Traumatic Brain Injury in the Criminal Justice Population

JUSTICE CENTER
THE COUNCIL OF STATE GOVERNMENTS
Collaborative Approaches to Public Safety

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Parts of this training were developed as a part of the Maricopa County Justice & Mental Health Collaboration Project.

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Today's Presentation

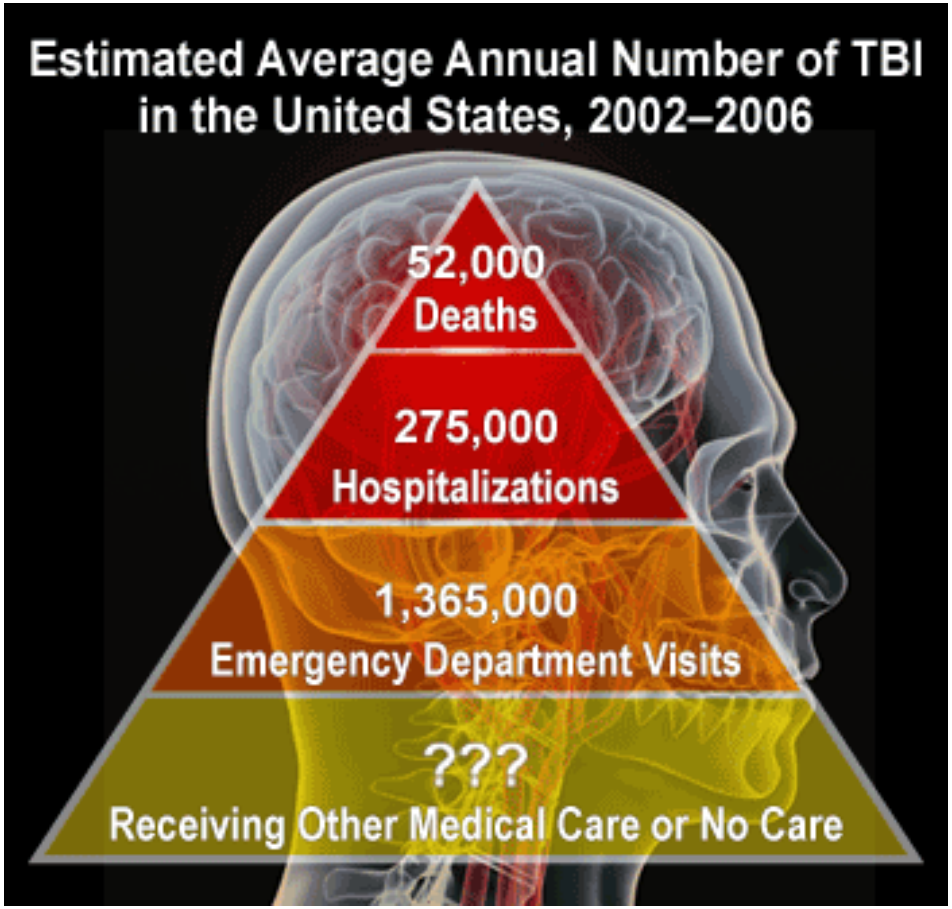
- What is TBI
- TBI and Behavior
- TBI in Criminal Justice Populations
- Implications for Supervision and Rehabilitation

Prevalence

- **In the United States...**
  - At least 3 TBIs occur every minute.
  - 15.3 million people live with TBI-related disability
  - TBIs cost Americans $76.5 billion in medical care, rehabilitation, and loss of work every year

According to the CDC…

A traumatic brain injury (TBI) is caused by a blow or jolt to the head or a penetrating head injury that disrupts the normal function of the brain. Not all blows or jolts to the head result in a TBI. The severity of a TBI may range from "mild," i.e., a brief change in mental status or consciousness to "severe," i.e., an extended period of unconsciousness or amnesia after the injury.

