



# BRAIN INJURY IN JUVENILE JUSTICE:

Information and Implications for Professionals

# Packet

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

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

# ▶ What We Will Cover

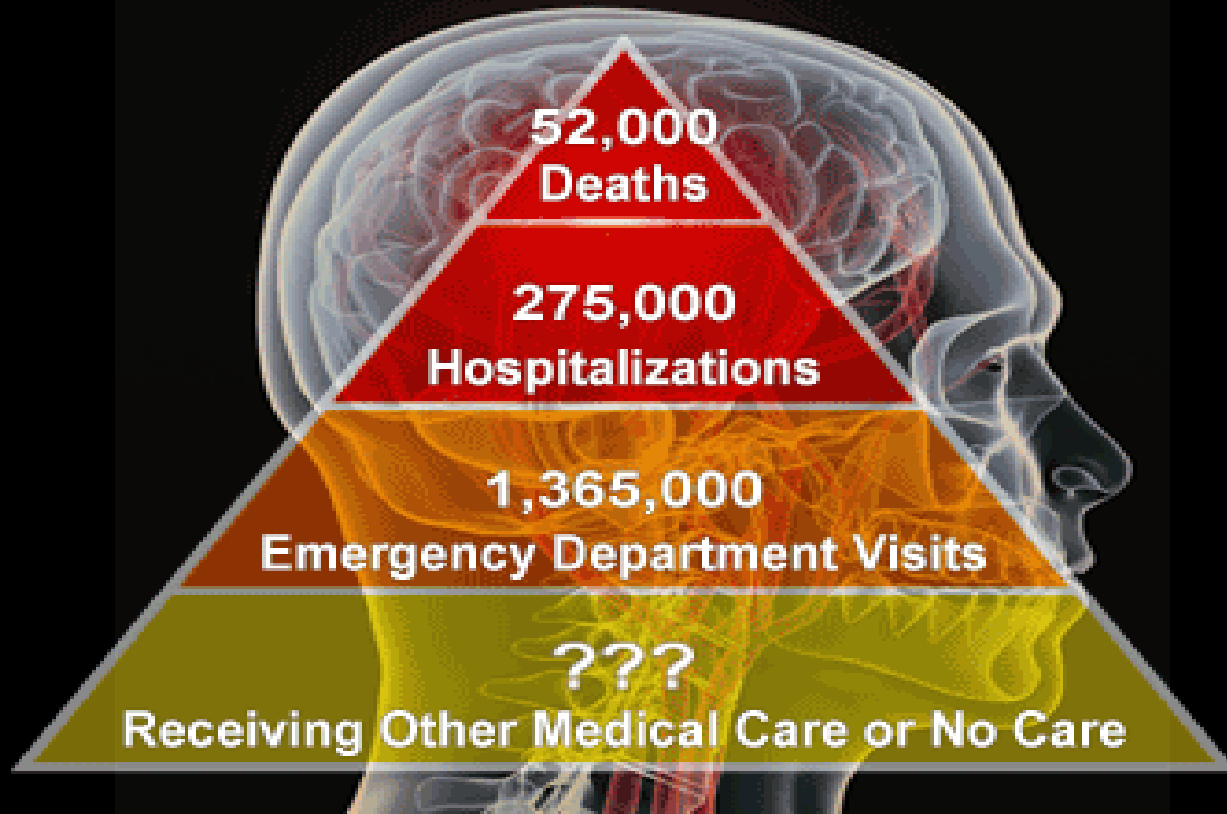
- Facts about brain injury
  - ▣ Definition, epidemiology, and effects
- Impact on youth offenders
- Findings from PA justice projects in PA
- Interventions
- Implications for practice

Funded by TBI State Implementation Partnership Grant SAP# 4100081563 from the U.S. Department of Health and Human Services, Administration for Community Living (ACL). Contents are the responsibility of the authors and do not necessarily represent the official view of ACL.



# How big is the problem?

## Estimated Average Annual Number of TBI in the United States, 2002–2006



# In 2013, there were:

**2.5 million**

emergency  
department visits  
related to TBI

**282,000**

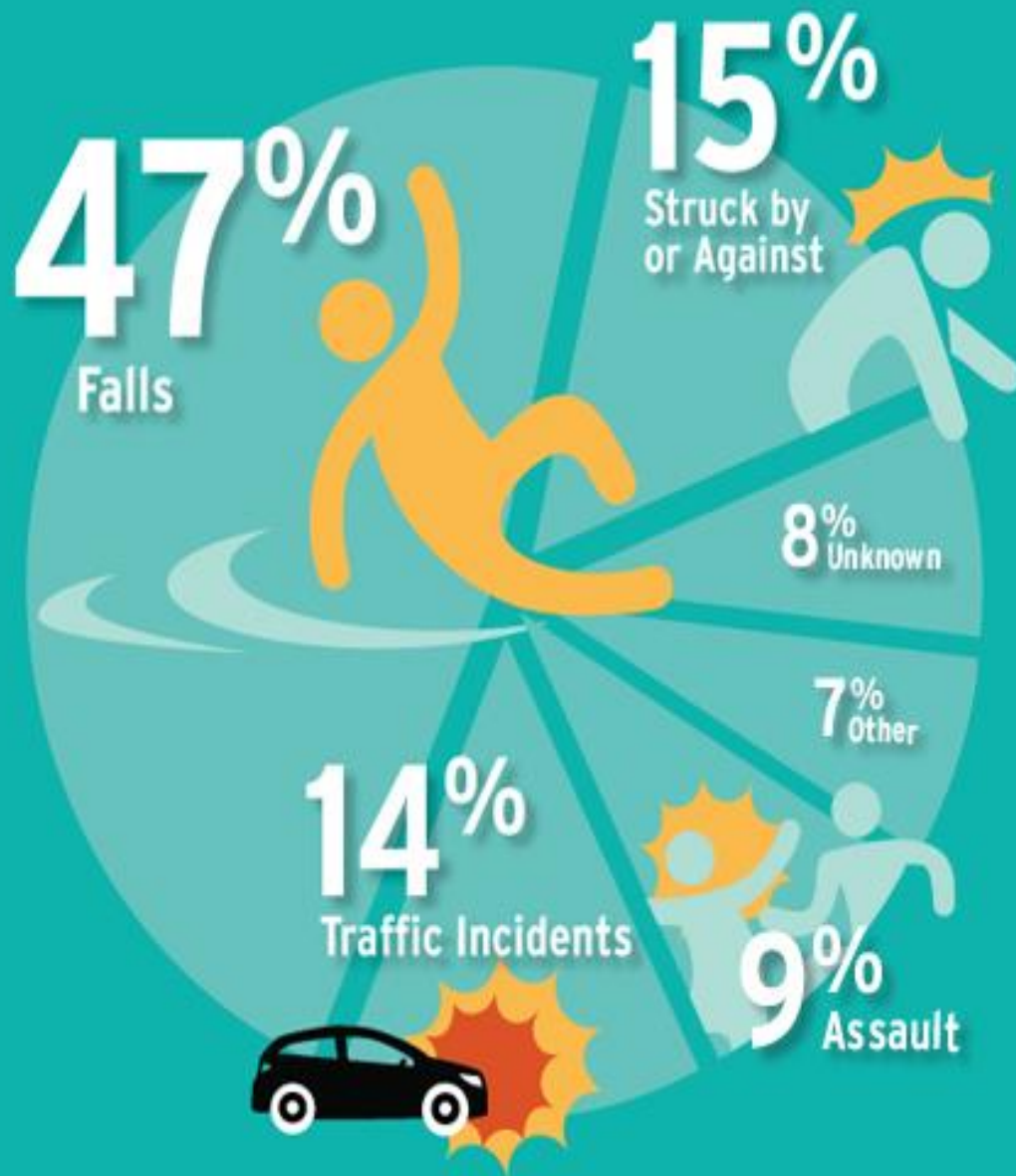
hospitalizations  
related to TBI

**56,000**

deaths  
related to TBI

# Leading Causes of Traumatic Brain Injury

in the United States (2013)

