

**ASSESSING THE BEHAVIOR AND NEEDS OF VETERANS
WITH TRAUMATIC BRAIN INJURY IN WASHINGTON STATE PRISONS:
ESTABLISHING A FOUNDATION FOR POLICY, PRACTICE, AND EDUCATION**

FINAL REPORT

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May 2016



ACKNOWLEDGEMENTS

The authors of this report would like to thank the practitioners and stakeholders who helped us transform an idea into a reality. Specifically, we would like to thank Teri Herold-Prayer, Andy Phillips, and Holly Delcambre of the Washington State Department of Corrections for their expertise in data collection, training, and technical assistance with incarcerated veterans who have TBI. Our knowledge of Washington State Department of Corrections inmate record data systems was greatly enhanced by the assistance of Susan Koenig, Senior Database Manager. We also are indebted to the Washington State Traumatic Brain Injury Council and the Washington State Department of Social and Health Services for their financial assistance and institutional support. We are especially thankful to council members Eric Dean and Ben Rogers for their enthusiasm for a research project unlike any other in the United States. Finally, we would like to thank Michael Campagna, Washington State University Research Associate, for his database management work and coordination with WADOC research analysts.

ABSTRACT

A growing awareness of justice involved veterans is revealing how little is known about this population, to what extent they have experienced a traumatic brain injury (TBI), and how this may relate to their criminal history, institutional behavior, participation in programs, and use of institutional resources. As the Washington State Department of Corrections (WADOC) moves forward with the implementation of evidence-based practices and other innovative strategies to promote offender change, it is important to know whether TBI affected inmate veterans are unique in their ability to respond appropriately to the prison environment. In the current study of WADOC incarcerated veterans, we compare TBI affected to non-TBI affected individuals to understand how a TBI history may affect their prison experiences and use of prison resources.

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EXECUTIVE SUMMARY

Veterans incarcerated in the Washington State Department of Corrections were evaluated to determine whether having experienced a traumatic brain injury (TBI) at any time during their life affects their institutional behavior and use of prison resources when compared to incarcerated veterans who have not experienced a TBI in their life time.

Research Procedure and Sample

- WADOC staff contacted a total of 1,015 incarcerated veterans to be screened with the Ohio State TBI Assessment Tool between January-March 2015.
 - 94% TBI assessments were completed for a sample size of 955 inmates.
 - Inmate record data collected from OMNI were matched to the TBI assessment data, yielding a sample with the following characteristics:
- 98% male
- 79% white
- 49 years average age
- 54% classified as a low risk to reoffend followed by 17% as moderate, 16% as high-risk/high-violent, and 11% as high non-violent risk.
- 7.25 years (87 months) average time served as of March 2015; 33% were serving life sentences.

Traumatic Brain Injury

- 59% reported a TBI with a loss of consciousness (LOC).
- 38% reported a head injury resulting in a low level TBI (LOC < 30 minutes).
- 21% reported a moderate (LOC > 30 minutes) or severe TBI (LOC > 24 hours).
- 15 was the average age for the first TBI experience among study respondents.

- 2.9 is the average number of head injuries reported by respondents.
- One third experienced two or more TBI's in their lifetime.
- 31% experience 2 or more TBIs by age 15 in which at least one was moderate to severe.

- 33% reported experiencing a TBI during their military service.
- 19% reported a loss of consciousness due to a drug overdose; 11% alcohol blackout.
- 17% reported a loss of consciousness due to choking.
- 3% reported a TBI due to child abuse.

Prison Program Participation

- No group differences were found for rehabilitation or life skills programs.
- TBI Veterans completed significantly fewer education and jobs skills programs, relative to non-TBI Veterans (1.8 vs. 2.6).
- TBI Veterans have a 41% decrease in the incident rate of completing education and job skills programs.

Medical Services

- TBI Veterans were significantly more likely to use medical services than non-TBI Veterans.
- TBI Veterans had a
 - 17% increase in the incident rate of medical visits.
 - 32% increase in the incident rate of medication use.
 - 40% increase in the incident rate of psychiatric medication use.
- TBI Veterans were more likely to be assessed as having a mental illness, relative to non-TBI Veterans (37% vs. 25%).

Prison Rule Infractions

- No group differences were found for non-violent infractions.
- 21% of incarcerated veterans committed a violent infraction
 - Among this group of study participants, TBI Veterans had a 56% increase in the incidence of violent infractions, relative to non-TBI Veterans.

Maximum Custody Use

- TBI Veterans were significantly more likely to be placed in maximum custody cells and to remain there longer than non-TBI Veterans.
- TBI Veterans had a
 - 43% increase in the incident rate of being placed in maximum custody
 - 21.5% increase in the incident rate of staying in maximum custody for a longer period of time.

ASSESSING THE BEHAVIOR AND NEEDS OF VETERANS WITH TRAUMATIC BRAIN INJURY IN WASHINGTON STATE PRISONS

The decade long wars in Afghanistan and Iraq have heightened our awareness of the stressors related to military service and the challenges associated with transition from military to civilian life. A growing awareness of veterans in general has revealed that traumatic experiences during war time deployments and the stressors of reintegrating back into families, civilian work, and the community can be a difficult process. The media has highlighted many veterans being met with unemployment, homelessness, substance abuse, and untreated mental illness upon their return home. These concerns have motivated communities and government agencies to be more responsive to veteran's needs including veterans who become involved with the criminal justice system. As an increasing number of veterans enter the prison system compared to previous generations of veterans, it is important to understand how they experience jail or prison and how treatment, support programs, and institutional resources may be adapted to serve both their risk and needs.

The Washington State Department of Corrections (WADOC) has identified veterans as an important segment of the inmate population and has implemented specialized veteran's units, veteran support groups, and a partnership with the Washington Department of Veterans Affairs. Although the WADOC is moving forward to be more responsive to the needs of incarcerated veterans, a growing awareness of justice involved veterans is revealing how little is known about this population, to what extent they have experienced a traumatic brain injury, and how this may relate to their criminal history, institutional behavior, participation in programs, and use of institutional resources. As the DOC moves forward with the implementation of evidence-based practices and other innovative strategies to promote offender change, it is important to know

whether TBI affected inmates are unique in their ability to respond appropriately to the prison environment. This study answers the following questions:

1. How many incarcerated veterans in Washington have a mild, moderate, or severe TBI?
2. How do incarcerated TBI-veterans compare to non-TBI veterans related to institutional behavior and use of resources?

