

# LIMBIC-CENC HEALTH ECONOMICS STUDY

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# BLUF

- **Main Aim**: Extrapolate DoD and VA health services and disability cost estimates to provide DoD and VA annual budgetary impact of TBI, including costs of comorbidities and subpopulations of interest (based on cohorts created in the Phenotype Study).
- **Current Status**: Acquisition of VA Cost data and DoD Tricare Billing Data. Pursuing acquisition of DoD Military Treatment Facility (MTF) Cost Data. Requested operations data for all inpatient billing in DoD and costs in VA via HERC.
- **Clinical Deliverables**: Two studies under review. Initial Dashboard comparing private sector (HCUP), DoD Tricare billing and VAMC inpatient costs by DRG.
- **1-year Goals**: 1) Complete DoD MTF cost data acquisition (Pugh) and DoD/VA Operations Data for all inpatient care via HERC. 2) Submit TBI/Dementia VA cost and combat and training exposures DoD and VA cost studies,
- **End of Cycle Goal**: Create dashboard that accounts for all TBI health services and disability costs in VA and DoD and compares to private sector



# Overview (Key Points)

- **Project Status:**

- Two manuscripts under review: 1) *TBI in Veterans: Social Determinants, Survival and Costs at BMJ Military Health* and 2) *TBI and Chronic Kidney Disease in Veterans: Risk, Survival and Costs at Journal of Head Trauma Rehabilitation*. Both accepted for posters at 2021 Academy Health.
- *Health Services Utilization, Health Care Costs, and Diagnoses by Mild Traumatic Brain Injury Exposure: A Chronic Effects of Neurotrauma Consortium Study*. Highlighted on US DoD Blast Injury Research Coordinating Office website.
- Worked with Ralph Depalma, MD and team to petition ICD 10 code for Primary Blast Injury to the Brain. Expected 10/2021.
- Submitted request for DoD MTF cost data and all operations inpatient DoD billing and VA cost data via HERC.

- **Deliverables:**

- In Process: Comparing the inpatient, outpatient, pharmacy and community care VA costs by TBI and Dementia status using TBI and age-matched non-TBI cohort for all veterans diagnosed with TBI using inpatient and outpatient VA administrative data 2000-2015; to be published in Fall 2021 Brain Injury special issue on LIMBIC outcomes.
- In Process: Comparing the inpatient, outpatient, pharmacy and community care VA and DoD costs by combat and training exposures for 1500+ veterans in Longitudinal study.
- In Process: Acquiring operations data for TBI DRG Dashboard comparing DoD, VA and private sector costs for all TBI DRGs in these systems.
- In Process: Longitudinal cost database. Based on acquired Phenotype Data (~1.7 million DoD+VA and ~880K DoD only FY00-FY19) linking DoD billing and VA inpatient, outpatient, pharmacy and community care costs.

# Results from Studies Under Review

- Based on 291,015 veterans without TBI and 181,521 veterans with TBI, Non-Hispanic Blacks, Hispanics, and veterans with high numbers of mental and physical comorbidities had higher likelihood of having TBI.
- Veterans with TBI were 1.2 times more likely to die and had \$19,808 higher total annual costs, with a similar pattern for all component cost categories.
- Chronic Kidney Disease: Based on the same cohort, veterans with TBI had higher covariate-adjusted odds of having a CKD diagnosis. Compared to veterans with neither, there was an increased hazard of death for veterans with co-occurring TBI and CKD. Compared to Veterans with neither, covariate-adjusted marginal effects of co-occurring TBI and CKD on total annual cost per veteran was \$42,996. This pattern held broadly for all cost categories.

