



# *Talking to Clients about their Substance Use*

Carolyn Lemsky, Ph.D.

What ABI providers should know About Substance Use and Brain Injury



# Risky alcohol use increases the risk for brain injury

30 to 50% of adults are intoxicated at the time of injury

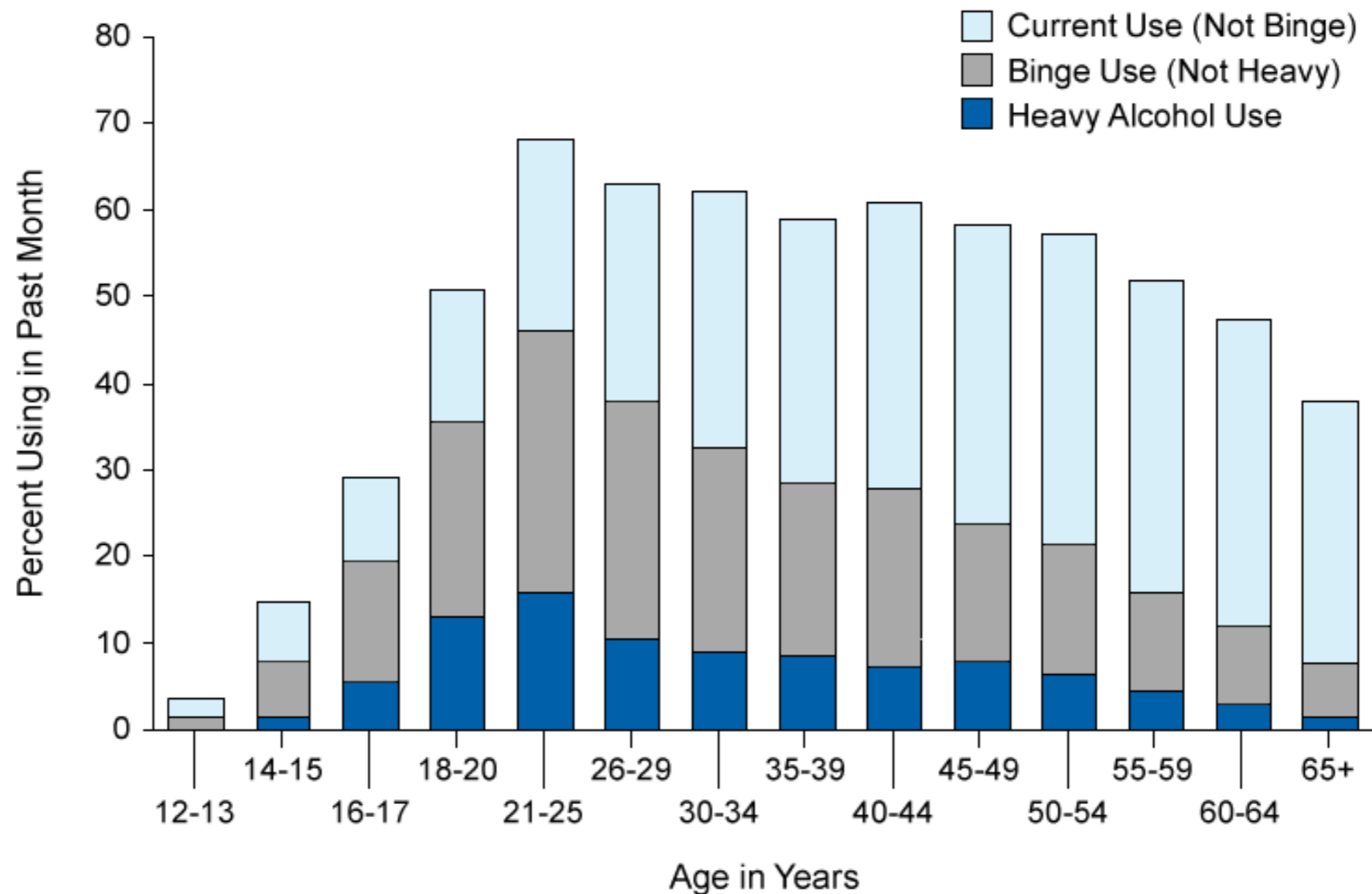
24 to 79% of people hospitalized after ABI have a history of Substance Use Disorder (SUD)

History of SUD is greater in high velocity injury (e.g., high fall/motor vehicle accident)



Parry-Jones, Vaughan, & Miles Cox, 2006 ; Bjork and Grant, 2009;  
Andelic, et al., 2010