Traumatic Brain Injury (TBI) and Incarcerated Veterans

Traumatic Brain Injury (also referred to as TBI) is an acute injury to the head or upper extremities that typically involves the following characteristics: loss or alteration of consciousness, memory loss, and/or hypotension. As is the case with most conditions, TBI can be mild (loss of consciousness < 30 minutes; altered mental state of up to 24 hours); moderate (loss of consciousness > 30 minutes but < 24 hours; altered mental state for > 24 hours); or severe (loss of consciousness for > 24 hours; memory loss for a week or more). This condition can complicate inmates' efforts to successfully adapt to prison life and positively engage programming during their incarceration.

Prior research has linked TBI to higher rates of aggression among affected inmates, endangering both inmates and correctional staff (Greve et al, 2001; Slaughter et al., 2003). Prisoners with TBI experience more difficulty comprehending and following prison rules than non-TBI prisoners, and also use crisis intervention services more often than non-TBI inmates (Piccolino & Solberg, 2014). In recent years, many prisoners with TBI have been identified as veterans (Pinals, 2010). Despite the smaller proportion of justice-involved veterans who served in Iraq and/or Afghanistan, relative to Vietnam and World War II, they are incarcerated at higher

rates than these prior cohorts of service men and women (Culp, Youstin, Englander, & Lynch, 2011). A 2013 report prepared by the Center for Health Care Evaluation for the Department of Veterans Affairs showed that nearly two thirds of justice-involved veterans struggle with substance abuse, making them more prone to illegal behavior and, once in the justice system, more likely to recidivate. TBI also places individuals at higher risk of suicide, and when combined with the stressors related to incarceration, could become an additional threat to the wellbeing of veterans with a history of TBI (Wortzel et al., 2009). Beginning in 2012, Washington State Department of Corrections began tracking the veteran status of inmates as well as studying the prevalence of TBI among prisoners (Phillips, 2013). By identifying inmates with TBI, WADOC staff can better address these inmates' needs and help them be successful during and after incarceration.

PART 1: METHODOLOGY

Research Setting

The Washington State Department of Corrections (WADOC) has 12 prisons located throughout the state with an inmate population of 17,498 (WADOC, 2015a). The inmate population is 93 percent male, 72 percent white, with an average age of 38.2 years. Seventy-one percent of Washington's inmates are incarcerated for violent crime, average 23.4 months in prison and approximately 30.4 percent will return to prison within three years of release (WADOC, 2015b). An internal study conducted by the WADOC estimated that 36 percent of offenders living in Washington's prisons have a history of TBI with 7.6 percent of these reporting a moderate to severe TBI history (Phillips, 2013). Approximately 8 percent of the WADOC inmate population are identified as veterans through the Public Assistance Reporting System (PARIS), the Veteran

Reentry Search Service (VRSS), or through self-identification as a veteran (Lutze, Herold-Prayer, & Drapela, 2015).

WADOC recently began to proactively identify incarcerated veterans, determine their veteran's benefit status, and connect veterans with representatives from the Washington State Department of Veteran's Affairs to assure inmates and their families were receiving their earned benefits. Through the process of identifying veterans at each institution, the WADOC assigned a Veteran's Manager to oversee the development of specific units, also known as "Vet Pods," to address the needs of veterans. At the time of this study the WADOC had recently (2013) developed Vet Pods at two facilities to house only military veterans from any war era. The Vet Pods are designed to enhance the core values of "honor, integrity, service, respect, and personal initiative."

Through the process of identifying the number of overall inmates with a lifetime history of TBI, identifying the number of veterans living within the prison system, and developing the Vet Pods, the WADOC discovered that they knew very little about how veterans, with or without a TBI, experienced prison. How do TBI affected and non-TBI affected incarcerated veterans participate in and complete correctional programming? How do they interact with other inmates and staff, use medical services, and/or use intensive management units (IMU's)? With a growing societal concern about TBI and justice involved veterans, it is important to know how TBI-veterans may experience the prison compared to non-TBI veterans.

Research Procedure

To assess both TBI and veteran's prison experiences, two sources of data were collected for this study. First, WADOC staff administered the publicly available *Ohio State University Traumatic Brain Injury Identification Method* (2012) assessment tool to determine veteran's self-reported lifetime history of ever having experienced a TBI (referred to as TBI Assessment for the

remainder of the study). Face-to-face interviews were conducted with veterans between February and April 2015. Inmate participation in the TBI Assessment process was voluntary. The interviews took 5 to 25 minutes to complete, depending on the number of TBIs participants reported. TBI Assessments were recorded by the interviewer on paper interview instruments during the face-to-face interviews. Washington State University researchers recorded each TBI Assessment into SPSS and electronically calculated the TBI severity score.

Second, official record data from the WADOC Offender Management Information (OMNI) system was used to determine inmate's institutional experiences. These data were merged with the TBI Assessment data to create a single data set. Those veterans assessed as having a moderate to severe TBI were compared with veterans reporting no TBI or low/minimal TBI lifetime history. Finally, our procedures for the use and protection of human subjects' data were reviewed and approved by the Washington State University Internal Review Board (IRB).

Measures

The *Ohio State University Traumatic Brain Injury Identification Method* (TBI Assessment) (2012) uses five (5) probing questions to initiate respondents' recollections concerning trauma to the head (see Appendix A). The questions probe whether subjects in relationship to injuries to the neck or head have ever experienced hospitalization or been treated in an emergency room, experienced a moving vehicle accident, fallen or been hit by something, been in a fight or violently shaken, or been nearby when an explosion or blast occurred. If a respondent answers "yes" to any of these five questions, then the cause of the injury is recorded. For each cause, respondents are asked if they ever lost consciousness and for how long, whether they were dazed or experienced a memory gap, and at what age the incident occurred. In addition, subjects are asked how many times they have ever lost consciousness from a drug overdose or being choked.

