

Traumatic Brain Injury, Mental Health and Addiction



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Financial Disclosure

I have no financial relationships to disclose relevant to this presentation.

Lifetime History of TBI:	Any TBI	TBI with LOC	Mod/Severe TBI
Colorado non-institutionalized adults (Whiteneck et al.)	43%	24%	6%
Ohio non-institutionalized adults (Corrigan et al.)	unk	22%	3%

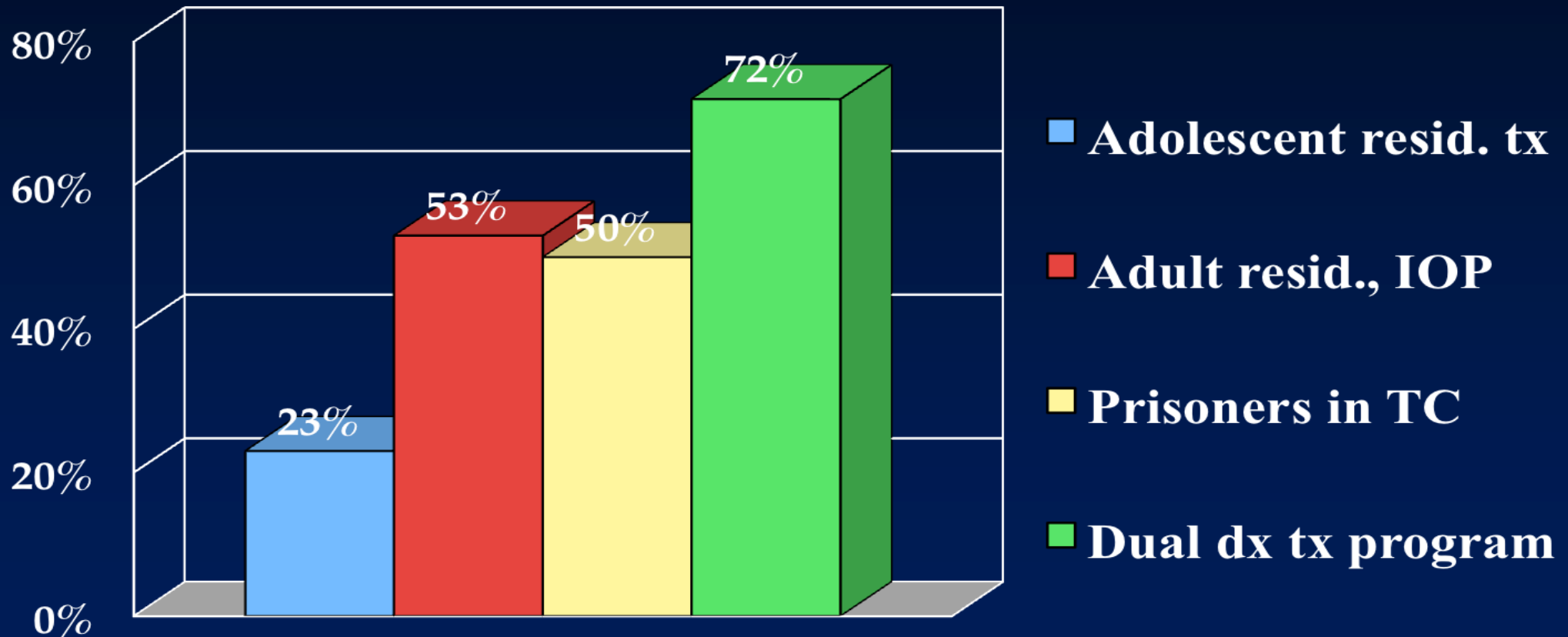
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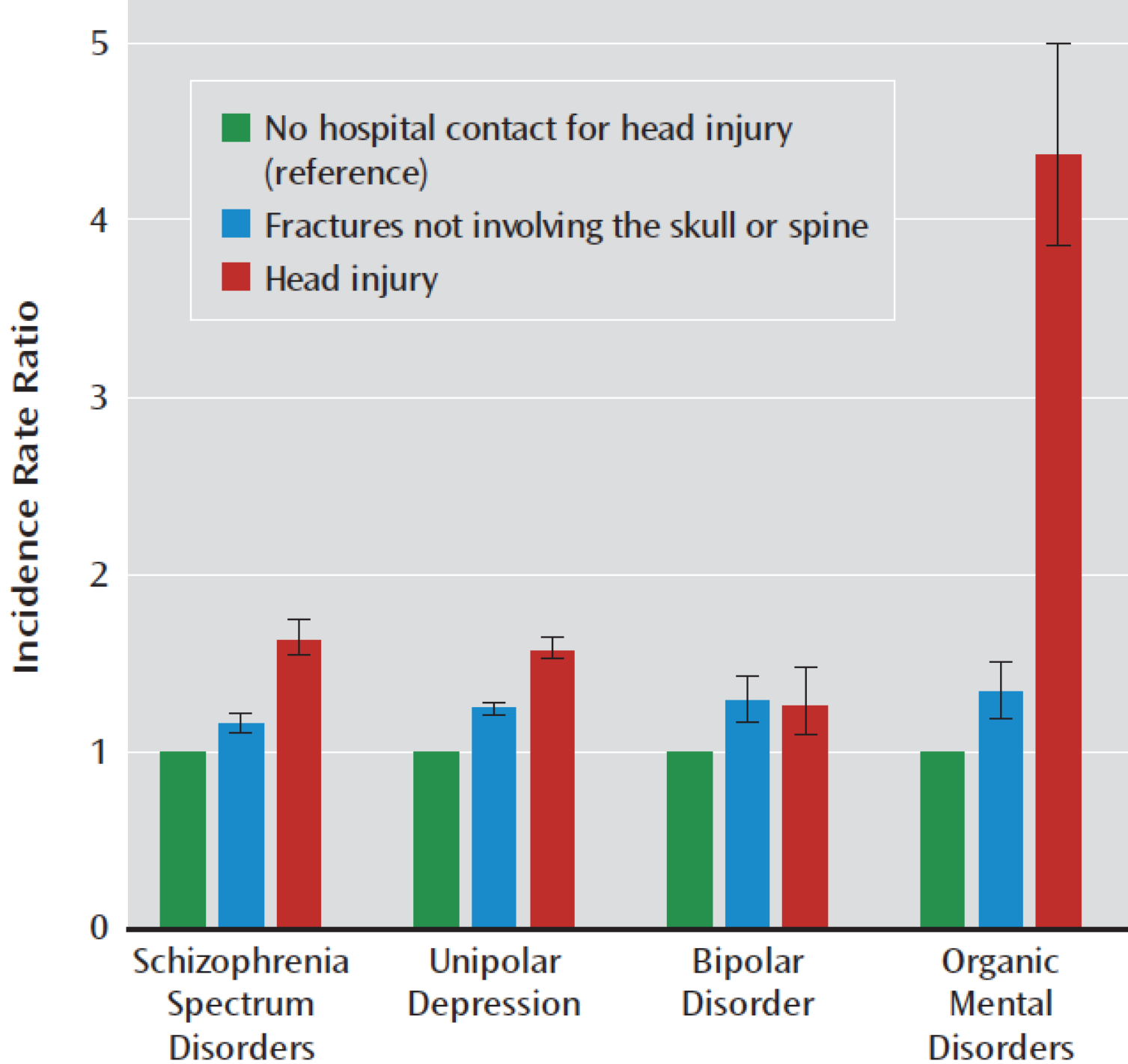
Substance Abuse Treatment Clients Who Have Had a TBI with Loss of Consciousness