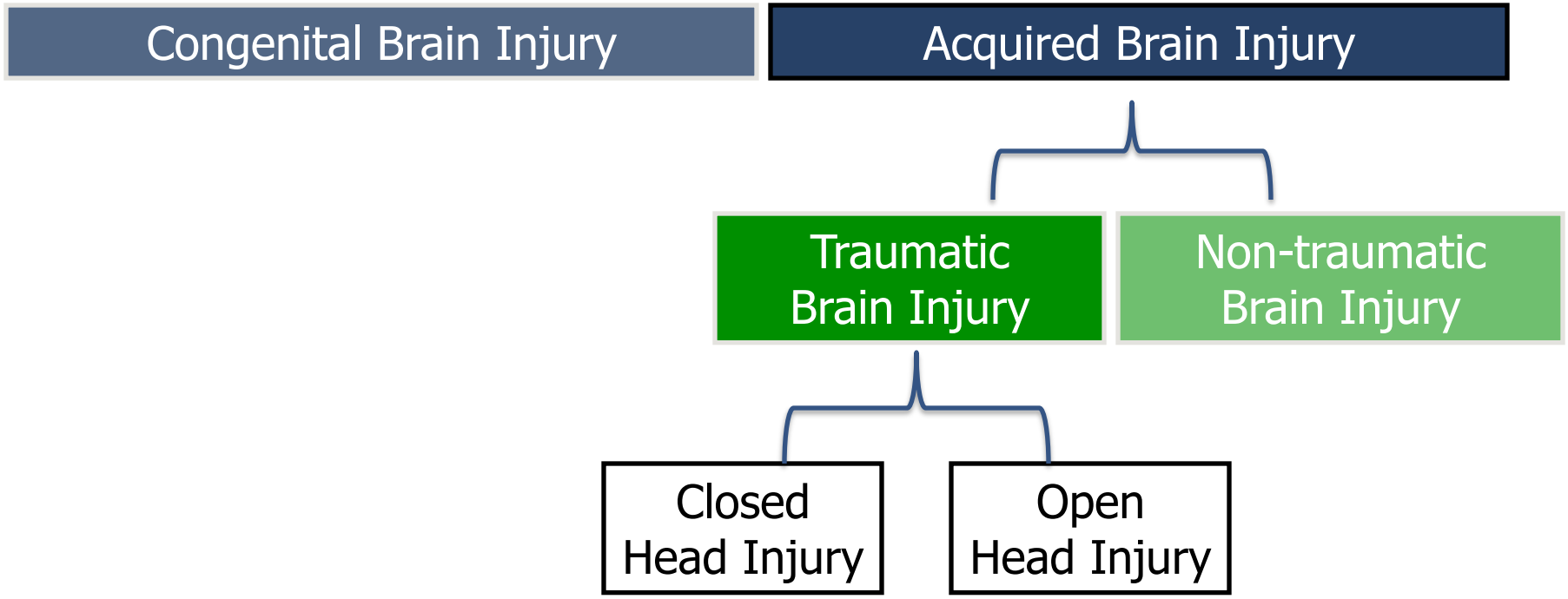


Traumatic Brain Injury

- Leading cause of death and disability in children.
- 400,000 brain injuries in children under 15 every year.
- More than half of TBIs occur before age 25.

Source: CDC, 2001

Types of Brain Injury



Source: Savage, 1991

Defining Severity

Measures

- Glasgow Coma Scale (GCS)
  - Eye opening
  - Motor response
  - Verbal Response
- Loss of Consciousness (LOC)
- CT Scan

Mild:

- Altered or Loss of Consciousness <30 min. with normal CT

  and/or

- MRI GCS 13-15 PTA < 24 hours

Moderate:

- LOC < 6 hours with abnormal CT

  and/or

- MRI GCS 9-12 PTA <7days

Severe:

- LOC > 6 hours with abnormal CT

  and/or

- MRI GCS<9 PTA>7 days

TBI Severity

Mild 85%

- Seen in ER or MD office
- Often unreported or undiagnosed
- 15% of these will continue to have chronic problems
- The majority of pediatric TBIs are mild, especially in children ages 5 to 14

Moderate/Severe 15%

- Hospitalized
- Rehabilitation

Sources: Asarnow, et al., 1995; DiScala, Osberg, & Savage, 1997; Kraus, 1995

TBI Severity and Recovery

- Most people with mild TBI make a complete recovery (80% to 90%)
- “Miserable minority” have chronic disability
- Recovery typically takes place in weeks or months (if at all)

Source: Ruff et al., 1996

Ideal Brain Injury Rehabilitation

- Physical Therapy
- Occupational Therapy
- Speech Therapy/Cognitive Retraining
- Neuropsychology
- Neuro-psychiatry
- Social Work
- Recreational Therapy
- Physiatry
- Neurology

Physical Effects of TBI

- Impaired Mobility
- Impaired Sensory Experiences - overstimulation
- Seizure disorders – alterations in brain functioning between seizures - may introduce a variety of psychiatric dimensions.
- Fatigability – physical and mental
- Chronic Pain
- Headaches
- Sleep Disorders (especially important during adolescence. Sleep – critical for adolescent brain development and brain function. Sleep or lack of it can effect new learning and memory.)
- Dizziness