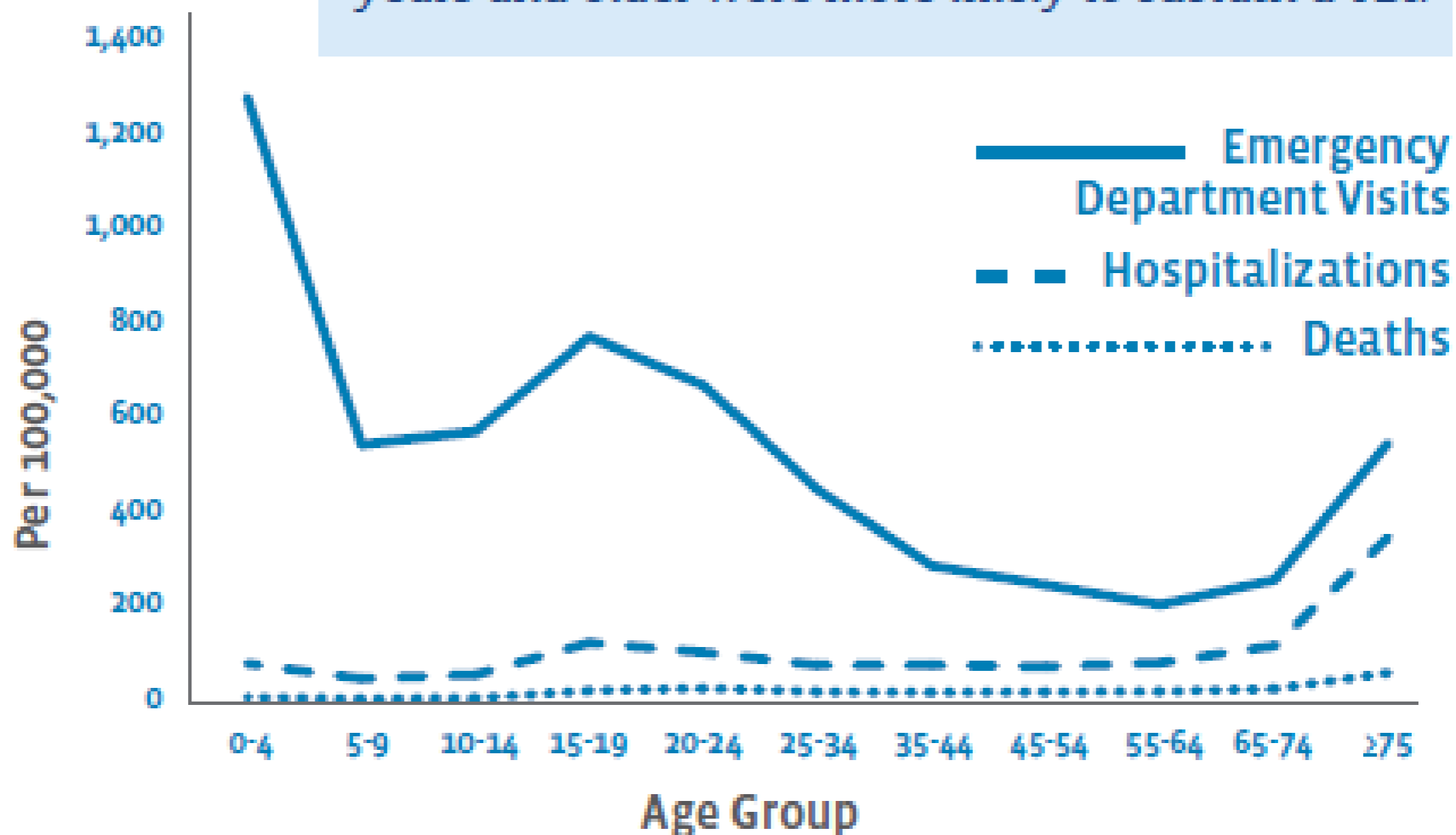
# Alcohol use among persons aged 12 or older, by age (2007)



Substance Abuse and Mental Health Services Administration, Office of Applied Studies (2008). *Results from the 2007 National Survey on Drug Use and Health: National Findings* (NSDUH Series H-34, DHHS Publication No. SMA 08-4343). Rockville, MD.

# Estimated average annual rates of traumatic brain injury-related emergency department visits, hospitalizations, and deaths, by age group, United States, 2002-2006

*Children, older adolescents, and adults aged 65 years and older were more likely to sustain a TBI.*



# Substance use after brain injury



## **Decline in substance use for 1 to 2 years**

Active rehabilitation

Less access and more supervision

Doctor's orders to refrain from alcohol use

## **Gradual increase to pre-injury levels beginning at about two years post-injury**

Bombardier, Temkin, et al., 2003; Ponsford, Whelan-Goodinson, et al., 2007

# Association between pre- and post-injury alcohol use

10.9 times more likely to misuse alcohol in those with pre-injury substance misuse

20% at risk for a new problem with substance use

Intoxication at the time of injury (higher blood alcohol level) was associated with heavy drinking at 1, 3, and 4 year follow-ups

Bombardier, Temkin, Machamer, & Dikmen, 2003; Corrigan, Bogner, Kreutzer, Witol, & Marwitz, 1996; Mysiw, Clinchot, & Fugate, 1997;

## Pre-injury “other substance”

20-40% report some history of illicit substance use.

