



NORTH DAKOTA  
BRAIN INJURY  
NETWORK

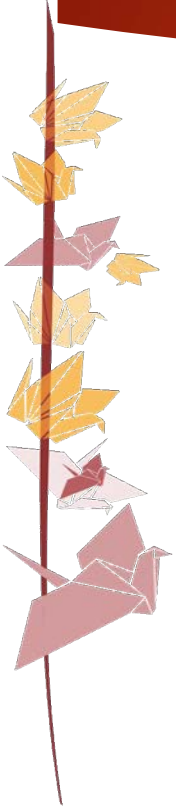
# Brain Injury 101

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*Help for Today,  
Hope for Tomorrow.*



# Brain Injury Defined

## Acquired Brain Injury (ABI)

Traumatic  
Brain Injury (TBI)

External Events: assault,  
fall, blast injury, motor  
vehicle crash

Non-Traumatic  
Brain Injury

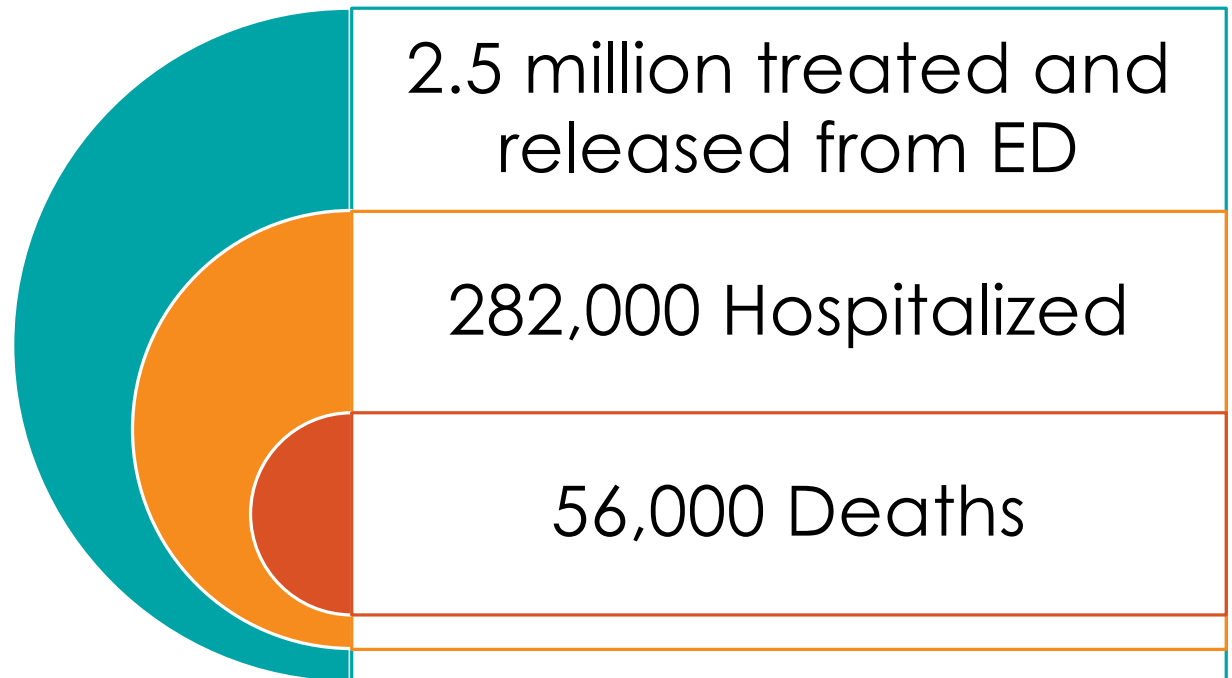
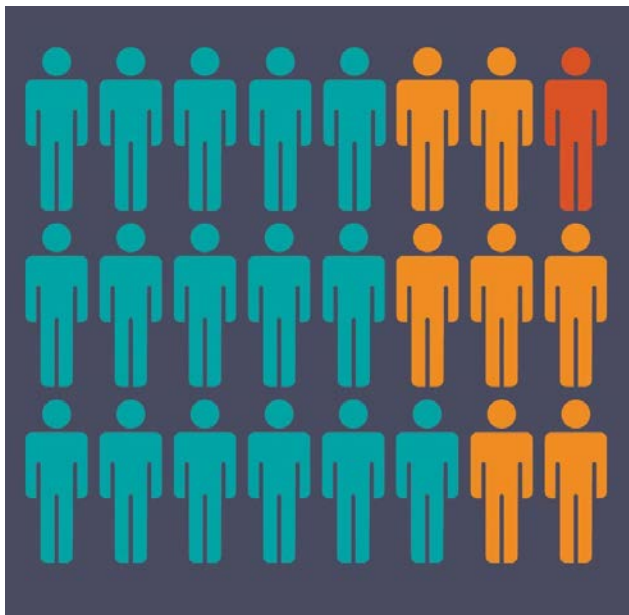
Internal Events: stroke,  
tumor, anoxia,  
aneurysm, infection