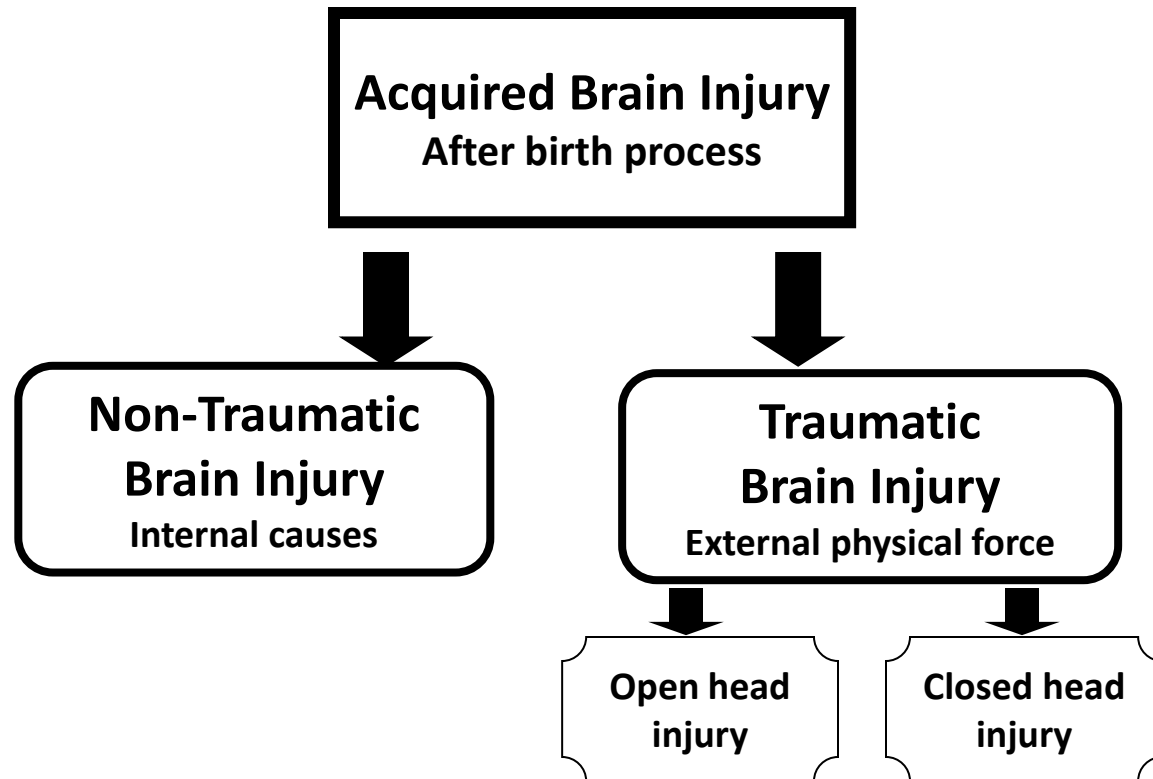




# Acquired Brain Injury



# 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 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

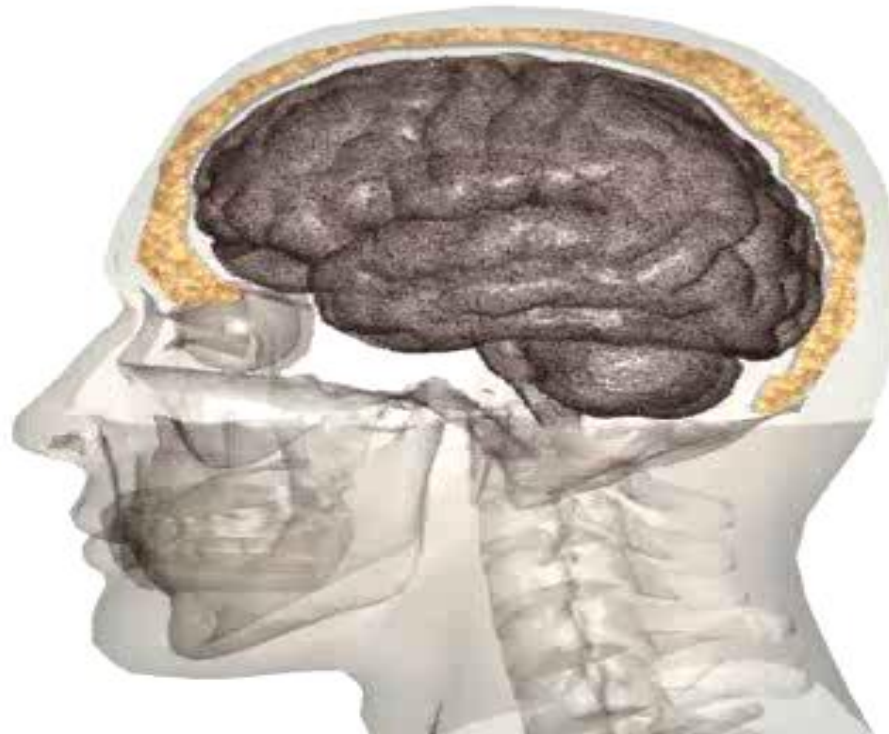


BRAIN INJURY  
ASSOCIATION  
OF PENNSYLVANIA



pennsylvania  
DEPARTMENT OF HEALTH

# ▶ Brain Hemorrhage

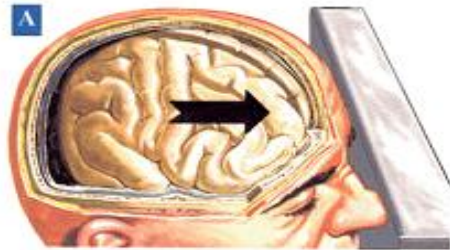


# Traumatic Brain Injury

- 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

# ▶ 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

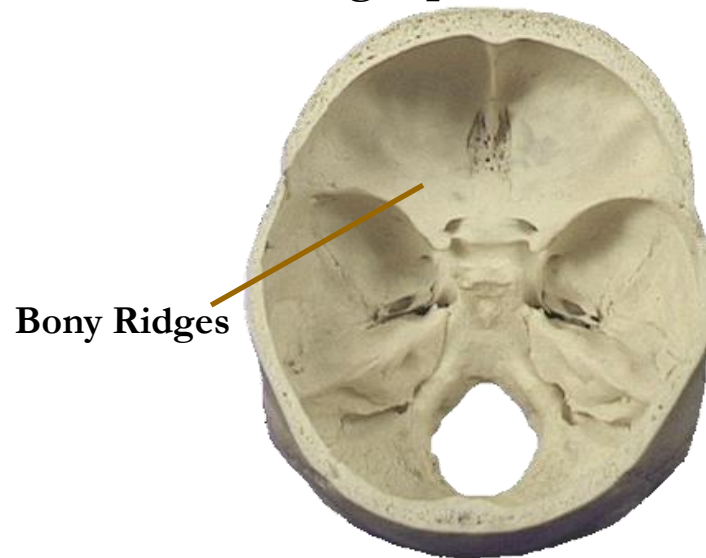
Dr. Mary Pepping of the University of Idaho's presentation *The Human Brain: Anatomy, Functions, and Injury*

