



TBI-BH ECHO

Traumatic Brain Injury - Behavioral Health ECHO
UW Medicine | Psychiatry and Behavioral Sciences

Disparities in traumatic brain injury care

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Speaker disclosures

- ✓ Kayli Gimarc MD has no disclosures.
- ✓ Megan Moore PhD has no disclosures.



Objectives

1. Introduction to TBI
2. Background and patient voice
3. Causes of inequity
4. The injury life course
5. Special populations
6. Critical gaps
7. Community based solutions
8. Current barriers
9. Resources & collaboration



Traumatic brain injury (TBI)

- ▶ TBI is a major cause of morbidity and mortality in the United States
- ▶ >200,000 TBI-related hospitalizations and nearly 70,000 TBI-related deaths in the US in 2021
 - These estimates do not include TBI treated only in the ED, urgent care, by primary care, or those who do not present for evaluation
 - Estimated ~2.5 million TBI-related emergency department visits per year
- ▶ Most common mechanism of injury: falls > MVC



Patient Voices

Disparate Treatment

"So [we] walked in...to the room...[we] were asking our daughter: 'Can you please move your...leg? Lift 'em up, move them, just to make sure...there was no problems with her legs...[I] would have liked somebody to go and apologize and explain it a little bit more. But the way... [I] see it is that **the doctors are just there to do what they're supposed to do...they're just there to go do the surgeries. Not for anything else...**"

-Spanish-speaking Latinx parent of child with TBI

Moore M, Robinson G, Mink R, et al. Developing a Family-Centered Care Model for Critical Care after Pediatric Traumatic Brain Injury. *Ped Crit Care Med*. 2015;16(8):758-65.



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Patient Voices

Disparate Treatment

"I wouldn't change a thing. **They...communicated with me very openly, very honestly...the [doctors] comforted me, and I could feel the sympathy and the empathy from them throughout the whole experience.** It was educational, as well. They didn't just say: 'This is...what we're gonna do.' They explained why; they explained the pros and cons; they explained what the outcome could be, would be or should be. They explained—they just kept me informed every step of the way."

~ English-speaking white parent of child with TBI

Moore M, Robinson G, Mink R, et al. Developing a Family-Centered Care Model for Critical Care after Pediatric Traumatic Brain Injury. *Ped Crit Care Med*. 2015;16(8):758-65.



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Patient Voices

Cisnormativity

"I think that...**healthcare is...a really vulnerable setting**, and...it's a situation that I think shouldn't be harder than it has to be...because there is so much vulnerability already involved in it. And I just feel like **it would be nice for...[the] next generation of trans people to have doctors that...were able to provide care for them in the way th[ey] needed**...I know that the discrepancies [and] assumptions about [identity]...played into some of my care, not being as useful to me as it could've been."

~Transgender participant

Harner V, Casillas B, Chrivoli J, Moore M. Improving trauma care for transgender/non-binary persons (in preparation).



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Patient Voices

Discrimination and Cultural Incongruence

"The doctor made me feel like she didn't care, maybe because [my child] wasn't white. That's how they treat all the Native people, because a lot of people told me similar stories."

"The equipment isn't really designed for anything other than going on completely paved roads or the mall. Because of that, **in therapy we are always working on her ability to use the forearm crutches over bumps and lumps, like she would be walking [on the rough terrain where family picks berries]."**

~ Parents of American Indian children with disability

Fuentes M, Lent K. Culture, Health, Function and Participation Among American Indian and Alaska Native Children and Youth with Disabilities: an Exploratory Qualitative Analysis. *Arch Phys Med Rehabil.* 2019;100(9):1688-1694.



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Disparities in Traumatic Brain Injury



What is known about causes?



What is known about disparities in care and outcomes?



What are gaps and critical areas for future research?

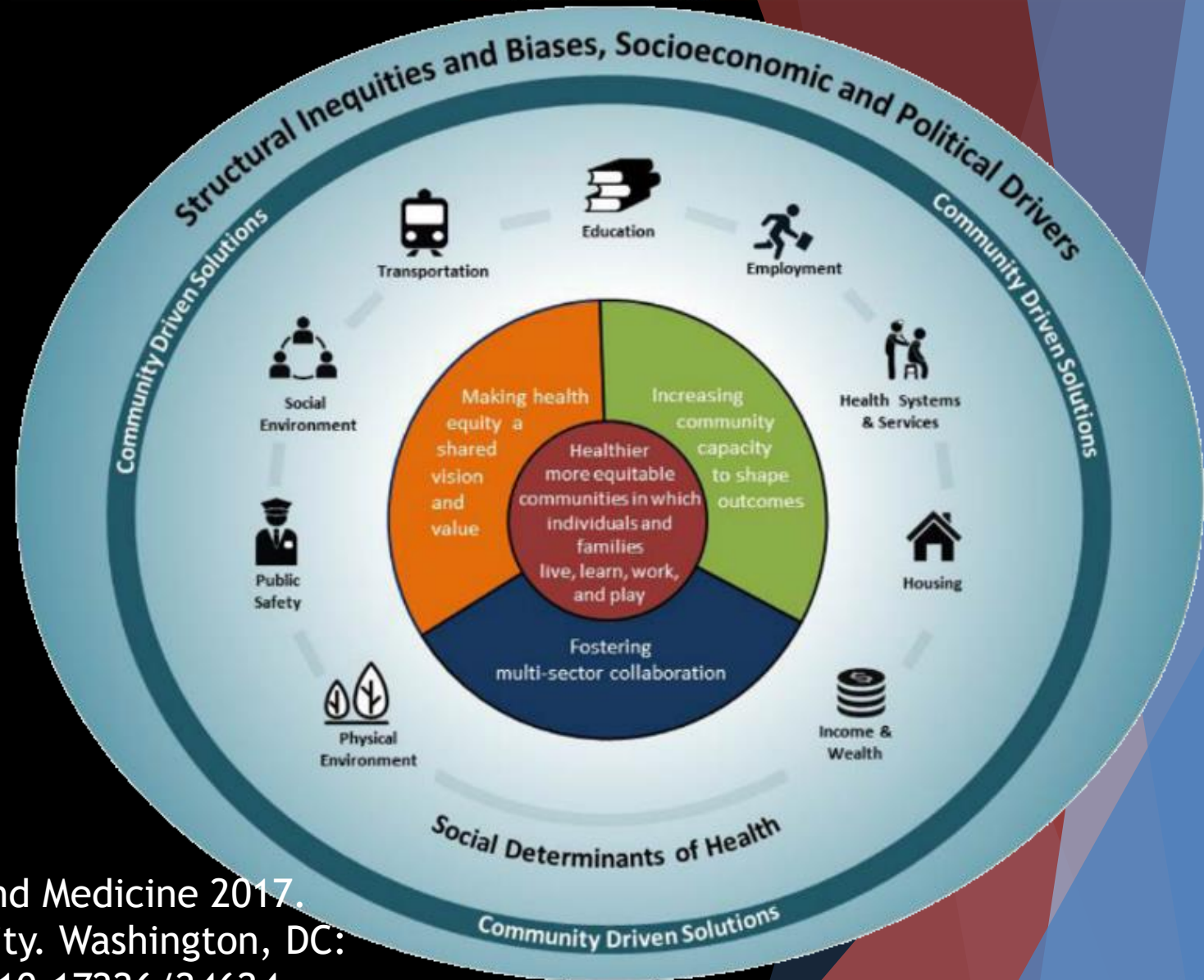


How can health equity be achieved?



