

# Que sait-on du traumatisme crânien de la personne âgée ?

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# THE BRAIN INJURY GUIDE & RESOURCES

A Collaboration of the Missouri Department of Health and Senior Services and the MU Department of Health Psychology

Home

TBI Basics

**Populations**

Topics

Treatment

CE Credits

About

Account

Search...

## The Elderly and Traumatic Brain Injury

### Quick Facts

- Older persons (>65 years) have the second highest incidence of TBI, following adolescents/young adults (14-24 years).
- Growing numbers of older persons are living with TBI, due to the increasing aging population and to medical advances that improve survival after TBI.
- Research suggests that many older persons are capable of returning to their communities following a TBI if they receive intensive inpatient rehabilitation.



### Falls and TBI

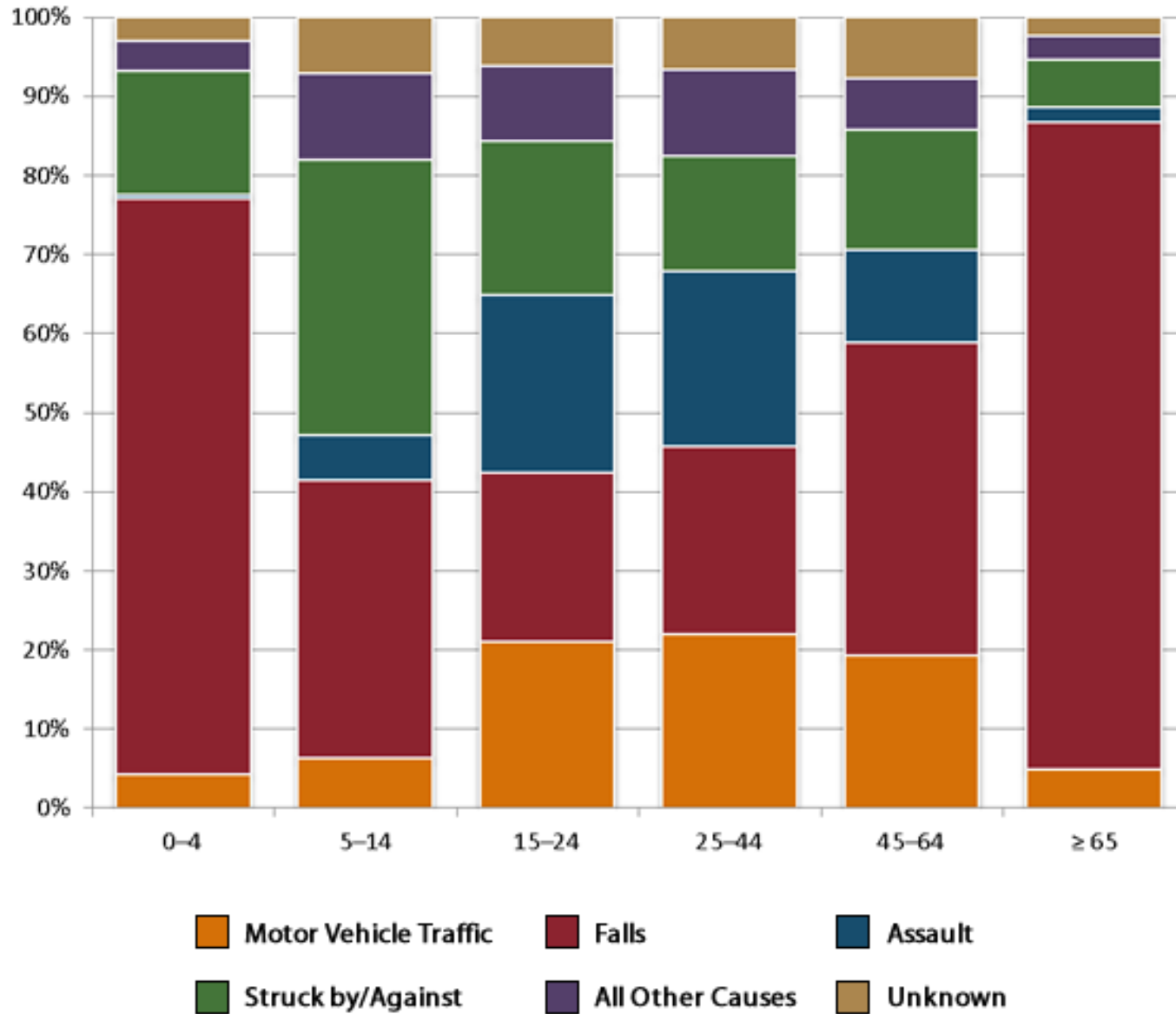
- Falls are the most frequent cause of TBI in older persons, followed by motor vehicle accidents.
- Two-thirds of those who have experienced one fall will have another fall within 6 months.
- Approximately 60% of falls in older persons happen in the home.
- At least 1/3 of these falls are due to environmental hazards in the home.