Brain injury is associated with greater use of both marijuana and cocaine in people seeking services to manage substance abuse.

Problematic drug use is associated with heavier drinking.

West, 2011; Corrigan & Deutsche, 2008



# Interaction between substance use and ABI

38 to 63% of people seeking treatment for substance abuse have a history of ABI

25 to 31% with loss of consciousness (LOC)

For concurrent disorders, the proportion of people with ABI is higher (up to 70%)

Those who do have a history of LOC are more likely to have comorbid psychiatric problems and to need repeated courses of treatment



# Clinical Observations about TBI and SUD

- 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.

Corrigan, 2013

# Substance Abuse Treatment Clients with TBI

- first used at a younger age
- have more severe SUD (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?)

(Corrigan & Mysiow, 2012)

## Lifetime history of TBI

Addictions more severe for those 1<sup>st</sup> injured before age 11

More serious injuries or younger age at 1<sup>st</sup> injury  
associated with slower speed of information processing  
and greater cognitive complaints

The finding of a high proportion of people with early  
childhood TBI observed in people with substance use  
disorders was replicated in a sample of prisoners

# Who is most at risk for co-occurring substance use and brain injury?

- ✓ Substance use problems prior to injury
- ✓ Intoxicated at the time of injury
- ✓ More than one to two years post injury
- ✓ Childhood injury
- ? Depressed/Anxious mood
- ? Social isolation