### North Dakota's Definition

***"Brain injury means damage to the brain or the coverings of the brain which produces an altered mental state and results in a decrease in cognitive, behavioral, emotional, or physical functioning. The term does not include an insult of a degenerative or congenital nature."***

NDCC 50-06.4

# 2.8 Million TBIs nationally a year



# North Dakota Numbers

- ▶ Each year in North Dakota an estimated 5,500 individuals sustain traumatic brain injuries (TBI).
- ▶ More than 14,400 (or 2.5%) of North Dakota adults reported they had been told at one time they'd had a stroke, according to the 2015 North Dakota Behavioral Risk Factor Surveillance System.
- ▶ More than **13,000** North Dakotans are currently living with a long-term disability from brain injury.

# TBI Severity Continuum

## Mild

- 75-90% cases
- Loss of Consciousness less 30min
- Up to 15% have long term impairments

## Moderate

- 10-30% cases
- Loss of Consciousness between 30min-24hrs
- Up to 30-50% have long term impairments

## Severe

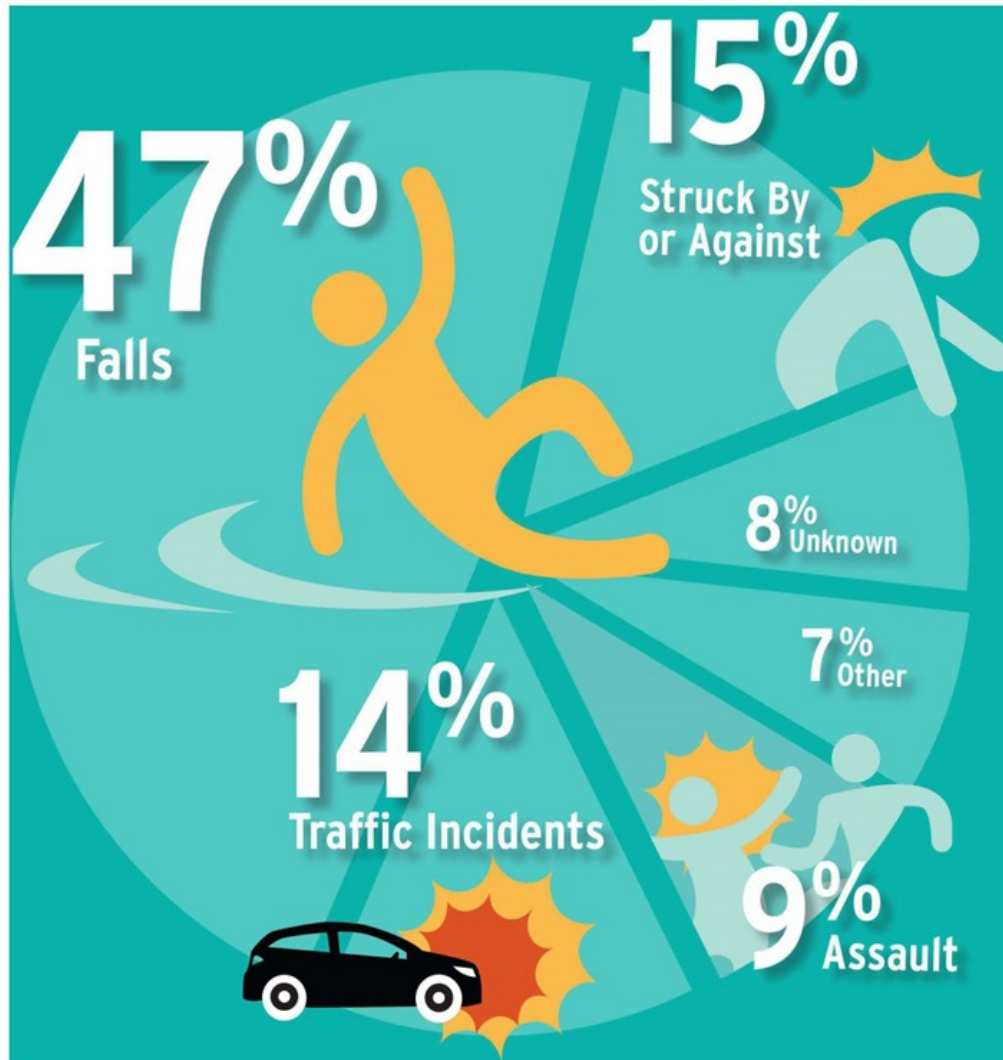
- 5-10% cases
- Loss of Consciousness greater 24hrs
- Up to 80% have long term impairments

# Brain injuries are like earthquakes.



- ▶ In a major quake, a severe brain injury involving fractures, hemorrhages or penetrating wounds — bridges go down and buildings collapse. The city is devastated.
- ▶ But mild brain injuries are smaller quakes: Books fall off shelves; vases are broken. It's harder to survey the damage and easy to miss what's broken, but something is clearly wrong.

