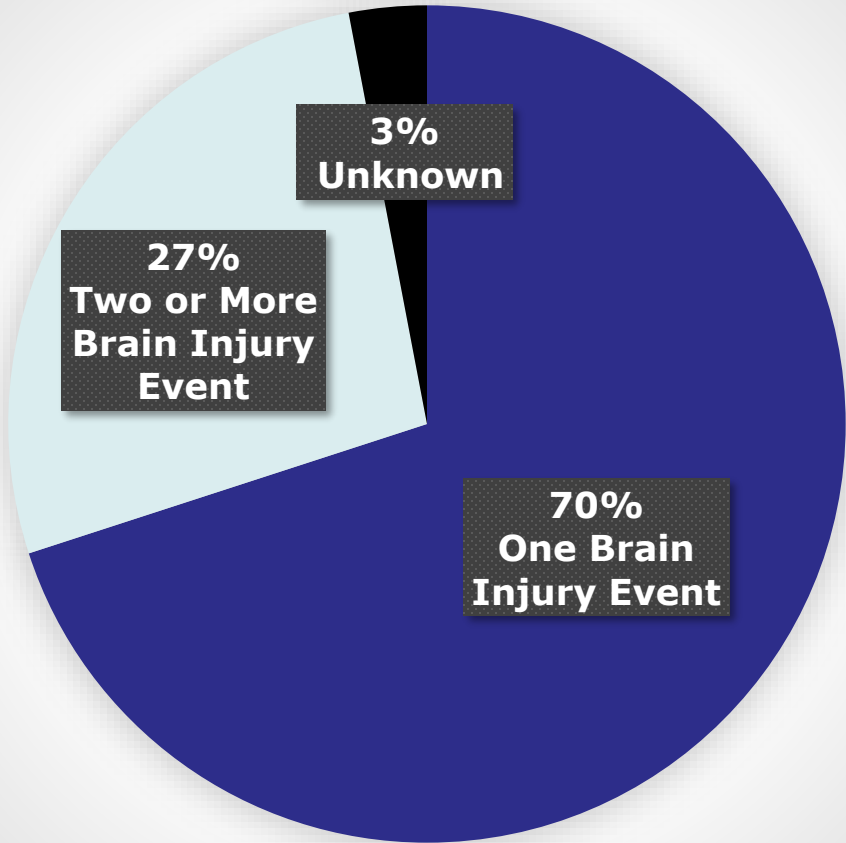
Screened for Brain Injury	485
Screened Positive for an Event that could have caused a Brain Injury	235 <b>(48.5%)</b>
Average Number of Episodes per Youth	3
Administered NeuroCognitive Testing	146
Showed Evidence of Impairments	83 (56.8%)