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Causes of Inequities & Community-Based Solutions



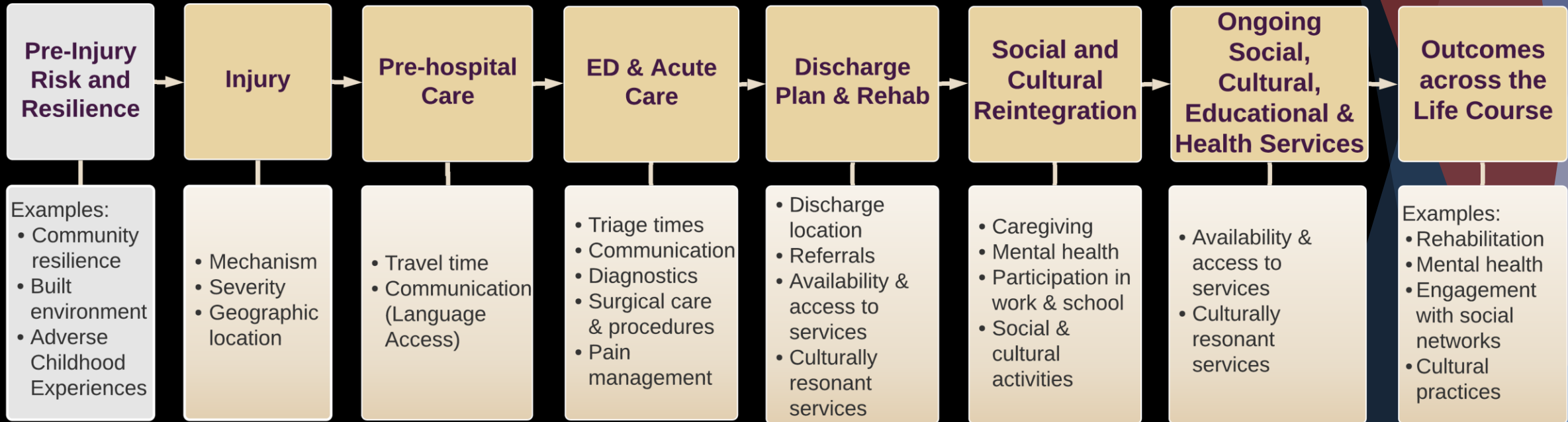
National Academies of Sciences, Engineering, and Medicine 2017.
Communities in Action: Pathways to Health Equity. Washington, DC:
The National Academies Press. <https://doi.org/10.17226/24624>



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The Injury Life Course: Disparities & Critical Intervention Points

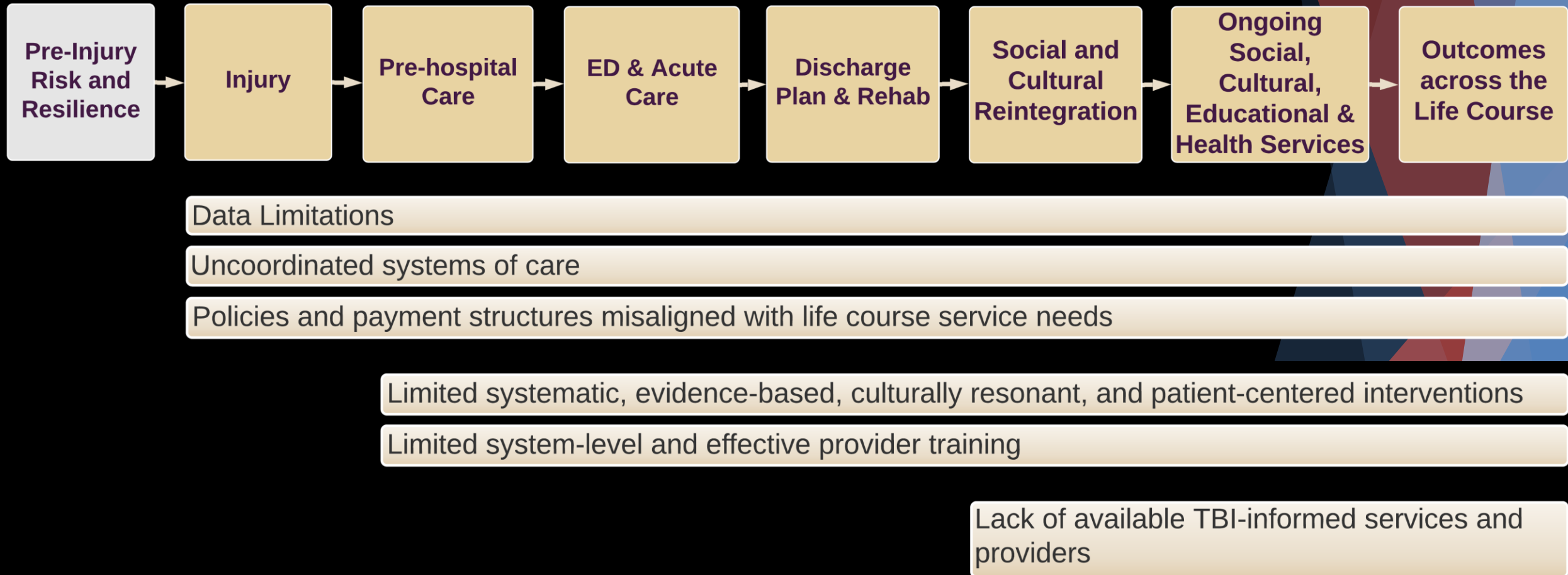
Structural Inequities and Biases



Individual Life Course

Family Life Course

The Injury Life Course: Critical Gaps



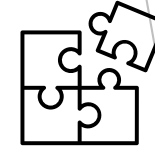
Special populations

- ▶ Children/adolescents
- ▶ Rural-living individuals
- ▶ Undomiciled or housing instability
- ▶ Women and sex/gender minorities
- ▶ Experiencing incarceration
- ▶ Limited English proficiency
- ▶ Uninsured
- ▶ Older adults
- ▶ Racial/ethnic minorities
- ▶ Intimate partner violence
- ▶ Gaps



Special populations: acknowledgment

- ▶ Although we discuss each of these populations separately, we acknowledge they are intertwined.
- ▶ This is not an exhaustive list of all vulnerable, marginalized, or otherwise unique populations affected by disparities after TBI
- ▶ The following slides will seek to summarize recent literature; significant gaps in the literature also exist



Children/adolescents

- ▶ TBI is a leading cause of death and disability among children in the US
- ▶ Disparities in outcome linked to race/ethnicity, insurance status, and rural geographic location