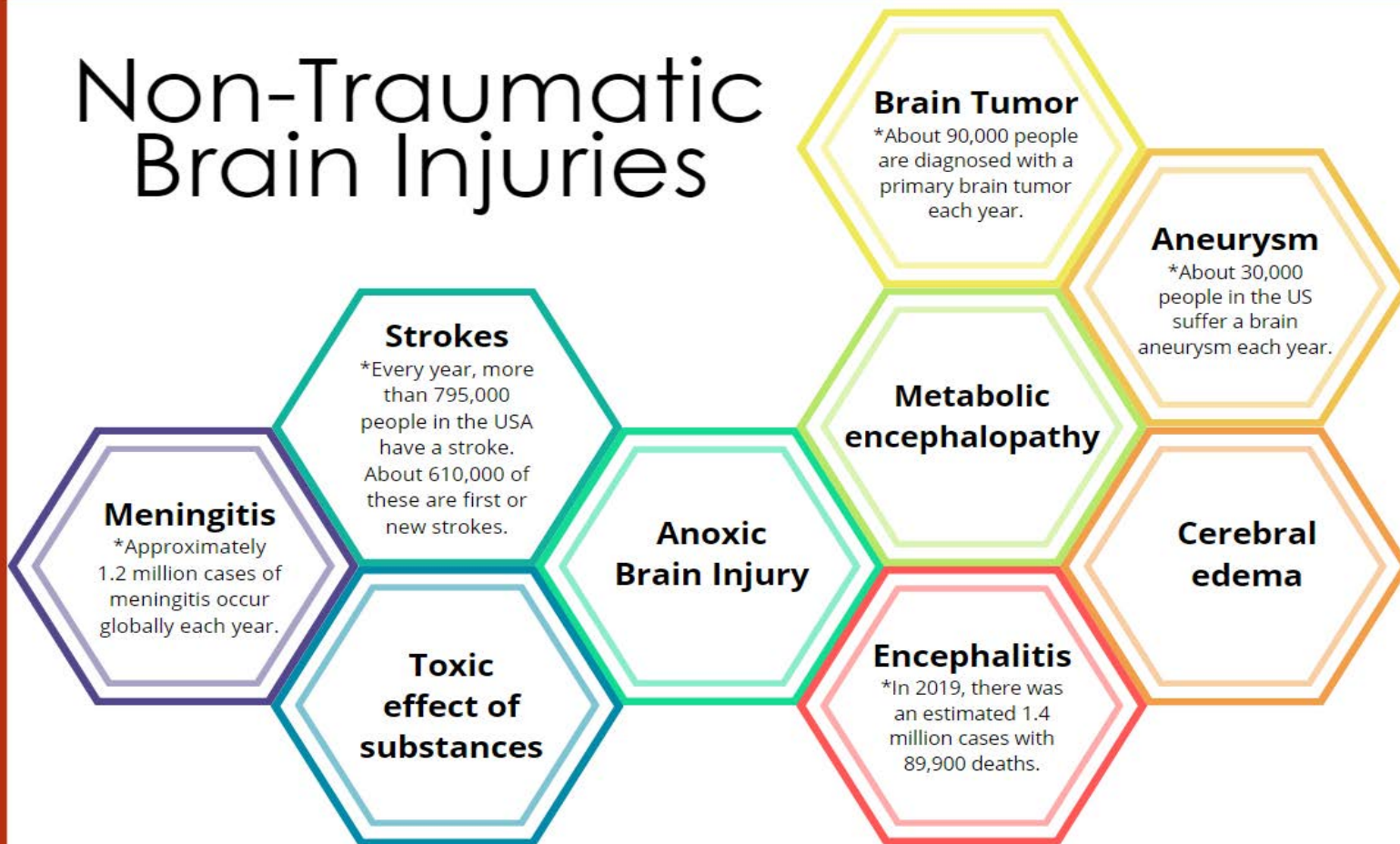




Leading Causes of TBI for General Population



# Non-Traumatic Brain Injuries





# Possible Impairments after a Brain Injury

## Physical

- Motor coordination
- Hearing and visual loss
- Spasticity and tremors
- Fatigue and/or weakness
- Loss of taste and smell
- Balance
- Mobility
- Speech
- Seizures
- Headaches or migraines
- Pain
- Changes in sleep patterns