Based on the TBI history, subjects who answered “no” to the first five probing questions and report never having lost consciousness, being dazed or experiencing a memory lapse, are classified as “improbable TBI.” Those experiencing no loss of consciousness (LOC), but report having been dazed or having memory lapses are classified as “possible mild TBI (no LOC).” Those reporting a LOC equal to or less than 30 minutes for any injury are classified as “mild TBI (with LOC).” Those who experience a LOC between 30 minutes and 24 hours are classified as “moderate TBI,” and those reporting a LOC for an injury that exceeds 24 hours are classified as “severe TBI.”

The *Ohio State University Traumatic Brain Injury Identification Method* (2012) has been validated on inmates. In 2009, the test-retest reliability statistics for a sample of inmates who were assessed with the OSU-TBI instrument ranged from .6 (acceptable) to .9 (excellent). Indices developed from OSU-TBI variables were able to predict a respectable amount of the variance in inmates’ behaviors such as depression, aggression, and cognitive symptoms (Bogner & Corrigan, 2009). In other research, inmate recall of TBI was strongly correlated with hospital records, suggesting that self-reported history of TBI is an acceptable way to measure this type of injury (Schofield, Butler, Hollis, & D’Este, 2011).

In addition to determining the number of veterans who experienced a TBI and the severity of the TBI, the TBI Assessment is used to determine the age at first injury, the worst injury, the number of injuries during a short period of time, and the number of anoxic injuries resulting in LOC due to drug overdose or oxygen deprivation due to choking. We also recorded whether the injury occurred in relationship to domestic violence, child abuse, or while serving in the military.

WADOC record data were used to collect demographic information, military service, criminal history, program participation, institutional behavior, use of medical resources, and use of maximum custody management unit resources (commonly known as solitary confinement).

Demographic characteristics include current age, race/ethnicity, sex, and education level. *Military service* is measured by military era (Vietnam, Korea, Desert Storm, Operation Iraqi Freedom [OIF], Operation Enduring Freedom [OEF]) branch of service (Air Force, Army, Marines, Navy, Coast Guard), and type of discharge (honorable, dishonorable, general, other). *Criminal history* is measured by number of prior incarcerations, sentence length, and risk to reoffend.

Program participation is measured by the number and type of rehabilitation programs (i.e., cognitive behavior programs, substance abuse, mental health, etc.), completion of educational and job programs (i.e., ABE, GED, employment skills, etc.), certificate programs (i.e., vocational training, etc.), and/or participation in life skills programs (i.e., parenting, money management, etc.).

Institutional behavior is measured by negative conduct and how inmates interact with others during their current incarceration. Infractions are measured by the number and type of violent assaults (inmate-to-inmate assault, inmate-to-staff assault), and rule violations (failure to comply with an order, out of bounds, possession of contraband, etc.).

Institutional resources are measured by several variables. *Medical* resources are measured by number of visits to medical services, general use medication, and use of psychiatric medications. *Maximum custody cells* use is measured by the number of times a person is sent to maximum custody and the total number of days assigned to maximum custody for whatever reason.

Research Sample

According to WADOC records, 8.7% of the 17,498 prisoners in the state are veterans (~N= 1,500) (Washington State Department of Corrections, 2015c). Only veterans residing in the major secure prisons, excluding minimum security camps, were contacted by WADOC staff and asked

if they would participate in the study. Of the 1,015 inmates contacted, 45 refused participation resulting in a 96% response rate. In addition, 4 inmates reported no military experience and therefore were not eligible for participation. An examination of the TBI Assessment Tool data revealed 7 assessments with incomplete data on key variables resulting in a final sample of 955 incarcerated veterans with complete data (94%). Comparisons of those who refused participation with those who participated showed no significant differences on demographic characteristics (results not shown).

Demographic characteristics. Incarcerated veterans in our sample are on average 49 years old, the majority are white¹ (79%), male (98%), and have at least a high school diploma (92%) with 39% having at least some education beyond achieving a high school diploma or GED (see Table 1). On average incarcerated veterans have spent approximately 7 years in prison for their current incarceration and one third (33%) are serving life sentences. According to the Static Risk Assessment (SRA) administered by the WA DOC, the majority of incarcerated veterans have been assessed as low risk to reoffend (54%), followed by moderate (18%), high violent (17%), and high non-violent risk (11%).²

¹ We were unable to differentiate ethnicity in the data. Therefore it is unknown how Latino is distributed throughout the race variable. Unfortunately race is captured via a White compared to all other races variable.

² The veteran population in our study appears to differ from the general inmate population. Our sample is older (49 vs. 38 years old) and more likely to be male (98 vs 92%), white (79 vs. 72%), serving a life sentence (33 vs. 16%), and more likely to be assessed low risk to reoffend (54 vs. 15%) when compared to the general population (DOC Fact Card, 2016).

Table 1. Sample Descriptive Statistics: TBI and non-TBI Veterans Comparisons

Variable	TBI Veterans n = 206		Non-TBI Veterans n = 749		Total Sample N = 955	
	%/M	(SD)	%/M	(SD)	%/M	(SD)
Age Current*	51.5	12.3	48.9	12.9	49.5	12.6
First admission to prison	39.6	13.2	37.9	13.4	38.2	13.0
Male	98.5		97.9		98.0	
White	83.5		78.2		79.4	
Time Incarcerated						
Current Sentence Time (years)	7.2		7.0		7.1	
Life Time (years)	9.1		8.8		8.9	
Times*	3.0		2.5		2.6	
Education > GED/HS	34.0		40.5		39.1	
Static Risk Assess. (SRA) ¹						
High Non-Violent (HNV)	11.3		9.2		10.9	
High Violent (HV)	21.8		15.1		16.5	
Moderate (MOD)	18.9		17.4		17.7	
Low (LOW)	49.5		55.7		54.3	
Current Offense						
Violent	46.6		38.4		40.1	
Nonviolent	53.4		61.6		59.9	
Military Branch ²						
Air Force	6.3		7.6		7.3	
Army	37.9		30.2		31.8	
Marines	9.7		8.8		9.0	
Navy	10.7		17.6		16.1	
National Guard	4.9		4.5		4.6	
Other ³	1.5		1.7		1.6	
Service Era						
Korea	0.5		0.3		0.3	
Vietnam	20.4		16.3		17.2	
1 st Gulf War	6.8		9.3		8.8	
Afghanistan and Iraq (OEF/OIF)	19.4		24.3		23.2	
Peace Time (any period)	52.9		49.8		50.5	

1. The risk scores utilized in this report come from the first administrations of the static risk assessment (SRA) for the offenders in the sample. 2. Nearly one-third (29.4%) of the duty data are missing. 3. The category "Other" includes Coast Guard (.4%), foreign military service (.4%), and reserves (.8%).