# How might brain injury contribute to substance use disorders?

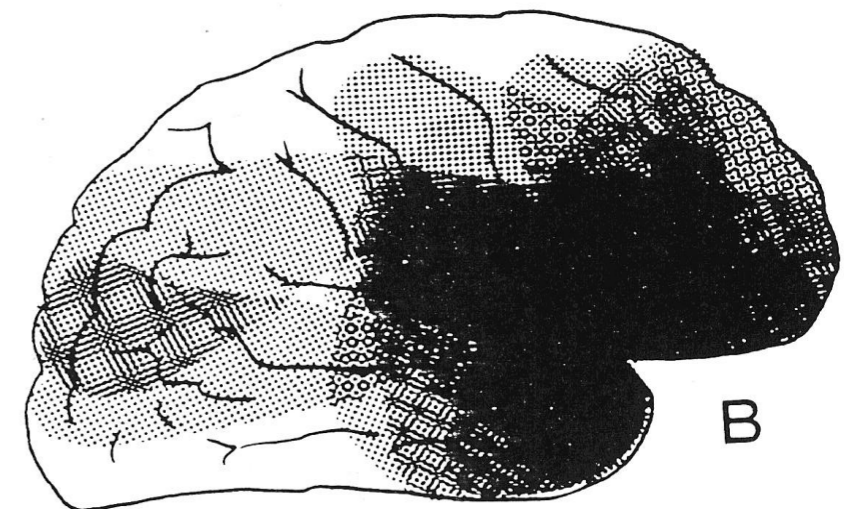
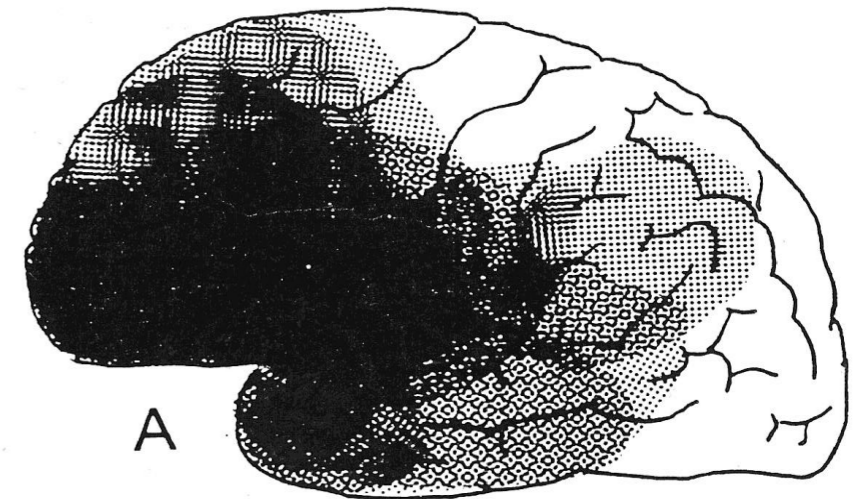
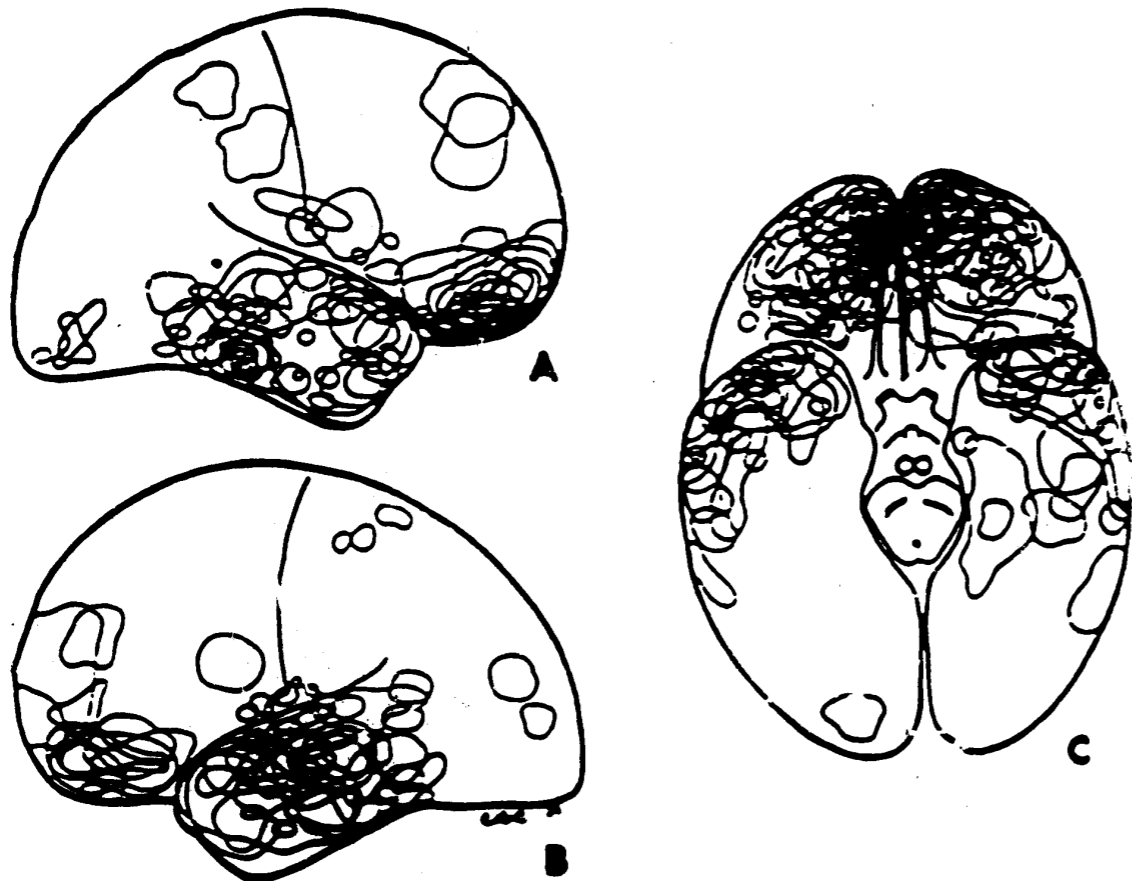
Neurological changes

