

LIMBIC-CENC PHENOTYPES STUDY

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BLUF

- **Main Aim**: Using longitudinal DoD and VA data, identify risk factors for TBI comorbidities and using these develop models of risk from for those who were deployed vs. not deployed and access VA care vs. do not access VA care
- **Current Status**: Final Data Acquisition and Beginning Analysis
- **Clinical Deliverables**: Predictive model of Homeless and Incarceration
- **1-year Goals**: Complete data acquisition, conduct traditional predictive models and begin phenotype analyses
- **End of Cycle Goal**: Finalize real-world model that can be applied to targeted cohorts to identify high-risk individuals who may benefit from a greater specificity and/or intensity of services to prevent progression.



Overview (Key Points)

- **Project Status:**

- Preliminary Stakeholder Panel meeting November 2020; Updated panel meeting scheduled. Includes Veterans, Active-Duty clinicians and line personnel. **Dr. Dismuke will lead this effort.**
- All data except DODTR obtained; working on this with LCDR Werner, our DoD sponsor and DHA now.

- **Deliverables:**

- Longitudinal database (880K DoD only; 1.7 million DoD+VA data) with an estimated completion with DoDTR: Month 21)
- Risk models predicting key comorbidities/adverse outcomes using longitudinal DoD and VA data for those who were deployed vs. not deployed and receive vs. don't receive VA care. (Months 12-36)
- By July 2021: Publication highlighting DoD predictors of homelessness in Veterans within 2 years of DoD transition



Adverse Outcome Following DoD-Transition



Inpatient
Outpatient
Pharmacy

ACTIVE DUTY
Component
With one or more
years of DoD Care

**LIMBIC VA Active
Duty Cohort**

FY
'00
'01
'02
'03
'04
'05
'06
'07
'08
'09
'10
'11
'12
'13
'14
'15
'16
'17
'18
'19

+
Entered VA Care
within one year of
Active Duty
discharge
between FY02-14
Two or more years
of VA care
Available Zip9 near
the time of VA
entry

**Fine/Gray
Competing
Events Model**

Outcomes

Homelessness within 2 years of entry to VA care
Incarceration within 2 years of entry to VA care

Independent Variable

TBI diagnosed in DoD (low intensity, high intensity)

Covariates Diagnosed in DoD

Mental Health: Substance Use Disorder, PTSD, Serious Mental Illness (Depression, Bipolar, Schizophrenia), Acute Stress Reaction, PTSD, Anxiety, Personality Disorder, Conduct Disturbance, Suicidal Ideation/Attempt, Overdose, Nicotine Dependence

Injury: High Intensity, Low Intensity

Weight and Sleep: Obesity, obstructive sleep apnea (OSA), insomnia

Physical Comorbidity Count: None, 1, 2-3, 4

Sociodemographic Variables

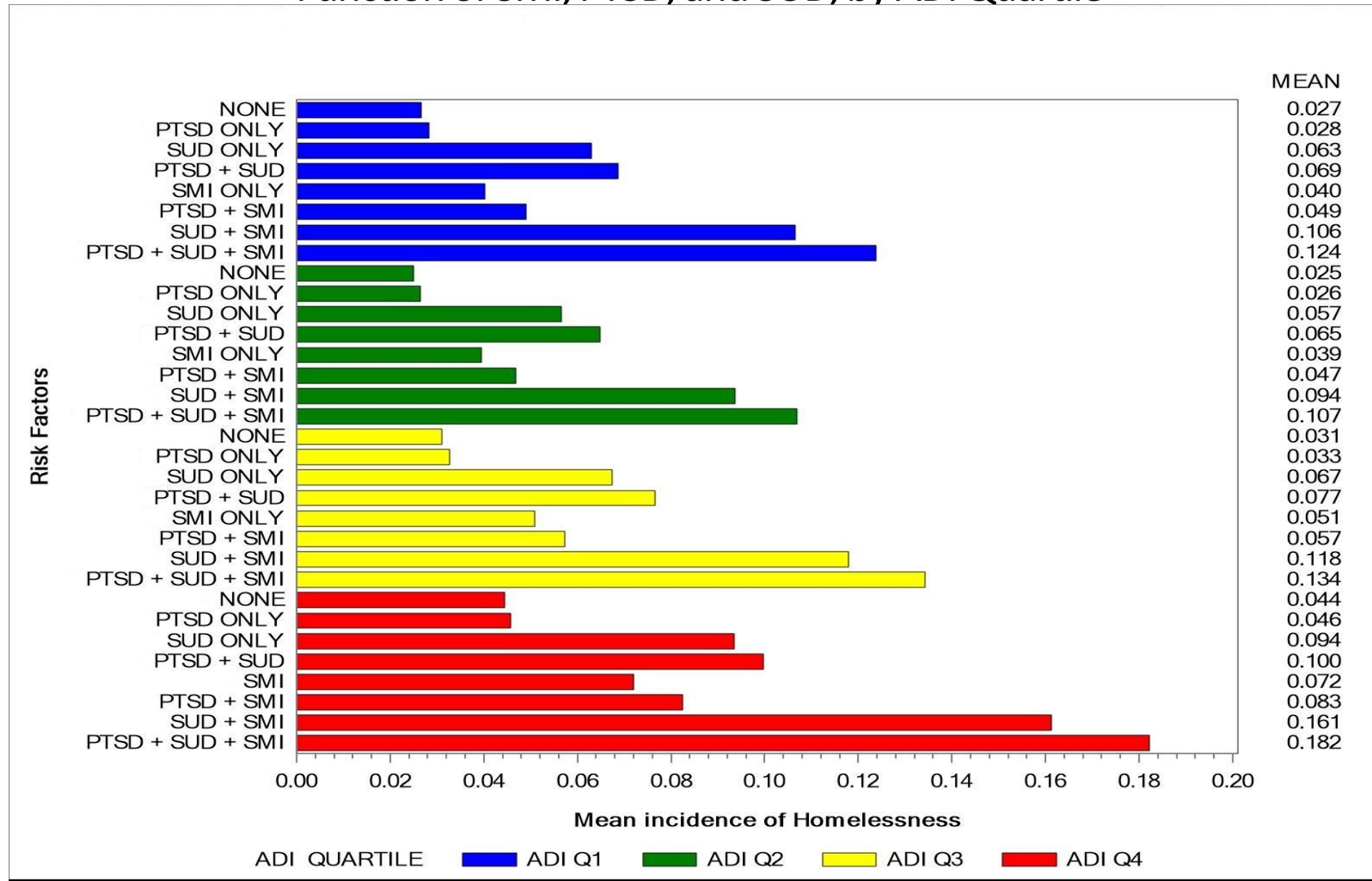
Area Deprivation Index: Quartiles Sociodemographic/ Military Characteristics: Age, Sex, Race/Ethnicity, Branch, Component, Rank, Deployment Status