## Cognitive

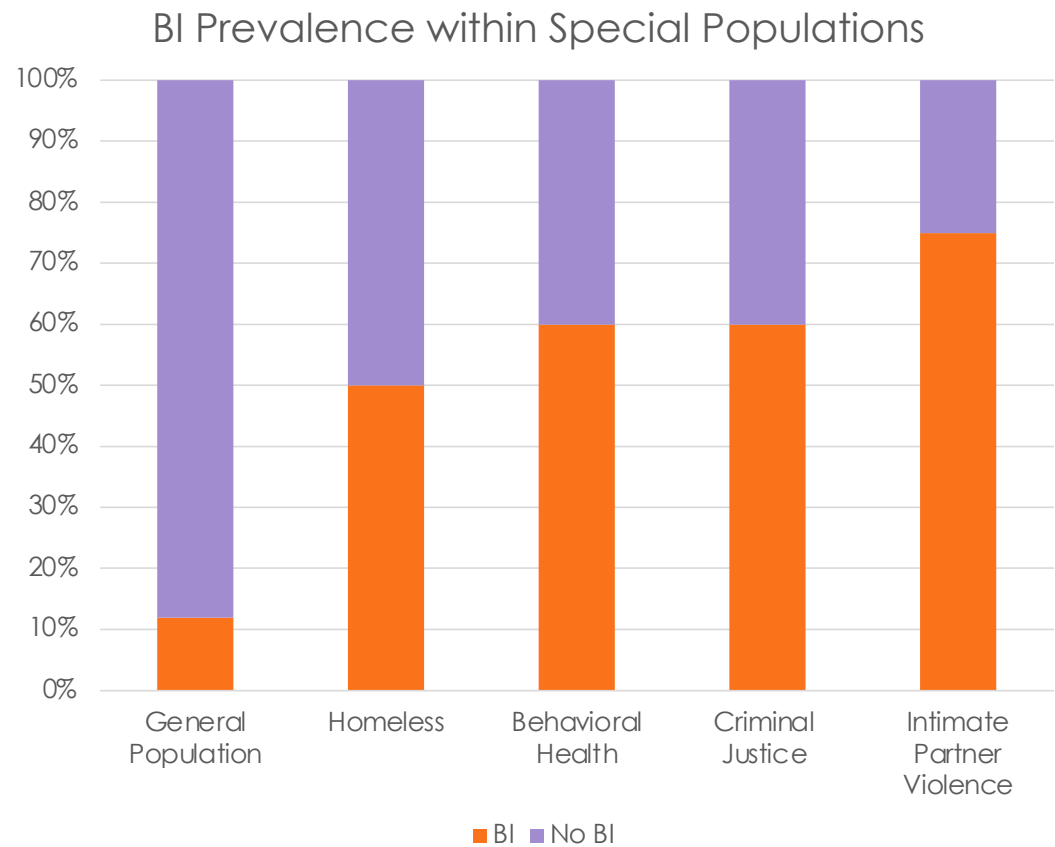
- Memory loss
- Difficulty with decision-making, planning, sequencing
- Impaired judgment
- Slowed ability to process/think
- Problem-solving difficulties
- Organizational problems
- Impaired perception of self, others
- Inability to complete task without reminders
- Trouble concentrating

## Emotional/ Behavioral

- Depression
- Mood swings
- Problems with emotional control; impulsive behavior
- Inappropriate behavior
- Inability to inhibit remarks
- Lack of response to social cues
- Problems with initiation
- Reduced self-esteem
- Difficulty relating to others
- Difficulty maintaining or forming relationships
- Increased anxiety and frustration

## Health Disparities

- ▶ Screening programs have shown that brain injuries hide in plain sight
- ▶ Particularly in high-risk populations



# Brain Injury and Homelessness

## GENERAL POPULATION

12% with a history of brain injury

FALLS is the #1 cause of injury

## HOMELESS

50% with a history of brain injury

ASSAULT is the #1 cause of injury

**90% of individuals with an injury report that their first injury was sustained prior to becoming homeless**

**Individuals with a history of brain injury who also experience homelessness tend to struggle with the:**

- Physical and mental health
- Substance use
- Suicidal ideation or attempts
- Memory
- Involvement in the criminal justice system



## CITATIONS



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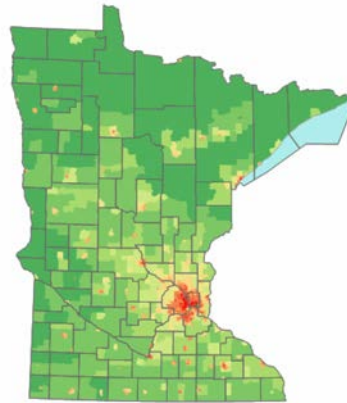
# Individuals Experiencing Homelessness

- ▶ People who experience homelessness are 2 to 4 times more likely to have a history of any type of TBI
- ▶ 10 times more likely to have a history of a moderate or severe TBI
- ▶ Majority 1<sup>st</sup> injury prior to experiencing homelessness

# Young Injuries

- ▶ Majority of injuries across studies occurred **prior to 1<sup>st</sup> criminal activity**
- ▶ McKinlay et al. (2013) looked at relationship between individuals who experienced a TBI during childhood and adult offending behavior?
  - ▶ Individuals who experienced childhood TBI were more likely, as adults, to have an offending history
  - ▶ Relationship of TBI to offense was stronger the more severe the injury