Lower threshold for problems resulting from substance use

Psycho-social changes

# Effects of TBI

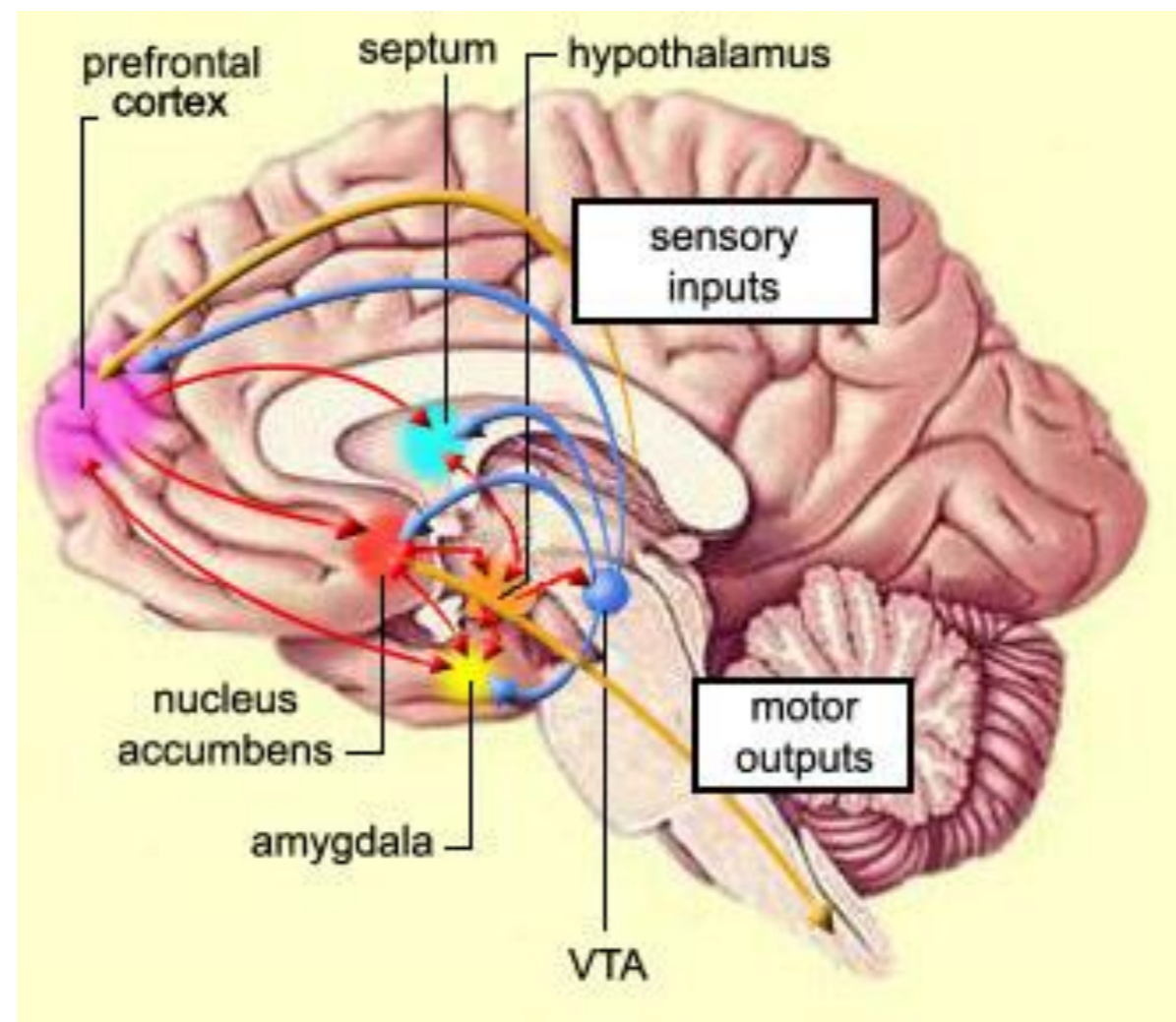
Series of 40 patients (Courville, 1950)



Series of 100 patients (Bigler, 1984)