Le traumatisme crânien interagit de manière négative avec l'âge par au moins deux mécanismes:

1. La capacité de récupération après un TC est moindre chez les sujets âgés
2. Les sujets âgés qui ont présenté un TC sont à plus fort risque de déclin cognitif

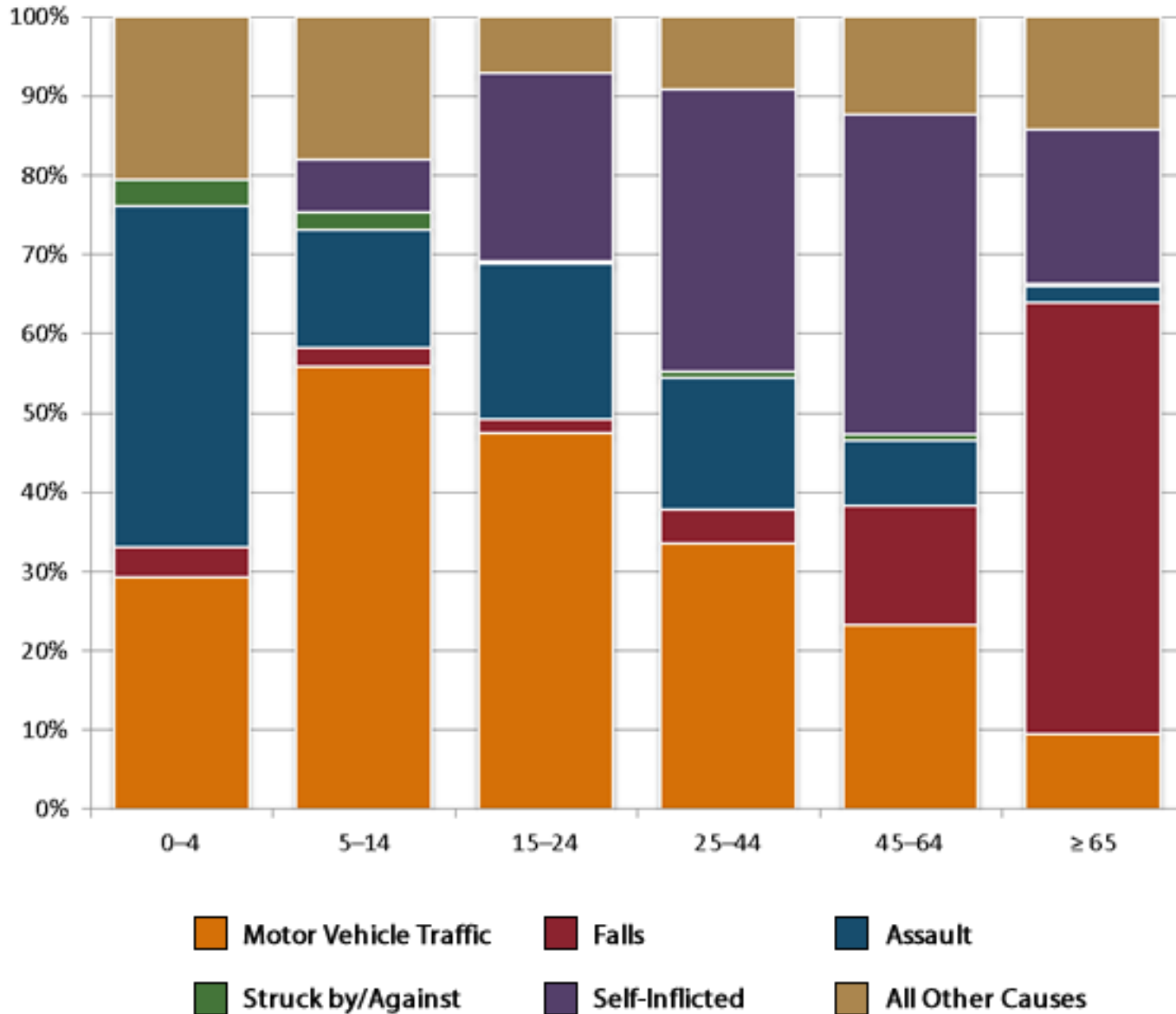
Les mécanismes suspectés associent une moindre capacité de compensation ou des réserves cognitives altérées.