Danish Population Registry

(Orlovska et al., 2014)

- 1.4 million people born in Denmark from 1977-2000
- Followed until 12/31/2010 (10-33 years)
- 114,000 with a hospital contact for a TBI
- Records matched to the Danish Central Psychiatric Register
- Case excluded if psychiatric diagnosis preceded TBI
- Compared to persons without injury or with orthopedic injuries



Suicide and Prior History of TBI

- Swedish mortality N=2.6 M (Fazel et al., 2014)
 - prior TBI vs same sex & age (AOR=3.3)
 - prior TBI vs uninjured siblings (AOR=2.3)
- Danish suicides N=7.4 M (Madsen et al., 2018)
 - prior TBI vs same sex, age & era (IRR=2.6)
 - prior severe TBI vs same sex, age & era (IRR=3.4)
- U.S. suicides N=270,074 (Ahmedani et al., 2018)
 - prior TBI vs same sex, age, psychiatric dx & SUD (AOR=8.8) [the highest of all co-morbid conditions]



Contents lists available at [ScienceDirect](#)

Addictive Behaviors

journal homepage: www.elsevier.com/locate/addictbeh

Commentary

The intersection of lifetime history of traumatic brain injury and the opioid epidemic

John D. Corrigan^a, Rachel Sayko Adams^{b,*}

Persons with TBI more likely prescribed opioids

- Headache and orthopedic pain common with TBI
- Persons with persistent post-concussive syndrome more likely prescribed opioids
- 70% of patients receiving rehabilitation for TBI prescribed opioids

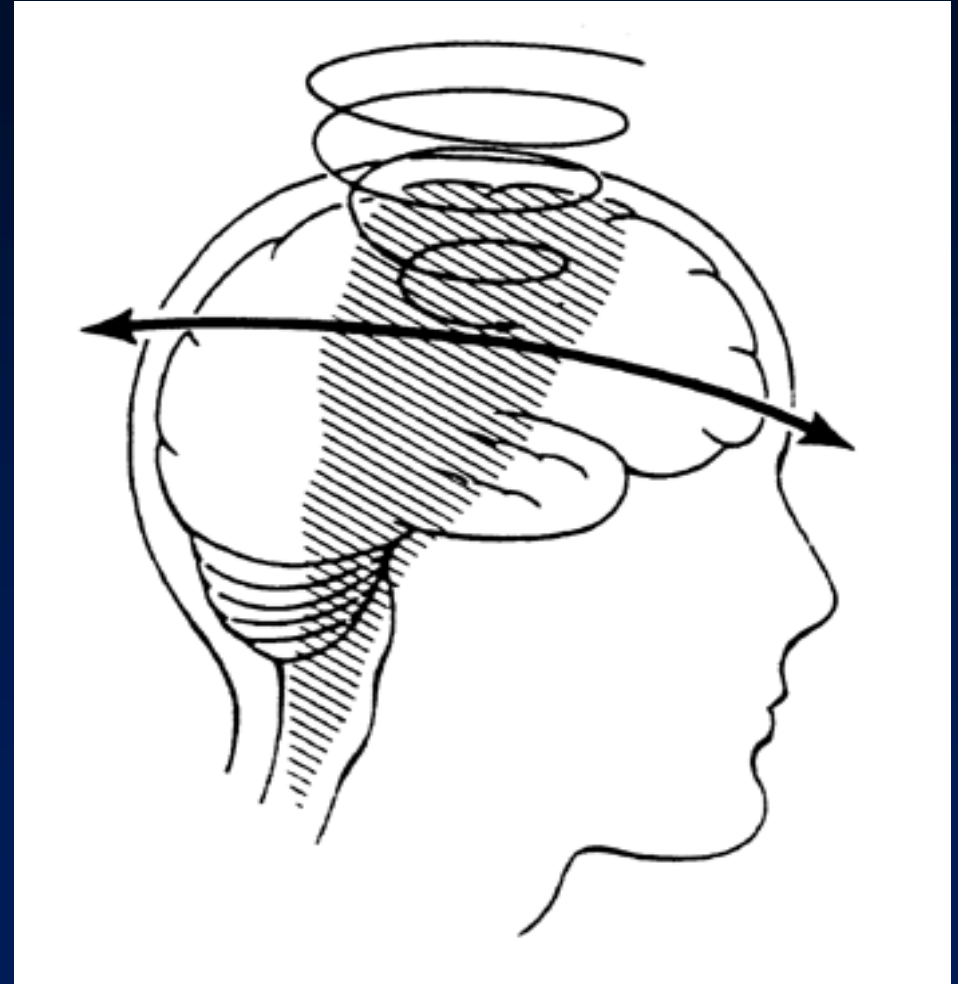
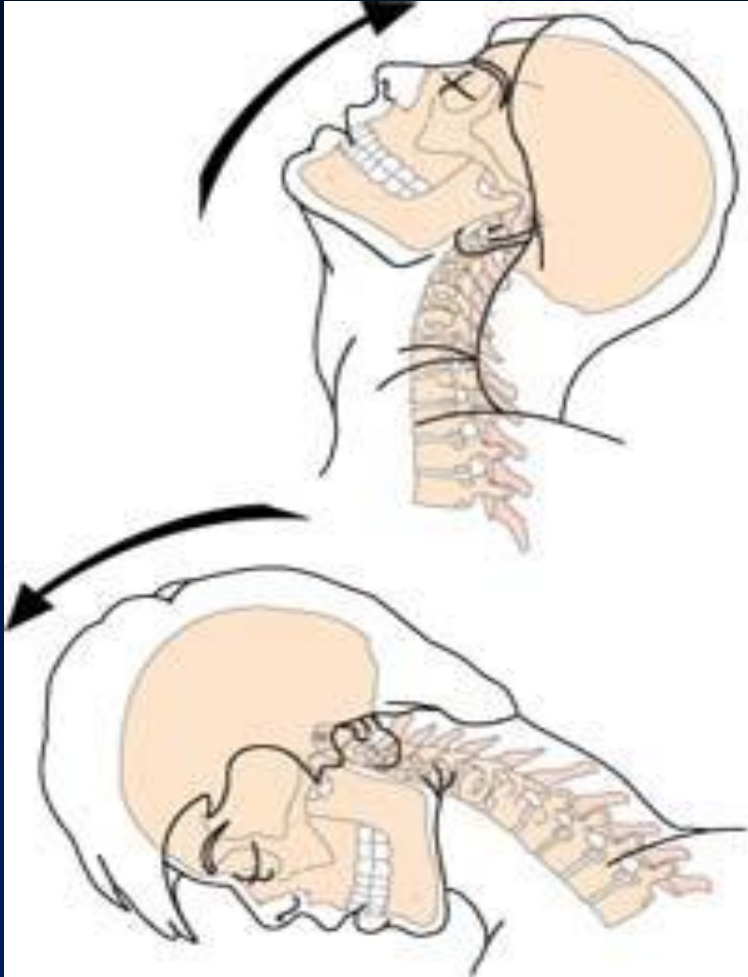
Persons with TBI more susceptible to addictive influence of opioids