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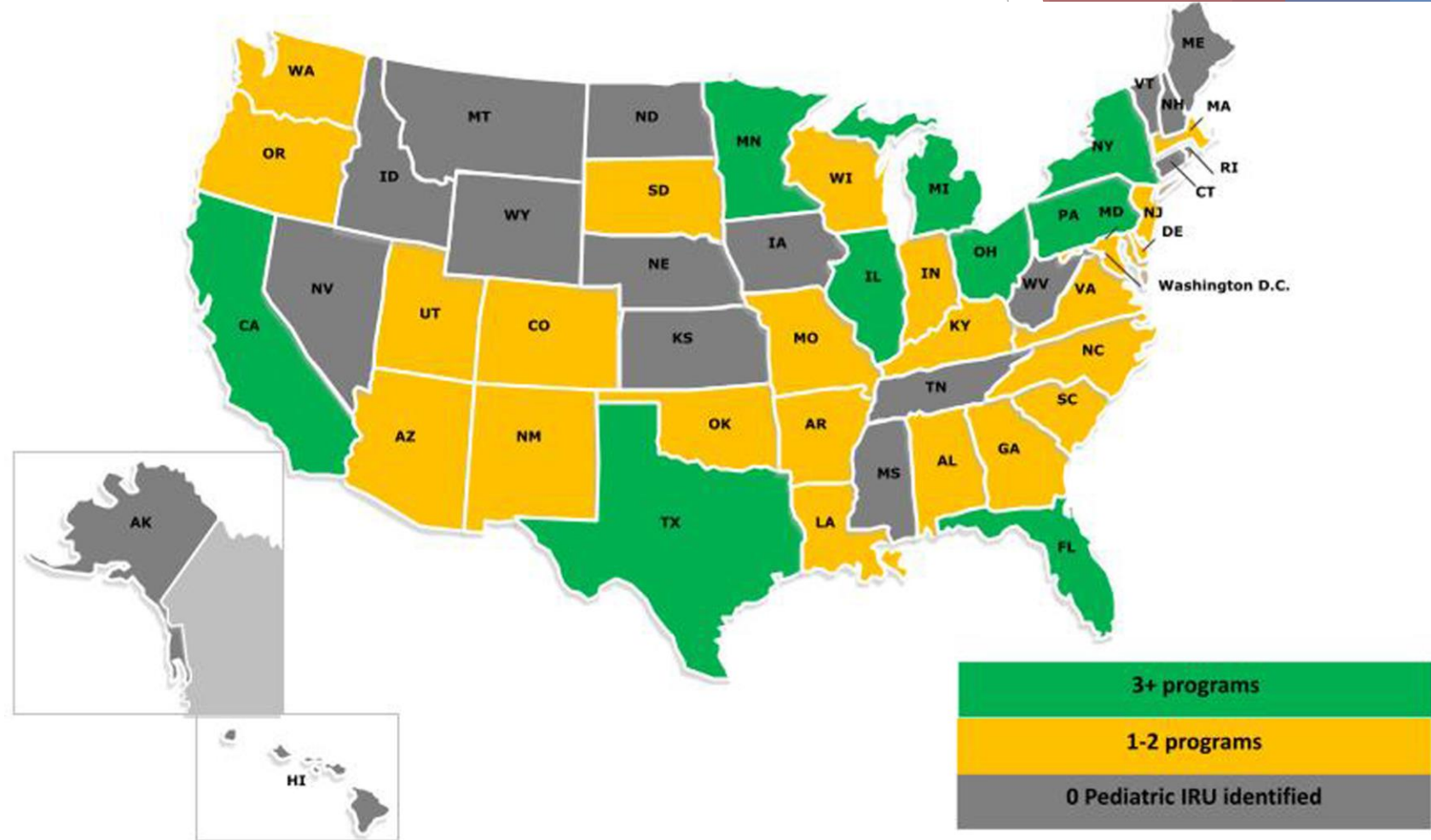
Children/adolescents

- ▶ Children belonging to racial/ethnic minority groups at increased risk of worse outcomes (3) and higher mortality rates (4, 5)
- ▶ American Indian/Alaskan Native (AI/AN) children are disproportionately affected by TBI; most studies either combine AI/AN individuals with other marginalized groups or exclude them due to small sample size (Brain Injury Association of America)



Children/adolescents

- ▶ Access to specialized inpatient pediatric rehabilitation services
 - Philip and Bosque (2022) surveyed pediatric inpatient rehabilitation facilities across the United States
 - 17 states with no specialized pediatric IRF/IPR
 - 46% of states offered only one or two pediatric rehabilitation programs



Philip K, Bosques G. A survey of inpatient pediatric rehabilitation practices across the United States¹. *Journal of Pediatric Rehabilitation Medicine*. 2022;15(3):425-431. doi:[10.3233/PRM-210047](https://doi.org/10.3233/PRM-210047)



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Children/adolescents

- ▶ Access to specialized inpatient pediatric rehabilitation services is not uniform
 - Pediatric inpatient rehabilitation units are more likely to have a classroom, a pediatric physiatrist, and therapists with pediatric training
- ▶ Access to outpatient pediatric rehabilitation services
 - Disparities in utilization linked to race/ethnicity and insurance status
 - Children with Medicaid hospitalized with TBI receive outpatient rehabilitation care at lower rates than privately insured peers (12)
 - Hispanic and non-Hispanic Black children less likely to receive outpatient mental health services after TBI-related hospitalization compared to Non-Hispanic White peers



Children/adolescents

- ▶ Disparities in utilization linked to geographic location / rural residence
 - Children in rural locations have increased TBI-related mortality rates, more severe injuries, and higher healthcare costs (14,15)
 - In a study of children with mild TBI, rural-living children had lower likelihood of encounter with mental health services



Children/adolescents

- ▶ Children belonging to racial/ethnic minority groups are disproportionately affected by TBI (data for Black, Hispanic, and AI/AN children)
- ▶ Disparities in insurance status and geographic status affect access to pediatric rehabilitation services (and thus, potentially, outcomes)
 - Increased drive time to acute evaluation / trauma center
 - Transportation barriers for caregivers for outpatient services
 - Insurance barriers to inpatient and outpatient services



Rural living individuals

- ▶ Timely trauma care is critical
- ▶ Access to trauma care is not uniform across the United States (16)
- ▶ Higher TBI fatality rates across non-metropolitan counties in the US (17)



Rural living individuals

- ▶ Chequer de Souza et al, 2024: systematic review and meta-analysis of brain trauma in rural and urban populations
- ▶ Etiology disparities
 - Transport-related brain TBI significantly more common (27% more likely) in rural residents compared to urban counterparts
 - Risk more than doubled for children/adolescents
 - Urban-dwelling individuals 64% more likely to suffer an injury as a pedestrian than those living rurally
 - TBI from other motorized vehicles (ATVs, motorcycles) 3.5x more likely to occur in rural setting