# Minnesota study<sup>3</sup>

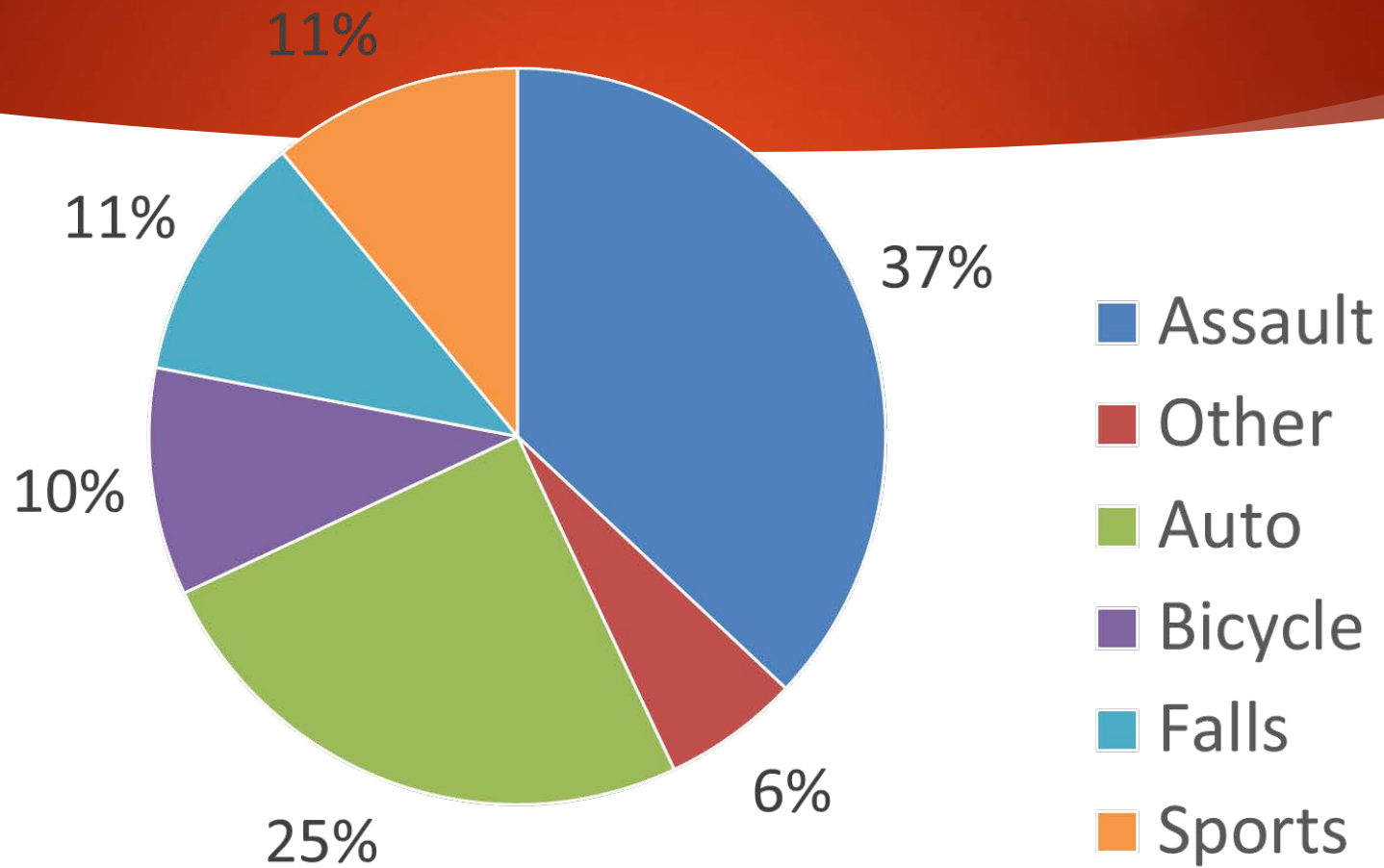


Out of 998 inmates

- ▶ 83% of Males
- ▶ 90% of 100 Females
- ▶ And 98% of 50 Juvenile males

reported having had one or more head injuries during their lifetime

# Causes of TBI among Male Inmates<sup>2</sup>





# Colorado Study<sup>4</sup>

Total number of screens: 4,164

Total percentage of adults with positive screens: 54%

Total percentage of juveniles with positive screens: 18%

Of those screened, 73% Total number of had current, positive neuropsychological impairment

# Colorado Co-Occurring<sup>4</sup>

## Childhood Violence

- 60% cohort
- 10% general population

## Adult Victimization

- 62% cohort
- 2% general population

## Suicide Attempts

- 39% at least one attempt cohort
- 4% thoughts, 1% plan in general population

## School suspension

- 54% cohort
- 26% men; 15% women general population

## Substance Abuse

- 93% history of abuse / misuse cohort
- 7% general population

## Mental Health

- 75% at least one diagnosis in cohort
- 19% general population

# Women

- ▶ London Study-64%<sup>5</sup>
- ▶ New Zealand-94%<sup>6</sup>
- ▶ Women involved with the criminal justice system convicted of a **violent crime** are more likely to have sustained a **pre-crime TBI** and/or some other form of **physical abuse**.