Percent Distributions of TBI-related Emergency Department Visits by Age Group and Injury Mechanism — United States, 2006–2010



National Vital Statistics System Mortality Data — United States

Percent Distributions of TBI-related Deaths by Age Group and Injury Mechanism — United States, 2006–2010



National Vital Statistics System Mortality Data — United States

L'âge est un facteur influençant de manière majeure le devenir et la récupération après traumatisme crânien.

Livingston et al. Recovery at one year following isolated traumatic brain injury: a Western Trauma Association prospective multicenter trial. J Trauma 2005;59:1298–304.

Après un traumatisme crânien grave (GCS <8), l'âge est un facteur péjoratif parfaitement identifié en particulier la mortalité.

Après traumatisme crânien modéré (GCS 8-13) la récupération est d'habitude bonne tant chez les jeunes que les sujets âgés. Cependant les sujets âgés récupèrent moins vite que les sujets jeunes mais continuent à évoluer même six mois après le traumatisme.

Mosenthal AC et al The effect of age on functional outcome in mild traumatic brain injury: 6-month report of a prospective multicenter trial. J Trauma. 2004 May;56(5):1042-8.



## NIH Public Access Author Manuscript

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### **Traumatic Brain Injury in Older Adults: Epidemiology, Outcomes, and Future Implications**

**Hilaire J. Thompson, PhD<sup>\*</sup>, Wayne C. McCormick, MD, MPH<sup>†</sup>, and Sarah H. Kagan, PhD<sup>‡</sup>**

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Te Kaporeihana Āwhina Hunga Whara

# Pragmatic Evidence Based Review

## Aging in moderate to severe TBI

Reviewer	Fiona Conlon
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References	Overall Judgement about evidence	Recommendations/Findings
<b>NEUROLOGIC</b>		
Bazarian et al, 2009 <sup>4</sup> Ishibe et al, 2009 <sup>3</sup>	STRONG evidence for causal relationship between TBI and the development of unprovoked seizures (This is based on research on veterans with penetrating head injury)	The risk is higher in the first year after trauma and falling in years 1-4 after injury and continuing more than 5 years after injury
Bazarian et al, 2009 <sup>4</sup> Ishibe et al, 2009 <sup>3</sup> Fleminger et al, 2003 <sup>17</sup>	STRONG association between moderate or severe TBI and dementia of the Alzheimer's type  STRONG evidence that a severe and moderate TBI is associated with a greater risk of parkinsonism	
Bazarian et al, 2009 <sup>4</sup> Ishibe et al, 2009 <sup>3</sup>	MODERATE evidence that younger TBI individuals have more sleep problems: difficulty falling asleep and more restless sleep.	Problems with sleep persist in 29% of the TBI population from 7-24 years post injury
Breed et al, 2004 <sup>18</sup> Colantonio et al, 2004(a) <sup>19</sup>	LIMITED evidence of vision and hearing problems in TBI individuals	29% of TBI population have vision and hearing problems that persist 7-24 years post injury
Bazarian et al, 2009 <sup>4</sup> Colantonio et al, 2004(a) <sup>19</sup>		

Those who are older at the time of injury:

- Have a higher risk of mortality after the initial rehabilitation period<sup>3 6 7</sup>.
- Are more disabled after discharge from rehabilitation despite having a less severe injury<sup>8</sup>.
- Show greater decline in Disability rating Score (DRS) after 5 years than those injured at a younger age<sup>9</sup>.
- Have an increased risk of cognitive decline, especially those aged over 60 at the time of injury<sup>10 11</sup>.
- Have a predicted greater decline in functional independence, fatigue and societal participation<sup>12 13 14 15</sup>.
- Initially have greater emotional stress than those injured at a younger age, but this lessens over time<sup>5</sup>.
- Have generally poorer outcomes in terms of long term unemployment, adverse social function, diminished social relationships and aggressive behaviours. These poor outcomes are further predicted by: longer post traumatic amnesia, unemployment at the time of injury, more severe disability rating at rehabilitation discharge and pre-injury substance abuse<sup>3 12</sup>.