Chequer de Souza, J., Dobson, G. P., Lee, C. J., & Letson, H. L. (2024). Epidemiology and outcomes of brain trauma in rural and urban populations: a systematic review and meta-analysis. *Brain Injury*, 38(12), 953–976.
<https://doi.org/10.1080/02699052.2024.2361641>



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Rural living individuals

- ▶ Severity of injury varies in rural vs urban locations
 - Rural patients 28% more likely to have severe TBI than urban counterparts
 - Half as likely to have a normal CT following TBI

Chequer de Souza, J., Dobson, G. P., Lee, C. J., & Letson, H. L. (2024). Epidemiology and outcomes of brain trauma in rural and urban populations: a systematic review and meta-analysis. *Brain Injury*, 38(12), 953–976.
<https://doi.org/10.1080/02699052.2024.2361641>



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Rural living individuals

- ▶ Recovery from injury in rural vs urban locations
 - Limited data
 - Discharge status reported in only 3 studies in 2024 meta-analysis (out of 36)
 - Good recovery significantly more likely in urban vs rural residents
 - Average length of stay in acute hospital several days shorter for urban patients, but not statistically significant)

Chequer de Souza, J., Dobson, G. P., Lee, C. J., & Letson, H. L. (2024). Epidemiology and outcomes of brain trauma in rural and urban populations: a systematic review and meta-analysis. *Brain Injury*, 38(12), 953–976.
<https://doi.org/10.1080/02699052.2024.2361641>



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Rural-living individuals

- ▶ Access to timely trauma care
- ▶ Access to rehabilitation services
 - More limited availability of subspecialist care
 - More limited availability of home health services
 - Transportation barriers to seeking outpatient care
- ▶ Gaps: more outcome measures besides mortality; analysis of Native populations



Undomiciled/housing insecurity

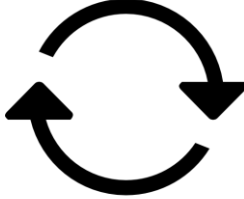
- ▶ Higher lifetime prevalence of any severity TBI in undomiciled individuals compared to general population (~2.5-4x) (24)
- ▶ Most common mechanism of injury for moderate to severe TBI: assault
- ▶ Non-White individuals are over-represented in this population

Stubbs JL, Thornton AE, Sevvick JM, et al. Traumatic brain injury in homeless and marginally housed individuals: a systematic review and meta-analysis. *Lancet Public Health*. 2020;5(1):e19-32. [https://doi.org/10.1016/S2468-2667\(19\)30188-4](https://doi.org/10.1016/S2468-2667(19)30188-4)



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Undomiciled/housing insecurity

- ▶ Bidirectional relationship between TBI and undomiciled status 
 - TBI is a risk factor for becoming unhoused
 - Multiple studies have demonstrated that TBI tends to precede housing insecurity (21,26,27)
 - Sequelae of TBI can contribute to risk of housing instability: Cognitive symptoms, job loss, altered relationships, increased risk of substance use
 - Undomiciled individuals are vulnerable to repeat brain injury



Undomiciled/housing insecurity

- ▶ Undomiciled individuals face disparities in adequate evaluation and access to follow up services
- ▶ Unhoused status is a risk factor for AMA discharge in patients with TBI
- ▶ Higher reported rates of mental health diagnoses, exposure to assault/abuse, substance use, and history of suicide attempts among undomiciled individuals with TBI compared to undomiciled individuals without TBI



Undomiciled/housing insecurity

- ▶ Observational cohort study of unhoused individuals in California:
 - History of TBI in homeless population was 79% compared to 12% in general population
 - Most common etiology of injury was violence
 - Almost half the population sustained their first TBI before age 18
 - Of those who had sustained TBI, nearly 40% sustained a severe TBI
 - High ACE score significantly associated with TBI

Bennett N, Chung JS, Lundstern MS, Bymaster A. Traumatic Brain Injury and Its Risk Factors in a Homeless Population. Arch Phys Med Rehabil. 2024 Dec;105(12):2286-2293. doi: 10.1016/j.apmr.2024.07.017. Epub 2024 Aug 10. PMID: 39134235.



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Undomiciled/housing insecurity

- ▶ Population with complex and overlapping vulnerabilities
 - Increased lifetime prevalence of TBI compared to general population
 - Increased vulnerability to repeat injury
 - Increased risk of repeat neurotrauma if discharged overnight - most common injury location for unhoused individuals with TBI is street or highway, and injuries more likely to occur at night (25)
 - Potential for underreporting of prior brain injuries
 - Barriers to follow up and complete evaluation
- ▶ Complex to study
 - Underreporting
 - Challenging in follow up and screening
 - Lack of healthcare access in unhoused population
 - Literature tends to focus on male population



Women and sex/gender minorities

- ▶ An acknowledgement of terminology and literature limitations
 - “Sex” and “gender” are frequently used interchangeably in the literature, although “sex” refers to the biological construct and “gender” refers to the social construct
 - Historically, evidence of the effects of gender and sex on the etiology, presentation, and outcome after TBI has been limited, and few studies have focused primarily on women or females

Colantonio A. Sex, gender, and traumatic brain injury: a commentary. Arch Phys Med Rehabil. 2016;97(Suppl. 2):S1-4.
<https://doi.org/10.1016/j.apmr.2015.12.002>



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Women and sex/gender minorities

- ▶ Recovery from TBI is an inherently gendered experience
 - Lack of attention devoted to complex parenting or domestic roles during rehabilitation (32)
 - Effects of gendered social and cultural norms on community reintegration and social role for women not well studied
- ▶ Differences in symptom reporting after TBI
 - Women report increased neurobehavioral symptom severity and volume in first 3-6 months after injury (34)
 - Women self-report more fatigue and negative affect; men report more impulsivity (41)
 - Women report more adverse sexual outcomes after mild TBI (42); chronic impacts of sexual dysfunction in women after TBI are not well studied



Women and sex/gender minorities

- ▶ A consensus-based clinical framework for gender-specific outcomes after TBI has not been developed (33)
- ▶ More literature needed



Experiencing incarceration

- ▶ Prevalence of TBI among individuals experiencing incarceration is higher than general population (44)
 - As high as 60.2% in a recent meta-analysis of an adult incarcerated population (45)
 - Another study of adolescents (age 16-18) experiencing incarceration demonstrated 49.7% had experienced TBI (47)



