Evaluation and Active Management of Mild Traumatic Brain Injury in Pediatric Acute Care: Time to Standardize

Gerard A. Gioia, PhD

Traumatic brain injury (TBI) is a significant and increasing public health concern for children. “Mild” TBI (mTBI), which includes the entity of “concussion,” is the most common presentation of TBI in the pediatric emergency department (ED) and urgent care setting. Despite the prevalence of this clinical syndrome, the management continues to evolve, stressing the importance for clinicians on the frontline to be knowledgeable of the mTBI care continuum from diagnosis to treatment.

This article presents a clinical process to improve the clinician’s practical management of mTBI in the acute care setting. Recognizing the continuum of mTBI care from initial diagnosis to recovery is imperative. This article features a broad care model that includes the role of the frontline provider, emphasizing communication with the other components of the care system. Specifically, this process includes a more standardized approach to care featuring the following: a clinical pathway, an mTBI screening tool developed purposely for the urgent/emergency care settings, an associated set of...
active/directive discharge instructions, and communication letters for the return to school and for referral to the primary care provider. These latter tools are a critical aspect of mTBI care because it is now viewed as an actively treatable condition with guidance beginning from the first point of entry in the health care system. The goal of this article is to provide a feasible pathway for the more standard use of these tools to improve the diagnosis and active management of mTBI in the urgent care setting.

This article reflects in part the work of a national standardization project, Screen-Inform-Prevent, in the emergency and urgent care settings. This project was launched in 2014 to bring best practices for mTBI screening to acute care with the support of One Mind (Mona Hicks), the Department of Defense, the National Football League, and several clinical-academic centers including Emory University (David Wright, Daniel Wu), University of Rochester (Jeff Bazarian), and Children’s National Health System (Gerard Gioia) http://onemind.org/Our-Solutions/SIP.

DEFINITIONS

A mild TBI (the diagnostic category which encompasses the term concussion) is defined as a traumatic brain injury induced by traumatic biomechanical forces secondary to direct or indirect forces to the head. It produces a disturbance of brain function that is related to dysfunction of neurometabolism and neurotransmission, rather than macrostructural injury, and is typically associated with normal structural neuroimaging findings (ie, computed tomography, magnetic resonance imaging). Concussion may or may not involve a loss of consciousness, and most times, it does not (occurring in approximately 13% of cases).

Concussion results in a constellation of symptoms manifested in physical, cognitive, emotional, and sleep-related domains. Duration of symptoms is variable and may last for as short as several minutes or as long as several days, weeks, months, or even longer in some cases. The most recent estimate in the large pediatric sample of the 5P study suggests that 30% of children and adolescents remain symptomatic past 4 weeks.

MEDICAL NEIGHBORHOOD FOR MTBI CARE

With an evolving health care delivery system, there are more options for patients in the initial evaluation of head injury within a medical neighborhood. As urgent care centers (UCCs) have become an epicenter for the initial care of minor injuries, they increasingly play a pivotal early role in the mTBI care continuum. Frontline clinicians at urgent or emergency care centers are charged with the primary task of making accurate and timely diagnoses and providing appropriate initial management, handing off to the primary care system to provide effective ongoing service delivery. Urgent care systems, in particular, are additionally tasked with the need to assess for red flags that necessitate transfer to a higher level of medical care if there are signs of neurological deterioration.

In the early stage of the injury, important initial decisions and guidance need to be made about critical life activities: (1) timing of return to school, (2) participation or restriction in sport and recreation activities, and (3) types of acceptable daily activities during the recovery process. To ensure active guidance across recovery, direct and explicit referral to the next level of care is a critical step. The Zuckerbraun et al pediatric ED study demonstrated that making this referral explicit reinforced and improved the family’s follow-up with their primary care provider. Thus, the mTBI neighborhood includes the medical providers in urgent, emergency, and primary care; school and recreation/sports systems; as well as specialty care providers. The variability in outcomes of mTBI (eg, patterns and severity of symptoms, lengths of recovery) and the individualized changing nature of the injury’s manifestation over time could potentially include any one of these components. It is important to recognize the broad system of mTBI service delivery and the role that the emergency and urgent care setting plays. Active role definition and performance within the spectrum of service delivery can optimize positive movement toward recovery and an appropriate understanding of the patient’s needs as they move through the care system.