Persons with TBI have more challenges for successful treatment

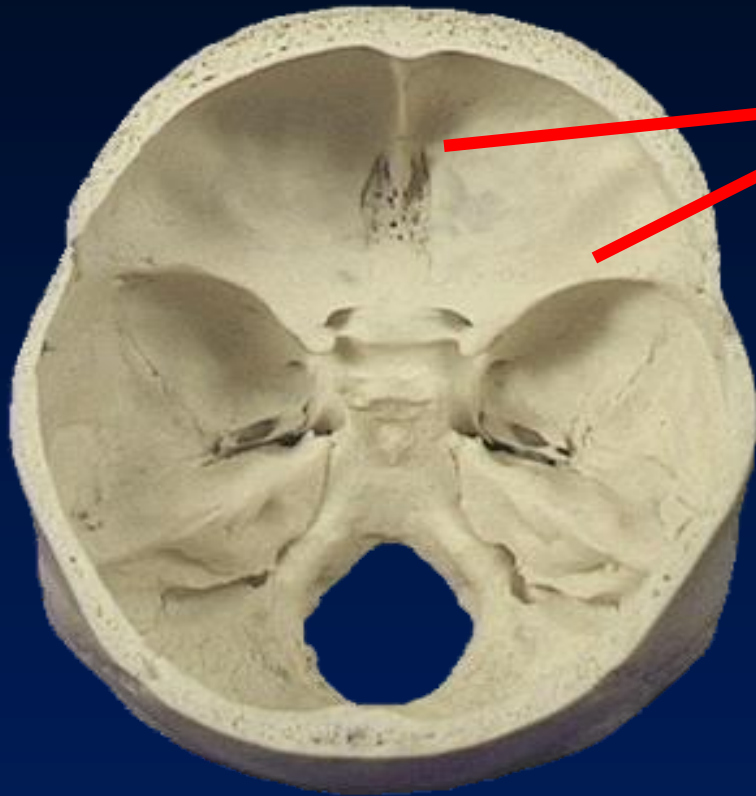
The “Fingerprint” of TBI

Frontal areas of the brain, including the frontal lobes, are the most likely to be injured as a result of TBI, regardless the point of impact to the head