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



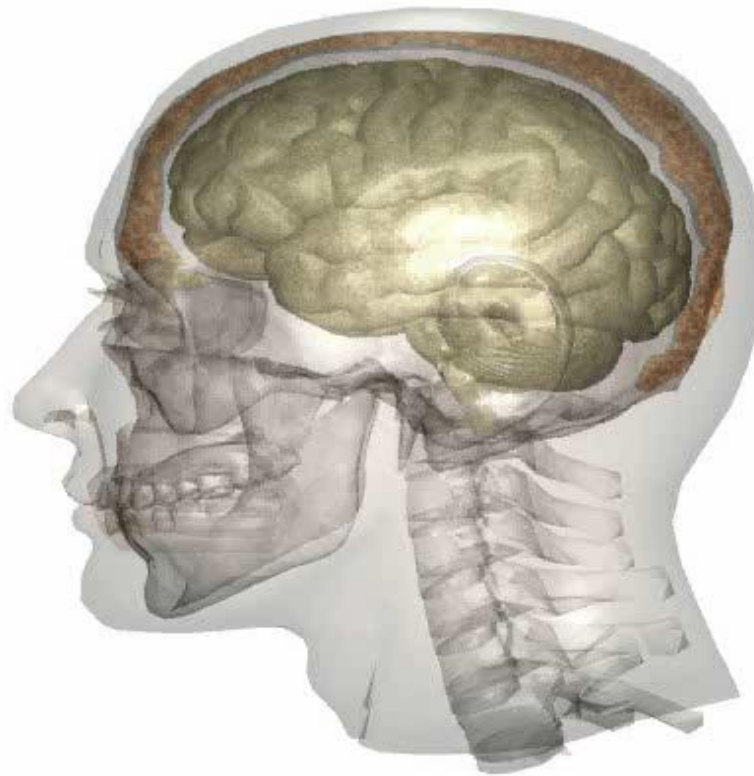
The base of the skull is rough, with many bony protuberances

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?



# ▶ Levels of Severity

## **Mild:**

- **Brief or no loss of consciousness**
- **Shows signs of concussion**
  - **Vomiting**
  - **Lethargy**
  - **Dizziness**
  - **Disorientation**

## **Moderate:**

- **Coma < 24 hours**
- **Focal findings on CT scan or EEG**
- **Neurological signs of brain trauma**
  - **Skull fracture with contusion**
  - **Hemorrhage**

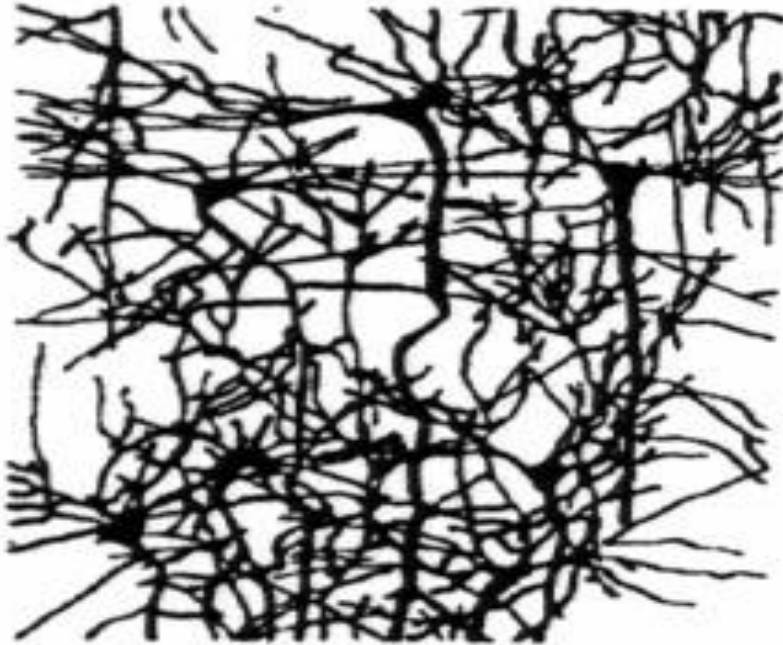
## **Severe:**

- **Coma > 24 hours**

# Effects of Trauma

Without Injury





With Injury



# ➤ And what about concussion?

- Incidence of diagnosed concussions among people under age 20 increased 71% between 2010 and 2015 among the general population
- Greatest increase among girls, up 119%
- Impact of a single concussion...

# What about Concussion? Signs and Symptoms

 <b>THINKING/ REMEMBERING</b>	 <b>PHYSICAL</b>	 <b>EMOTIONAL/ MOOD</b>	 <b>SLEEP DISTURBANCE</b>
<ul style="list-style-type: none"> <li>• Difficulty thinking clearly</li> <li>• Feeling slowed down</li> <li>• Difficulty concentrating</li> <li>• Difficulty remembering new information</li> </ul>	<ul style="list-style-type: none"> <li>• Headache</li> <li>• Nausea or vomiting (early on)</li> <li>• Balance problems</li> <li>• Dizziness</li> <li>• Fuzzy or blurry vision</li> <li>• Feeling tired, having no energy</li> <li>• Sensitivity to noise or light</li> </ul>	<ul style="list-style-type: none"> <li>• Irritability</li> <li>• Sadness</li> <li>• More emotional</li> <li>• Nervousness or anxiety</li> </ul>	<ul style="list-style-type: none"> <li>• Sleeping more than usual</li> <li>• Sleeping less than usual</li> <li>• Trouble falling asleep</li> </ul>

# Concussion Management

- Recognize and manage:
  - Remove from play and/or risky activities
  - Provide medical attention
  - Offer temporary accommodations
    - Bottom bunk status
    - Elevator use
    - Assistance in cafeteria
    - School relief
  - Monitor recovery by observing symptoms
  - Seek concussion specialty care if symptoms do not resolve within 4 weeks