# Age at Time of Injury

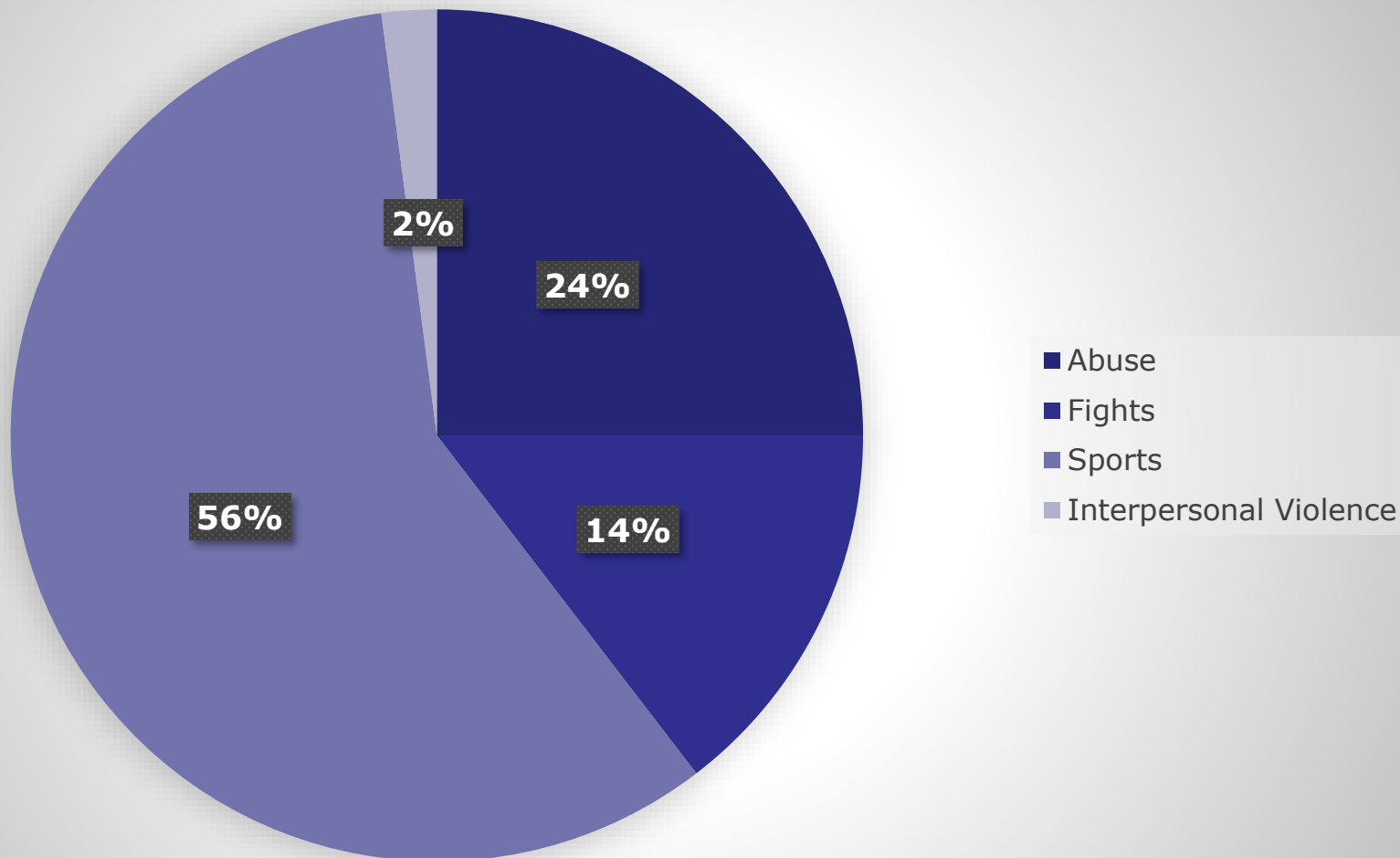
## Age at Time of Brain Injury



# Multiple Injuries



# Causes of Repetitive Blows to the Head



# ➤ Most Common Areas of Impairment

- Based on assessment, including measures of self-perception, the following areas were the most common *significant* impairments:
  - ▣ Working Memory (62%)
  - ▣ Behavioral Regulation (48%)
  - ▣ Delayed Recall of Novel Information (47%)
  - ▣ Planning and Organization (38%)

## Why do those with brain injury need a different approach?

- Executive dysfunction
- Emotional dysregulation
- Memory Impairment
  - ▣ Variability of memory
  - ▣ Prospective Memory

*The effects of brain injury in childhood may not be immediately evident given that demands change as we age.*

**These are neuropsychological functions, mediated by the brain, not always under willful control.**

# Determining History of Brain Injury: Screening

- Research shows that a semi-structured interview reviewing a lifelong history of events that could have caused a brain injury is the BEST way to identify possible history
- There are multiple instruments that can be used:
  - ▣ Traumatic Brain Injury Questionnaire
  - ▣ Ohio State University TBI-Identification Form
  - ▣ Brain Injury Screening Questionnaire



# OSU TBI-Identification Method

**Step 1**  
Ask questions 1-5 below. Record the cause of each reported injury and any details provided spontaneously in the chart at the bottom of this page. You do not need to ask further about loss of consciousness or other injury details during this step.

I am going to ask you about injuries to your head or neck that you may have had anytime in your life.