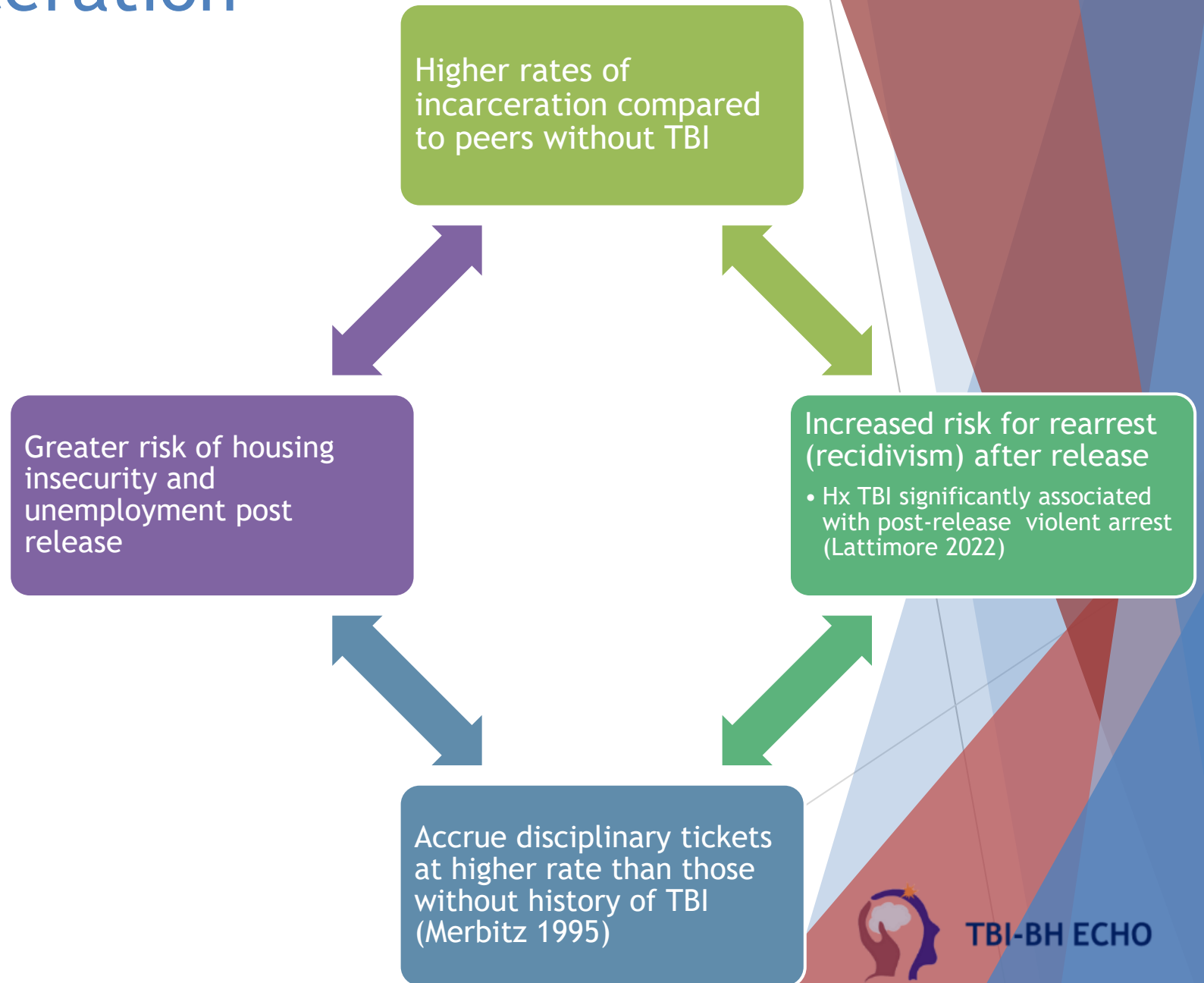
Experiencing incarceration

- ▶ Neurocognitive sequelae of TBI can contribute to situations that increase risk of harm or disciplinary action in a correctional facility setting (47,48)
 - Trouble focusing, remembering information, following instructions - can appear as uncooperative or defiant behavior
 - Poor judgment, impulsive behavior - can increase risk of harm to self or others
 - Emotional lability and dysregulation - can include showing emotions that do not match the situation, which can lead to miscommunication or escalation
 - Problems with motor skills and speech - can appear uncooperative
 - Sensitivity to light and noise



Experiencing incarceration

History of TBI and incarceration puts individuals at risk for worse outcomes due to complex and bidirectional relationships



Lattimore PK, Richardson NJ, Ferguson PL, Pickelsimer EE. The Association of Traumatic Brain Injury, post-traumatic stress disorder, and criminal recidivism. Health Justice. 2022 Feb 17;10(1):7. doi: 10.1186/s40352-022-00169-7. PMID: 35175451; PMCID: PMC8851722.

Merbitz C, Jain S, Good G, Jain A. Reported head injury and disciplinary rule infractions in prison. J Offender Rehab. 1995;22(3/4):11-9.



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Experiencing incarceration

- ▶ Identification and screening are critical
 - Identifies individuals in need of treatment, services, and accommodations
 - Increases awareness among correctional staff
 - Challenging and often limited in correctional setting
- ▶ Some states have specific programs for individuals living with TBI in correctional and detention facilities (but not all)
 - Nashia.org: Criminal & Juvenile Best Practice Guide for State Brain Injury Programs
 - MindsourceColorado.org
 - TBI-youth-justice.org



Experiencing incarceration

- ▶ More research is needed to understand outcomes and experiences of incarcerated individuals with TBI
- ▶ Paucity of studies exploring effects of psychological/behavioral interventions for TBI in an incarcerated population
 - Studies that do exist report some positive effects of interventions on interpersonal behavior, cognition, and recidivism (de Geus 2021)
 - Most beneficial aspects are personalized treatment and re-entry plans and psychoeducation
 - All studies had methodological limitations
- ▶ Few studies include women/girls

de Geus EQJ, Milders MV, van Horn JE, Jonker FA, Fassaert T, Hutten JC, Kuipers F, Grimbergen C, Noordermeer SDS. Acquired Brain Injury and Interventions in the Offender Population: A Systematic Review. *Front Psychiatry*. 2021 May 7;12:658328. doi: 10.3389/fpsy.2021.658328. PMID: 34025480; PMCID: PMC8138134.



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Experiencing incarceration

Six-month post-release outcomes for inmates with traumatic brain injury in supported community programming

Elizabeth Ahlers ^a, Kim Gorgens^a, Marybeth Lehto^a, and Judy Dettmer^b

^aGraduate School of Professional Psychology, University of Denver, Denver, Colorado, USA; ^bNational Association of State Head Injury Administrators, Alabama, USA

ABSTRACT

Objective: The goal of this study is to examine the effectiveness of case management services for a population of justice-involved individuals with TBI history.

Methods: Two thousand three hundred and eighty-nine records from statewide behavioral health and brain injury program databases were used in two studies.

Results: Participants with a reported TBI history were more likely to have experienced trauma and to have a behavioral health diagnosis relative to incarcerated persons without TBI. Six months after release, 56.8% of participants with a history of TBI were still receiving community treatment, 27.8% were not in treatment, and 3.4% had completed treatment. There was a high attrition rate; 70% of people referred for case management failed to maintain contact.

Conclusions: For those that did receive services, these data suggest that it prevented an escalation of psychosocial needs. There were no differences in community participation as measured by the Mayo Portland Adaptability Index's Participation Index (M2PI) scores ($t_{24} = .497, p = 0.624$) at intake and after 6 months of case management. This study confirms that case management confers a benefit to persons with TBI who are released from the criminal justice system. Further, recidivism rates for this vulnerable group were no different from the larger population of returning citizens.