# Impact on correctional services

- ▶ Lower treatment completion rates and higher rates of disciplinary incidents
- ▶ Higher rates of recidivism (17% higher than a 'low TBI' group)

# Impact on correctional services

- ▶ Higher levels of alcohol and drug use preceding their current incarceration
- ▶ More prior incarcerations
- ▶ Increased utilization of services while incarcerated (health and psychological)
- ▶ Lower ability to maintain rule-abiding behavior during incarceration

## North Dakota Brain Injury Network

### Brain Injury and Criminal Justice

Brain injuries are often known as a "silent epidemic" because symptoms are not always immediately evident. Brain injury can cause many ongoing impairments that can create barriers and cause difficulty with overcoming incarceration and maintaining life in the community.

Up to **87%** of individuals involved in the criminal justice system report having had a **BRAIN INJURY**

#### Incarcerated individuals with **TBI** may have:

- Increased utilization of health and psychological services
- Lower rates of treatment completion
- More disciplinary incidents
- Higher rates of recidivism
- Higher levels of substance use prior to incarceration

#### Incarcerated individuals with **2+** head injuries have higher rates of:

- Violent thoughts
- Suicidal ideation
- Suicide attempts
- Hallucinations
- Anxiety
- Depression

### WE CAN HELP AT NDBIN

- Help you with establishing routine screenings policies for brain injury in order to identify individuals who may have a history of brain injury and may need additional support.
- Provide targeted training for working with individuals with brain injury.
- Provide case consultation and technical assistance for individuals you serve.
- Serve as connection for individuals and their families to resources, and much more.



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# Individuals experiencing intimate partner violence

- ▶ Screening among IPV survivors ranges from 30%-60% depending on the study.
- ▶ Survivors of intimate partner violence who have a TBI due to an assault are more likely to:
  - ▶ be diagnosed with PTSD, insomnia, and depression, and report worse overall health.



## Brain Injury and Intimate Partner Violence

Intimate Partner Violence (IPV) is defined as aggression or abuse by a current or former intimate partner, which includes behaviors of physical and sexual violence, psychological aggression, and stalking.



**60% - 92%** of abused women obtain a **Traumatic Brain Injury (TBI)** directly correlated with IPV.

**Individuals who have suffered a TBI from assault due to IPV are more likely to experience:**

- PTSD
- Depression
- Insomnia
- More likely to report **poor health overall**, such as:  
*\*smoking tobacco, drinking alcohol, suffering from chronic pain and using high quantities of pain medication*

**50% to 90%** of individuals with a history of domestic violence have **symptoms of TBI**

- Over 30 million women in the United States experience domestic violence in their lifetime, so **20-27 MILLION LIKELY HAVE SYMPTOMS OF TBI**

### CITATIONS



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# Early Childhood Impact

According to a Christchurch, New Zealand study:

- ▶ Early childhood TBI, even if mild, may pre-dispose people to later having **behavioral problems and/or involvement with law enforcement**
- ▶ People with an early childhood TBI, that resulted in at least one night in hospital, were found to be **three times more** likely as young adults to have alcohol or drug dependency

## NDBIN and Education



### What is NDBIN?

The North Dakota Brain Injury Network provides information and support to individuals with brain injury, their family members and various service providers and agencies. Our resource facilitator assists with navigating the service system and provides technical assistance in finding the right resources for each individual. We offer outreach and education to increase public awareness of brain injury, as well as peer support by connecting people with others who have experienced a brain injury. We can provide onsite training to facilities and organizations as well. All of our services are FREE.

### Support for Educators

#### Technical assistance such as

- juvenile brain injury screenings
- juvenile symptom inventory administration
- troubleshooting behavior
- connecting with relevant services
- observation of student and formal recommendations.

Trainings for families, para educators, and staff

Development of 504s and IEP goals

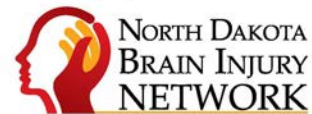
As long as the student has a brain injury (Concussion, TBI, stroke, tumor, etc) and is a resident of North Dakota we can offer our services at no cost!

### Contact: Carly Endres

Senior Project Coordinator, North Dakota Brain Injury Network  
carly.endres@und.edu • 701-777-8004

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NORTH  
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**NORTH DAKOTA  
BRAIN INJURY  
NETWORK**

# Why?

- ▶ Symptomology of injury
- ▶ Undiagnosed/lack of treatment

# Symptomology

- ▶ Brain injury-related effects that can complicate individuals activities, self management, and ability to interact with others
  - ▶ Impaired cognition and behavioral impacts can have wide spread effects
  - ▶ Emotional dysregulation, impulsivity, and impaired processing speed likely most be linked to criminal justice involvement

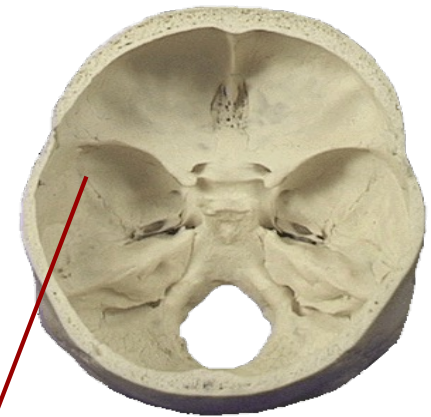
# Skull Anatomy

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.