Cognitive Effects of TBI

- Reduction in abstract reasoning capacity
- Difficulty grasping the main point of a discussion
- Difficulty applying points of interest to one's life
- Reductions in complex information processing skills
- Impaired attention and concentration
- Heightened distractibility
- Difficulty with new learning and short term memory
- Increased mental fatigue
- Subtle communication problems (e.g. tangentially)
- Judgment problems
- Visual-spatial impairments, including trouble with directions, mechanical tasks, or visual field defects
- Low fatigue thresholds
- Problems with planning and organizing
- Initiation deficits
- Confusion and perplexity
- Problems with flexibility of thinking
- Basic intellectual deficits as measured by IQ
- Slowness in thinking and performance

Emotional/Behavioral Effects of TBI

- Disinhibition
- Suspiciousness
- Impulsivity
- Lack of awareness of deficit and unrealistic appraisal
- Reductions in or lack of the capacity for empathy; inability to experience emotions
- Childlike emotional reactions or behavior
- Uncontrolled laughing or crying; mood swings (emotional labality)
- Preoccupation with one's own concerns (egocentrism)
- Poor social judgment
- Rage reactions
- Euphoria
- "Flat" affect
- Agitation
- Reduced or altered sense of humor
- Low frustration tolerance
- Misperception of other people's facial expressions/ intentions; inability to perceive emotions
- Hyper-sexuality or hypo-sexuality
- Catastrophic emotional reactions

Higher Prevalence of TBI in Justice Involved Populations

- Prevalence of TBI in prisoners is as high as 60%
- Childhood TBI is predictive of future offending behavior
  - Defined 3 groups who sustained childhood injuries age 0-17, at least 5 years ago
    - Moderate/Severe TBI group
    - Mild TBI group
    - Orthopedic control group (sustained fractured limbs without TBI)
  - Moderate/Severe TBI group were more likely to have a history of
    - Offending behavior
    - Arrest
    - Conviction
    - Petty Crime

Source: McKinlay et al., 2013

Associated With Infraction in Prison

- Prospective Cohort Study, Shiroma et al 2010
  - Defined individuals with medically attended TBI as ED or hospital discharges with TBI ICD-9s
  - Those without TBI were older, more likely to be black, had a higher proportion of violent offence convictions, had longer sentences, and had served more time
  - Overall prevalence of a history of medically attended TBI while incarcerated was 1.19% in males and 0.93% in females

Associated With Infraction in Prison

- TBI cohort had higher rates of infractions per year (1.81 vs 1.57)
- Controlled for age, violent crime conviction, prior criminal history, security level, sentence length
- Found an increased rate of infraction for males (32% more) and non-significant increased rate for females (8%)

Still, causality has not been established

Source: Shiroma et al., 2010

Male/Female Violence and TBI

- Among male prisoners, history of TBI is strongly associated with perpetration of violence and other kinds of violence
- Women inmates who are convicted of a violent crime are more likely to have sustained a pre crime TBI and/or some other form of physical abuse

Sources: Cohen RA, et al. 1999;
Brewer SK, Burgess AW, Shults J, 2004

TBI and Intimate Partner Violence

- Women prisoners report significant histories of domestic violence. Between 57 and 75% of imprisoned women experienced physical, psychological and/or sexual violence before prison.