## Key Recommendations from the CDC Pediatric mTBI Guideline:

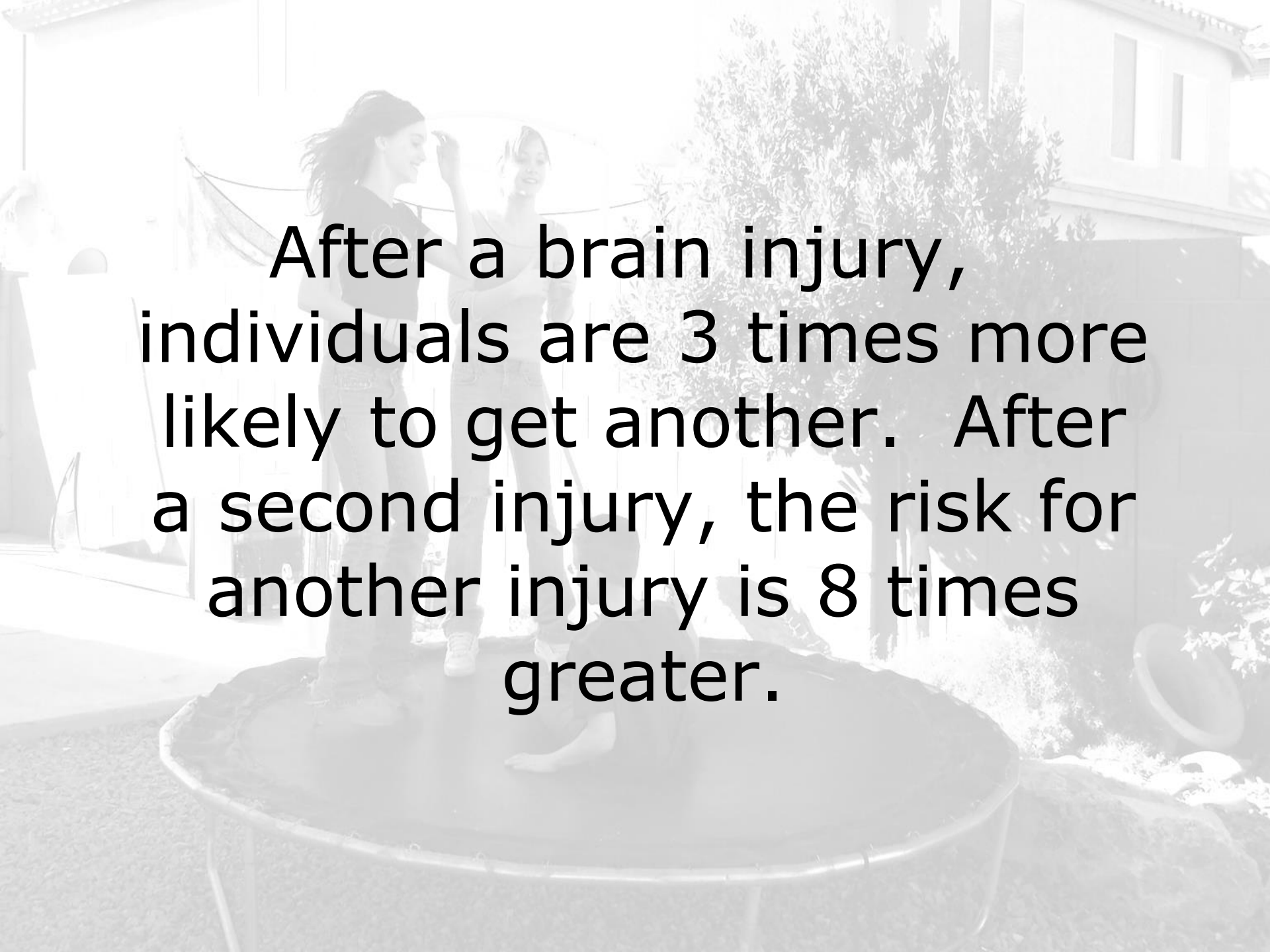
1. Do not routinely image patients to diagnose mTBI.
2. Use validated, age-appropriate symptom scales to diagnose mTBI.
3. Assess evidence-based risk factors for prolonged recovery.
4. Provide patients with instructions on return to activity customized to their symptoms.
5. Counsel patients to return gradually to non-sports activities after no more than 2-3 days of rest.



# A Single Concussion May Have Lasting Impact







After a brain injury, individuals are 3 times more likely to get another. After a second injury, the risk for another injury is 8 times greater.

