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## Traumatic Brain Injury in Older Adults—A Public Health Perspective

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Traumatic brain injuries (TBIs) are a leading cause of morbidity and mortality in the US.<sup>1</sup> In recent years, these injuries have received greater attention as a public health concern due to increased awareness of sport- and military-related TBIs.<sup>2</sup> However, older adults have been reported to have higher rates of TBI than any other age group.<sup>1</sup> In 2017, adults aged 65 years or older accounted for 38.4% of all TBI-related deaths and 43.9% of all TBI-related hospitalizations in the US.<sup>1</sup> In addition, older adults who experience a TBI are more likely to have higher morbidity and mortality, slower recovery, and worse outcomes than younger adults.<sup>2</sup>

TBI in older adults is a growing public health concern that requires a focused, age-specific approach to prevention and management. The leading causes of TBI-related hospitalizations and deaths among older adults (ie, falls) are also different from younger individuals (ie, motor vehicle collisions and suicides) and require a unique approach to prevention and management.<sup>1</sup> The implementation of evidence-based prevention and management efforts is paramount for helping older adults age in place. It is important to systematically examine the scope of the problem and adopt evidence-based prevention strategies if we hope to successfully address the growing public health burden of increasing TBI rates in older adults.

### Describe the Overall Public Health Burden

Although efforts have been made to describe the burden of TBIs in older adults in the US, the burden is substantially underestimated. National prevalence estimates for older adult TBI morbidity and mortality typically are derived from administrative claims databases and have

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limitations that result in notable underestimates (eg, many individuals seek care outside of the hospital system or do not seek care at all).<sup>1</sup> This enduring need to quantify the true burden of TBI has led to calls to implement a comprehensive national surveillance system, which could capture the number of people experiencing a TBI each year. Quantification could also capture the leading causes of TBI and the places where these individuals are seeking care. Collecting this information regularly (eg, yearly) may provide the opportunity to obtain national estimates for TBI overall and for individuals with disability caused by a TBI. Collection of this information may also assist in the monitoring of trends over time to determine whether prevention efforts are effective in reducing TBIs and in giving insights to health care professionals and hospitals.

### **Identify Modifiable Risk and Protective Factors**

To our knowledge, few existing data sources offer information on the circumstances associated with TBIs. Detailed information about TBI circumstances could allow for better identification of protective and risk factors. For example, the primary mechanism of injury for TBI in older adults is falls,<sup>1</sup> but less is known about the circumstances that lead to the fall, especially at a population level. This is where a national surveillance system would also be helpful by building a better understanding of factors and circumstances associated with TBI that could be used to develop effective prevention and management practices.

### **Identify and Evaluate Effective Prevention Practices and Increase Adoption of Evidence-Based Prevention Practices**

The adoption of evidence-based practices may facilitate the prevention of TBIs associated with falls in older adults. Falling is the primary mechanism of injury for TBI in older adults,<sup>1</sup> which aligns with research showing that aging is associated with changes in gait and balance, increased prevalence of chronic conditions, and increased use of prescription medications, each a risk factor for falls.<sup>3</sup> Health care professionals serve an important role in screening older adults for their risk of falls, assessing which modifiable risk factors are present, and intervening to reduce identified risk through education and effective strategies like home modifications (eg, reducing fall risk associated with flooring, furniture, and structures).<sup>4</sup> There is ongoing need to more widely adopt other evidence-based practices to help reduce older adult falls including physical therapy, other exercises that increase balance, strength, and gait stability (eg, tai chi), and managing medications with adverse events linked to falls.<sup>5</sup>

Motor vehicle collisions are also an important mechanism of injury for older adult TBIs.<sup>1</sup> Although driving may help older adults stay mobile and independent, health care professionals may consider reviewing medications that may be factors in motor vehicle collision risk and working with older adults to plan for their future mobility by identifying strategies for getting around when driving is no longer an option.<sup>6</sup> Creating a plan is an important consideration to decrease risk of motor vehicle collisions and falls and to stay healthy for optimal mobility, stay safe at home, and stay mobile in the community.