ARTICLE HISTORY

Received 3 May 2021

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Accepted 19 January 2024

KEYWORDS

TBI; justice-involved; recidivism; case management; re-entry; returning citizens; brain injury

Limited English proficiency

- Limited English proficiency has been associated with disparities in care; trauma populations
- Castro et al (2022): retrospective cohort of adult trauma patients
 - LEP status significantly associated with increased hospital LOS, higher in-hospital mortality rate (Chinese or Spanish speaking)
- Bertram et al (2024): retrospective review of trauma activations and interpreter use
 - Of n=70 LEP patients, 88.6% required and interpreter, and 66.1% had evidence of professional interpreter use within 24 hours
 - LEP patients who lacked early interpreter use had longer hospital LOS than EP patients and LEP patients with early interpreter use

Castro et al. The Association of Limited English Proficiency With Morbidity and Mortality After Trauma, Journal of Surgical Research, Vol 280, 2022, Pages 326-332, ISSN 0022-4804, <https://doi.org/10.1016/j.jss.2022.07.044>.

Bertram SC, Nichols FR, Cox LE, Ozathil DK, Mallah MM. Early use of professional interpreters improves trauma outcomes: Results of a single-center retrospective study. Surg Open Sci. 2024 Sep 22;21:52-57. doi: 10.1016/j.sopen.2024.09.006. PMID: 39399161; PMCID: PMC11470466.

Limited English proficiency

- ▶ In a population of geriatric patients presenting to ED after head strike, among patients with LEP status:
 - Lower verbal component of GCS
 - Twice as many LEP patients presented with undocumented LOC compared with EP patients
 - EP patients more likely to be discharged to rehabilitation facility

Layrisse-Landaeta V, Dincheva GR, Khedr S, Geng A, Schombs M, Maisha K, Chao SY, Chen CC. Impact of English proficiency on use of Glasgow Coma Scale in geriatric patients with traumatic brain injury. Trauma Surg Acute Care Open. 2024 Jul 1;9(1):e001439. doi: 10.1136/tsaco-2024-001439. PMID: 38957620; PMCID: PMC11217998.



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Limited English proficiency

- ▶ English proficiency influences acute rehabilitation experience and potentially outcomes after TBI
- ▶ Lower FIM communication scores at acute rehabilitation discharge compared to English proficient individuals (despite no significant difference between the groups on admission) in moderate-severe TBI (52)
 - Complex interplay of many factors
 - Potential for rater bias?
 - Negative effect of language discordance on treatment?



Limited English proficiency

- ▶ Outcome disparities after TBI
 - Lack of English language proficiency is an independent predictor of severe disability at 6 months post-TBI (53)
- ▶ Limited availability and lack of proximity to multilingual care creates additional access barriers
 - Fewer outpatient rehabilitation services available for pediatric patients with TBI who need interpretation services (54)
 - 40% decrease in number of county-wide multilingual rehabilitation services for every 10% increase in % of people speaking a language other than English at home
 - Longer travel times to access multilingual rehabilitation services



Uninsured

- ▶ Insurance status impacts access to resources, healthcare utilization, disposition location, and contributes to disparities in outcomes after TBI
 - Uninsured individuals struggle to access care, impacting outcomes
 - Proposed cuts to Medicaid will disproportionately impact children, those with disability, and those living in poverty



Older adults

- ▶ TBI is a significant cause of morbidity and mortality in adults aged 65 and older
- ▶ Risk of TBI-related hospitalization is higher among those 65 and older compared to other age groups, and in particular is highest among those over 74
- ▶ Older adults have higher risk for poor functional outcomes after injury than other age groups
- ▶ Fall prevention strategies are increasingly important



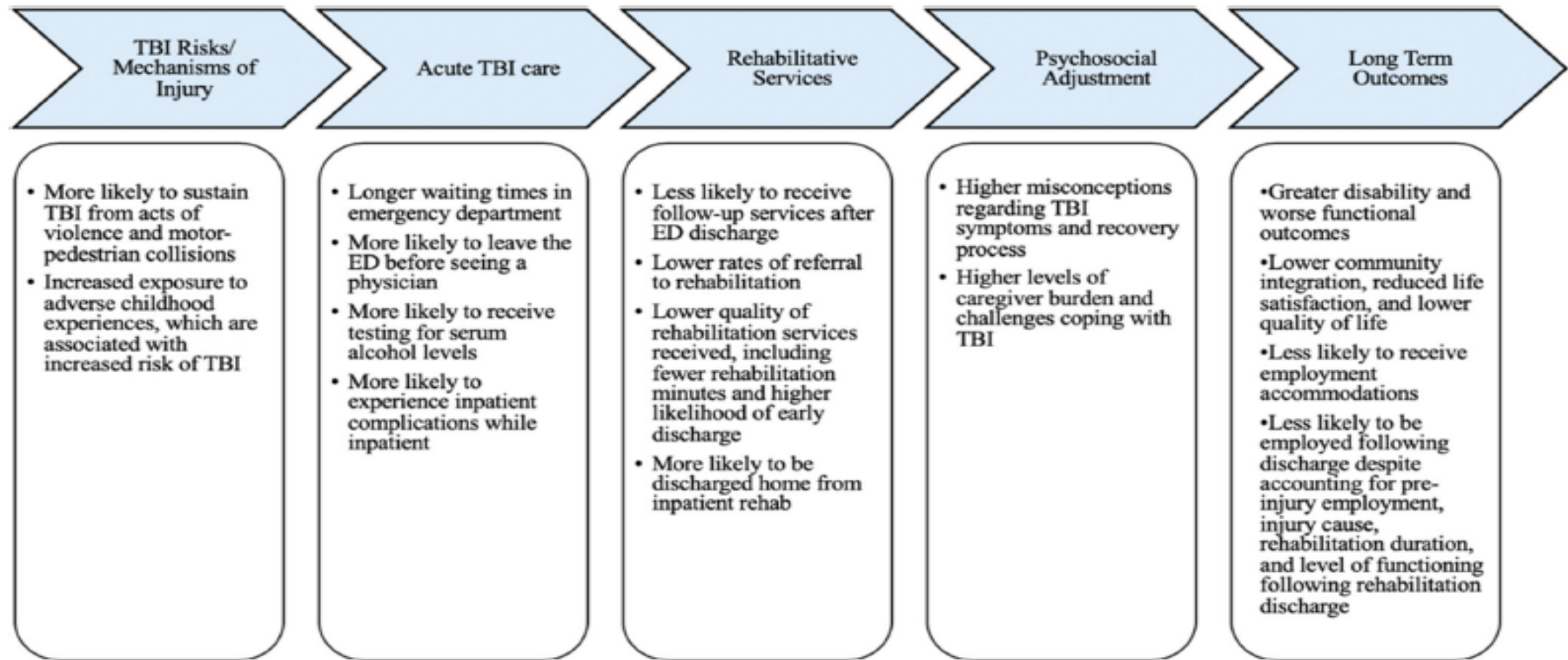


Fig. 1 Racial and ethnic disparities across the continuum of the TBI experience

Saadi, A., Bannon, S., Watson, E. *et al.* Racial and Ethnic Disparities Associated with Traumatic Brain Injury Across the Continuum of Care: a Narrative Review and Directions for Future Research. *J. Racial and Ethnic Health Disparities* (2021)