Statistical comparisons on demographic characteristics between the TBI and non-TBI veteran groups shows that the groups are very similar with no significant differences between groups for the demographic characteristics of sex, race, education, time incarcerated, and the static risk assessment. The groups did significantly differ in age with the TBI group being

significantly older (51.5 years) compared to the non-TBI group (48.9 years).³ Although the groups did not significantly differ on their average time served for their current incarceration, the range of time served differs for each veteran. Thus, age and time served during their current incarceration are controlled for in the multi-variate analyses.

Military service characteristics. The largest group of veterans served in the Army (~38%), followed by the Navy (11%), Marine Corp (~10%) and the Air Force (6%). The majority of incarcerated veterans (52.9%) in our sample completed their military service during peace time (see Figure 1). The majority of war era veterans served in the military during the either the Iraq and Afghanistan wars (2001-2014) or Vietnam (1961-1975). Military service in the first Gulf War (1990-1991), and the Korean Conflict (1950-1955; n=3 <1% of sample) were the least common among our sample.

Although a general anecdotal belief exists that incarcerated veterans receive dishonorable discharges from military service, our results show that the majority of incarcerated veterans (42%) were released from the military with honorable, general, or medical discharges (see Figure 2). Interestingly, nearly a third of the discharge type is unknown. This appears to be due to self-report data not recorded in the WA DOC's records.⁴

³ t-test=-2.53; df=953; p=.012)

⁴ The principle investigators are exploring methods to access missing or self-reported discharge data and will provide updates once these data become available.

Figure 1. Service Era

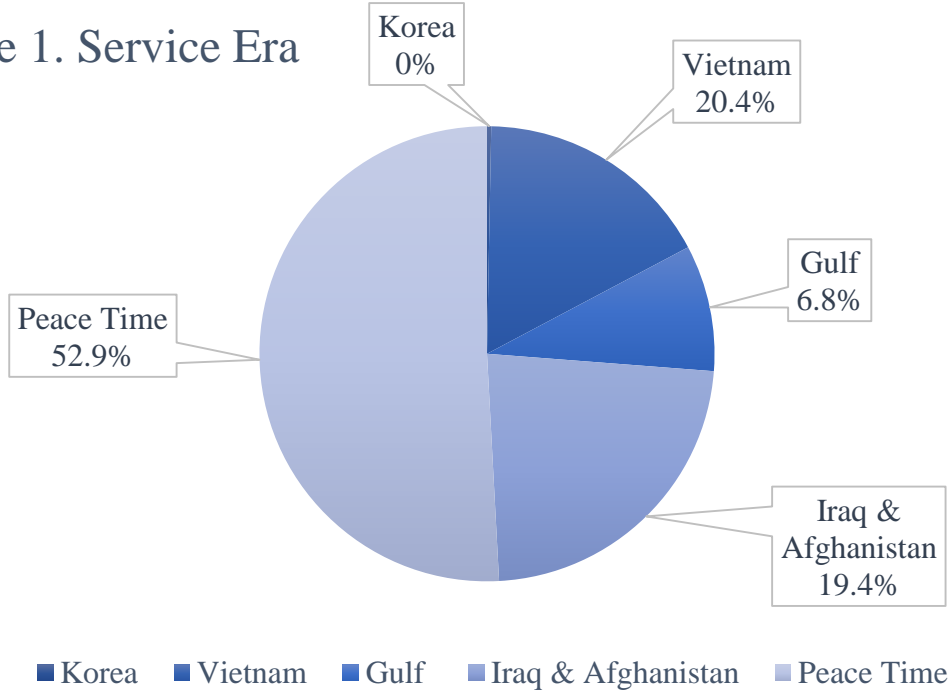
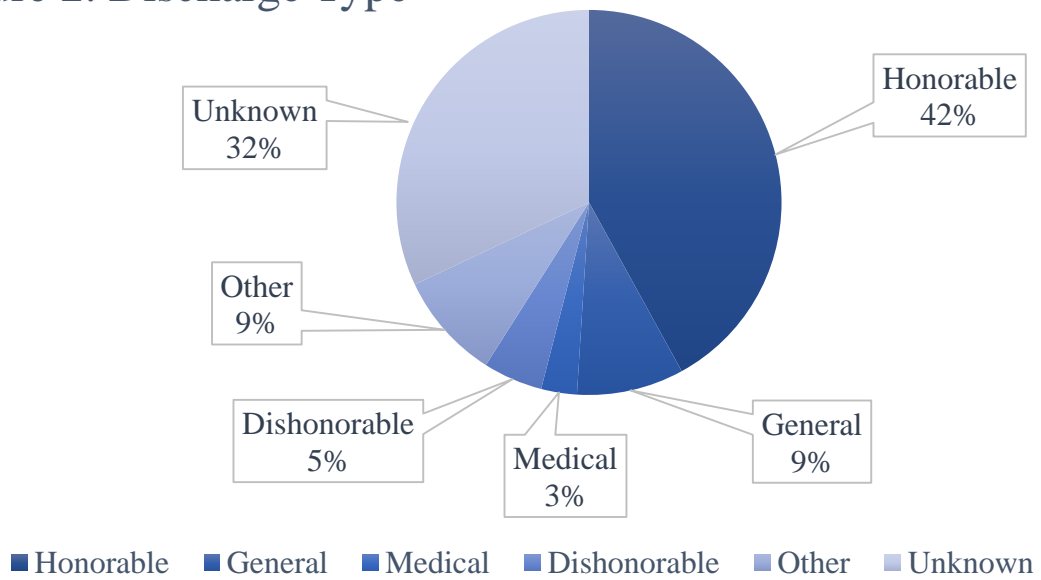