- BRAINS and Domestic Violence Project

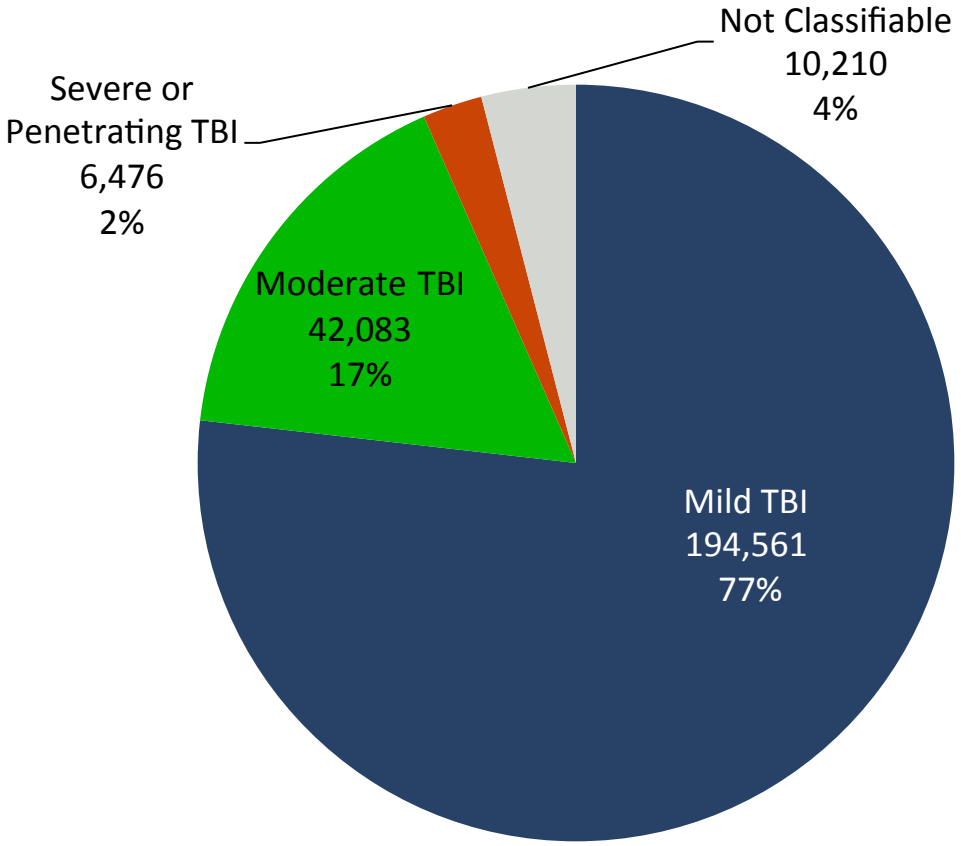
Homelessness

Homelessness has been found to be related to both head injury and prior imprisonment

- Lack of appropriate care following TBI
- Street related violence
- Foster care
- Street Living
- Modes of transport

Source: Kushel MB, et al. 2005

U.S. Military Casualty Statistics - TBI: Operation New Dawn, Operation Iraqi Freedom, and Operation Enduring Freedom 2000-2012



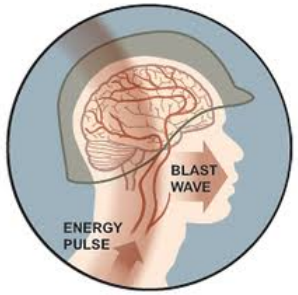
Source: Congressional Research Service, 2013;
Original chart created by Dr. Micheal Carino, Army Office of the Surgeon General, 2012

Veterans and TBI

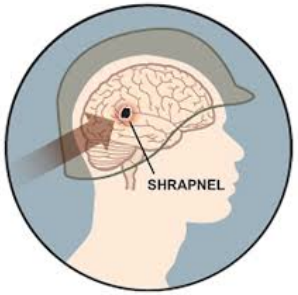
- Blasts account for 2/3 of combat injuries in Operation Iraqi Freedom and Operation Enduring Freedom
- 1 in 5 U.S. soldiers from Iraq and Afghanistan return with a mild TBI
- Among veterans, high association of mild TBI and PTSD

Source: Elder, GA and Cristian, A, 2009; BrainlineMilitary2009; Photo credit: Graphic by Al Granberg, Krista Kjellman-Schmidt, and ProPublica

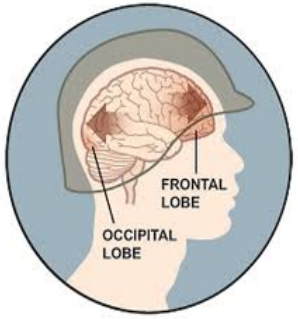
Types of Blast Injuries



Primary Blast Injury
Direct injury from blast overpressure waves, shock waves



Secondary Blast Injury
Energized fragments propelled by the explosion impact head



Tertiary Blast Injury
Individuals thrown by the blast and collide with objects or structures

Substance Abuse Disorders

- Before their injury, people who sustain a TBI are twice as likely as others in the community to have issues with substance abuse – the use may have led to the injury
- Some studies suggest that use may get worse 2 to 5 years post injury
- Prisoners self reported health indicate those with one or more head injuries have significantly higher levels of alcohol and/or drug use during the year preceding their incarceration

Source: Allen D.N., and Landis, R.K., 1998

Behavioral Health and TBI

- 73% of women in state prison have been diagnosed with a mental health problem
- Research is showing that there is a high prevalence of individuals reporting TBI with co-occuring substance disorder and severe mental illness, one study reports up to 72%
- Symptoms like paranoia, obsessional disorder, depression
- PTSD