CLINICAL PATHWAY FOR THE INITIAL EVALUATION AND MANAGEMENT OF MTBI

In May 2005, the US Centers for Disease Control and Prevention (CDC) published the Acute Care Injury Research Agenda update, recognizing that new treatments and guidelines for acute injury are not often adopted uniformly. The highest-priority research areas include the development and evaluation of acute injury treatment strategies that will result in defining evidence-based protocols and research to then develop and evaluate strategies to ensure their translation, dissemination, implementation, and adoption. With the need for standardized and systematic care plans, the opportunity exists to develop key processes and tools that will improve clinical recovery management and reduce morbidity. From a public health perspective, improved and standardized identification will increase our understanding of the incidence and course of mTBI, with the ultimate consequence of directing appropriate
health and education resources to intervention and prevention efforts. Without adequate recognition and identification of the problem, our accurate understanding of the scope and impact of mTBI will be diminished, and allocation of necessary resources will be misdirected. Establishing a feasible system of systematic identification, diagnosis, and management will, therefore, serve clinical and public health purposes.

The Zuckerbraun et al pediatric ED study provides an example of how patient outcomes can be improved with the use of a standardized diagnostic tool and consistent discharge instructions. This study examined 354 children admitted to 2 pediatric EDs under 2 experimental conditions: standard care and the application of an intervention using the Acute Concussion Evaluation–Emergency Department version and standardized discharge instructions guiding home management, school return, and return to recreation/sport participation. Relative to the standard care condition, the intervention condition demonstrated significant improvements in patient follow-up care with their primary care provider at all time points (eg, 32% vs 61%, P < .001 at week 4) and increased parental recall of discharge instructions, with greater academic assistance given to the student upon return to school with the use of a return-to-school letter. Families were better able to describe postconcussion symptoms and exhibited more cautious return to risk activities. This study demonstrates that the application of a standardized diagnostic tool and the delivery of evidence-informed discharge instructions within the workflow of the ED can improve patient outcomes.

To implement diagnostic tools and discharge instructions effectively requires a clinical pathway that respects the practical workflow of the urgent and emergency care settings. Such a pathway is proposed, recognizing the likely need to adapt the process to the resources available in any given clinical setting. Table 1 presents the 3-step clinical pathway including: (1) the initial screening assessment to determine the need for further mTBI evaluation; (2) when indicated, application of the mTBI screening tool to assist the diagnosis; and (3) the provision of a structured discharge plan to provide key evidence-based recommendations for daily activity, academic and workload demands, as well as athletic/recreation restriction.

Below we describe in detail the 3-step pathway in the evaluation and management of children and adolescents presenting to an acute care center with a suspected mTBI.

<table>
<thead>
<tr>
<th>Event</th>
<th>Action</th>
<th>Tools</th>
<th>Communication</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Patient arrival sustaining trauma</td>
<td>Screening: determine if mTBI assessment protocol is indicated</td>
<td>Mild TBI Screening Tool</td>
<td>a. Patient/family</td>
</tr>
<tr>
<td></td>
<td>ED: nurse to perform</td>
<td>a. 2 Trigger questions re blow, mental status change</td>
<td>b. Red flags assessment</td>
</tr>
<tr>
<td></td>
<td>Urgent care: notify provider</td>
<td>b. Referral to ED</td>
<td></td>
</tr>
</tbody>
</table>

**Decision**

If no triggers or only 1 trigger is positive, consider other diagnoses; counsel vigilance for possible delayed symptom onset. If both triggers are positive, initiate diagnostic assessment for mTBI.