# TBI's contribution to SUD

Changes to the reward system in the brain can contribute to impulsivity

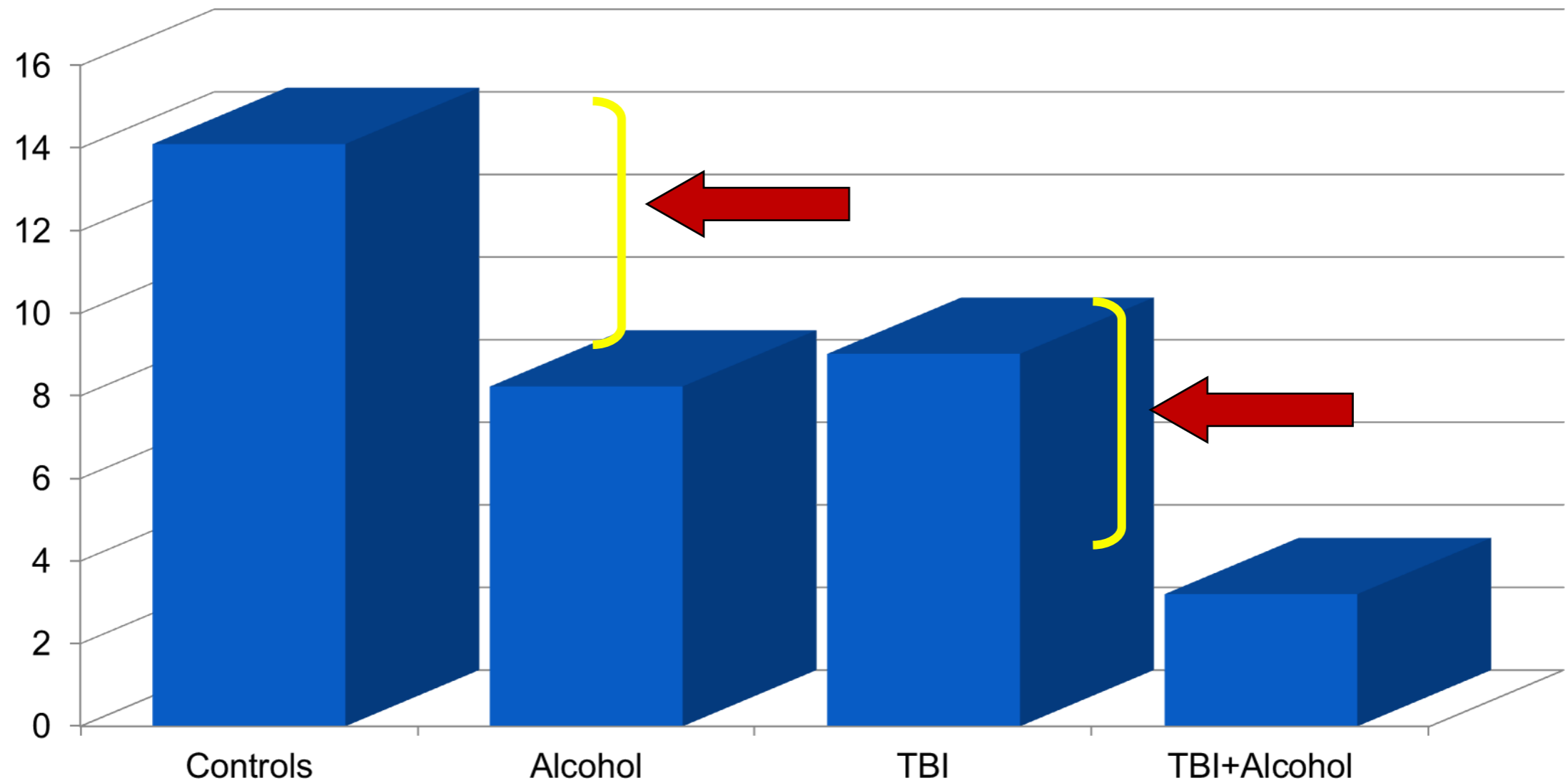




# Event related evoked potentials

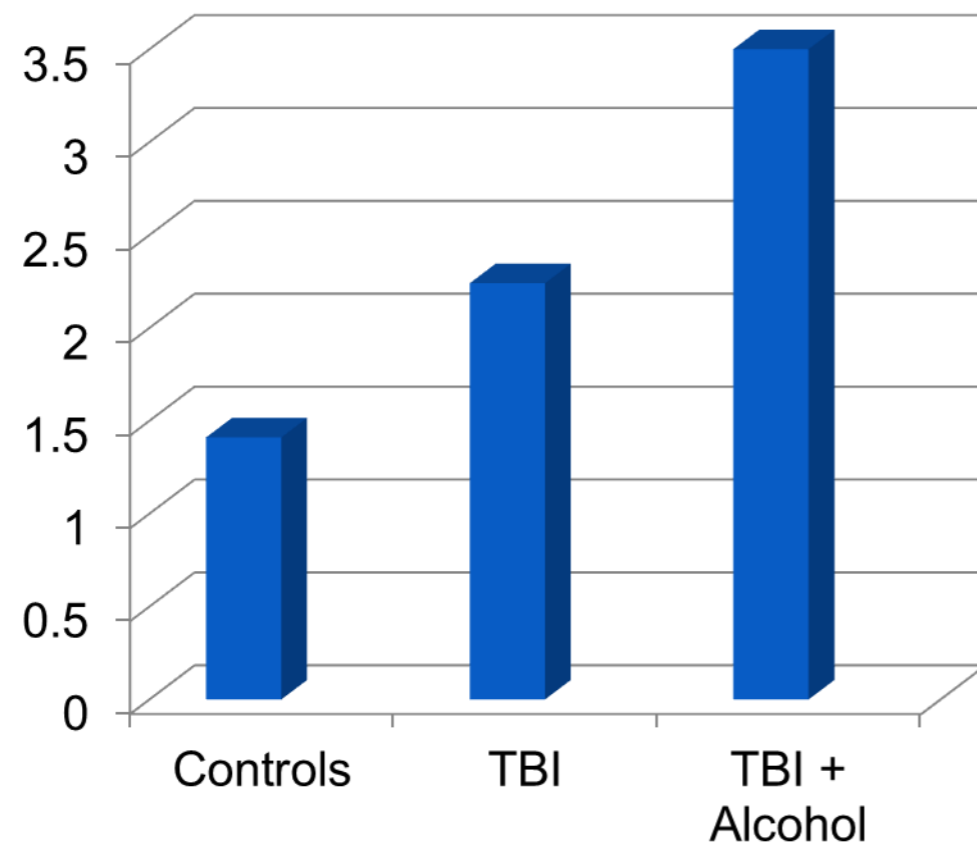
(Baguley, et al., 1997)

