**When to Order CT Imaging for Children Presenting with Suspected Mild Traumatic Brain Injury\***

This handout for healthcare providers provides an overview of the Computed tomography (CT) imaging recommendations contained in the CDC Pediatric Mild TBI Guideline. These evidence-based recommendations are designed to help healthcare providers rule out the presence of a severe injury while balancing the risks associated with head CT (as well as possible concomitant sedation for imaging).

**Did You Know?**

The CDC Pediatric Mild TBI Guideline is the:

* Most comprehensive review of pediatric mild TBI scientific evidence to date—**summarizing 25 years of scientific research**
* First U.S. evidence-based Guideline that covers all causes of pediatric mild TBI.
* Inclusive of 46 clinical recommendations that cover diagnosis, prognosis, and management/treatment.
* Applicable to healthcare providers working in:
  + Primary care
  + Outpatient specialty
  + Inpatient care
  + Emergency care settings

Using a modified **Grading of Recommendations, Assessment, Development and Evaluations (GRADE)** process, each recommendation was assigned a level of obligation:

1. **Level B:** (Should do) Most patients in most circumstances would want the recommendation followed

**RECOMMENDATIONS FOR HEALTHCARE PROVIDERS**

**1**. Healthcare providers *should not* routinely obtain head CT for diagnostic purposes in children with mTBI. **(Level B)**

**2.** Healthcare providers should use validated clinical decision rules to identify children with mTBI at low risk for intracranial injury, in whom head CT is not indicated, as well as children who may be at higher risk for clinically important ICI, and therefore may warrant head CT. Existing decision rules combine a variety of factors that, when assessed together, may increase the risk for more serious injury. Such risk factors include the following:

* Age < 2 years old
* Vomiting
* Loss of consciousness
* Severe mechanism of injury
* Severe or worsening headache
* Amnesia
* Nonfrontal scalp hematoma
* Glasgow Coma Score < 15
* Clinical suspicion for skull fracture **(Level B)**

3. For children diagnosed with mTBI, healthcare providers should discuss the risks of pediatric head CT in the context of risk factors for ICI with the patient and his/her family. **(Level B)**

**TOOLS TO HELP YOU IMPLEMENT THE CDC RECOMMENDATIONS**

The Pediatric Emergency Care Applied Research Network (PECARN) Pediatric Head Injury/Trauma Algorithms can be used for evaluating children with Glasgow Coma Scale (GCS) 14-15 following head trauma. These evidence-based, validated decision rules are designed to help healthcare providers determine when a CT scan is or is not recommended for a pediatric patient seen in the acute setting with suspected mTBI following head trauma and can be used to help you implement the CDC Pediatric mTBI Guideline.

. The goal of the PECARN decision rule is to minimize the risk of failure to identify ciTBI in those children who present with signs and symptoms of mTBI and to avoid unnecessary radiation exposure from a head CT.

**IMPORTANT: The PECARN decision rules shown below apply only to children with GCS scores of 14 or 15. There are separate decision rules that should be followed for patients (A) younger than 2 years of age and (B) those 2 years and older.**

**Figure below**

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\*The PECARN Decision Rule focuses specifically on children seen with head trauma with a GCS score 14 or 15. The PECARN decision rule is not applicable for pediatric patients seen for head trauma with GCS scores of 13, for whom CT scans are recommended because the likelihood of intracranial abnormalities is higher in this population.

*LOC* is defined as a history of loss of consciousness with the traumatic event.

† Severe mechanism of injury: motor vehicle crash with patient ejection, death of another passenger, or rollover; pedestrian or bicyclist without helmet struck by a motorized vehicle; fall of more than 0.9 m for children younger than 2 years, or more than 1.5 m for children aged 2 years and older; or head struck by a high-impact object.

# Definition of clinically-important traumatic brain injury (ciTBI)(any of the following satisfy definition):

* Death from traumatic brain injury (TBI)
* Neurosurgical intervention for traumatic brain injury
  + Intracranial pressure monitoring
  + Elevation of depressed skull fracture
  + Ventriculostomy
  + Hematoma evacuation
  + Lobectomy
  + Tissue debridement
  + Dura repair
  + Other
* Intubation of more than 24 hours for TBI.
* Hospital admission of 2 nights or more for the TBI in association with TBI on CT.
* Hospital admission for TBI defined by admission for persistent neurological symptoms or signs such as persistent alteration in mental status, recurrent emesis due to head injury, persistent severe headache or ongoing seizure management.

*Take action to improve the health of your young patients seen for mTBI*

**For more on the CDC Pediatric mTBI Guideline and other evidence-based recommendations in this Guideline, visit:** [**www.cdc.gov/HEADSUP**](http://www.cdc.gov/HEADSUP)**.**