2. Diagnostic assessment

Assess mTBI mechanism, signs & symptoms, history, and neurologic/balance/vision function

Mild TBI Screening Tool

Patient/family

3. Discharge plan

1. Brief education about mTBI (definition, risks of reinjury)

Mild TBI Screening Tool

1-3. CDC discharge instructions

1-3. Patient/family

2. Reasons to return to ED

- 

4. School return, no sports/risk activity

- 

5. Follow-up: primary care provider

- 

4. ACE return-to-school letter

4. School

5. Follow-up letter to primary care

5. Primary care provider

**TABLE 1. Clinical pathway for acute pediatric concussion evaluation and management.**

**STEP 1: SCREENING QUESTIONS**

As indicated in the 2005 CDC directive and demonstrated in the pediatric ED study, the use of a standard evaluation tool facilitates the early identification and diagnosis of mTBI. As an initial step, identifying the conditions in which the clinician would initiate the evaluation of a suspected mTBI is important to incorporate within the workflow of a busy office practice, urgent care, or ED.
The mTBI workflow, however, is important to customize to an individual center. One of the core differences between urgent and emergency care centers is the presence of a standardized screening process. Emergency centers typically use nurses on the frontline to assign priority using the emergency severity index or similar scales. Urgent care centers that lack the consistent patient acuity of EDs often lack a true triage process and instead use rapid intake with an ancillary provider who could be a medical assistant, nurse, or x-ray technician, perhaps with a lower skill level in the use of critical thinking and prioritization of care. Therefore, it is important to tease out who makes this screening assessment to alert a physician of a possible mTBI.

In the context of a likely trauma situation, 2 trigger questions are proposed to engage the mTBI evaluation process: (1) presence of a blunt force or deceleration/acceleration event to the head or body that jerks the head significantly or blast exposure and (2) positive alteration of consciousness or mental status. The screening tool for mild TBI (Appendix A) has been developed to guide this process with the 2 questions posed in a likely head trauma scenario. This 2-tiered screening tool was built purposely, recognizing the complexity of both urgent care and ED settings, to make the evaluation process efficient. Therefore, the 2 screening questions are first asked, requiring both to be answered positively for the mTBI evaluation protocol to be completed. The 2 questions are:

a. Did any of the following occur? A blunt force to the head? Rapid and forceful back and forth head movement (like whiplash)? Blast injury?

b. Was there a change in mental status (eg, confusion, dazed, disoriented, or poor memory for events around the injury) or a change in the level of consciousness (seemed out of it, not responding as you normally do)?

Based on the responses to these questions, an active decision must be made. If both questions are answered affirmatively, the clinician should consider the likelihood of a mild TBI and proceed to Step 2 and the evaluation of mTBI. If only 1 or neither of the questions is answered affirmatively, then mTBI would not be as likely; the clinician should consider other possible diagnoses, although the clinician should also consider counseling the patient to be vigilant for possible delayed mTBI symptom onset.

**STEP 2: EVALUATION PROCESS FOR IDENTIFICATION/DIAGNOSIS**

With positive responses to the 2 screening questions, the screening tool for mild TBI guides the rest of the evaluation: including a determination of the mechanism of injury (eg, motor vehicle collision, sports, assault), evaluation of the full set of signs and symptoms, gathering specific medical history related to the possibility of a protracted recovery, and the performance of a brief neurologic examination including an oculomotor screen and motor examination (strength, balance, and coordination).

The evaluation of a patient with mTBI can be complicated at times because the symptoms are common to other medical or psychiatric conditions (eg, posttraumatic stress disorder, depression, attention-deficit/hyperactivity disorder, headache syndromes). The determination of a reasonable mechanism of injury and the temporal proximity of the associated signs and symptoms to the injury is important to establish. In defining the mechanism of injury, assess how the injury occurred, the type of force, and location on the head or body where the force (blow) was received. The force to the head may be indirect, such as with an individual being struck in the body resulting in the head accelerating forward and then backward quickly (eg, whiplash). Establishing the cause and mechanism of the injury may help to estimate the force of the blow the patient sustained.

Next, assess the acute injury signs of altered consciousness or mental status changes, including any changes to the patient's level of consciousness and their capability to process information at the time of the injury. Inquire whether loss of consciousness occurred or was observed (including by whom). Next, assess any disruption of memory processing, defining the presence of retrograde (loss of memory for events before the injury) and anterograde (loss of memory for events after the injury) amnesia. Assess for the presence of other early signs that may have been observed by others such as appearing dazed or stunned, confusion about events, answering questions slowly, repeating questions, forgetful about recent information, or seizure activity.