# 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 rec injuries



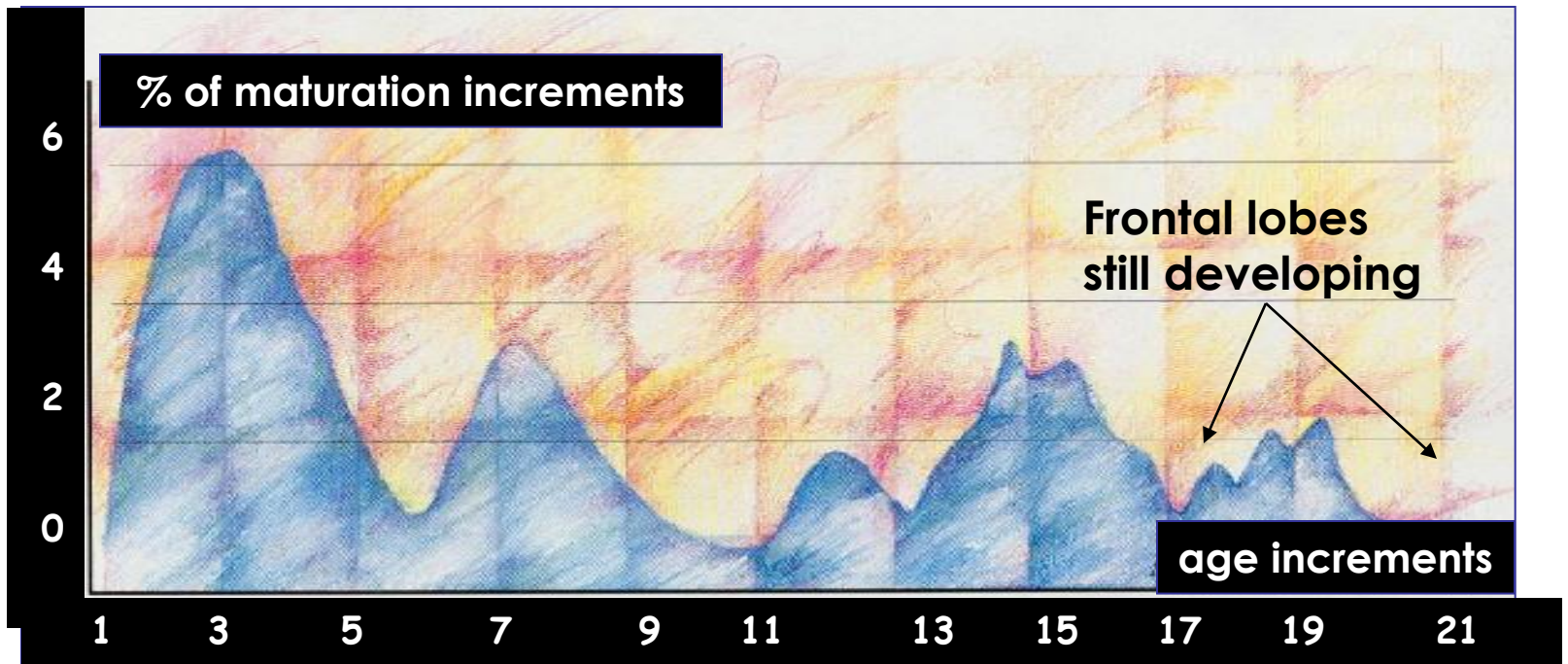
# ▶ A Child's Brain

- 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



# Rates of Development

## 5 Peak Maturation Periods



**Peak Maturation Periods**  
**FIVE distinct stages between the ages of 1 and 21 yrs.**

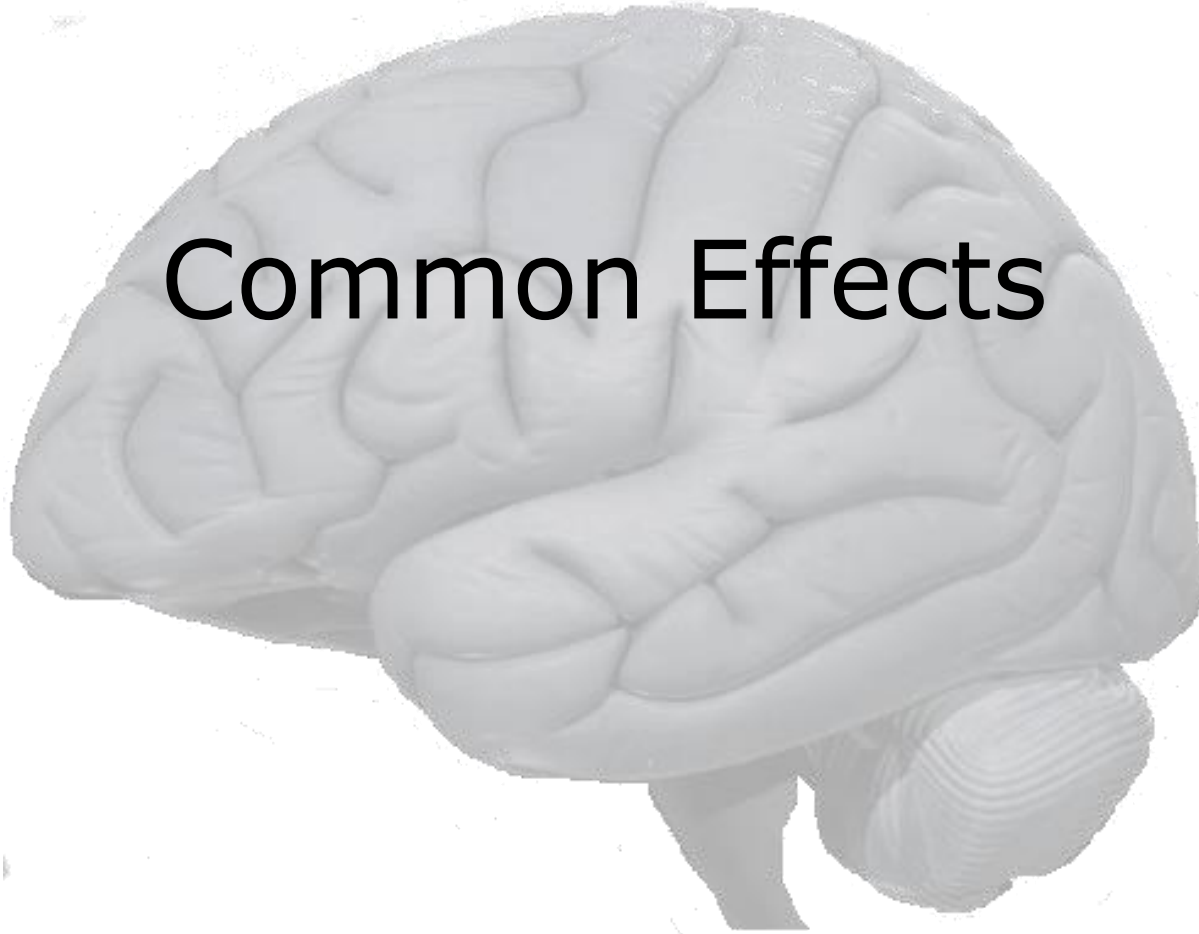
## Pediatric brain injury is associated with:

- Lower educational attainment
- Increased rates of substance misuse
- Less sophisticated interpersonal skills
- Increased risk for psychopathology
- Lower levels of pro-social behavior
- Increased rates of aggression

(Bellesi et al., 2019; Sariaslan et al., 2016; McKinlay et al., 2014; Bloom et al., 2001; Schachar et al., 2004; Ganesalingam et al., 2007; Gerring et al., 2009; Cole et al., 2008; Stoddard et al., 2011)

# ▶ Brain Injury

## Common Effects





# Brain Behavior Relationships

## Parietal Lobe

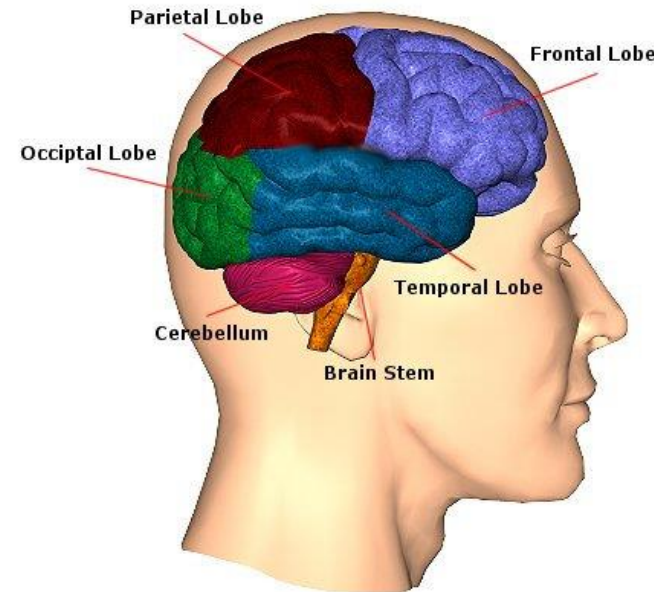
- Sense of touch
- Differentiation:  
size, shape, color
- Spatial perception
- Visual perception

## 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
- 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

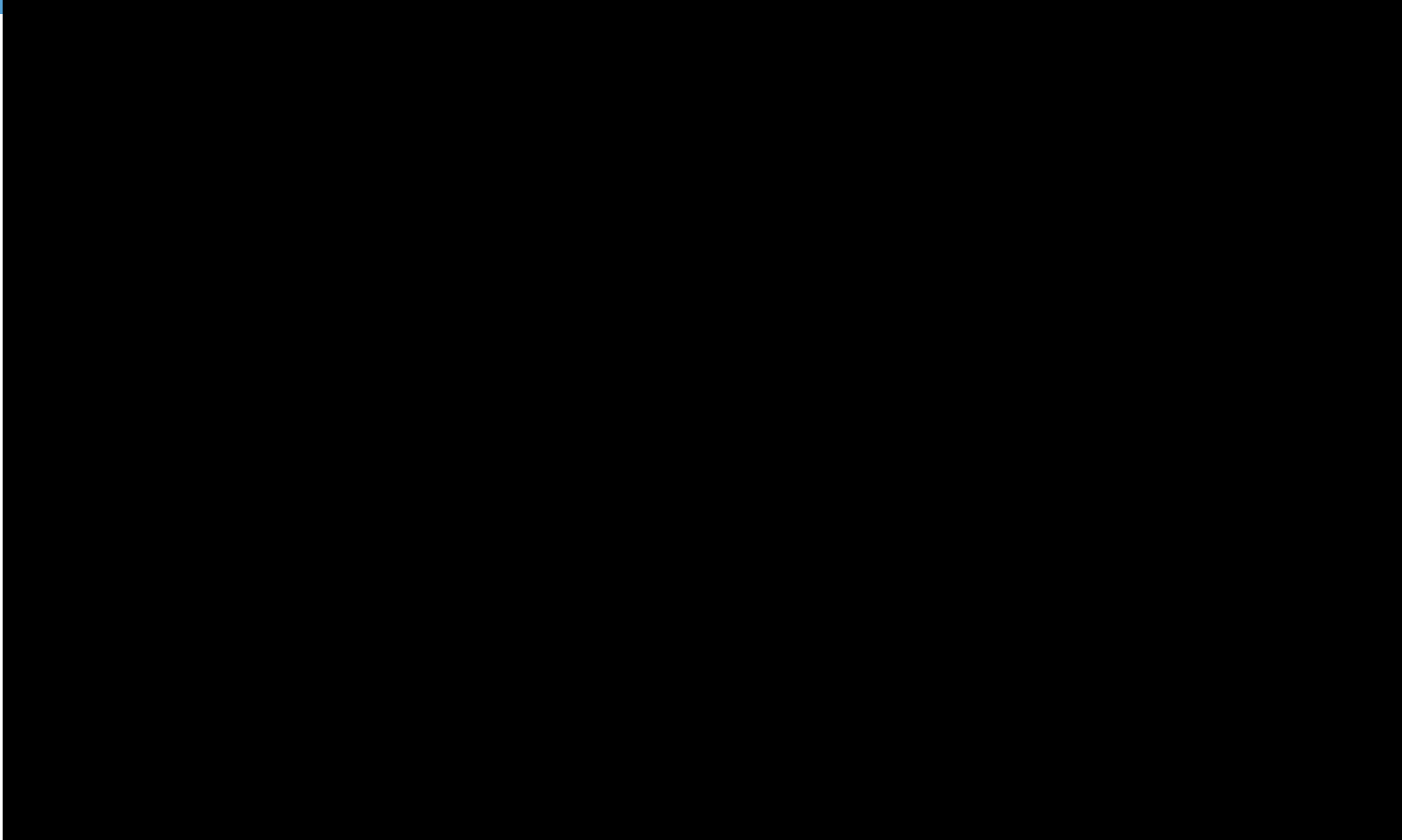
*The brain is responsible for getting information in and ready to use...*

- 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
- 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 after the brain is injured
  - 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





# 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
- 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



# 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





*"Don't cut your nose off to spite your face"*

# 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





# ➤ These problems can result in:

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



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

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

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

# 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)

# Brain injuries in justice involved youth are often undiagnosed...





# ▶ Undiagnosed Scenario



# A young man in his mid-twenties...

...hospitalized in a mental health unit, was admitted with the following complaint, "There is something wrong with my head and I can't keep a job." During a clinical interview, he revealed that his had been physically abusive and he was subsequently hospitalized for broken bones as a child. When he was school age, he was hit by a car, resulting in hospitalization for multiple injuries. He was placed in Special Education, as he had trouble learning and controlling his behavior in class. As a teen, he began using multiple drugs as well as alcohol. While still a teen, he was involved in another incident, resulting in hospitalization for several days. Thereafter, his ability to concentrate, remember, and control his temper became even worse.