1. In your lifetime, have you ever been hospitalized or treated in an emergency room following an injury to your head or neck? Think about any childhood injuries you remember or were told about.  
 No  Yes—Record cause in chart

2. In your lifetime, have you ever injured your head or neck in a car accident or from crashing some other moving vehicle like a bicycle, motorcycle or ATV?  
 No  Yes—Record cause in chart

3. In your lifetime, have you ever injured your head or neck in a fall or from being hit by something (for example, falling from a bike or horse, rollerblading, falling on ice, being hit by a rock)? Have you ever injured your head or neck playing sports or on the playground?  
 No  Yes—Record cause in chart

4. In your lifetime, have you ever injured your head or neck in a fight, from being hit by someone, or from being shaken violently? Have you ever been shot in the head?  
 No  Yes—Record cause in chart

5. In your lifetime, have you ever been nearby when an explosion or a blast occurred? If you served in the military, think about any combat- or training-related incidents.  
 No  Yes—Record cause in chart

**Interviewer instructions:**  
If the answers to any of the above questions are "yes," go to Step 2. If the answers to all of the above questions are "no," then proceed to Step 3.

**Step 2**  
Interviewer instructions: If the answer is "yes" to any of the questions in Step 1 ask the following additional questions about each reported injury and add details to the chart below.

Were you knocked out or did you lose consciousness (LOC)?  
If yes, how long?  
If no, were you dazed or did you have a gap in your memory from the injury?  
How old were you?

**Step 3**  
Interviewer instructions: Identify a history to complete the chart.

Have you ever had / experienced multiple (e.g. history of abuse) knocked out (LO) if no, were you dazed / memory from the if no, were you dazed / memory from the  
What was the most you had an impact? How old were you a Ended?

Step 1	Step 2			
Cause	Loss of consciousness (LOC)/knocked out			
	No LOC	< 30 min	30 min-24 hrs	> 24 hrs
car accident				
high school football				

if more injuries with LOC: How many? \_\_\_\_\_ Longest \_\_\_\_\_

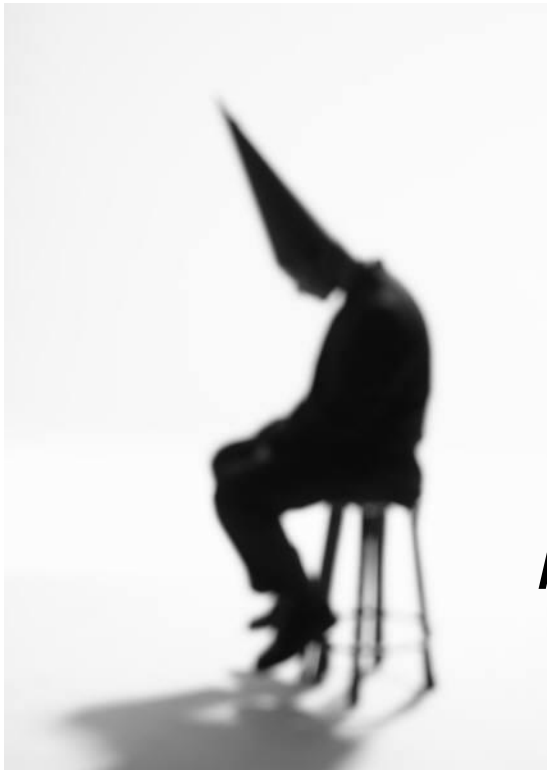
Step 3	Typical effects
Cause of repeated injury	Disrupts necessary no LOC

- Can be administered by someone with basic interviewing skills and minimal training
- Takes approximately 5 minutes to administer
- Interpretable
- Useful in a wide variety of settings

# Determining cognitive impairment: Assessment

- How to assess for neurocognitive impairment?
  - ▣ Refer for additional testing to assess Memory and Executive Functioning
    - ▣ Neuropsychologist
    - ▣ School System (school psychologist)
    - ▣ Office of Vocational Rehabilitation
    - ▣ Brain Injury Resources