Figure 2. Discharge Type



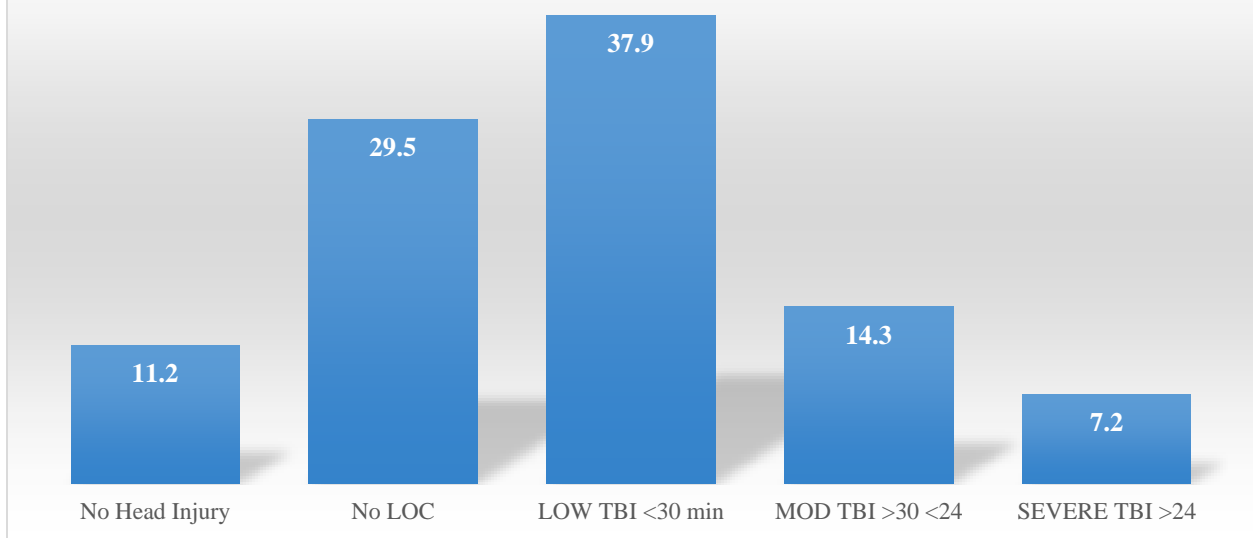
PART 2: FINDINGS

The findings are organized to answer our two main research questions related to (1) the number of incarcerated veterans assessed as having a low, moderate, or severe TBI; and (2) how TBI veterans compare to non-TBI veterans in their institutional behavior and use of institutional resources. First, we use univariate and bivariate statistics to describe the veteran population's experiences with TBI. Second, we use a quasi-experimental design to compare our treatment group (TBI veterans) with our comparison group (non-TBI veterans) to isolate the effect of TBI on each outcome. Finally, we use multivariate statistics to compare how veterans with moderate and severe TBI's compare to veterans with no- or improbable TBI's in relationship to program participation, institutional behavior, use of medical resources, and use of intensive management unit resources.

Results of the TBI Assessment and Incarcerated Veterans

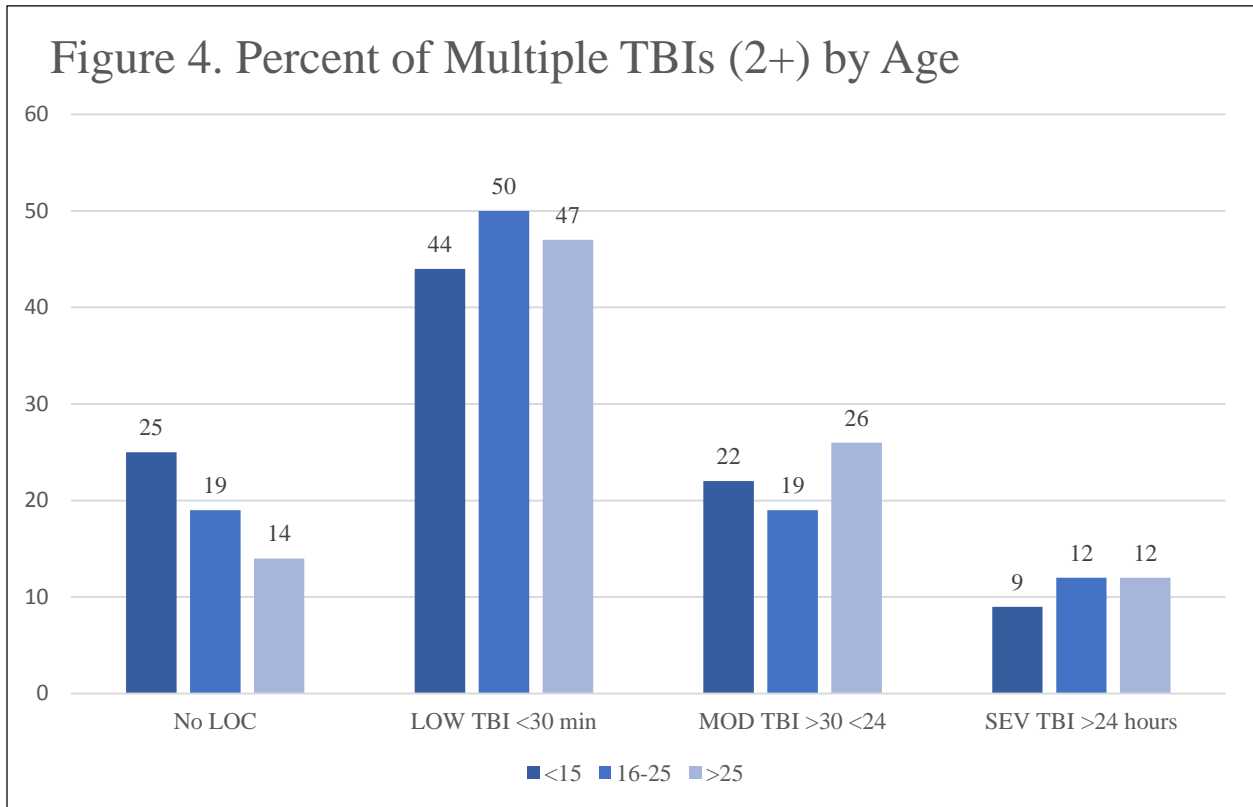
The results of the TBI Assessment show that 41 percent of the veteran population did not report a head injury or any loss of consciousness during their lifetime due to a head injury (see Figure 3). Thirty-eight percent report having experienced a mild TBI with a loss of consciousness (LOC) for less than 30 minutes, 14 percent a moderate TBI (LOC >30 minutes and <24 hours), and 7 percent a severe TBI (LOC > 24 hours) at some point in their lifetime. Of those reporting a TBI, 30 percent experienced a TBI as a result of their military experience either during training exercises or during war time deployment (results not shown).