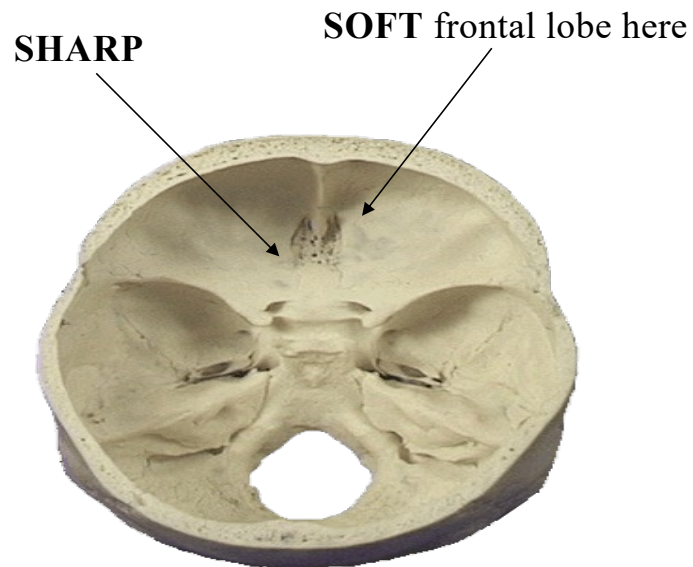
These ridges can result in injury to the temporal and frontal lobes of the brain during rapid acceleration.



**Bony ridges**

# Brain Injury

Many of our adult thinking skills reside in the frontal lobe; the frontal lobe is very vulnerable to injury.



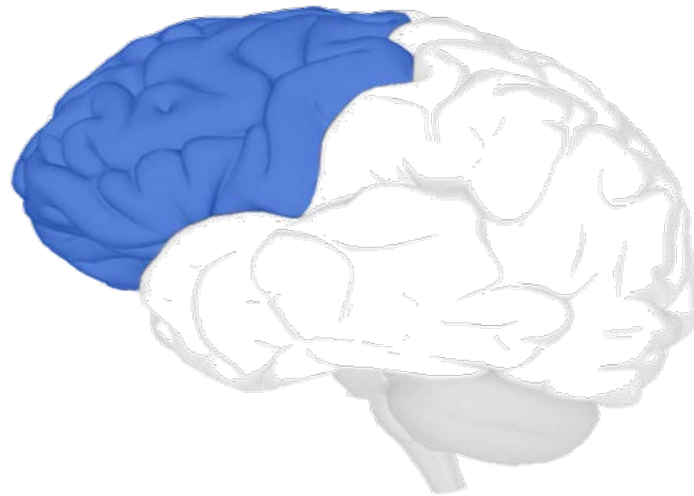


# The Frontal Lobe

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

These include:

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

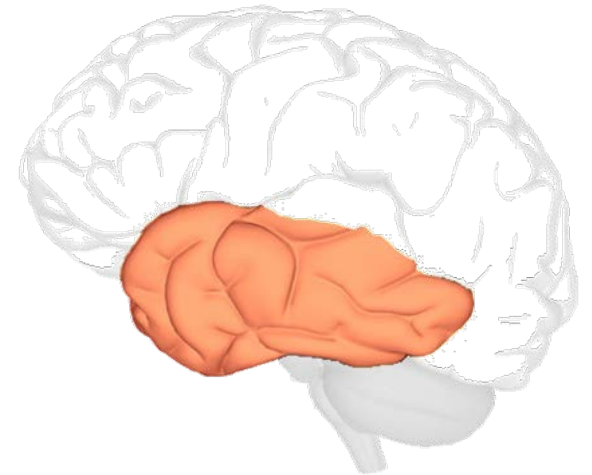


**Source:** Adapted from Dr. Mary Pepping of the University of Idaho's presentation "The Human Brain: Anatomy, Functions, and Injury"

# The Temporal Lobe

**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.



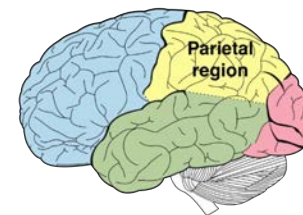
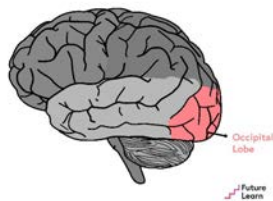
*Source: Adapted from Dr. Mary Pepping of the University of Idaho's presentation "The Human Brain: Anatomy, Functions, and Injury"*

# TBI “Fingerprints”

There are two other lobes in the brain, but the frontal lobe and the temporal lobe are critically involved in managing behavior and emotions.