# Impact of Brain Injury on Success in Programming



*Brain injury impacts an individual's ability to **use** the treatment they are provided.*

*How can we adapt treatment to facilitate success?*

## 3 Reasons for Negative Outcomes in Treatment due to TBI

- Neurobehavioral consequences of injury undermine the ability to participate in “conventional” treatment
- There is a greater likelihood of co-occurring behavioral issues in this population
- Less ability to sustain improvements from treatment without continued structure and support

# Universal Approaches for Interactions

- Talk slowly
- Keep it simple, direct, and straightforward
- Keep your voice low and watch non-verbals. Try to de-escalate the situation
  - ▣ Lower the volume
  - ▣ Pull them aside if possible

- Give information and feedback in small and more frequent chunks
- Consider pairing with written information
  - Examples: Phone call or visitor information; important dates or requirements
- Be proactive
  - How can you help someone to prepare?
  - How can you help someone remember?
  - How can you help someone avoid difficult situations?

# Individual Sessions

- **Individuals:**

- ▣ May not accurately report “how they are doing”
- ▣ May not follow through as agreed upon
- ▣ May have difficulty developing insight
- ▣ May not recognize their need for treatment
- ▣ May not benefit from session to session



# Strategies

- Structure sessions so that they follow the same routine each week
- Create a system to verify “how things went” between sessions
  - Parent, school and/or program staff check
  - How is youth tracking data?: Log, calendar, etc.
- Be direct in your questioning
- Allow additional time for processing and do check-in on comprehension
- Consider providing direct assistance for problem-solving
- Create a way to summarize sessions and progress
  - Issues and Actions
- Create and implement strategies to assist with follow-up
  - Examples—creating reminders in calendar/phone, etc. to follow through with recommended activities or data collection; Asking significant others to play a role in needed follow up; Providing check-ins between sessions



# ▶ Example—“Issues and Actions”

## Issue

- ▣ I am too tired on this medication
- ▣ I am worried that it is making me fat and sluggish

## Action

- ▣ It will take 6 weeks to adjust (June)—I need to be patient
- ▣ I am scheduled to see Doc in June—will review then
- ▣ Implement a better sleep routine and avoid napping
  - ▣ Plan specifics
- ▣ Exercise can help
  - ▣ Plan specifics...
- ▣ Track/verify energy levels w/ staff

# Treatment Groups/Counseling

- May have trouble understanding the content or processing the info quickly enough
- May have limited ability to recognize content's applicability to self
- May over or under-contribute
- May repeat self
- May not be able to initiate or complete homework tasks
- May come to group/session unprepared

- May need more direction (unable to develop insight)
- May not be able to accurately report how they are doing
- May not have an accurate sense of how well or poorly one is doing in the group itself
- May not see the need to ask for assistance
- May have difficulty tolerating long sessions (Many groups are 2 hours in length)

# Strategies

- Alert group leader(s) so that they are aware of the individual's brain injury and can adjust expectations
- Offer support to the participant so that they have some strategies for group
  - Do they need an outline of group content to refer to?
  - Do they need some guidance about how often to participate?
  - Do they need a "pre-set" before group?
    - Reminder of expectations about focus of group, requirements, and expectations?
  - Do they need a "wrap-up" after group?
    - Check-in on comprehension
    - Operationalize the follow-up expectations
  - Do they need 1:1 support to successfully "get the content"?
    - Peer support counselor
    - Reinforcement of content in therapy
  - Do they need other special accommodations for group?

# ▶ Helping with participation

- Provide contextual cues to help someone get in and be on target
  - “So Joe, we are talking about XXX. Sam is struggling with that too. I remember that you had said that you...”
- Set specific expectations about number of times one should participate
  - How will they track this during group?
- Work in individual therapy on strategies to address specific brain injury barriers
  - Will/how can an individual reveal their brain injury to group?
  - Signals (ways to indicate when to stop talking/talk more)
  - “Scripts”—what to say when caught off guard or unsure  
“I’m sorry, I lost the point here. Can you remind me...”