Figure 3. Tramatic Brain Injury Severity



In addition to TBI severity, incarcerated veterans reported experiencing a number of TBIs over their lifetime. For example, 11 percent reported no TBI, 16 percent reported experiencing at least 1 TBI of any severity level, and 72 percent receiving two or more TBIs of any severity in their lifetime; reporting a range of 0-9 (the maximum recorded on the assessment) with a mean of 2.96. Prior research suggests that experiencing a TBI during periods of significant brain development may have a greater long term impact than experiencing a TBI later in life. In addition, experiencing multiple TBIs within a short period of time may also enhance the likelihood of long term complications. Figure 4 shows whether an incarcerated veteran experienced a TBI during childhood (<15 years old), young adulthood (16 to 25 years old), or adulthood (> 26 years old) and whether they experienced two or more TBIs of any severity within a 24 month period. Of the veterans reporting a TBI, 31 percent experienced two or more TBI's prior to the age of 15 in which one or more of the TBIs were assessed as moderate or

severe (see Figure 4). These findings are similar to those reported in the civilian, non-incarcerated, general population related to age of first TBI occurrence.



These descriptive findings suggest that TBI is a common experience for incarcerated veterans living in Washington’s prisons. It is clear that being a veteran and/or experiencing a TBI are relevant and important factors to consider when assessing the experiences of the inmate population and how the prison environment and offender change programs may be designed to address this population of inmates. The following analyses build upon these descriptive findings to determine how veterans and those with TBI experience the prison environment and utilize prison resources.

Prison Behavior and Resource Utilization

In this section we compare the (1) TBI-veteran group, those who have reported a moderate to severe TBI at any time in their life, to the (2) non-TBI veteran group who reported either no head injuries, a head injury with no loss of consciousness, and/or an improbable TBI (LOW <30 minutes LOC) due to a head injury at any period in their lives. We make comparisons between these two groups and their likelihood to participate in prison programs, use medical services, commit rule infractions, or spend time in solitary confinement.⁵

Prison Program Participation

The WADOC provides multiple opportunities for inmates to participate in offender change programs including cognitive-behavioral therapy, education, job skills training, and life skills programs related to a variety of topics. These programs tend to be geared toward assisting inmates to successfully cope with the prison environment as well as develop the skills necessary to be successful after release. Descriptive statistics show that 64 percent of incarcerated veterans during their current incarceration have participated in at least one rehabilitation program, 51 percent in a life skills program; 29 percent in an educational or job skills program; and 1 percent in family programs. Bivariate analyses comparing the TBI group with the non-TBI group shows no significant differences between groups for the total number of certificates earned (mean=9), participation in life skills programs (mean=<1), and rehabilitation programs (mean=1.8). Significant findings were found for participation in education and job skills programs with the TBI group (mean=.72) participating in significantly fewer programs than the non-TBI group (mean=1.4).⁶ The multivariate analyses confirm the bivariate findings. While holding constant

⁵ Solitary confinement is used to describe what is formally called “max custody” in the WA State DOC. Solitary confinement is used for the purposes of protection and serious disciplinary infractions. With the current data we cannot distinguish between the two reasons for solitary confinement at this time.

⁶ t-test: $t=2.45$; $df=957$; $p=.015$

the length of time incarcerated for their current offense and age, there is a 41 percent decrease in the incidence rate of completing education or job skills programs (see Table 2; $1 - .589 = .411$).

No significant differences were found between groups for rehabilitation or life skills programs.

Table 2: Negative Binomial Regression Models for Program Participation (N=948)

Variable	Rehabilitation			Education and Job Skills			Life Skills		
	Wald	Rate Ratio	p-value	Wald	Rate Ratio	p-value	Wald	Rate Ratio	p-value
TBI	.139	1.037	.710	18.702	.589	< .001	1.794	1.166	.180
Prison Time	6.523	1.000	.011	3.450	1.000	.063	10.975	1.000	.001
Age	4.480	.992	.034	108.892	.958	< .001	2.312	1.007	.128
Model Fit									
X ²	8.571*			145.829**			20.645**		
-2 Log Likelihood	-1728.648			-1363.113			-1201.253		

*.05; **.001

Medical Service Use

The bivariate results show that the TBI group was significantly more likely to use prison medical services during their current incarceration (mean=227 visits) compared to the non-TBI group (mean=173 visits).⁷ The multivariate analyses confirmed the bivariate findings. While holding constant the length of time incarcerated for their current offense and age, there is a 17 percent increase in the incidence rate of medical visits, a 32 percent increase in the incident rate of medication use, and a 40 percent increase in the incident rate of psychological related medication use (see Table 3, next page).

⁷ t-test: $t = 3.06$; $df = 953$; $p < .01$

Table 3: Negative Binomial Regression Models for Use of Medical Resources (N=948)