The brain is set into motion along multiple axial planes



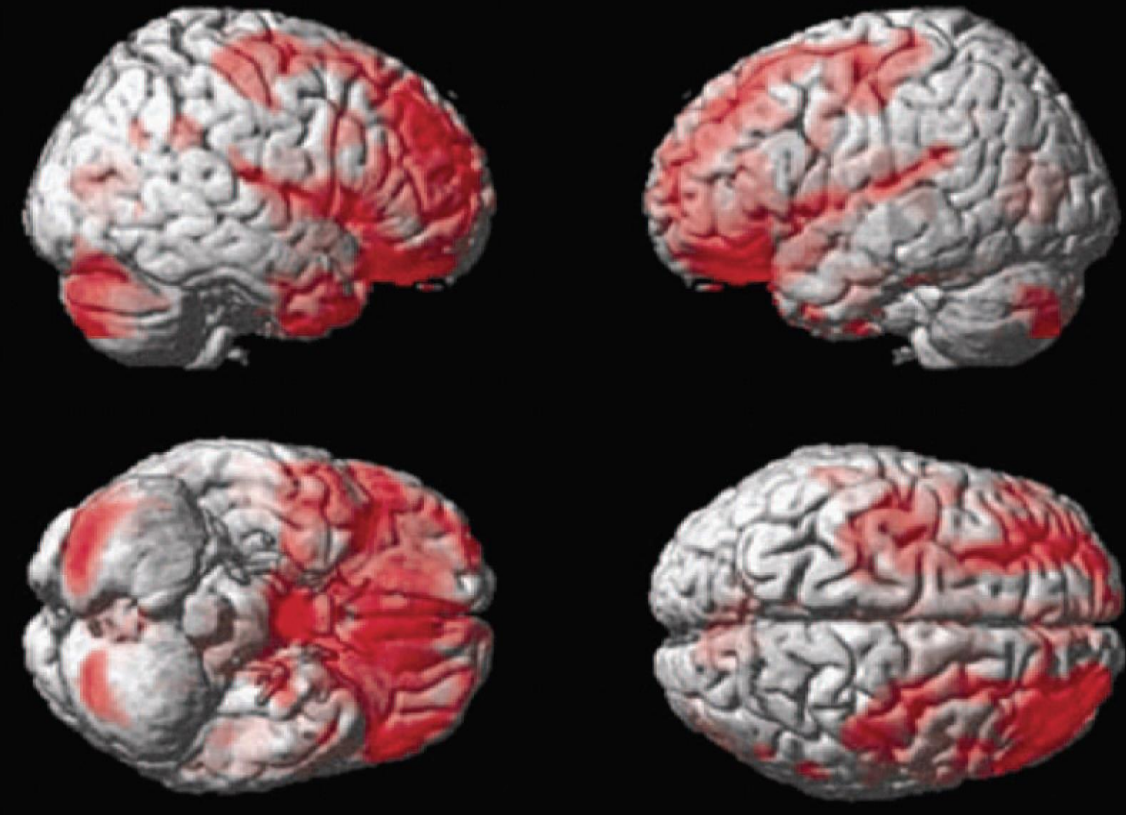
Interior Skull Surface



Bony ridges

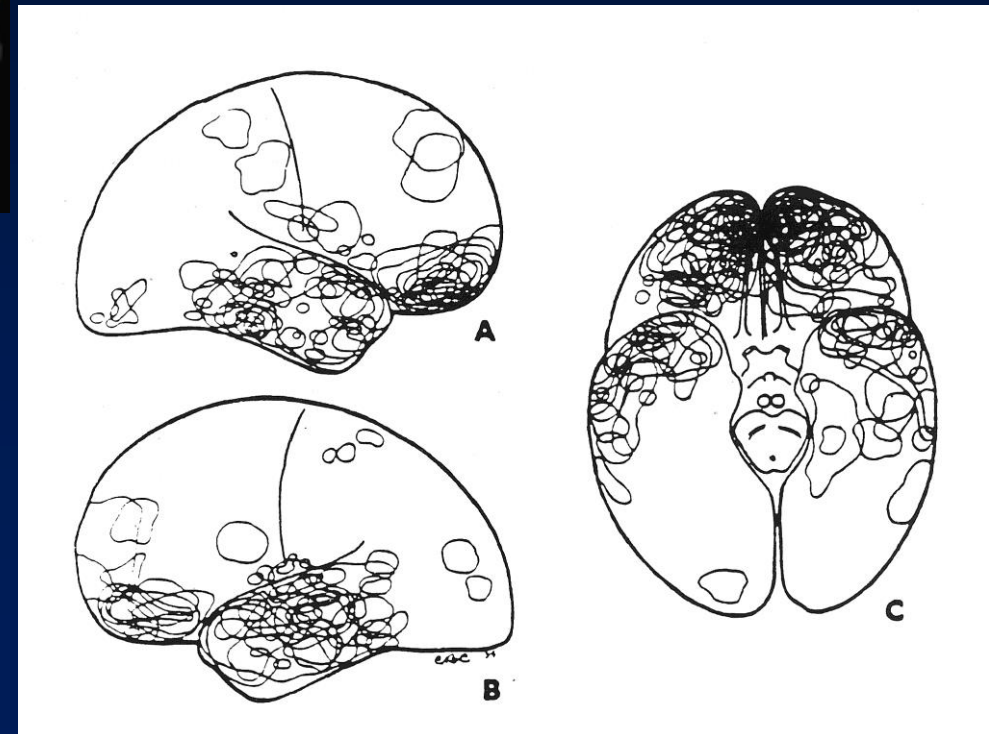


Injury from contact with skull



Areas of contusion in
(Courville, 1950)

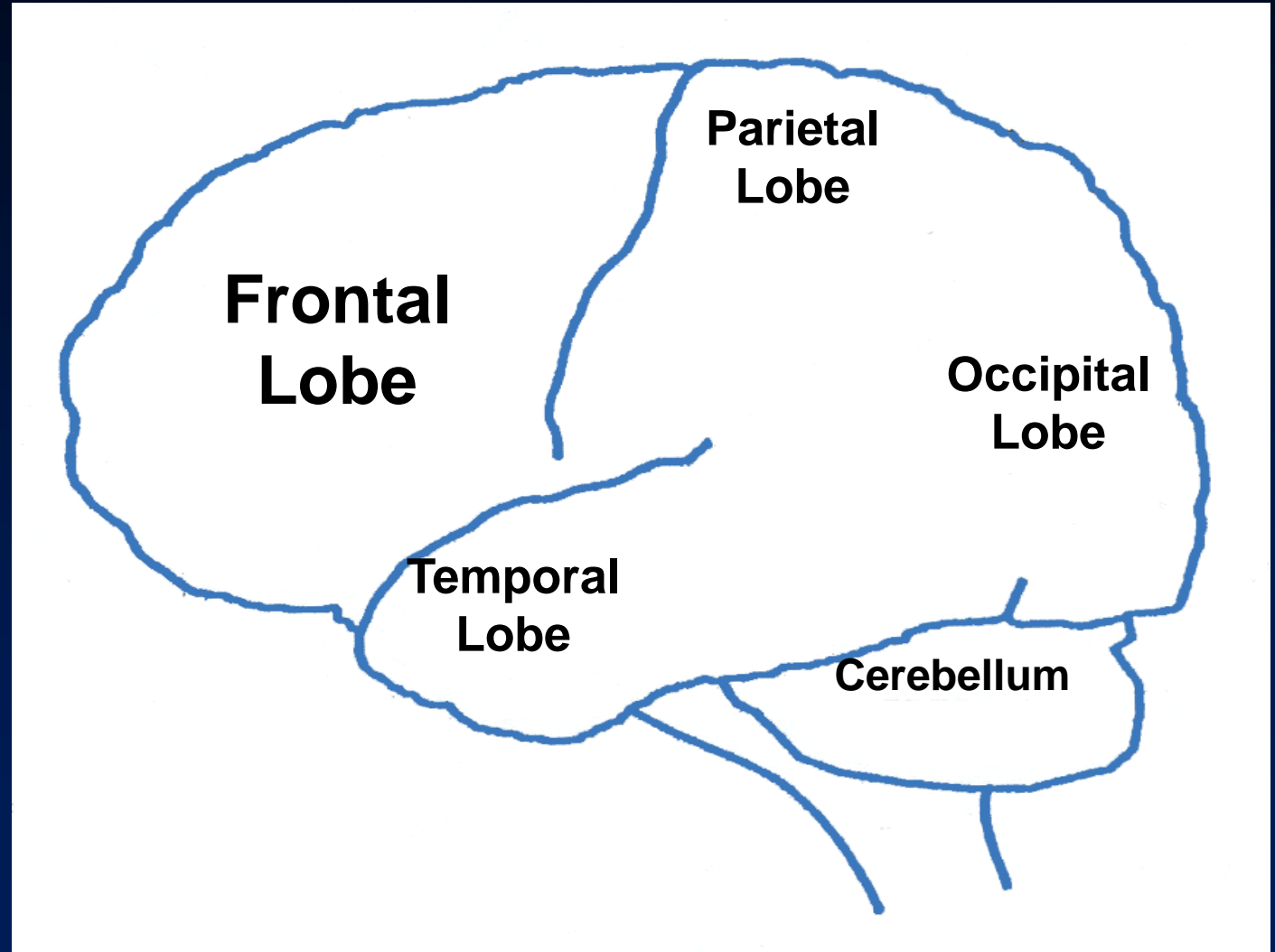
Loss of gray matter one
year post-injury
(Bigler, 2007)