Assessing the patient's history is an important part of the evaluation because certain risk factors have been associated with a longer period of recovery from an mTBI, including prior mTBIs, chronic headaches, history of mental health disorders (anxiety, depression), and developmental disorders such as learning disabilities and attention-deficit/hyperactivity disorder. With respect to the history of prior mTBIs, it is particularly important to identify those injuries which took longer than 1 week to recover because this is a factor that predicted more prolonged recovery in the large Canadian 5P study of pediatric mTBI.6

The symptom checklist assesses 14 postconcussional symptoms reported by the patient and/or parent, if necessary. Note that this checklist simply asks for the presence or absence of the symptom and not for the severity of the symptom. As various symptoms can
be present prior to the injury (e.g., inattention, headaches), it is important to assess any changes from typical presentation.

A physical examination follows the history and signs/symptoms assessment to identify neurologic impairment. A Glasgow Coma Score is determined—assessing for best eye, verbal, and motor response. Mild TBI is classified as a Glasgow Coma Score of 13 to 15, although most patients with mild TBI are scored at the highest level. Next, the clinician examines the patient for their pupillary response to light, with any unequal or unresponsive finding suggesting a concern with a more severe injury. Abnormal oculomotor responses can be found with mTBI. The clinician should assess the convergence of the eyes and smooth pursuits. Motor function is assessed including grip strength and pronator drift. Finally, a balance examination is conducted via a tandem stance/Romberg test.

As part of the initial evaluation process, the clinician must also screen for the signs of more serious injury which could necessitate emergency transfer for the patient in an urgent care or neuroimaging/observation for the patient in an ED. Thus, in addition to the physical examination, an assessment of the 12 Red Flags for acute emergency management is conducted, reflecting possible neurological deterioration (Table 2).

**STEP 3: DISCHARGE PLAN**

Once the diagnosis has been established, the patient and family are to be given active guidance regarding initial treatment and management of the mTBI. This is perhaps the most misunderstood aspect of the care plan, as treatment has evolved to advocate for an "active" rehabilitation approach. A complete discharge plan therefore includes mTBI education, signs indicating the need for more care, and the specific rehabilitation steps and guidance for return to school and sports.

**DISCHARGE EDUCATION**

The discharge education process educates the patient/family about mTBI and its risks, provides reassurance regarding a positive recovery process, and guides the initial treatment process and prevention of reinjury. A sample set of discharge instructions from the CDC can be found at https://www.cdc.gov/headsup/providers/discharge-materials.html. The benefits of explicit discharge education on mTBI outcome in terms of improved recovery have been demonstrated in several studies of patients in the ED that receive directive postinjury guidance and reassurance. Treatment of mTBI has evolved over the last several years where a more active rehabilitation approach is now advocated from the point of initial diagnosis. The discharge instructions should prepare the patient and family to manage the recovery process and connect them with the next level of medical care. The patient and family must be counseled that the brain is more vulnerable to reinjury during recovery and that the patient must avoid any and all risk activities that could result in a second injury because these reinjuries can result in a more complicated recovery.

The discharge education should include a discussion of the signs to seek emergency care after discharge. Over the first 24 to 48 hours, families and patients should be counseled to assess carefully any of the serious signs. If any of these signs are observed or suspected, immediate medical attention should be sought. Next, the family and patient are instructed on the kinds of activities that the patient should and should not engage in during the recovery process. In this step, the 4-step gradual return to activity guide is described with education about managing exertional effects (i.e., increased symptoms when engaging in excessive activity). At the same time, the patient should also be instructed to not be overly underactive. Guidance is given about the student's return to school and sports or other risky activities, which is discussed in further detail below. Finally, an explicit recommendation should be made for the family's follow-up with their primary care doctor.