Impact on Behavior in Corrections

TBI Consequences	Functional Impact on Behavior
Attention Deficits →	Difficulty focusing on or responding to required tasks or directions
Memory Deficits →	Difficulty to understanding or remembering rules or directions
Irritability or Anger →	Incidents with other inmate or correctional officers
Slowed Verbal and Physical Responses →	May seem uncooperative
Uninhibited or Impulsive Behavior →	Problems controlling anger and unacceptable sexual behaviors

Screening and Assessment

- Screening
  - Several instruments
    - TBIQ – about 15 minutes to administer, validated in correctional populations, may be longer if multiple positives
    - OSU TBI-ID- about 5 minutes to administer
    - HELPS TBI – about 5 minutes to administer
  - Drawbacks
    - Time consuming, especially with several positives
    - Unclear how a positive for an individual should inform care, given the high prevalence across the board
  - Rikers strategy
    1. Screen a small sample to establish high prevalence
    2. Consider population level interventions
    3. Decided against implementation of system-wide intake screening

What can we do in jail?

- Assess prevalence (incoming adolescent patients)

  TBIQ*

  Screening (head injuries)

  Injury detail (mechanism, amnesia)

  Symptom checklist
- Assess incidence
  - Injury surveillance

Source: Diamond PM et al. J Head Trauma Rehabil. 2007 Nov-Dec;22(6):330-8.

Prevalence of TBI Among Newly Admitted Adolescents

	No injury or 1 minimal injury but no altered state	Multiple minimal	TBI (≥ 1 injury with altered mental state)	Total
N	125	68	191	384
Male	98	52	149 (50%)	300
Female	27	16	41 (48.8%)	84
Age (mean)	17.1	17.2	17.2	17.2
M status	5.6%	10.3%	15.2%**	11.2%
N of reported Injuries	.72	3.5	5.4**	3.5
Assault related injuries	20.0%	70.6%**	68.1%**	53.0%
TSSI***	1.01	1.26	1.70**	1.40
TSFI****	0.96	1.43	2.07**	1.59

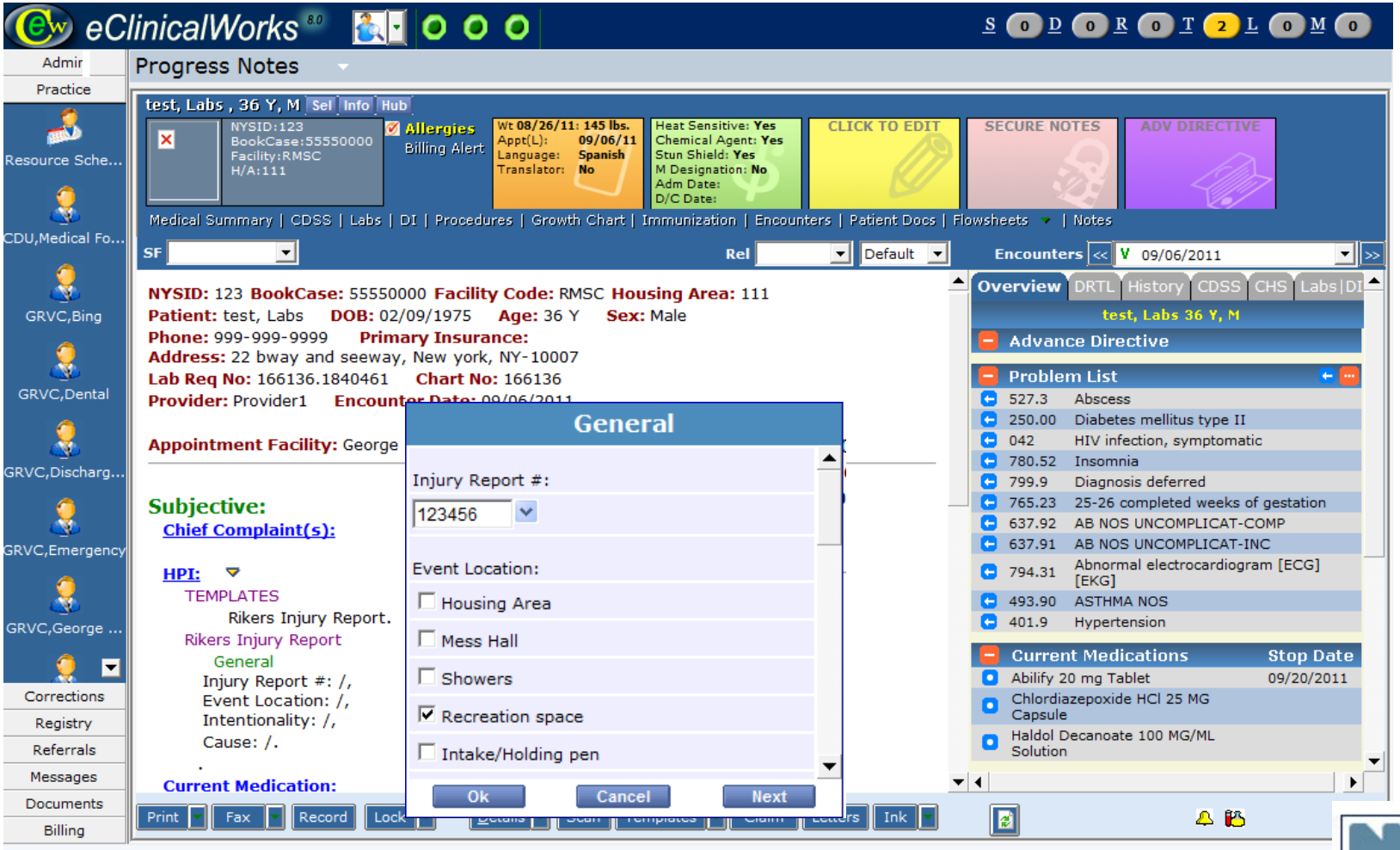
Table note: differences among categories determined by One Way ANOVA, Post Hoc Tukey
*P<0.05
** P<0.01
*** F(2,381) = 25.26, p<.001
**** F(2,380) =37.68, p<.001