**P300 Amplitude**

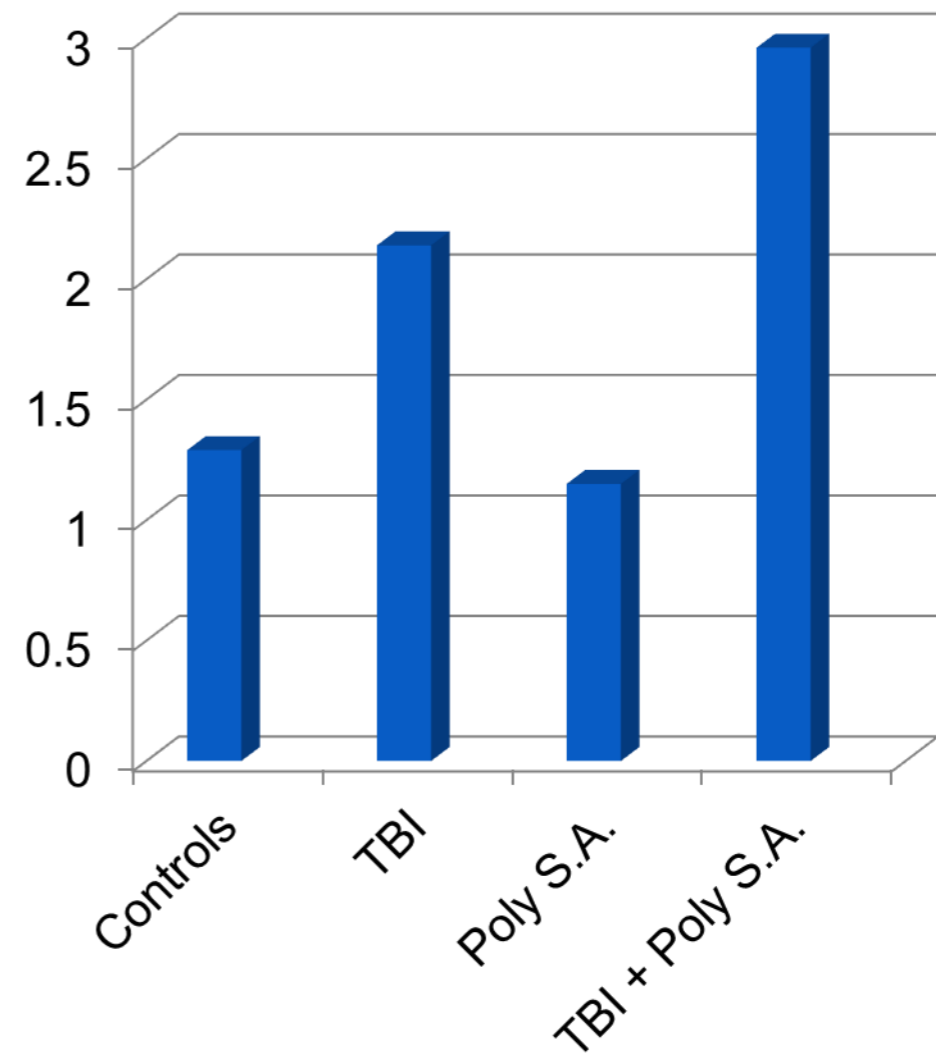


# Ventricle to brain ratio

Bigler, et al., 1996



Barker, et al., 1999



# Summary

Defined high risk substance use and substance use disorders

People who use substances in a harmful way are at risk for acquiring a brain injury

Brain injury and substance use are worse in combination than either on its own

# A window of opportunity

Many people who return to heavy drinking do abstain for a period of one to two years

**Secondary prevention has great potential to reduce morbidity**

# Natural History of TBI to Age 25

(McKinlay et al., 2008)

1,265 children born in 1977 in Christchurch, New Zealand and followed to age 25

Annual assessments from 4 months to age 16, then at 18, 21 and 25

Verified through medical records all TBI's diagnosed by a professional (MD office, ED, hospitalized)

79.3% successfully followed through age 25

# Early Injury as Predictor of Later Problems

Compared to no TBI and outpatient only, by early adolescence (10-13 y.o.) those **hospitalized with a mild TBI before age 6** were:

More hyperactive and inattentive as rated by parent and teacher

More likely dx'd with ADHD, conduct disorder or oppositional defiant behavior

More likely to have **substance abuse problems**

More likely to demonstrate mood disorders

# Early Injury as Predictor of Later Problems (continued)

- By late adolescence and early adulthood (16-25 years old):
  - Those hospitalized with 1st TBI before age 6, **3 times more likely to have a diagnosis of either alcohol or drug dependence by age 25**
  - Those hospitalized with 1st TBI 16-21,  
**3 times more likely to be diagnosed with drug dependence**
  - TBI highly associated with likelihood of arrest



## Concussions linked to increase in suicides, criminality, bullying: St. Mike's study

Researchers at St. Michael's Hospital found that teens with serious concussions were more likely to become bullies, and to be bullied.