## Les adultes de plus de 75 ans:

- 60% des chutes se produisent à la maison
- ont la plus forte probabilité d'hospitalisation et de décès secondaire à un traumatisme crânien
- ont 5 fois plus de chance d'être admis en long séjour pour plus d'un an.

La mortalité des traumatismes crâniens augmente de manière linéaire avec l'âge.

Accidents moins fréquents mais plus graves

50% des piétons tués et 35 % des cyclistes tués ont plus de 65 ans.  
22% des piétons tués ont plus de 80 ans.

Perte d'autonomie dans une population fragile après TC

Iatrogénie en particulier des anticoagulants et antiagrégants

Population en constante augmentation

Les patients âgés au moment du traumatisme crânien ont:

- un risque de mortalité accru après la période de rééducation initiale.
- un handicap plus lourd à la sortie de rééducation malgré des lésions initiales moins sévères.
- des scores de handicap à 5 ans supérieurs à ceux qui ont présenté le même type de traumatisme à un âge moins avancé
- un déclin cognitif supérieur, en particulier chez ceux qui avaient plus de 60 ans au moment du traumatisme.
- un net déclin en terme d'indépendance fonctionnelle, fatigue et participation sociale
- un stress émotionnel plus important que chez les sujets plus jeunes
- Un risque accru de crises d'épilepsie, de démence, de Parkinsonisme, de troubles du sommeil

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CLINICAL ARTICLE

# **Clinical article: mortality associated with severe head injury in the elderly**

**H. C. Patel • Omar Bouamra • Maralyn Woodford •  
David W. Yates • Fiona E. Lecky**

	Age group (years)			
	65–70	70–75	75–80	>80
<i>n</i> (%)	137 (23)	147 (21.7)	160 (22.6)	225 (32)
Median ISS	25	25	25	25
Median GCS motor	1	1	2	2
Percentage with isolated HI	49	52	60	53
M:F ratio	64:36	60:40	56:44	46:53
Mechanism of injury (%)				
Fall	50	49	54	54
Rta	43	46	41	42
Assault	6	5	5	3
Number treated in NC (%)	55/137 (40)	55/147 (37)	54/160 (33)	43/225 (19)
Number treated in ICU (%)	69/89 (77)	67/86 (77)	55/83 (66)	46/105 (43)
Overall mortality (95% CI)	71.5 (64–79)	74.8 (68–82)	85 (79–91)	87 (83–91)

	Age range ( <i>n</i> )			
	65–70 (137)	70–75 (147)	75–80 (160)	>80 (225)
Overall mortality	71.5 (64–79)	74.8 (68–82)	85.0 (79–91)	87.1 (83–91)
Mortality in patients with:				
GCS 3–5	79.6 (72–87)	85.9 (79–93)	92.0 (87–97)	92.6 (88–97)
GCS 6–8	47.1 (30–64)	56.4 (43–69)	73.3 (62–85)	78.8 (70–87)
Surgical lesions	75.7 (66–85)	84.7 (76–93)	90.1 (84–96)	89.4 (84–95)
Non-surgical lesion	66.7 (55–78)	65.3 (55–76)	78.3 (69–88)	84.8 (78–91)
Isolated head injuries	65.7 (54–77)	74.0 (64–84)	83.3 (76–91)	83.3 (77–90)
Mortality in patients treated:				
In an intensive care setting	59.4 (48–71)	58.2 (46–70)	70.9 (59–83)	76.1 (64–88)
Not in an intensive care setting	75.0 (56–94)	63.2 (41–85)	89.3 (78–101)	81.4 (71–91)
In a neurosurgical centre (NC)	65.5 (53–78)	70.9 (59–83)	74.1 (62–86)	76.7 (64–89)
In a non-neurosurgical centre (NNC)	75.6 (66–85)	77.2 (69–86)	90.6 (85–96)	89.6 (85–94)



## **Ground level falls are associated with significant mortality in elderly patients**

Spaniolas *et al.* J Trauma. 2010 Oct;69(4):821-5. 1

### **BACKGROUND:**

Falls from height are considered to be high risk for multisystem injury. Ground-level falls (GLF) are often deemed a low-energy mechanism of injury (MOI) and not a recommended triage criterion for trauma team activation. We hypothesize that in elderly patients, a GLF may represent a high-risk group for injury and concurrent comorbidities that warrant trauma service evaluation and should be triaged appropriately.