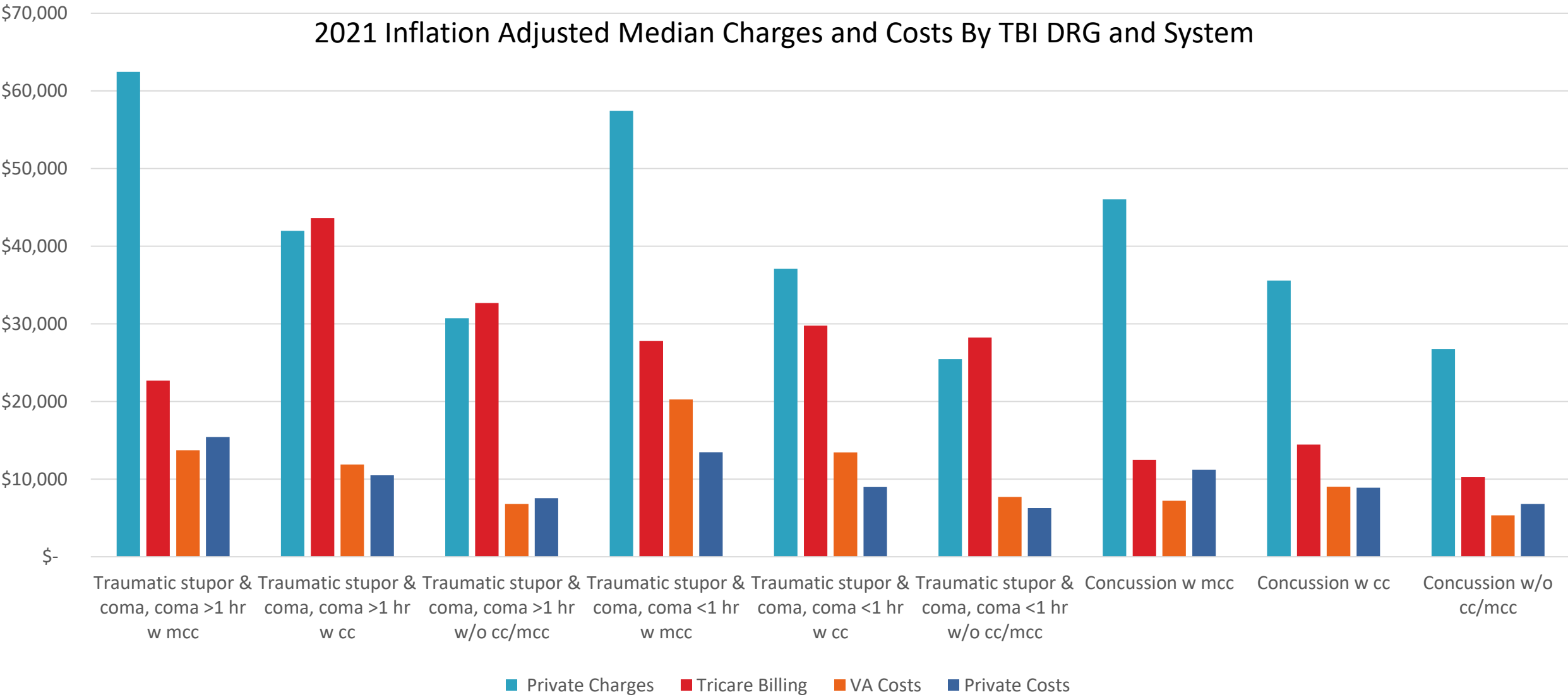


# Creation of a Dashboard to Compare DoD, VA and Private Sector Inpatient Costs by Diagnosis Related Groups (DRG)

- Created a cohort of Veterans diagnosed with TBI in inpatient or outpatient VA administrative data based on DoD/VA ICD-9 codes between 2000-2015.
- Requested DoD data for those veterans who have records in DaVINCI.
- Followed utilization and cost of inpatient care in DoD Tricare and VA between 2004-2020 based on DRGs.
- For all inpatient discharges in DoD Tricare and VA 2004-2020, estimated the median DoD billing amount and VA MCA cost per TBI non-surgical DRG.
- Used AHRQ Health Care Utilization Project (HCUP) National Inpatient Sample (NIS) tool to calculate the median private sector hospital charge and hospital cost by TBI non-surgical DRG for 2017.
- Used the US Department of Labor Inflation Calculator to convert \$ to 2/2021 value.



## 2021 Inflation Adjusted Median Charges and Costs By TBI DRG and System



# Summary

- **Research Deliverables:**
  - 2 studies under review and accepted for posters at Academy Health 2021.
  - Initial Dashboard for TBI Inpatient DRGs comparing DoD Tricare, VA facility costs, and private sector charges/costs.
- **1-Year Goal:**
  - Papers submitted regarding association between combat and training exposures and costs, and TBI/Dementia and costs.
  - Acquisition of operations data via HERC to fully create TBI DRG dashboard.
  - Complete DoD MTF Cost data acquisition
  - Begin Phenotype/ Cost Modeling Analysis as phenotypes are determined and DoD and VA billing and cost data is merged.
  - These are on target to meet **End of Cycle Goals** (Budget Impact of TBI on VA and DoD relative to non-TBI veterans based on linking DoD and VA cost data to Phenotype data)
- **End of Cycle Goals:**
  - Develop and submit key studies to examine care trajectories over DOD and VA and associated DoD and VA budget impact using Phenotype Data.
  - Develop and submit key studies to examine combat and training exposures association with DoD Tricare and DoD MTF and VA facility and community care costs.
  - Dashboard of TBI DRG billing and costs by important patient factors such as age, gender and insurance status for private sector.
  - DoD, VA, NIH proposals to extend these analyses.
    - Working with Jesus Caban at Walter Reed NiCOE and private sector partners to submit proposals to link service members and veterans across the 3 systems to compare cost of care across systems and over time.

# QUESTIONS