TSSI: Total Symptom Severity Index. TSFI: Total Symptom Frequency Inventory

Overall Prevalence

- 384 screened patients
- Overall prevalence of TBI 49.5% (44.5%-54.5%)
- 63.9% had more than 1 arrest
- 56.1% of the no injury/minimal was a recidivist (Nov. 2008 – Sept. 2013)
- 71.7% of the multiple minimal was a recidivist
- 66.7% of the TBI group was a recidivist

Incidence-Rikers Injury Report Template



Concussion/mTBI Questions

Reason for Appointment

1. Injury report#784

History of Present Illness

TEMPLATES:

Pt involvedin a fight this evening and claims no inj,denies nausea,vomitting,LOC.

Injury Report:

General

Injury Report #: *784 /*
Event Location: *Housing Area /*
Intentionality: *Intentional /*
Cause: *inmate-on-inmate fight /*
Verified Injury: *Denies injury (and no visible injury) /*
Did the patient have a blow to the head? *No /*
Did the patient ever lose consciousness? *No /*
Was the patient ever dazed and confused after injury? *No /*

Vital Signs

TBI and Other Injuries. NYC Jails
June 1, 2012 – September 30, 2013 (16 Months)

	Injuries	Head Injuries	Risk per 1000 days	RR head injury	TBI Injury	Risk per 1000 days	RR TBI
ADULTS	20,317	2,761 (13.6%)	.389	Ref	530 (2.6%, 19.2%)	.0747	Ref
ADOLESCENTS	4,284	371 (8.6%)	.596	1.53* (1.37-1.70)	53 (1.2%, 14.3%)	.0851	1.13
TOTAL	24,601	3,132 (12.7%)	.405	-	583 (2.3%, 18.6)	.0755	-

Incidence of TBI in NYC Jails

	TBI per 100,000 Person Years	Methodology
Sports Related2	31.5	ED Encounters
2004 review3	100-300	Hospital Treated
2004 review3	600+	Estimate of Total, Accounting for Cases Not Seeking Hospital Care
New Zealand Community1	790	ED and Others
NYC Jails Adolescents	3107	Active Surveillance
NYC Jails Total	2756	Active Surveillance

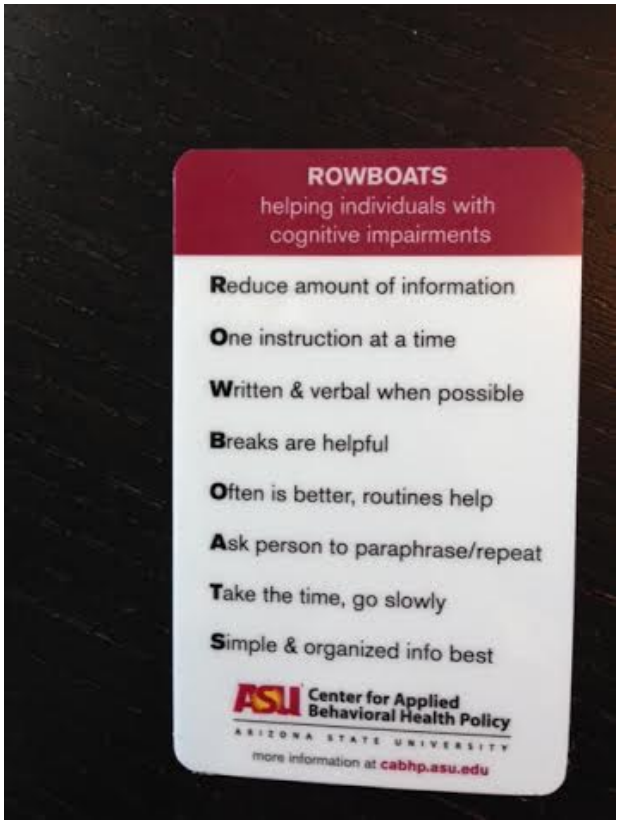
27/53 (50.9%) adolescent TBI were seen in ED or by on-island ED doctor