After high school, he enlisted in the National Guard and served in Iraq for several months. He was injured in an attack, later describing this experience as 'severe PTSD'. Once he was back in the states, he could not keep a job. His use of drugs and alcohol escalated and he was jailed for various offenses. He had nowhere to sleep except his car. A mental health crisis resulted in hospitalization. The clinician recognized the likelihood of traumatic brain injury (TBI). Neuropsychological testing revealed to the multidisciplinary treatment team problems with his multiple conditions.

This young man was indeed a case of "Unidentified TBI". Once brain injury was identified as a contributing factor, he was linked to appropriate services and supports and was able to get supported employment and move along with his life.



# ▶ Undiagnosed Brain Injuries

- Brain Injury is often referred to as the “hidden disability”
- Individuals may
  - Drop out of school
  - Start misusing substances
  - Fail at relationships
  - Be unable to obtain or maintain employment
  - End up in Mental Health System
  - Become victims
  - Become homeless
  - Get into trouble with the law



# ABI puts people at risk for justice involvement

- Decreased cognitive skills
- Poor impulse control, emotional dysregulation
- Decreased academic engagement
- Susceptibility to negative peer influence
- Poor insight
- Limited ability to self-monitor or evaluate self



# Interpretation of ABI in Criminal Justice Settings

Effects of brain injury can appear to be lack of cooperation or disrespect:

- Failure to respond quickly to directives
- Inability to initiate requests for assistance
- Difficulty remembering prior discussions
- Inconsistent attention
- Difficulty following directions
- Difficulty learning routines
- Difficulty expressing needs
- Impulsivity and dyscontrol

# Characteristics of Brain Injury: How they may look in justice settings

Characteristic	Behavior
Poor cognitive skills including memory and organization	Can't recall information or retell stories consistently; Misses appointments; Decreased academic engagement
Slowed processing and poor attention	Responds slowly to directives; Appears distracted or disinterested; Does not participate effectively in group treatment
Poor problem-solving/reasoning and judgment	Doesn't anticipate consequences of actions; Susceptible to negative influence; Can't generate alternative solutions
Poor initiation	Has trouble getting started – chores, homework, etc.; Doesn't ask for help
Limited ability to self-monitor or evaluate	Doesn't see self as others do; Has trouble setting realistic goals; Does not see mistakes or ask for help
Emotional dysregulation and/or anxiety and depression	Over-reacts emotionally; Tends to feel nervous or depressed; Sleep issues

# ▶ What else could it be?





# 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

# Project Elements

- Formal Screening
- Neurocognitive Testing
  - Brief neurocognitive assessment battery
- Brain Injury Education and Counseling
- Education and Support for Related Systems
- NeuroResource Facilitation

# Screening

- 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
- OSU-TBI Identification Method
- Certain episode characteristics are associated with a greater likelihood of long-lasting effects

**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?

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**  
Interviewer instructions: Identify a history of repeated injuries to complete the chart.

Cause of repeated injury	Typical duration of repeated injury	
	Does not involve LOC	Does involve LOC

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

Have you ever had a repeated injury (e.g. history of abuse)?  
If yes, what was it?  
If no, were you dazed or did you have a gap in your memory from the injury?  
What was the most you had an impact?  
How old were you when it ended?



# ▶ Neurocognitive Assessment

- Focused on Memory and Executive Functioning
- Compared an individual's performance to a sample of peers (same age, gender, education)
- Determined if individual is likely to have difficulty in school, work, and independent living
- Offered a cognitive profile of strengths and barriers which might impact RISK and RESPONSIVITY
- Suggested possible resource connections and interventions

# ▶ NeuroResource Facilitation

- Assist individuals with brain injury to:
  - Understand and navigate programs that support persons with disabilities
  - Find and apply for the most relevant programs and services to meet their needs and attain their goals
  - Problem-solve any barriers that may arise
- Connect to brain injury programs and services
- Goes beyond making referrals-- NRF continues throughout the process until services are in place

# Summary of Findings: Adult Corrections

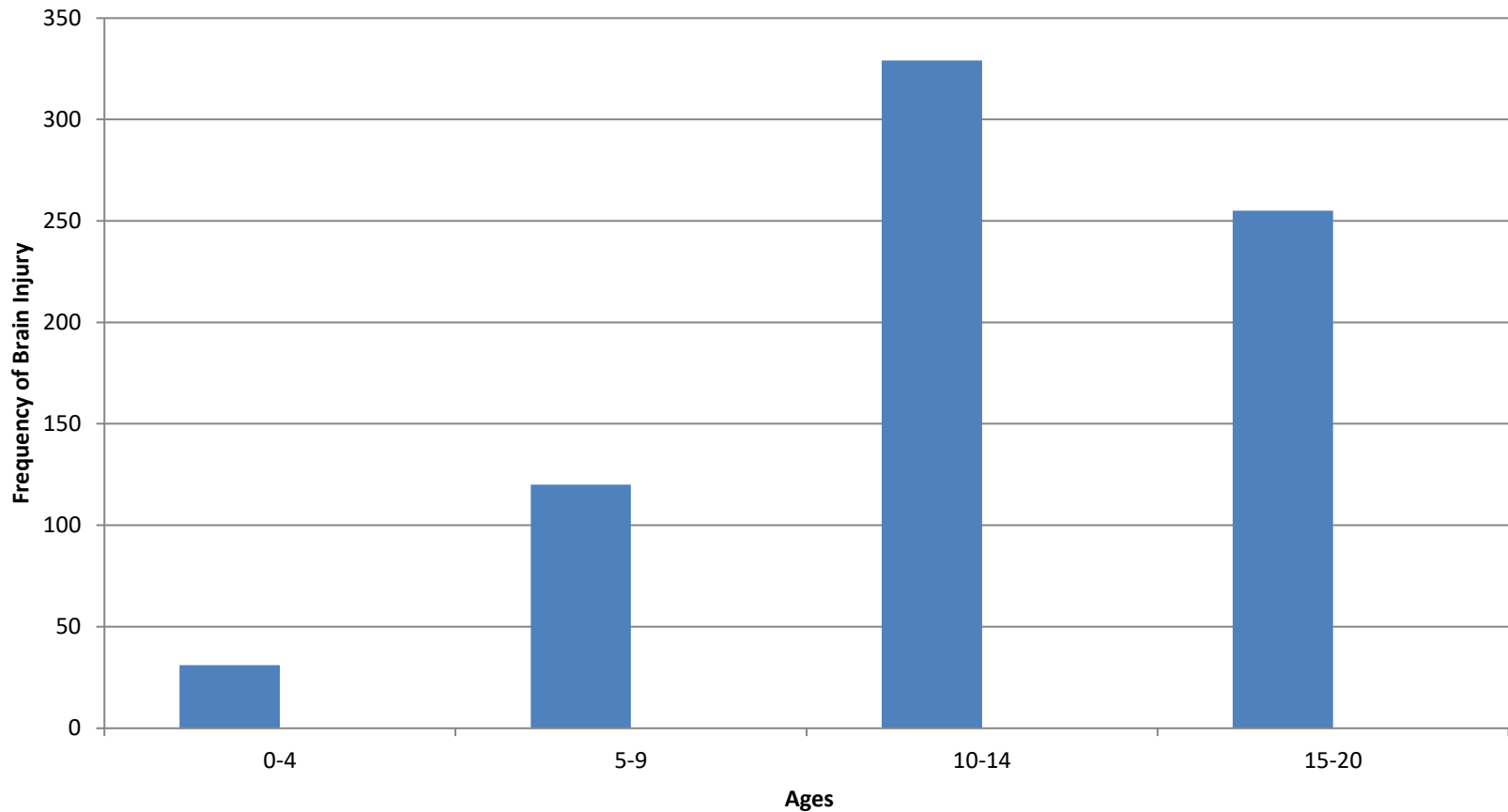
PA 2013-2015	N=164
Screened Positive Events that could have caused a Brain Injury	<b>75.95%</b>
Average Number of Events per Individual	4.1
Percentage of Events that Occurred before age 21	75%
Showed Evidence of Neurocognitive Impairments on Standardized Testing	71.59%