Simplified Brain Behavior Relationships

Frontal Lobes

- Initiation
- Problem solving
- Judgment
- Inhibition of impulse
- Planning/anticipation
- Self-monitoring
- Motor planning
- Personality/emotions
- Awareness of self
- Organization
- Concentration
- Mental flexibility
- Speaking



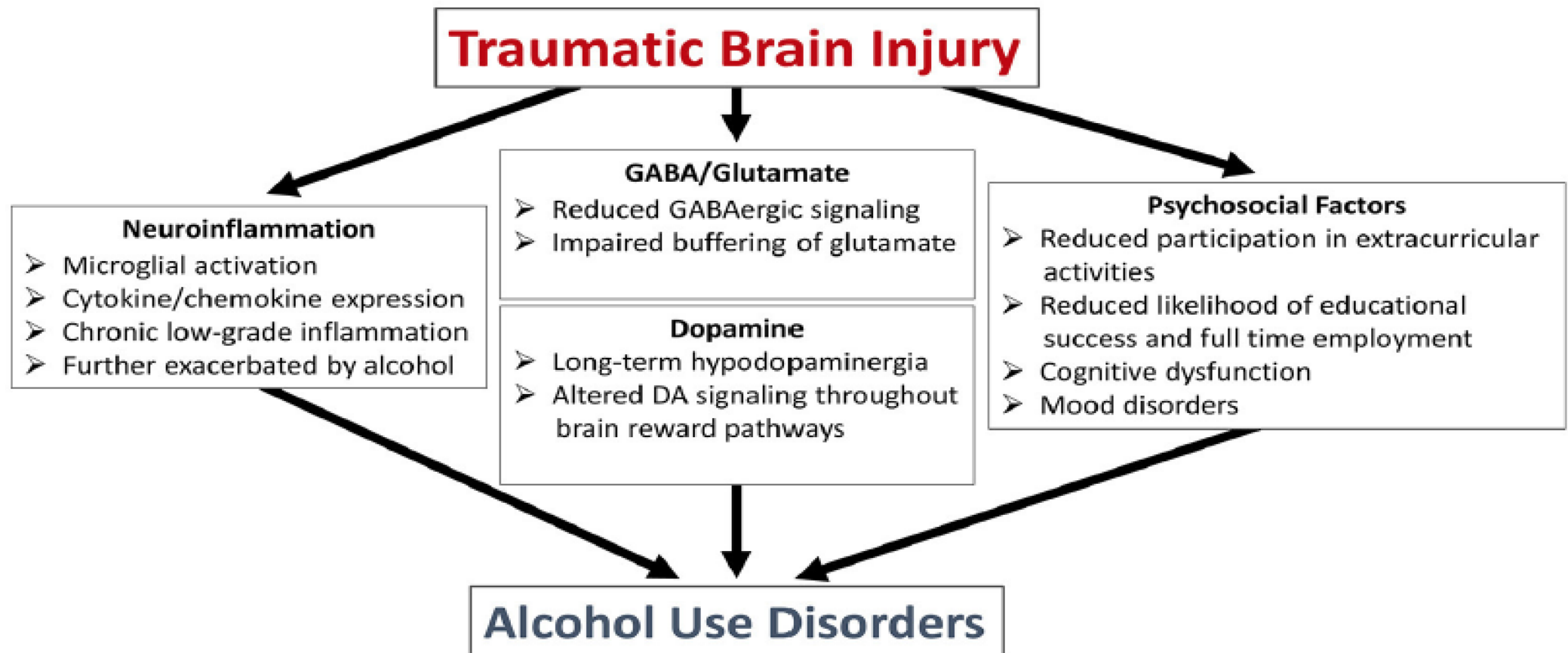
Traumatic Brain Injuries during Development: Implications for Alcohol Abuse