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**TABLE 2. Red flags for acute emergency management (referral to ED or consideration for neuroimaging).**

<table>
<thead>
<tr>
<th>Red Flag</th>
<th>Description</th>
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<tbody>
<tr>
<td>Headaches that worsen</td>
<td>Pain in head with or without nausea</td>
</tr>
<tr>
<td>Seizures</td>
<td>Dj of seizures or convulsions</td>
</tr>
<tr>
<td>Focal neurologic signs</td>
<td>Localized numbness, weakness, tingling, muscle weakness, facial weakness</td>
</tr>
<tr>
<td>Looks very drowsy/can’t be awakened</td>
<td>Patients are unable to awaken when called</td>
</tr>
<tr>
<td>Repeated vomiting</td>
<td>Vomiting occurs at least once with no indication of infection</td>
</tr>
<tr>
<td>Weakness or numbness in arms/legs</td>
<td>Slight weakness or numbness in arms or legs</td>
</tr>
<tr>
<td>Can’t recognize people or places</td>
<td>Patients unable to recognize objects or people</td>
</tr>
<tr>
<td>Slurred speech</td>
<td>Speech is slurred or inaudible</td>
</tr>
<tr>
<td>Increasing confusion or irritability</td>
<td>Sudden change in mental status with agitation or behavior changes</td>
</tr>
<tr>
<td>Unusual behavioral change</td>
<td>Significant change in behavior, mood, or personality</td>
</tr>
<tr>
<td>Neck pain</td>
<td>Patients experience discomfort and pain in neck</td>
</tr>
<tr>
<td>Change in state of consciousness</td>
<td>Sudden change in consciousness, alertness, or awareness</td>
</tr>
</tbody>
</table>

Instructions: The patient should be carefully observed over the first 24 to 48 hours for these serious signs. Red flags are to be assessed as possible signs of deteriorating neurological functioning. Any positive report should prompt strong consideration of referral for emergency medical evaluation (e.g., computed tomographic scan to rule out intracranial bleed or other structural pathology).
provider to guide the continuing process of recovery. When patients were explicitly instructed to follow up with their primary care provider at the time of discharge, this connection was increased significantly.7

Given the attention mTBI has received more recently, many patients and families can become extremely worried about the recovery process. We strongly recommend that clinicians frame the discharge instructions in a positive manner, reassuring the family and patient that they will improve and recover over time. We use statements such as “You will get better. You will improve and recover gradually.” Also important are tying in the activity management/restriction guidance and ensuring that the patient and family understand what they can control during recovery. Statements such as “Take control of your activity level, find your sweet spot of activity and not too much, not too little, and your efforts to control your activity will pay off” can help guide positive expectations. This active guidance process can serve to allay fear and anxiety over the unknown. This issue is also an important reason why patients and families should follow up with their primary care provider to receive further reassuring guidance about their child’s individualized recovery plan.

Return to Sports
A critical aspect of the discharge process is to prevent repeat injury, especially during recovery. For children and adolescents, this means placing limits and/or restrictions on activities such as sports and other recreational endeavors. There should be no return to physical education or recess that involves physical activity until full recovery. All 50 states and the District of Columbia have laws that require written medical clearance to return to sport participation following an mTBI in high school and many youth sports. Although this clearance should never occur at the time of injury, families and athletes should be informed about the necessity of these restrictions and the need for formal medical clearance when recovery is complete. Mention of the state law and the need for final medical clearance can occur in the context of the discussion about follow-up with the primary care provider. The return-to-play (risk) clearance criteria, which signify full recovery, include:

1. No symptoms at rest and no medication use to manage symptoms
2. No return of symptoms with typical physical and cognitive activities
3. Cognitive functions at typical baseline
4. Normal balance and coordination
5. No other related medical/neurological complaints

Although the focus above is on formal sports participation, the family should also be instructed similarly about managing risk activities at home and in the neighborhood (eg skateboarding, trampoline use, rough-housing). One should not assume that families will make the connection about these everyday risk activities and should, therefore, give the families explicit instructions.