# JUVENILE Summary of Data

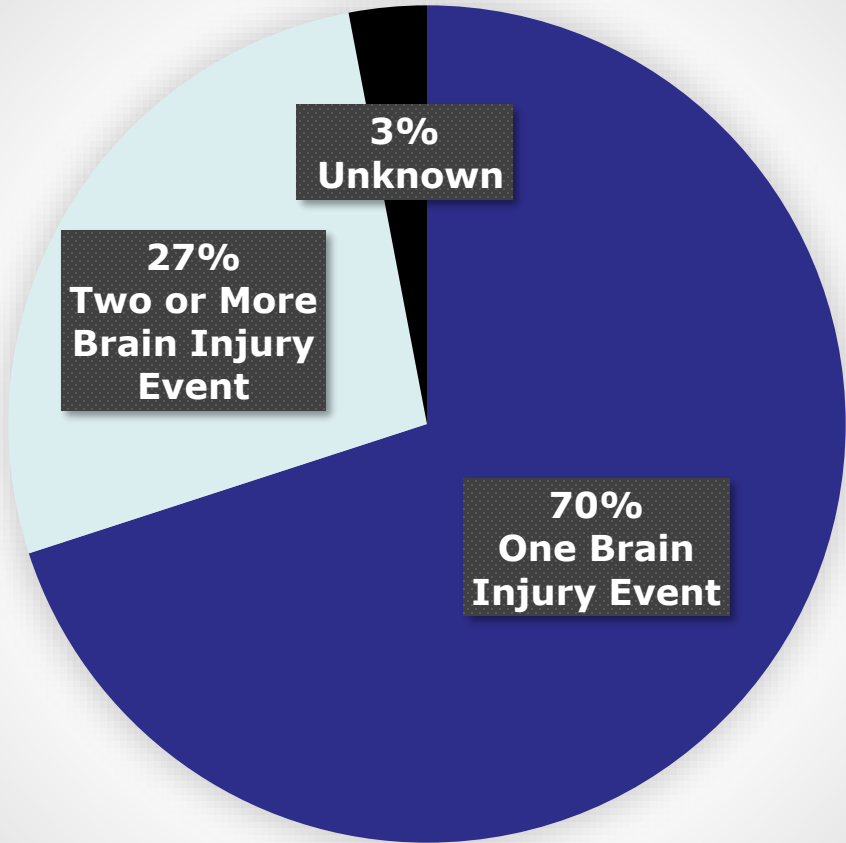
Screened for Brain Injury	485
Screened Positive for an Event that could have caused a Brain Injury	235 <b>(48.5%)</b>
Average Number of Episodes per Youth	3
Administered NeuroCognitive Testing	146
Showed Evidence of Impairments	83 (56.8%)

# Age at Time of Injury

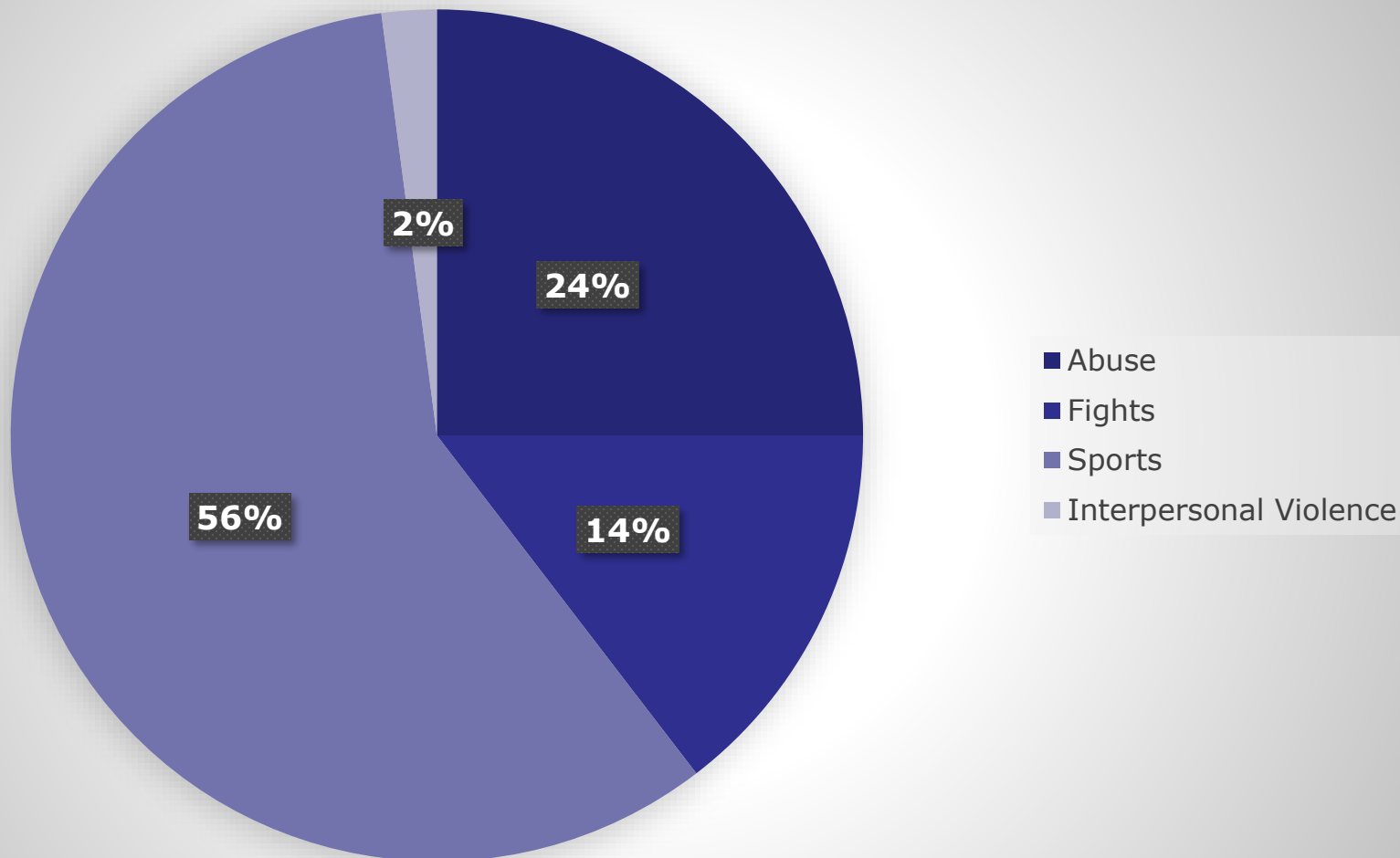
## Age at Time of Brain Injury



# 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%)



# 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

## Impact on responsiveness and treatment success

- May not benefit from experience or remember from one session to the next
- Intention and behavior may be disconnected
- May not fit well with others and have trouble perceiving, understanding, and conforming to norms
- Difficulties in communication and learning style make didactic training and treatment groups difficult
- Problems with regulation of thoughts, feelings and behavior may impact participation and ability to benefit from many forms of education and treatment