## Factors Associated With Assessing and Diagnosing TBIs in Older Adults

Although public health primary prevention strategies are critical in reducing the burden of TBIs in older adults, secondary (eg, assessing and diagnosing TBIs) and tertiary (eg, managing TBIs) prevention strategies are also important, but can be more complicated than in younger populations. One reason for this challenge may be a limited understanding in older adults and health care professionals of how common comorbidities and preexisting conditions (eg, diabetes, cardiovascular disease, pulmonary disorders, dementia) may play a role in TBIs.<sup>7</sup> For example, the assessment and diagnosis of TBI among older adults who experience head trauma can be difficult because loss or alteration of consciousness might be attributable to a preexisting or concurrent medical condition (such as stroke or dementia) or medication-related adverse events rather than a symptom caused by a TBI. These factors may bias or limit an accurate TBI diagnosis using standard clinical criteria.<sup>2</sup> A TBI diagnosis may also be missed in the emergency department if there are acute injuries (eg, a hip fracture or other orthopedic injury), which can further complicate recovery. Future studies analyzing the role of comorbid or preexisting conditions on diagnosis, recovery, long-term morbidity, or mortality are warranted.

## Factors Associated With Managing TBIs in Older Adults

Management of TBIs in older adults is challenging because of the slower recovery trajectories and more severe outcomes in older adults compared with younger adults.<sup>2</sup> However, aggressive treatment and good preinjury health status are associated with lower short-term mortality among older adults with TBI, suggesting that adverse outcomes can be mitigated with appropriate management.<sup>2</sup> Rehabilitation, whether at an inpatient rehabilitation facility, skilled nursing facility, or at home, is important for recovery. Older adults are likely to receive less intensive rehabilitation services than younger patients and regain less functional ability during and after inpatient rehabilitation.<sup>2</sup> Despite the increasing rates of older-adult TBIs, there are few, if any, evidence-based TBI guidelines specifically for older adults to inform the diagnosis and management of TBI that optimally tailor identification, management, and rehabilitation for this population.<sup>2</sup> One reason for the lack of TBI guidelines for older adults is a lack of clinical trials for treatment of TBI that target older adults. In addition, clinical trials in TBI management traditionally use age cut-offs that exclude older adults from participating. Further research that includes this population may help inform evidence-based guidelines and help improve outcomes for older adults with TBIs.

As the proportion of older adults increases in the US, the number of older adults who experience a TBI can be expected to also increase further. A public health approach for TBI supports a better understanding of the burden of TBIs in this population, identifies modifiable risk and protective factors, and develops and tests prevention strategies to help assure widespread adoption of effective prevention principles and strategies. Evidence-based prevention strategies tailored for older adults and bidirectional communication between health care professionals and patients may help prevent and manage TBIs.

## REFERENCES

1. Centers for Disease Control and Prevention. Surveillance report of traumatic brain injury-related hospitalizations and deaths by age group, sex, and mechanism of injury—United States, 2016 and 2017. 2021. <https://www.cdc.gov/traumaticbraininjury/pdf/TBI-surveillance-report-2016-2017-508.pdf>
2. Gardner RC, Dams-O'Connor K, Morrissey MR, Manley GT. Geriatric traumatic brain injury: epidemiology, outcomes, knowledge gaps, and future directions. *J Neurotrauma*. 2018;35(7):889–906. doi:10.1089/neu.2017.5371 [PubMed: 29212411]
3. Ambrose AF, Paul G, Hausdorff JM. Risk factors for falls among older adults: a review of the literature. *Maturitas*. 2013;75(1):51–61. doi:10.1016/j.maturitas.2013.02.009 [PubMed: 23523272]
4. Centers for Disease Control and Prevention. STEADI: stopping elderly accidents, deaths, & injuries. Accessed January 11, 2022. <https://www.cdc.gov/steady/index.html>
5. Stevens JA, Lee R. The potential to reduce falls and avert costs by clinically managing fall risk. *Am J Prev Med*. 2018;55(3):290–297. doi:10.1016/j.amepre.2018.04.035 [PubMed: 30122212]
6. Centers for Disease Control and Prevention. MyMobility Plan. Accessed January 11, 2022. [https://www.cdc.gov/motorvehiclesafety/older\\_adult\\_drivers/mymobility/index.html](https://www.cdc.gov/motorvehiclesafety/older_adult_drivers/mymobility/index.html)
7. Hawley C, Sakr M, Scapinello S, Salvo J, Wrenn P. Traumatic brain injuries in older adults-6 years of data for one UK trauma centre: retrospective analysis of prospectively collected data. *Emerg Med J*. 2017;34(8):509–516. doi:10.1136/emmermed-2016-206506 [PubMed: 28052919]