Return to School
The discharge process must also address the student’s return to school. The primary role of the medical provider in the urgent care or ED setting is to conduct initial medical evaluation, define the student’s symptom profile, and communicate this information to the school. This communication can then facilitate the school plans to support the student’s return. Key elements of a return-to-school letter should indicate the following: (a) proposed date of return to school, (b) the student’s current symptoms, and (c) necessary safety restrictions. As indicated previously, sending an explicit communication letter to the school can facilitate the initiation of support services for the student.7 To guide the return-to-school process, a return-to-school letter is provided in Appendix B. By receiving the return-to-school letter, the school can take these identified symptoms and translate them into symptom-targeted academic accommodations, providing individualized support to the recovering student.13

Although there are as of yet no hard and fast evidence-based guidelines as to when a student would return to school, it is generally recommended that they stay out of school for 1 or 2 days to facilitate the acute recovery process. In a randomized controlled trial of children and adolescents with mTBI, students who were restricted from school and other activities for 1 to 2 days exhibited better recovery indicators than those who were restricted for 5 days.14 Thus, most students will likely do well with restriction from school for only a brief period, whereas a small percentage may require a longer period due to more significant symptom severity. This decision must be individualized based on the child/adolescent’s symptom burden. The final decision on when to return to school highlights another important reason to emphasize follow-up of the patient and family with their primary care provider soon after the acute care visit, as a better determination can be made regarding the date of return to school with monitoring of symptom recovery.

Communication With the Primary Care Provider
Following the diagnosis and initial management of mTBI in the ED or urgent care setting, follow-up with the primary care provider and return to school are facilitated by a summary of the evaluation findings. Appendix C provides a sample letter that can be sent to the primary care provider regarding the evaluation findings with their patient. This communication allows primary care providers the opportunity to assess the patient for improvement since the time of injury and initial evaluation. In
SUMMARY

As alternate options of acute care become more prevalent, the pediatric urgent care setting plays an increasingly important role within the medical neighborhood in the early identification, diagnosis, and management of mTBI. This article describes a clinical pathway that engages a standardized Screen-Inform-Prevent process for pediatric acute care. The pathway involves the initial screening for a suspected mTBI, assessment of the red flags for emergency management, the standard screening evaluation of the injury, followed by standard discharge education and positive guidance for recovery. Referral for follow-up is made to the primary care provider, communicating the evaluation findings. Guidance is also initiated regarding the student's return to school via the return-to-school letter. Safety recommendations are provided to minimize repeat injuries, including restriction of sports and other risk recreational activities. Medical clearance for return to sports for a patient diagnosed with mTBI should not be made in the ED or urgent care setting, but providers should be familiar with the criteria for full recovery. By standardizing the process of screening, evaluation, discharge guidance, and referral/communication of the findings using the available clinical pathway and tools, the needs of children and adolescents who have sustained mTBI will be better served.

Appendix A. ED and urgent care screening tool for mild TBI.

<table>
<thead>
<tr>
<th>SCREEN-INFORM-PREVENT: ED/Urgent Care Screening Tool for Mild TBI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NURSE/Initial Screen</strong> (Triggered by trauma patients with GCS 13-15)</td>
</tr>
<tr>
<td>1. Did any of the following occur? A blunt force to the head? Rapid and forceful back and forth head movement (like whiplash)? Exposure to bomb blasts?</td>
</tr>
<tr>
<td>o No — No Trigger</td>
</tr>
<tr>
<td>o Yes — Next Question</td>
</tr>
<tr>
<td>2. Was there a change in mental status (e.g., confusion; dazed, disoriented, or poor memory for events around the injury) or a change in the level of consciousness (seemed out of it, not responding as you normally do)?</td>
</tr>
<tr>
<td>o No — No Trigger</td>
</tr>
<tr>
<td>o Yes</td>
</tr>
<tr>
<td>3. Mechanism</td>
</tr>
<tr>
<td>o MVC  o Sports Injury  o Blast</td>
</tr>
<tr>
<td>o Pedestrian-MVC  o Fall  o Polytrauma</td>
</tr>
<tr>
<td>o Bicycle  o Blunt Object  o Assault or Fight</td>
</tr>
<tr>
<td>4. Alteration of consciousness or mental status characteristics (Check all that apply)</td>
</tr>
<tr>
<td>W  P</td>
</tr>
<tr>
<td>□ Loss of Consciousness</td>
</tr>
<tr>
<td>□ Amnesia or memory loss (memory loss before or after the event)</td>
</tr>
<tr>
<td>□ Seizure</td>
</tr>
<tr>
<td>□ Confusion or brief mental status change (Bell Rung; Seeing Stars; Dazed)</td>
</tr>
<tr>
<td>□ Repeats questions</td>
</tr>
<tr>
<td>□ Answers questions slowly</td>
</tr>
<tr>
<td>W = Eye Witnesses or Observed in ED</td>
</tr>
<tr>
<td>P = Patient Report</td>
</tr>
<tr>
<td>5. History</td>
</tr>
<tr>
<td>Y  N</td>
</tr>
<tr>
<td>□ □ History of chronic headaches, e.g. migraines</td>
</tr>
<tr>
<td>□ □ Prior mTBI(s); Date(s) _____; # with symptom duration &gt;1 week _____</td>
</tr>
<tr>
<td>□ □ History of mental health disorders, e.g. depression, PTSD, anxiety</td>
</tr>
<tr>
<td>□ □ Prior diagnosis of a learning disorder or ADHD</td>
</tr>
</tbody>
</table>
6. Evaluation (if Nurse/Initial Screen is positive)