# ▶ In treatment groups and school...

- 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 unprepared

- May do poorly on tests
- May not have an accurate sense of how well or poorly one is doing
- May not recognize the need to ask for assistance
- May have difficulty tolerating long sessions (many groups are 2 hours in length)

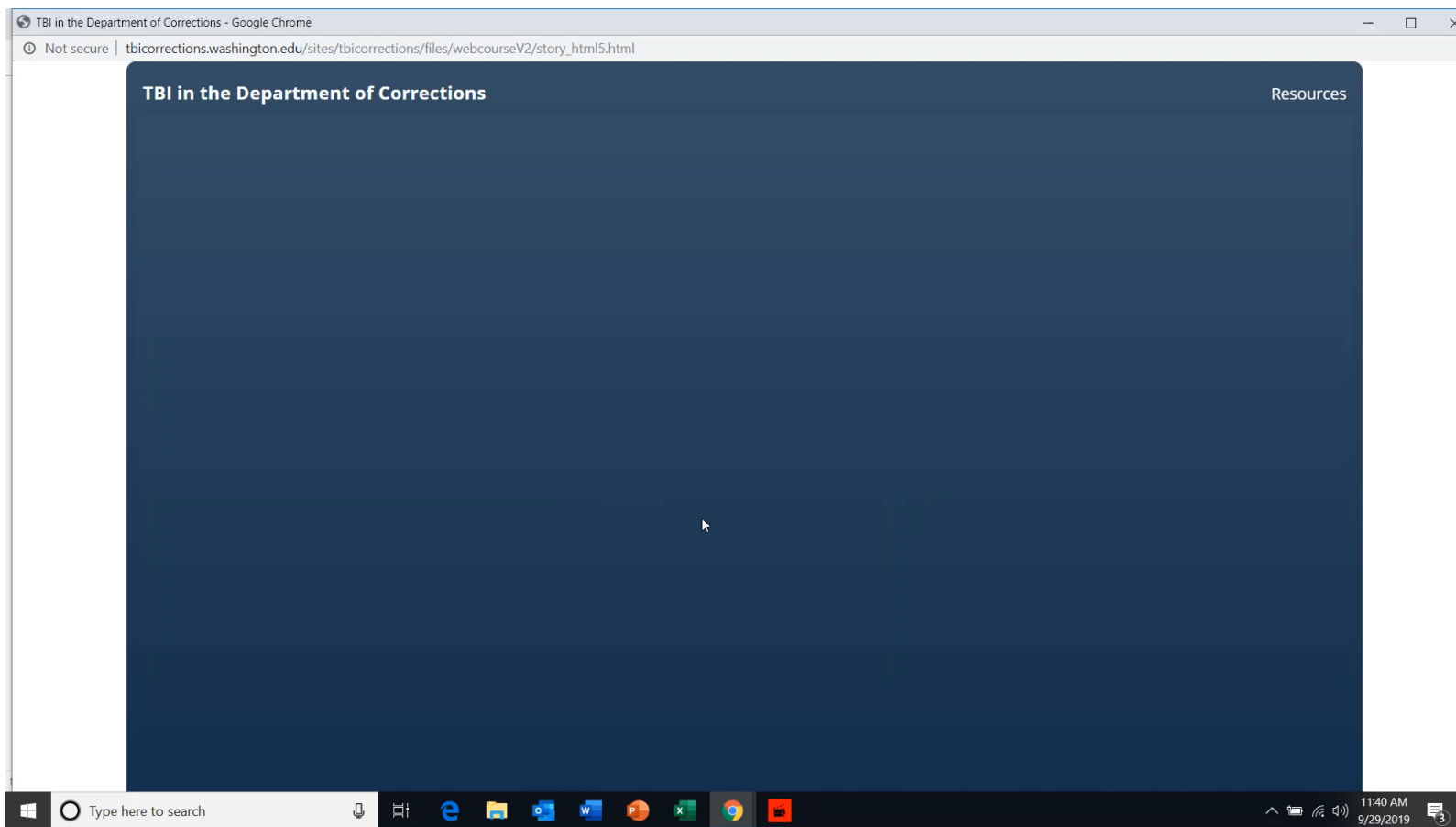


# Universal Approaches for Interactions

- 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?**

# What helps? Advice from Corrections staff





# Other things that may help

- Prepare
- Assist with organization
- Assist with Reminders
- Check on Understanding
- ADJUST expectations

# Resources Available



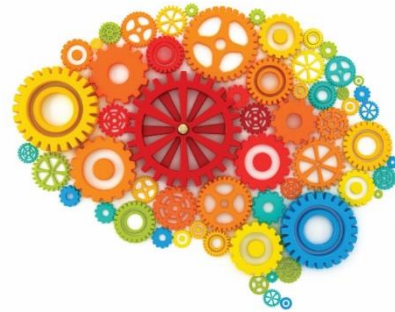
# ▶ Brain Injury Resource Line (BIRL)

- Operated by BIAA
- Number to call if looking for resources
- Anyone can call
- Not a crisis line, but a place to learn about resources and how to access them

**1-800-444-6443**



# School Re-entry



**BrainSTEPS**  
Strategies Teaching Educators, Parents, & Students  
A BRAIN INJURY SCHOOL RE-ENTRY CONSULTING PROGRAM

- Available in all counties in PA
- Operated through the Intermediate Units
- Referrals can be made online at [www.brainsteps.net](http://www.brainsteps.net)
- For alternative schools, referrals ultimately must be initiated by the HOME SCHOOL DISTRICT to the IU

# “NFRP”

- NeuroResource Facilitator Program
- Offered through a grant to the PA Department of Health
- Provides 1:1 assistance, free of charge, to individuals with brain injury to identify, apply, and connect to appropriate resources
- Call 866-412-4755 or go to:
- <http://neuroresource.health.pa.gov/>

# Other Brain Injury Resources

- PA Head Injury Program
  - ▣ Provides for \$100,000 or 1 year of services if qualified
  - ▣ Services can be provided in home, community, or in a facility
  - ▣ To apply: **1-866-412-4755**

# ▶ Medicaid Waivers--PA

- Provide funding for home and community-based services to qualified individuals
- Must be 18 years or older
- Must be determined to require care, if not provided, would make them at risk for institutionalization
- Application process is lengthy and requires at least 3 in-person meetings
- To apply: 1-877-550-4227

# Vocational Rehabilitation

- Federally-mandated state agency
- Helps people with disabilities get back to work
- Early Reach efforts help youth aged 14-21
  - PA: Office of Vocational Rehabilitation
  - Work with liaison or county district to apply prior to discharge





# Other Resources

Brain Injury Support Groups

[www.biapa.org/support\\_groups](http://www.biapa.org/support_groups)

Disabilities Rights of PA (DRP)

<https://www.disabilityrights.org/>

PA Health Law Project

<https://www.phlp.org/>

# Information on Brain Injury



- [www.brainline.org](http://www.brainline.org)
- <https://www.cdc.gov/traumaticbraininjury/>
- <http://www.biausa.org/>
- <http://www.msktc.org/tbi/factsheets>

# Questions



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**