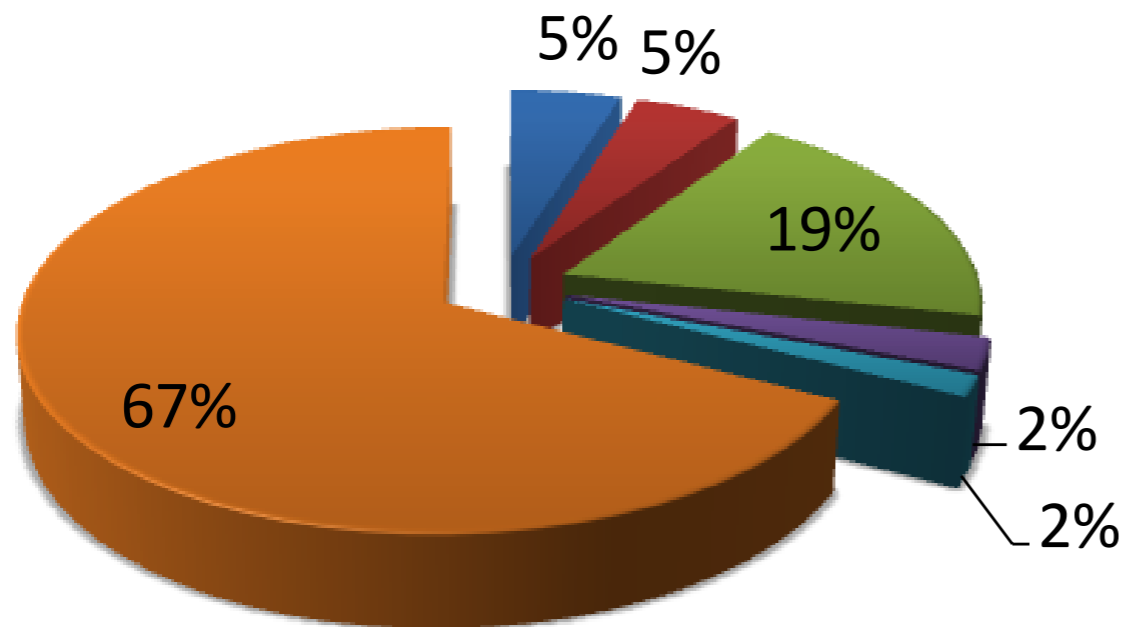
- psychological distress (AOR = 1.52),
- attempting suicide (AOR = 3.39),
- prescribed medication for anxiety, depression, or both (AOR = 2.45).

# Outcomes of Childhood Injury

# From All Addictions Programs at CAMH main campus

## Most Severe Injury

- Improbable
- Possible
- Mild
- Moderate
- Severe
- None



N= 2521

28% w/LOC  
occurred before the  
age of 15.

	No ABI with LOC N=1180	1 ABI with LOC N=286	2 or more ABI with LOC N=75	F*
Alcohol	19.09 (12.49)	22.57 (11.82)	22.68 (11.57)	p=.000
Alcohol to intoxication	12.36 (12.18)	14.66 (12.29)	17.69 (13.03)	p=.000
Amphetamines	.624 (2.40)	.385 (1.70)	1.03 (3.81)	p=.085
Cocaine	5.02 (7.95)	7.27 (8.90)	6.66 (8.68)	p=.000
Cannabis	8.57 (10.39)	11.00 (12.33)	11.17 (14.81)	p=.005
Lifetime DTs	.513 (4.18)	1.62 (9.10)	1.95 (6.42)	p=.027
* Welch robust test of equality of means				

# Lifetime Substance Use (Years)

	<b>No ABI with LOC N=1180</b>	<b>1 ABI with LOC N=286</b>	<b>2 or more ABI with LOC N=75</b>	<b>F*</b>
Alcohol Treatmen t	.794 (3.55)	1.25 (2.97)	1.63 (3.97)	p=.029
Drug Treatmen t	.747 (2.28)	1.02 (2.44)	1.24 (2.15)	p=.051
* Welch robust test of equality of means				

Number of previous episodes of inpatient  
treatment