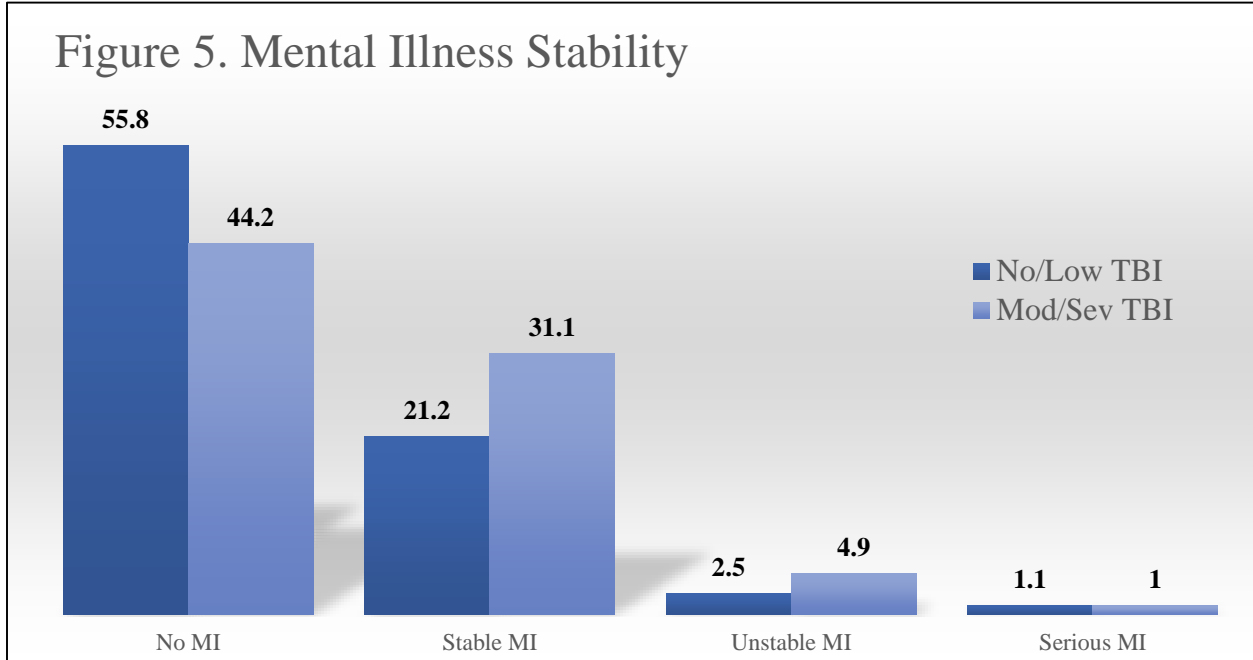
Variable	Medical Visits			Medication Use			Psychological Medication Use		
	Wald	Rate Ratio	p-value	Wald	Rate Ratio	p-value	Wald	Rate Ratio	p-value
TBI	3.858	1.169	.050	11.219	1.321	< .001	17.701	1.402	< .001
Prison Time	303.472	1.000	< .001	301.540	1.000	< .001	128.852	1.000	< .001
Age	25.426	1.014	< .001	332.818	1.054	< .001	.745	1.003	.388
Model Fit									
X ²	594.681**			1054.819**			199.503**		
-2 Log Likelihood	-5706.124			-5355.635			-4353.149		

** p < .001

An additional measure of medical services and psychological wellbeing is the assessment of an inmate’s mental illness stability. This is a static, descriptive measure taken at a single point in time with the purpose of relaying information to correctional staff about the steadiness of an inmate’s mental health status. Inmates with a moderate to severe TBI are more likely to be assessed with a mental illness (37% vs. 24.8%). A small percentage of veteran inmates are assessed as being in an unstable mental health status at any given time. For those veterans who are considered unstable, those with a moderate or severe TBI were nearly two times as likely to be unstable compared to those in the TBI group (4.9% vs. 2.5%) (see Figure 5).⁸

⁸ Approximately 20% of the mental illness stability data were missing for our sample. Thus, please interpret these results with caution.

Figure 5. Mental Illness Stability



Prison Rule Infractions

Eighty-two percent of incarcerated veterans committed at least one *non-violent infraction* and 21 percent committed at least one *violent infraction* during their current period of incarceration. The bivariate results show no significant differences between groups for the commission of non-violent infractions. The TBI group was significantly more likely to commit a violent infraction compared to the non-TBI group. The multivariate analyses confirmed the bivariate findings. While holding constant the length of time incarcerated for their current offense and age, for those with a moderate or severe TBI there is a 56.5 percent increase in the incidence rate of violent infractions (see Table 4).

Table 4. Negative Binomial Regression Models for Prison Infractions (N=948)

Variable	Non-Violent Infractions			Violent Infractions		
	Wald	Rate Ratio	p-value	Wald	Rate Ratio	p-value
TBI	.192	1.038	.661	10.348	1.565	.001
Prison Time	125.611	1.000	< .001	92.090	1.000	< .001
Age	9.756	.990	.002	15.278	.979	< .001
Model Fit						
X ²	158.497**			107.141**		
-2 Log Likelihood	-2960.640			-805.280		

** p < .001

Maximum Custody Use

The descriptive statistics show that the majority of incarcerated veterans (75%) have not spent any time in solitary confinement during their current incarceration. For those who sustain a moderate or severe TBI there is a 42.6% increase in the incident rate of being placed in maximum custody, commonly known as solitary confinement, and a 21.5% increase in the incident rate of staying in maximum custody for a longer period of time (see Table 5).

Table 5: Negative Binomial Regression Models for Maximum Custody (N=948)

Variable	Number of Times			Length of Time		
	Wald	Rate Ratio	p-value	Wald	Rate Ratio	p-value
TBI	11.162	1.426	.001	5.390	1.215	.020
Prison Time	132.515	1.000	< .001	521.645	1.000	< .001
Age	35.208	.978	< .001	103.659	.971	< .001
Model Fit						
X ²	175.768**			915.153**		
-2 Log Likelihood	-1365.574			-4062.741		

** p < .001

CONCLUSION AND POLICY IMPLICATIONS

The results of the current study include several important findings that may help to inform policy considerations for incarcerated veterans in Washington State. Our results show that 21 percent of incarcerated veterans reported having experienced a moderate to severe TBI during their lifetime. Our study shows that incarcerated veterans who have experienced a moderate to severe TBI, when compared to incarcerated veterans who have not experienced a TBI or report an improbable TBI during their lifetime, show significant differences in institutional behavior and the use of institutional resources. There are several important policy considerations to be made based on these findings.

First, it is important to note that nearly 60 percent of incarcerated veterans report having experienced a TBI during their lifetime that resulted in a loss of consciousness with one-third reporting that their TBI occurred during their military service. Prior research indicates that the severity, density, and age when a TBI occurs may result in inmates having more difficulty understanding and complying with prison rules and more likely to experience mental and physical health issues (Blonigen et al., 2014). Results of the current study show that a large proportion of incarcerated veterans, 1 in 5 (21%), reported having experienced a moderate to severe TBI at some point during their lifetime. Of the veterans reporting a TBI, 31 percent experienced two or more TBIs prior to the age of 15 in which one or more of the TBIs were assessed as moderate or severe. Thus, those with a moderate to severe TBI represent a large group of offenders living in Washington's prison who may need additional resources and programming to address their unique needs while incarcerated and once released to the community.