### **CONCLUSIONS:**

Patients older than 70 years and with GCS score <15 represent a group with significant in-hospital mortality.

## **Prognostic Markers for Poor Recovery After Mild Traumatic Brain Injury in Older Adults: A Pilot Cohort Study.**

Kristman VL *et al.* J Head Trauma Rehabil. 2016 Nov/Dec;31(6):E33-E43

### **OBJECTIVE:**

To identify prognostic markers associated with poor recovery from mild traumatic brain injury (MTBI) in older adults.

### **CONCLUSION:**

Recovery after MTBI in older adults may be associated more with psychosocial than with biomedical or injury-related factors.

# **Computed tomography abbreviated assessment of sarcopenia following trauma: The CAAST measurement predicts 6-month mortality in older adult trauma patients.**

Leeper *et al.* J Trauma Acute Care Surg. 2016 May;80(5):805-11

## **BACKGROUND:**

Older adult trauma patients are at increased risk of poor outcome, both immediately after injury and beyond hospital discharge. Identifying patients early in the hospital stay who are at increased risk of death after discharge can be challenging.

## **CONCLUSION:**

Out of hospital does not assure out of danger for the elderly. Sarcopenia is a strong predictor of 6-month postdischarge mortality for older adults. The CAAST measurement is an efficient and inexpensive measure that can allow clinicians to target older trauma patients at risk of poor outcome for early intervention and/or palliative care services

# **Sarcopenia as a Predictor of Mortality in Elderly Blunt Trauma Patients: Comparing the Masseter to the Psoas using Computed Tomography.**

Wallace *et al.* J Trauma Acute Care Surg. 2016 Nov 4.

**BACKGROUND:** Sarcopenia, or age-related loss of muscle mass, is measurable by computed tomography (CT). In elderly trauma patients, increased mortality is associated with decreased psoas muscle cross-sectional area (P-Area) on abdominal CT. Fall is the leading cause of injury in the elderly and head CT is more often obtained. Masseter muscle cross-sectional area (M-Area) is readily measured on head CT. Hypothesizing that M-Area is a satisfactory surrogate for P-Area, we compared the two as markers of sarcopenia and increased mortality in elderly trauma patients.

## **CONCLUSIONS:**

In elderly trauma patients, M-Area is an equally valid and more readily available marker of sarcopenia and two-year mortality than P-Area. Future study should validate M-Area as a metric to identify at-risk patients who may benefit from early intervention.

## **Prognostic Markers for Poor Recovery After Mild Traumatic Brain Injury in Older Adults: A Pilot Cohort Study.**

Kristman *et al.* J Head Trauma Rehabil. 2016 Nov/Dec;31(6):E33-E43.

### **CONCLUSION:**

Recovery after MTBI in older adults may be associated more with psychosocial than with biomedical or injury-related factors.

## **Sex differences in mortality following isolated traumatic brain injury among older adults.**

Albrecht *et al.* J Trauma Acute Care Surg. 2016 Sep;81(3):486-92

### **CONCLUSION:**

We found no sex differences in mortality following isolated TBI among older adults, in contrast with other studies and our own analyses using all TBI cases. Researchers should consider isolated TBI in outcome studies to prevent residual confounding by severity of other injuries.

## **Traumatic Brain Injury in the Elderly: Is it as Bad as we Think?**

**Calvin H. K. Mak • Stephen K. H. Wong •  
George K. Wong • Stephanie Ng • Kevin K. W. Wang •  
Ping Kuen Lam • Wai Sang Poon**

Though elderly people in general did fare worse after traumatic brain injury, certain “younger elderly” people, aged 65–75 years, could have a comparable outcome to younger adults after minor to moderate head injury.