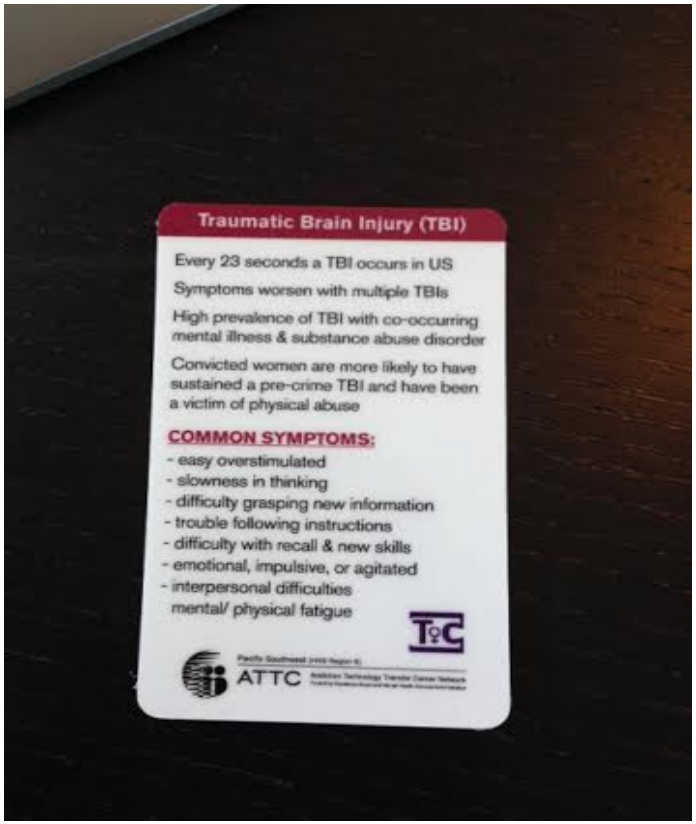
1. Feigin VL, et al. Lancet Neurol. 2013 Jan;12(1):53-64.
2. Selassie AW et al. 2013 Sep 20. doi:pii: S1047-2797(13)00318-9.
3. J. David Cassidy et al. J Rehabil Med 2004; Suppl. 43: 28–60

What Can We Do in Corrections?

- Provide acute care
  - Safe rooms
- Educate correctional staff
- Educate medical and mental health staff
- Provide programming to educate patients/begin group treatment
  - Our focus group experience
- Screening?
- Complexity of conferring special status
- Legal involvement?