MINI REVIEW
published: 20 July 2017
doi: 10.3389/fnbeh.2017.00135

 **frontiers**
in Behavioral Neuroscience

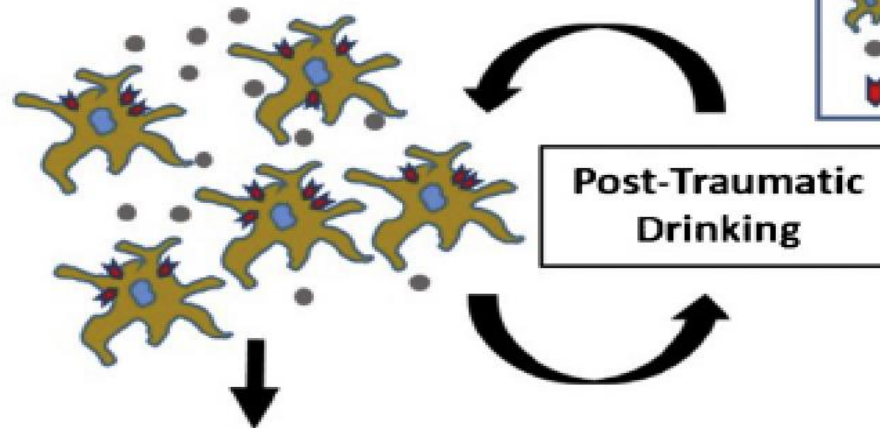
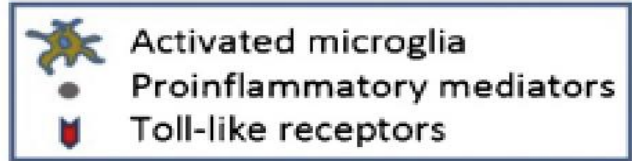
Zachary M. Weil* and Kate Karelina

Behavioral Neuroendocrinology Group, Department of Neuroscience, Center for Brain and Spinal Cord Repair, Ohio State University Wexner Medical Center, Columbus, OH, United States

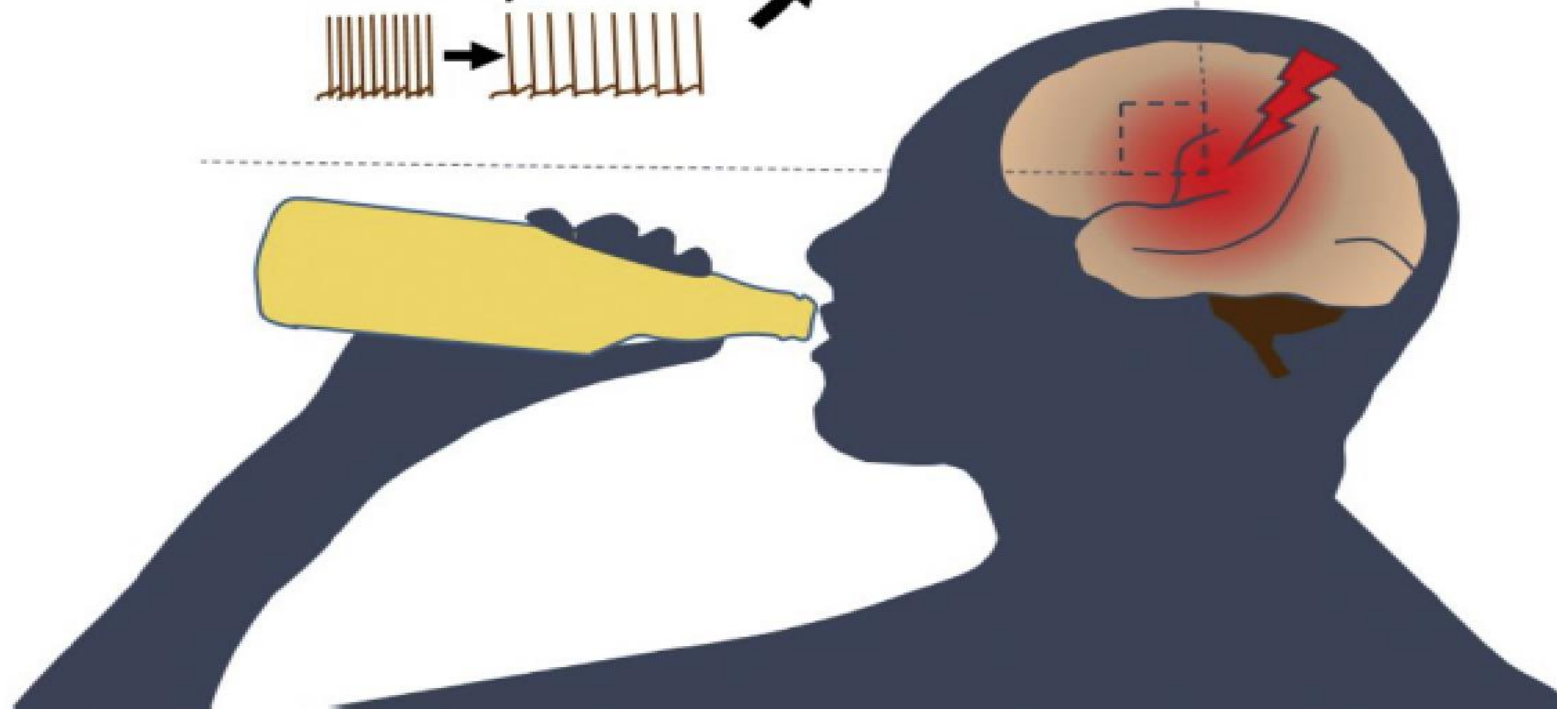
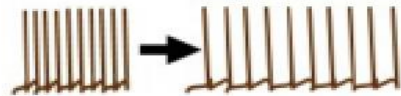