Thus, damage especially to these regions can result contributing to mental health and/or addiction problems. Damage to these lobes is considered the **“Fingerprint of Traumatic Brain Injury.”**

The Occipital Lobe  
the visual system



# Importance of Supports

Without proper supports, brain injury can lead to mental health and addiction issues that bring people living with “hidden” brain injury into the criminal justice system.

- ▶ Appropriately, **structure** offered by school, parents, and community fall away as children go through adolescence into adulthood. A Brain Injury that was incurred at age seven may not be fully “unmasked” functionally or behaviorally until age 11, 12, or 13 with the challenges of middle school/puberty
- ▶ The frontal lobes and temporal lobes injured earlier are **unable to adequately respond to the expectations of behavioral regulation and executive skill functioning**

# Undiagnosed Brain Injuries

- ▶ Undiagnosed brain injury often referred to as the “hidden” disability
- ▶ Individuals may:
  - ▶ Drop out of school
  - ▶ Start abusing substances
  - ▶ Fail at relationships
  - ▶ End up in Mental Health System
  - ▶ Become homeless
  - ▶ Be unable to obtain or maintain a job

# You may hear individuals say...

- ▶ I struggle keeping up with conversations!
- ▶ These lights are driving me crazy!
- ▶ I feel stupid now
- ▶ I can never remember \_\_\_\_\_ (appointments, meetings, due dates, bills, etc.)
- ▶ I notice a difference in my life after my \_\_\_\_\_ (car accident, fall, overdose, etc.)
- ▶ My brain feels foggy

# Undiagnosed Brain Injuries

- ▶ Systems that have primary functions other than Brain Injury often do not document Brain Injury
  - ▶ Unless medical documentation available
  - ▶ Brain Injury screening is in place
- ▶ Many brain injuries are undiagnosed
- ▶ A **need** for screening exists
- ▶ Contact us to set up your screening training!

# Brain Injury Framework for Support

- ▶ NOT treating the brain injury as separate, but providing support and resources for the individual where they are at in context of brain injury
- ▶ Demystifies brain injury for non-brain injury professionals
- ▶ Empowers individuals with brain injury and families to advocate for appropriate supports



## NDBINs role.....

- ▶ Contracted by Department of Health and Human Services (DHHS) to serve as the central source of brain injury information, support, and training in the state.
- ▶ Developed because there had been identified a **lack of awareness, lack of training, and a lack of coordination across existing services.**

# What is NDBIN doing?

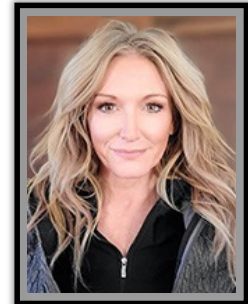


- ▶ Presentation to residents at JRCC
- ▶ Partnered with amazing early adopters Development of Framework from Colorado
- ▶ Online screening and symptom inventory
- ▶ CIT Presentations-Bismarck and Dickinson
- ▶ Attended Citizens Academy in Grand Forks and Fargo
- ▶ Exhibiting at jail and prison 'fairs'
- ▶ Lunch and Learn
- ▶ Book Club
- ▶ Hired more resource facilitators!
- ▶ Currently writing a DOJ grant to implement screenings at the penitentiary

# Resource Facilitation



- ▶ FREE, evidenced based service connecting individuals with BI, families and caregivers, and professionals with resources
- ▶ Provide support for individuals and families through ongoing follow up calls
- ▶ Provide information regarding state and local resources (ex. Housing, insurance, food assistance)
- ▶ Respond to requests for assistance, information, resources, and referral
- ▶ Counsel and be a support person for survivors and families
- ▶ Locate other professionals who can assist with recovery
- ▶ Develop new programs and resources for survivors, families, and professionals
- ▶ Support students/parents with return to school/sports with education and connecting to a TBI specialist if needed



# ROWBOATS

- ▶ **R**educe amount of information
- ▶ **O**ne instruction at a time
- ▶ **W**ritten & verbal when possible
- ▶ **B**reaks are helpful
- ▶ **O**ften is better, routines help
- ▶ **A**sk person for paraphrase/repeat
- ▶ **T**ake time, go slowly
- ▶ **S**imple & organized info is best



# \*How to refer



- Services -
- Resource Directory
- Brain Injury Information -
- Events & Training -
- Caregiver Corner -

## New Infographics

The North Dakota Brain Injury Network (NDBIN) has a variety of infographics available to help American Indian survivors of a brain injury.

- [View the new resources](#)



### [Brain Injury Guide](#)

View this helpful guide from NDBIN. It provides information to individuals with a brain injury.



### [Brain Injury ID Card](#)

An individual with a brain injury may request a free brain injury identification card from NDBIN.



### [Brain Injury Screenings](#)

Find out where screenings are happening or schedule one in your community.



### [FREE Certified Brain Injury Specialist Training](#)

June 11 & 12  
8:30 am – 4:30 pm  
Via Zoom





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