ROWBOATS Tip Card



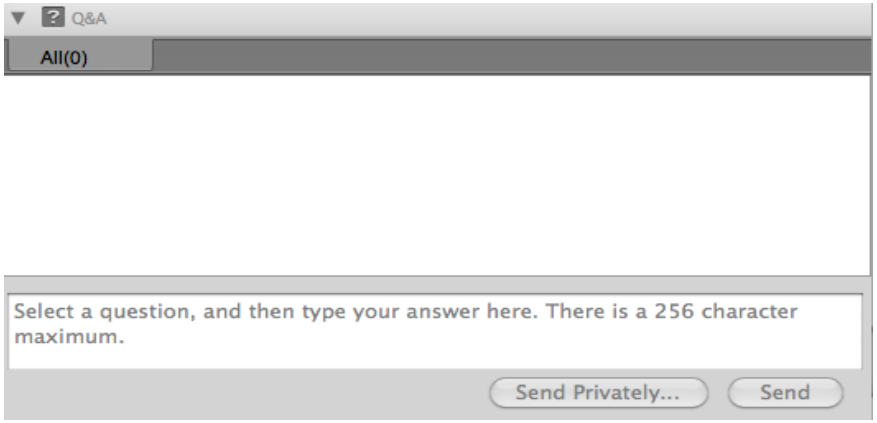


Minnesota Project

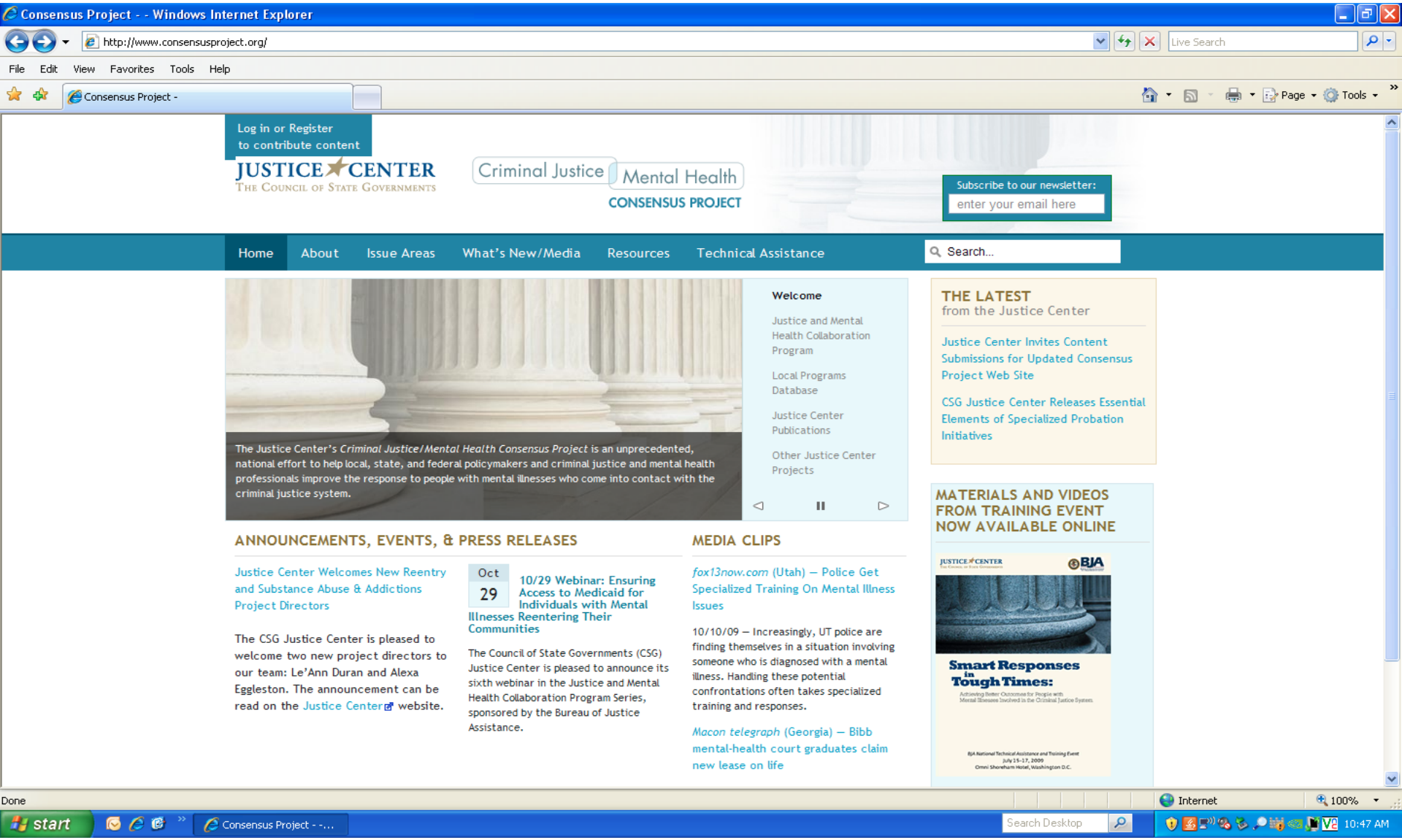
- 2006 Minnesota was awarded a State TBI Implementation Partnership Grant which is being conducted as an interagency effort entirely through the Minnesota DOC.
- *TBI in MN Correctional Facilities: Strategies for Successful Return to Community*, a three year project administered by US Department of Health & Human Services, Maternal & Child Health Bureau, Health Resources & Services Administration (HRSA)

Question and Answer Session

Please type your questions into the Q&A box at the lower right hand side of the screen.



Find us online at http://csgjusticecenter.org/mental-health/



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Thank You!

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