Neuroinflammation

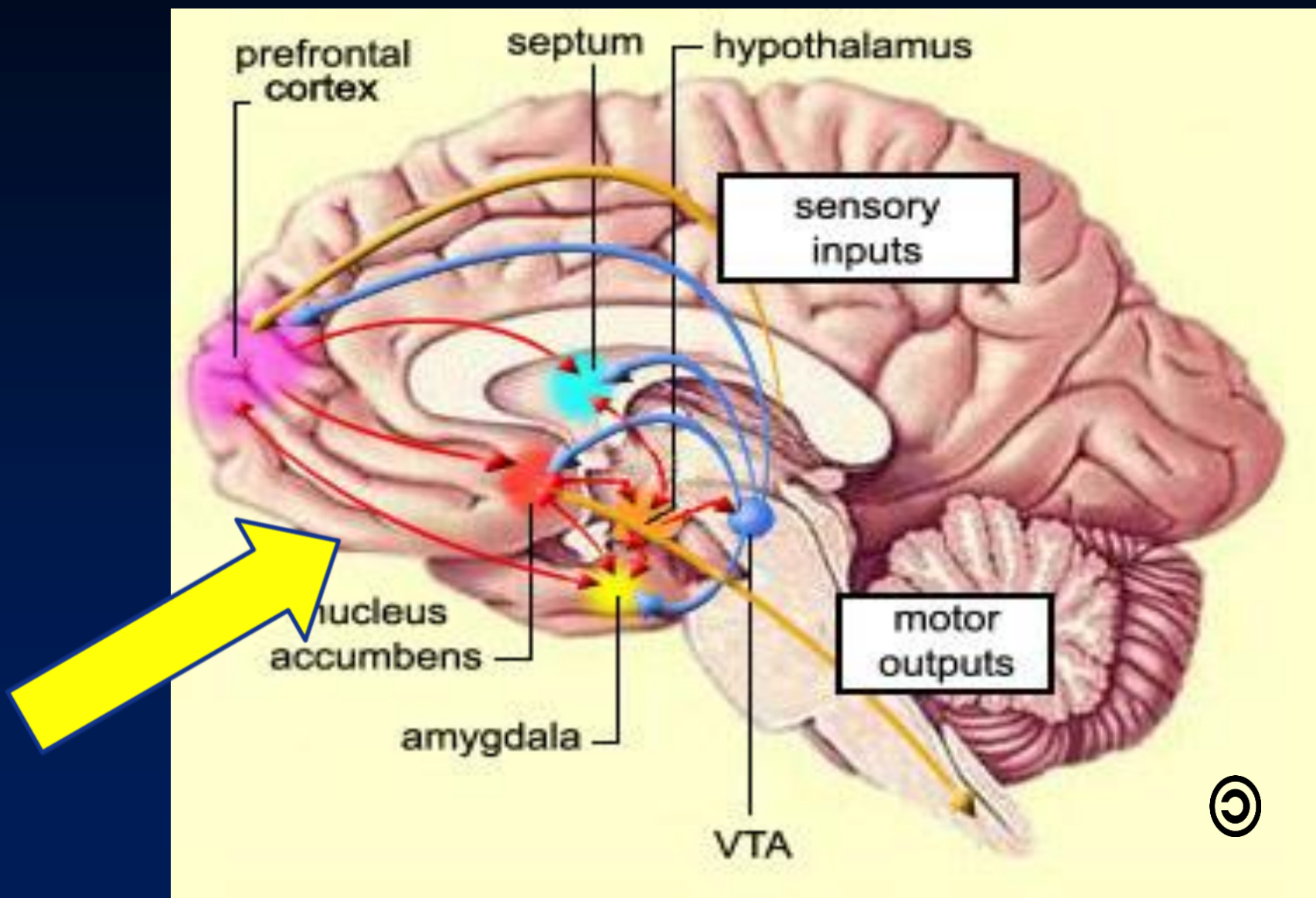
TBI-induced Neuroinflammation



Reward dysfunction



Disruption of Dopaminergic Pathways



Lessons Learned from TBI and Substance Use Disorders

Two Consistent Clinical Observations:

- Compared to others in SUD treatment there is an even *greater* disconnect between TBI clients' intentions and their behavior.
- Clients with TBI are more likely to prematurely discontinue treatment, often after being characterized as non-compliant.

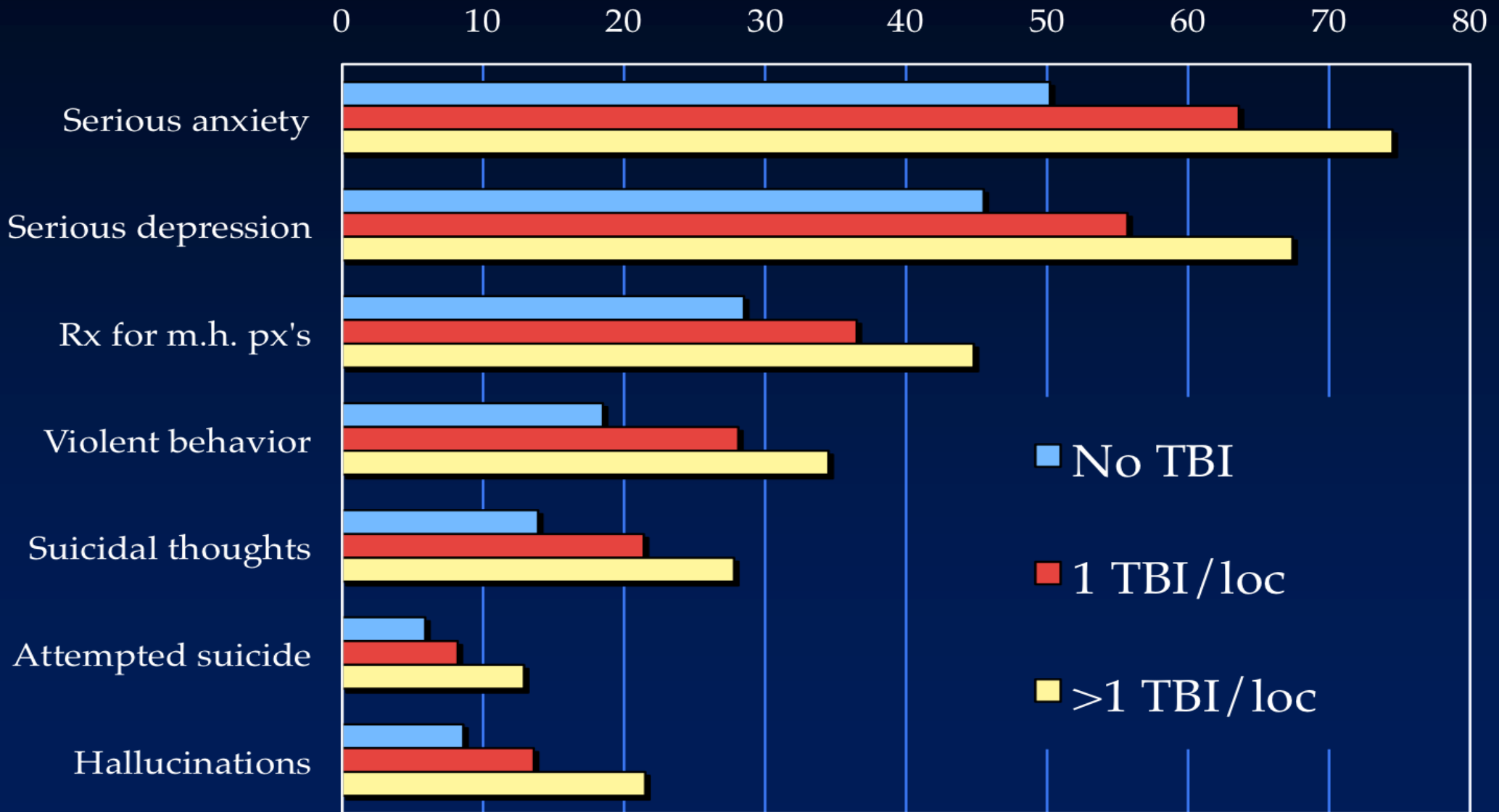
Reasons for negative effect on outcome due to TBI:

1. Neurobehavioral consequences undermine ability to participate “conventionally” in treatment
 - Cognitive load in treatment
 - Misattribution of behavior by peers & professionals

Reasons for negative effect on outcome due to TBI:

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2. Greater co-occurring psychiatric disorders for those with TBI

Symptoms past 12 months of Clients Admitted for Substance Abuse Treatment in Kentucky (N=7,932)



Dually diagnosed SUD and Severe Mental Illness [N=295]

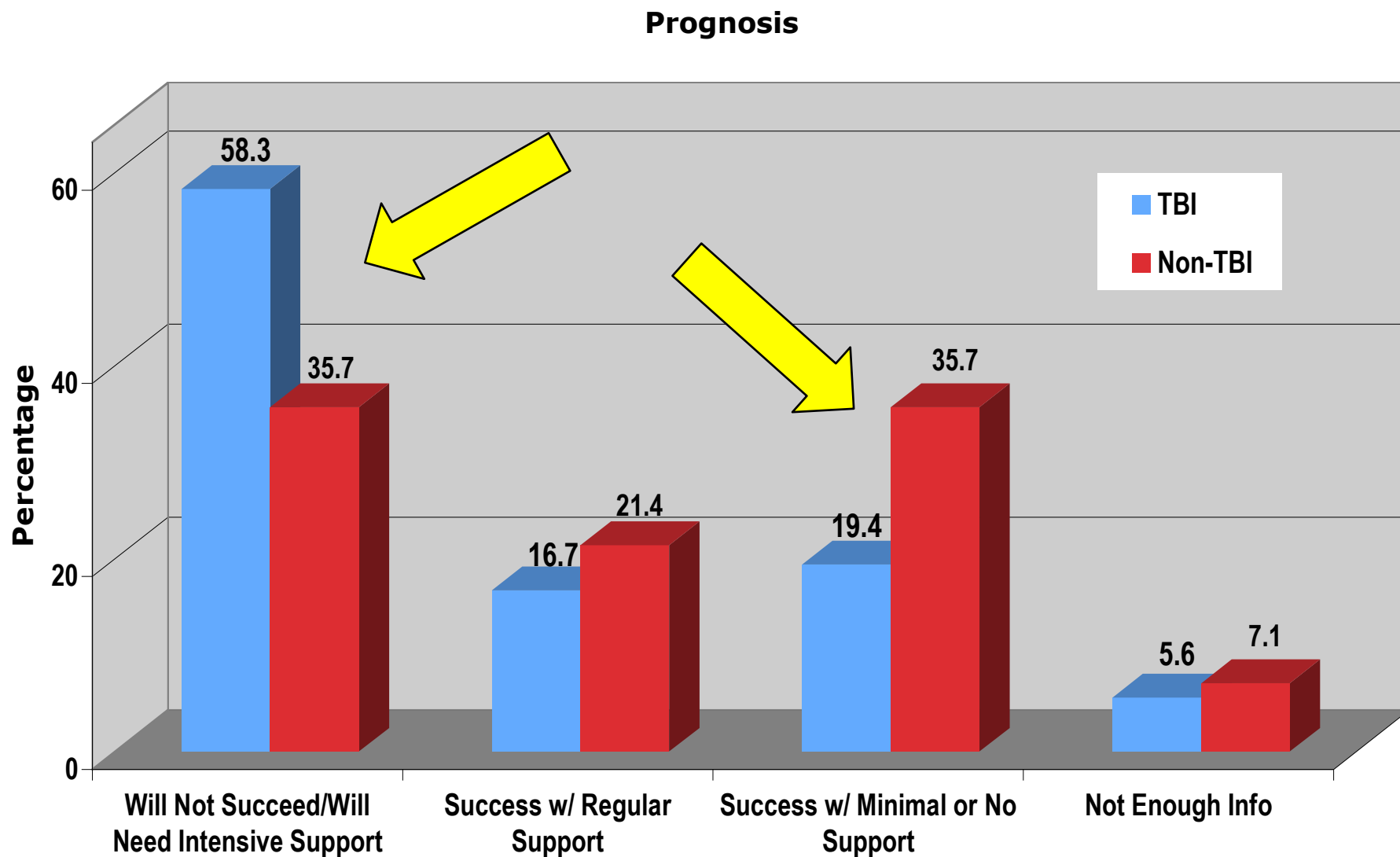
(McHugo et al., 2016)

- 80% at least 1 TBI; 61% at least 1 TBI with LOC; 24% at least 1 mod/sev TBI
- Extent of TBI history associated with worse alcohol use, **worse psychiatric symptomology**, more arrests, greater homelessness
- TBI history associated with greater likelihood of **PTSD** and **anti-social and borderline personality disorders**.
- Earlier age at 1st TBI with LOC associated with presence of psychotic spectrum disorders

Reasons for negative effect on outcome due to TBI:

1. Neurobehavioral consequences undermine ability to participate “conventionally” in treatment
2. Greater co-occurring psychiatric disorders for those with TBI
3. Less ability to sustain improvements without external structure

Staff Prognosis for Continued Success after IDDT



Recommendations for SUD Treatment Providers

Treatment planning needs to incorporate:

- Accommodations for neurobehavioral deficits
- Co-morbid interactions (e.g., depression, anxiety, violence prone, pain, sleep disturbance)
- Greater formal and/or informal supports needed during and after treatment completion

~~Behavioral Health~~ Recommendations for SUD Treatment Providers

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THANK YOU

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