Intimate partner violence

- ▶ IPV survivors often experience multiple incidents leading to TBI, as IPV-related violence occurs cumulatively over time
- ▶ Many studies do not document the chronicity and acuity of IPV and TBI
- ▶ More research is needed to understand outcomes for groups at high risk, including LGBTQIA+ individuals, individuals with disability, and for understanding differential outcomes by race/ethnicity
- ▶ Detection of IPV-related TBI is limited
 - lack of uniform practice guidelines for screening, underreporting due to potential legal or retaliatory ramifications, and survivors not seeking medical care



Literature gaps

- ▶ Refugee/asylum seekers
 - Population faced with unique challenges - access to medical care depends on area of resettlement, resources in that location (cost, availability, language concordant services), and cultural factors
 - Our healthcare system is inherently challenging to navigate
 - Limited reporting barriers: Asylum seekers may not initiate discussions of how they were affected by trauma/violence in their home country (121); cultural barriers and norms play a role (121)
- ▶ LGBTQIA+ individuals
- ▶ Sex workers
- ▶ Climate change



Literature gaps

- ▶ Refugee/asylum seekers
- ▶ LGBTQIA+ individuals
 - Paucity of data regarding outcomes of individuals with TBI who identify as non-gender conforming, lesbian, gay, bisexual, transgender, queer, intersex, asexual, or with other gender expression (LGBTQIA+).
 - Existing literature demonstrates that LGBTQIA+ individuals experience multiple health inequities and potential barriers to care.
 - Barriers to care may include individual concerns for mistreatment or denial of care by healthcare providers [122, 123].
 - The prevalence of TBI among LGBTQIA+ individuals is unclear. Limited studies of outcomes of LGBTQIA+ individuals with TBI are available.
 - Meltzer and Juengst studied neurobehavioral symptoms after TBI, with participants identifying as transgender or “other gender” reporting more symptoms of negative affect and fatigue than men or women with comparable TBI history, although sample size of transgender/other gendered individuals was small [124]
- ▶ Sex workers
- ▶ Climate change



Literature gaps

- ▶ Refugee/asylum seekers
- ▶ LGBTQIA+ individuals
- ▶ Sex workers
 - There is little literature examining TBI among sex workers, despite the vulnerability of this population to violence [125] and the high burden of physical violence experienced by women sex workers [126].
 - In a study by Baumann et al., nine out of ten participants with a history of sex work had experienced a TBI over their lifetime, and all participants reported at least one head injury related to violence [125].
 - Their findings highlighted multiple barriers to seeking care, including stigma toward sex workers, normalization of violence against sex workers, and nonrecognition of head injury.
 - Farley et al. reported that 61% of women surveyed had sustained at least one head injury during sex work, with a mean of 15.3 incidents among those reporting [127].
- ▶ Climate change

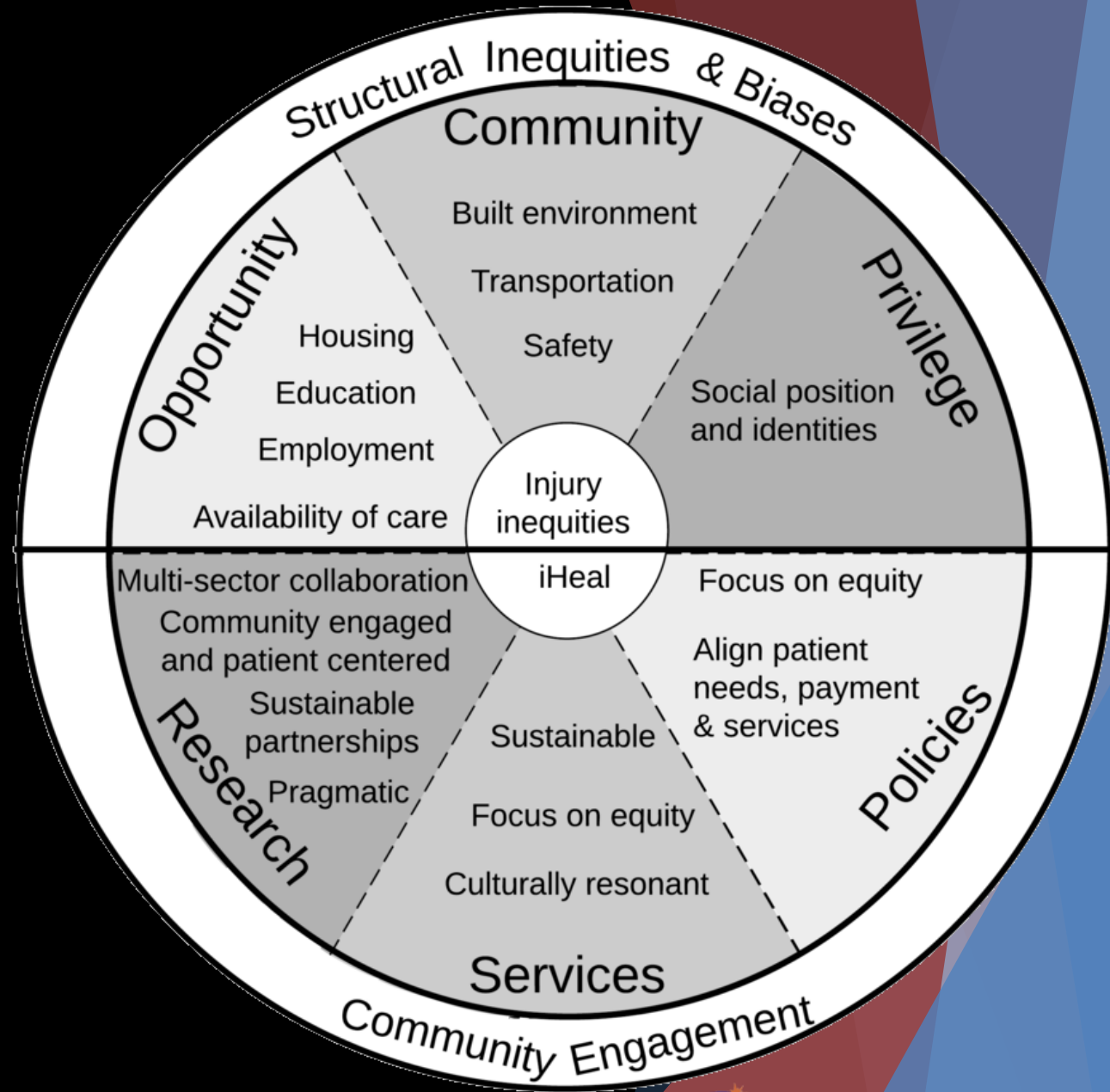


Literature gaps

- ▶ Refugee/asylum seekers
- ▶ LGBTQIA+ individuals
- ▶ Sex workers
- ▶ Climate change
 - Scarce literature
 - Shapiro et al. found that cognitive and physical impairments as sequelae of TBI can impact hurricane preparedness and recovery [128].
 - Insight and judgment impairments can hinder self-protective actions like taking shelter; memory deficits can limit timely purchasing of essential supplies; aphasia can impact communication with first responders; strength and coordination deficits can complicate evacuation options.
 - Sequelae of TBI, including headache and seizure, can be worsened by extremes in temperature and humidity brought about by post-hurricane power loss.
 - Electricity outages may also negatively impact those who depend on power wheelchair mobility, positive airway pressure devices for sleep apnea, and automatic pumps for tube feeds.



