

## Supplementary Online Content

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**eTable 1.** Predictors Included in the Development of the Optimal Classification Trees

**eTable 2.** Patients With ciTBI Who Were Erroneously Classified as Very Low Risk With the PECARN Rules or the Optimal Classification Trees

This supplementary material has been provided by the authors to give readers additional information about their work.

**eTable 1. Predictors included in the development of the Optimal Classification Trees**

Predictor	Values	Missing data	Comment
Age	Continuous	Imputed	
Sex	Male, female	Imputed	
Injury severity	Low, moderate, severe	Imputed	Severe: motor vehicle crash with patient ejection, death of another passenger, or rollover; pedestrian or bicyclist without helmet struck by a motorized vehicle; falls of more than 0.9 m (3 feet) for <2 and more than 1.5 m [5 feet] for ≥2 years); or head struck by a high-impact object
Loss of consciousness	None, <5s, 5s to 1 min, 1 to 5 min, >5 min, or unknown	New category (“unknown”)	
Seizure onset	No seizure, immediately, within 30 minutes of injury, >30 min after injury	Imputed	
Seizure duration	[No seizure], <1 min, 1 to 5 min, 5 to 15 min, >15 min, or unknown	New category (“unknown”)	
Headache intensity	None, mild (barely noticeable), moderate, severe	Imputed	Assessed only in verbal children
Number of vomiting episodes	0, 1, 2, >2 times	Imputed	
Mental status	GCS 15, GCS 15 with additional signs of AMS, GCS 14	Imputed	Additional AMS signs: agitation, somnolence, repetitive questioning, or slow response to verbal communication (but excluding a [non-specific] “other AMS” designation)
Skull fracture	No or unclear, palpable and not depressed, palpable and depressed	Imputed	
Hematoma size	No hematoma, small (<1 cm or barely palpable), medium (1-3 cm), large (>3cm)	Imputed	
Hematoma location	None, frontal, occipital, parietal or temporal	Imputed	

AMS: altered mental status, GCS: Glasgow Coma Scale.

**eTable 2. Patients With ciTBI Who Were Erroneously Classified as Very Low Risk With the PECARN Rules or the Optimal Classification Trees**

ID	Cohort	Missed by	Age (verbal status)	Sex	Mechanism of injury (severity)	GC S	Recorded signs or symptoms	ciTBI
<b>A</b>	<2 y, development	PECARN rule	Newborn (preverbal)	Male	Object fell on head (moderate)	15	[None]	Hospitalization + TBI in CT
<b>B</b>	>=2 y, development	OCT, PECARN rule	6 y (verbal)	Male	Fell down the stairs (moderate)	15	Small (<1 cm) frontal hematoma	Neurosurgery
<b>C</b>	>=2 y, development	OCT, PECARN rule	10 y (verbal)	Female	Occupant in motor vehicle collision (moderate)	15	Amnesia for the injury, moderate headache within 1 h	Hospitalization + TBI in CT
<b>D</b>	>=2 y, development	OCT, PECARN rule	11 y (verbal)	Male	Sports (moderate)	15	Amnesia for the injury, facial trauma	Hospitalization + TBI in CT
<b>E</b>	>=2 y, development	OCT, PECARN rule	16 y (verbal)	Male	Assault (moderate)	15	Facial trauma	Hospitalization + TBI in CT
<b>F</b>	>=2 y, validation	OCT, PECARN rule	7 y (verbal)	Male	Wheeled transport crash other than bike or motor vehicle (moderate)	15	Medium (1-3 cm) frontal hematoma, dizziness, unclear palpation exam for skull fracture, facial trauma, neurological deficit (cranial nerve)	Hospitalization + TBI in CT
<b>G</b>	>=2 y, validation	OCT, PECARN rule	11 y (verbal)	Male	Bike collision or fall from bike (moderate)	15	Large (>3 cm) frontal hematoma, moderate headache within 1 h, signs of injury in the flank and extremities	Hospitalization + TBI in CT
<b>H</b>	>=2 y, development	PECARN rule	26 mo (preverbal)	Male	Fell from an elevation (moderate)	15	Medium (1-3 cm) parietal or temporal hematoma	Hospitalization + TBI in CT
<b>I</b>	>=2 y, development	PECARN rule	6 y (verbal)	Female	Wheeled transport crash other than bike or motor vehicle (moderate)	15	Small (<1 cm) parietal or temporal hematoma, moderate headache within 1 h	Hospitalization + TBI in CT

ID	Cohort	Missed by	Age (verbal status)	Sex	Mechanism of injury (severity)	GCS	Recorded signs or symptoms	ciTBI
J	>=2 y, development	PECARN rules	15 y (verbal)	Female	Sports (moderate)	15	Large (>3 cm) frontal hematoma, moderate headache within 1 h, facial trauma	Hospitalization + TBI in CT
K	>=2 y, development	OCT rules	9 y (verbal)	Male	Sports (moderate)	15	Amnesia for the injury, suspected loss of consciousness (<1 minute)	Hospitalization + TBI in CT
L	>=2 y, development	OCT rules	11 y (verbal)	Male	Bicycle accident (moderate)	15	Amnesia for the injury, suspected loss of consciousness (1 to 5 minutes), moderate headache	Hospitalization + TBI in CT
M	>=2 y, development	OCT rules	16 y (verbal)	Male	Not listed injury mechanism (moderate)	15	Severe headache within 1 h	Hospitalization + TBI in CT
L	>=2 y, development	OCT rules	17 y (verbal)	Male	Assault (moderate)	15	Large (> 3cm) frontal hematoma, amnesia for the injury, loss of consciousness (1 to 5 minutes), moderate headache within 1 h, altered mental status (for reasons other than agitation, somnolence, repetitive questioning or slowness in verbal communication)	Hospitalization + TBI in CT

(ci)TBI: (clinically important) traumatic brain injury. CT: Computed tomography. GCS: Glasgow Coma Scale. OCT: optimal classification trees. PECARN: Pediatric Emergency Care Applied Research Network.