# School or Training Programs

- Many have multiple failures
- May come to school unprepared
- May not be able to initiate or complete homework tasks
- May do poorly on tests (sometimes despite understanding the content)
- May not recognize the need to ask for assistance



# Strategies

- Alert teacher(s) so that they are aware of the individual's brain injury and can adjust expectations
- Seek evaluation/support through special education or BrainSTEPS
- Some other accommodations to consider
  - Preferential seating
  - A copy of an outline of content to refer to during lecture
  - Examples of work as desired
    - Examples of essays, math problems, etc.
  - Guidance about how often to participate
  - 1:1 support
    - Reviews of expectations
    - Help managing assignment book and calendar
    - Help with organization of materials
    - Direct communication about when help/improvement is necessary

# Household Routines

- Participants may not fit well with others and have trouble perceiving, understanding, and conforming to norms
- May have difficulty learning routines
- May be over-stimulated or triggered in group settings
- May not benefit from experience





# Strategies

- When possible, choose environments that are less provocative for that individual
  - Smaller groups/dorms or less stimulating times
- Be specific about what is expected and provide reminders
- Consider written reminders about routines
  - Family visit days, phone use, laundry, etc.
- Help staff to adapt expectations
  - Set the expectation that they will need to need to provide reminders, cues, feedback

# Resources

- Connect individuals to appropriate resources
  - ▣ Proper evaluation
    - ▣ Neurocognitive assessment
    - ▣ Medical evaluation
  - ▣ BrainSTEPS (school)
  - ▣ OVR (work)
  - ▣ Brain injury professionals/providers
  - ▣ Brain Injury Resource Line
    - ▣ 1-800-444-6443

# Questions and Implications for Juvenile Service Providers:

- How might you identify those youth who have history of brain injury?
- How might you identify their cognitive difficulties?
- How will this information affect treatment recommendations and expectations?
- What resource connections can be made for these individuals and who can make them?

## How can we help?

# Technical Assistance 2018-2021

- Grant-funded assistance is available to service providers and juvenile probation departments in PA
- Can include:
  - Brain injury education and training
  - Consultation to develop brain injury protocols or resource connections for your organization
  - Screening
  - **Customized** to your organization's needs

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# Questions



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# Selected References

Farrer, T.J., Frost, R. B., & Hedges, D.W. (2013). Prevalence of traumatic brain injury in juvenile offenders: A meta-analysis. *Child Neuropsychology, 19*(3), 225-234.

Gordon, W. A., Spielman, L. A., Hahn-Ketter, A. E., & Sy, K. T. L. (2017). The relationship between traumatic brain injury and criminality in juvenile offenders. *Journal of Head Trauma Rehabilitation, 32*(6), 393-403.

Haarbauer-Krupa, J. K., Glang, A., Kurowski, B., & Breiding, M. J. (2018). Report to Congress: the management of traumatic brain injury in children.

Kaba, F., Diamond, P., Haque, A., MacDonald, R., & Venters, H. (2014). Traumatic brain injury among newly admitted adolescents in the New York City jail system. *Journal of Adolescent Health, 54*(5), 615-617.

Krasny-Pacini, A., Chevignard, M., Lancien, S., Escolano, S., Laurent-Vannier, A., De Agostini, M., & Meyer, P. (2017). Executive function after severe childhood traumatic brain injury—Age-at-injury vulnerability periods: The TGE prospective longitudinal study. *Annals of Physical and Rehabilitation Medicine, 60*(2), 74-82.

Saban, K. L., Hogan, T. P., DeFrino, D., Evans, C. T., Bauer, E. D., Pape, T. L. B., ... & Smith, B. M. (2013). Burnout and coping strategies of polytrauma team members caring for Veterans with traumatic brain injury. *Brain Injury, 27*(3), 301-309.

For further information



[www.biapa.org](http://www.biapa.org)



[www.health.pa.gov](http://www.health.pa.gov)

Toll Free Brain Injury Resource Line  
**1-800-444-6443**

PA Department of Health  
**1-717-772-2763**