Injury-related Health Equity across the Lifespan (iHeal)



Moore M, Conrick KM, Graves JM, Fuentes M, Vavilala, MS. Injury and Health equity: Building community, research, and advocacy partnerships to address the national research and policy agenda. Presented at: Annual Conference of the Society for the Advancement of Violence and Injury Research; 2017; Ann Arbor, MI.



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Acknowledging current barriers



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Summary

- ▶ Complex interplay of structural factors, social determinants of health, and individual vulnerabilities
- ▶ What strategies have you used in your own practice or community?
- ▶ How do you share resources and collaborate?



Thank you



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References

Patient and Community Driven Solutions: Examples drawn from these studies

1. Fann JR, Hart T, Ciol MA, et al., Improving transition from inpatient rehabilitation following traumatic brain injury: Protocol for the BRITE pragmatic comparative effectiveness trial, Contemporary Clinical Trials (2021), [https://doi.org/ 10.1016/j.cct.2021.106332](https://doi.org/10.1016/j.cct.2021.106332)
2. Moore, M., Winkelman, A., Kwong, S., Segal, S. P., Manley, G.T., & Shumway, M. (2014). The Emergency Department Social Work Intervention for Mild Traumatic Brain Injury (SWIFT-Acute): A Pilot Study. *Brain Injury*, 28, 448-455.
3. Erlick, M.R. Vavilala, M.S., Jaffe, K.M., Blayney, C.B., Moore, M. (2021). Provider Perspectives on Early Psychosocial Interventions after Pediatric Severe Traumatic Brain Injury: an Implementation Framework. *Journal of Neurotrauma*, 38(4): 513-518.
4. Harner V, Casillas B, Chrivoli J, Moore M. Improving trauma care of individuals who identify as transgender and non-binary (in preparation).

IHeal: Moore M, Conrick KM, Graves JM, Fuentes M, Vavilala, MS. Injury and Health equity: Building community, research, and advocacy partnerships to address the national research and policy agenda. Presented at: Annual Conference of the Society for the Advancement of Violence and Injury Research; 2017; Ann Arbor, MI.

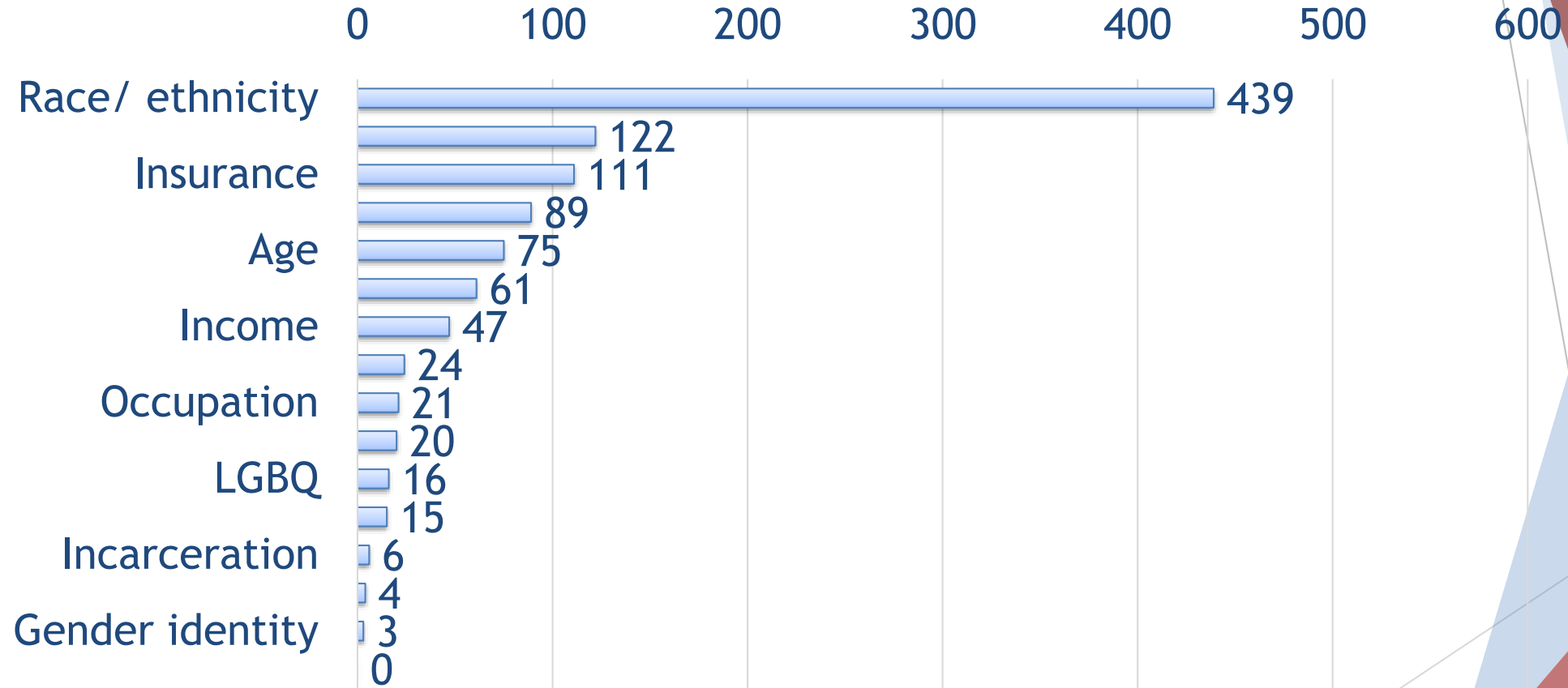
Gimarc K, Moore M, Hinson HE, Gardner R. 2024. Traumatic Brain Injury. In: Ovbiagele, B., Lewis, S., Correa, D.J., Thomas, R., CharlestonIV, L. (eds) Achieving Equity in Neurological Practice. Springer, Cham. https://doi.org/10.1007/978-3-031-62727-9_18

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Critical gaps: disparities across identities



Moore M, Conrick KM, Fuentes M, et al. Research on injury disparities: a scoping review. *Health Equity* 2019; 3(1):504-511.



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