Descriptive Statistics: DoD Characteristics

	Homelessness within 2 years of Military Separation	Justice Involvement within 2 years of Military Separation	Cohort of Transitioning Service Members (Active Duty Only)
	4.64% (n=19,436)	0.77 % (n=3,221)	N=418,624
Age at VA entry	27.5 (6.0)	26.7 (5.2)	30.4 (8.8)
17-29	72.74 (14,137)	79.45 (2559)	61.30 (256,619)
30-39	21.32 (4143)	16.52 (532)	18.72 (78,382)
40+	5.95 (1156)	4.03 (130)	19.98 (83,623)
Male	82.47 (16028)	94.88 (3056)	82.63 (345,911)
Race/Ethnicity			
White	51.01 (9915)	62.85 (2120)	58.93 (246,675)
Black	30.21 (5871)	15.62 (503)	18.42 (77,106)
Hispanic	11.61 (2256)	11.95 (385)	9.98 (41765)
Asian	1.84 (357)	1.33 (43)	2.70 (11,301)
Native American/Pacific Islander	2.58 (501)	2.51 (81)	1.82 (7630)
Highest Rank: Enlisted	97.86 (19,021)	97.80 (3150)	91.41 (982,649)
Deployed During Service	76.56 (14,881)	87.33 (2813)	67.72 (283,511)
TBI in DOD	6.27 (1218)	10.74 (346)	3.74 (15,672)
Severe Mental Illness in DOD	30.63 (5954)	34.40 (1108)	15.98 (66909)
Substance Abuse in DOD	45.88 (8918)	62.31 (2007)	23.52 (98,464)
PTSD in DOD	15.39 (2991)	20.55 (662)	8.28 (34,675)
Personality Disorder in DOD	5.87 (1140)	6.18 (199)	1.65 (6910)
Disturbance Conduct in DOD	1.22 (238)	1.77 (57)	0.43 (1814)
Area Deprivation Index (ADI) Lowest Quartile (1-25)	16.46 (3199)	16.86 (543)	18.47 (77,340)
Quartile 2 (26-50)	24.70 (4801)	29.06 (936)	29.28 (122,577)
Quartile 3 (51-75)	25.78 (5011)	28.28 (911)	24.07 (100,769)
Highest Quartile (76-100)	24.20 (4703)	21.79 (702)	15.81 (66,203)

Figure 1 – Predicted Probability of Homelessness within Two Years of Military Separation, as a Function of SMI, PTSD, and SUD, by ADI Quartile



Summary

- **Research Deliverables:**
 - Developed unique DoD-VA linked database (~1.7 million DoD+VA and ~880K DoD only) FY00-FY19 with data added as available
 - Traditional biostatistical models describing associations of TBI with key comorbidities and outcomes in progress.
 - Substance Use Disorders, Early Onset Dementia, Homelessness, Emergence of Chronic Disease
 - Literature reviews on TBI phenotypes in preparation for phenotype analysis
- **1-Year Goal:**
 - Papers submitted regarding Homelessness, Early Onset Dementia, Substance Use Disorders
 - Complete DoDTR data acquisition
 - Begin Phenotype/ Risk modeling analyses (*Months 12-36*)
 - These are on target to meet **End of Cycle Goals** (Risk scores for key comorbidities and begin to examine associations with blast exposures (*Months 24-48*))
- **End of Cycle Goals:**
 - Developed key papers identifying DoD risk for trajectories of improvement/decline using longitudinal DoD-VA data
 - DoD, VA, NIH proposals to extend these analyses.
 - **Intent to fund: EP200051 - “Military Injuries--Understanding Post-Traumatic Epilepsy (MINUTE): Bioinformatics with Big Data to Examine Multimodal PTE Biomarkers”**
 - Finalize real-world model that can be applied to targeted cohorts to identify high-risk individuals who may benefit from a greater specificity and/or intensity of services to prevent progression.

QUESTIONS