Second, the TBI and the non-TBI group appear to participate in rehabilitation and life skills programs at a similar rate, but the TBI group was significantly less likely than the non-TBI group to participate in education and job skills programs. These findings *do not reveal why* the TBI group is less likely to participate in these types of programs, but they are important to establishing the need to develop strategies to effectively motivate and prepare incarcerated veterans with TBI for participation in offender change programs during prison to improve their likelihood of success after release. Prior research clearly shows that education and work are important factors in reducing recidivism and achieving long term reintegration into the community (Lutze, Drapela, & Schaefer, 2015; Smith et al., 2006). Thus, understanding how to involve the TBI group in education and job skills programs and how to deliver such programs to TBI inmates may help to improve program participation while in prison and success after release for this population.

Third, those reporting TBI were significantly more likely to use medical resources than the non-TBI group. The TBI group was more likely to visit medical services, be on prescribed medications, and to be prescribed psychiatric medications. The results of the current study *do not reveal why* the TBI group uses medical services more than the non-TBI group, however, prior research suggests that those with a history of moderate to severe TBI have greater difficulty with cognitive processes, experience greater psychological diagnosis of depression and anxiety, and are sensitive to external stimuli (Blodgett, et al., 2015; Saxon et al., 2001). In addition, the physical trauma that caused the TBI often resulted in additional injuries that may produce chronic pain and physical disability. Thus, considerations may need to be given to moderating external stimuli in the prison environment such as noise and light, providing medical care that considers both the mental and physical aspects of TBI, or the consideration of alternative health

plans to holistically address the chronic needs of those with a history of TBI. Modifications in the prison environment or in the delivery of health services may reduce the reliance on medical services of those with moderate and severe TBI histories. In addition, innovative and enhanced health care alternatives may also improve behavioral outcomes related to violence and the use of maximum custody.

Fourth, incarcerated veterans reporting a moderate to severe TBI during their lifetime appear to behave differently than non-TBI group in regards to violent infractions. While we found no significant differences between these two groups related to non-violent infractions, veterans in the moderate/severe TBI group were significantly more likely than their non-TBI counterparts to commit a violent infraction during their incarceration. These findings are important as they relate directly to the safety and security of the institution and the wellbeing of others who live and work within the prison system. Our findings *do not reveal why* the TBI group behaves or experiences violence more often than the non-TBI comparison group.⁹ It may be that the TBI group experiences greater challenges in cognitively processing stimuli in the prison environment or possess the capacity to moderate their response to external stimuli. The TBI group may also be more vulnerable due to mental and physical health to victimization by other inmates, thus being placed in situations where violence is more likely to occur.

Finally, the TBI group was significantly more likely to be placed in maximum custody and to spend longer periods of time in maximum custody than the non-TBI group. Although the current study *does not reveal why* the TBI group is more likely to be placed in maximum custody cells and to spend more time there per visit, given the findings that the TBI group are more likely

⁹ Inmates who fight, whether they are the aggressor or the defender, may receive an infraction and spend time in maximum custody. Thus, the results of our study do not indicate whether TBI veterans are more or less likely to initiate violent interactions.

to experience mental health issues and to be incarcerated for violence, it is not surprising that the TBI group was more likely to use maximum custody cells. The ability to address the medical, psychological, and environmental needs of incarcerated veterans with TBI may reduce the need to use maximum custody confinement.

The cumulative results of this study suggest that incarcerated veterans with a moderate to severe TBI are a population worthy of the WA DOC's consideration in adapting programs, services, and policy. These findings suggest that incarcerated veterans that reported experiencing a moderate to severe TBI at some point during their lives experience the prison environment differently than those who have a low probability of ever having experienced a TBI or head injury. Although this study is limited to incarcerated veterans, prison administrators may want to more broadly consider ways to support inmates with a TBI and manage prison resources to effect positive outcomes.

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Appendix A: Ohio State University TBI Identification Method

Subject ID: _____ Current Age: _____ Interviewer initials: _____ Date: _____

Ohio State University TBI Identification Method—Short Form
(Version 4/11/12-Lifetime: to be used when querying about lifetime history of TBI)

I am going to ask you about injuries to your head or neck that you may have had anytime in your life.
Interviewer instruction: Record cause and any details provided spontaneously in the box at the bottom of the page. You do not need to ask further about loss of consciousness or other details during this step.

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.
 Yes—Record cause in table below
 No
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?
 Yes—Record cause in table below
 No
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?
 Yes—Record cause in table below
 No
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?
 Yes—Record cause in table below
 No
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.
 Yes—Record cause in table below
 No
6. If all above are “no” then proceed to question 7. If answered “yes” to *any* of the questions above, ask the following for each injury: **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			Dazed/Mem Gap		Age
	No LOC	< 30 min	30 min-24 hrs	Yes	No	

If more injuries with LOC: How many more? ___ Longest knocked out? ___ How many ≥ 30 mins.? ___ Youngest age? ___

7. Have you ever lost consciousness from a drug overdose or being choked? ___ # overdose ___ # choked

* adapted with permission from the Ohio State University TBI Identification Method (Corrigan, J.D., Bogner, J.A. (2007). Initial reliability and validity of the OSU TBI Identification Method. *J Head Trauma Rehabil*, 22(6):318-329,

SCORING

- _____ # **TBI-LOC** (number of TBI's with loss of consciousness from #6)
- _____ # **TBI-LOC \geq 30** (number of TBI's with loss of consciousness \geq 30 minutes from #6)
- _____ **age at first TBI-LOC** (youngest age from #6)
- _____ **TBI-LOC before age 15** (if youngest age from #6 $<$ 15 then =1, if \geq 15 then = 0)
- _____ **Worst Injury (1-5):**
 - If responses to #1-5 are "no" classify as 1 "improbable TBI".
 - If in response to #6 reports never having LOC, being dazed or having memory lapses classify as 1 "improbable TBI".
 - If in response to #6 reports being dazed or having a memory lapse classify as 2 "possible mild TBI (no LOC)".
 - If in response to #6 loss of consciousness (LOC) does not exceed 30 minutes for any injury classify as 3 "mild TBI (with LOC)".
 - If in response to #6 LOC for any one injury is between 30 minutes and 24 hours classify as 4 "moderate TBI".
 - If in response to #6 LOC for any one injury exceeds 24 hours classify as 5 "severe TBI".
- _____ # **anoxic injuries** (sum of incidents reported in #7)