- **Symptom Checklist** (Check all that apply)
  - Headache
  - Nausea/Vomiting
  - Dizziness/Balance Problems
  - Sensitivity to Light or Noise
  - Confusion/Disorientation
  - Blurred or Double Vision
  - Ringing in the Ears
  - Drowsiness/Fatigue
  - Feeling Slowed Down
  - Difficulty Concentrating
  - Difficulty Remembering
  - Fogginess, Grogginess
  - Irritability

- **Physical Exam** (to confirm the patient fits the Mild TBI category)

  **GCS Score:**
  - Eye _____
  - Verbal _____
  - Motor _____

  **Pupillary Response to Light**
  - Normal
  - Abnormal
    - Unequal or unresponsive concern for more severe injury

  **Eyes — Convergence**
  - Normal
  - Abnormal
    - Measure ability to view near target without diplopia. Patient seated, wearing corrective lenses. Patient focuses on small target at arms length (e.g., pencil) and bring it to tip of nose. Patient stops moving target when object doubles (ignore blurring vision). Distance noted double vision should be <6cm to be normal. Repeat 3x.

  **Motor**
  - Test grip strength
    - Normal
    - Abnormal
    - Could represent spine injury or more severe intracranial injury

  **Test pronator drift**
  - Normal
  - Abnormal

  **Smooth Pursuit**
  - Vertical and Horizontal
    - Normal
    - Abnormal
    - Using finger or small object and observe ability of patient to track a vertical and horizontal (form an H pattern with finger or object an arms length away from patient). Inability to smoothly cross midline, nystagmus, or jerky movements of the eyes is abnormal

  **Balance**
  - Tandem Stance/Romberg Test*
    - Normal
    - Abnormal
    - Perform with person standing, arms crossed, without shoes and with the dominant foot directly in front of the non-dominant foot in tandem, with eyes open for 30 seconds. Repeat with eyes closed. Imbalance may represent dysfunction
APPENDIX B. ACE RETURN-TO-SCHOOL LETTER.

ACE POST-CONCUSSION
RETURN TO SCHOOL LETTER

Dear School Staff:

__________ sustained a concussion on ____________. Every concussion is different and recovery typically can take between several days to several weeks. While it is important for the student to return to school as soon as they can tolerate, the key to assisting recovery is to manage their physical and cognitive activity. Too much cognitive or physical activity can make symptoms worse and possibly prolong recovery, while too little activity can unnecessarily create anxiety and cause him/her to fall behind in their school work. As symptoms resolve and the student’s learning/cognitive functioning returns to normal, they can gradually progress to their normal school day.

The student is currently reporting the following symptoms. They should be viewed as the targets for classroom accommodations and adjustments.

<table>
<thead>
<tr>
<th>PHYSICAL</th>
<th>COGNITIVE</th>
<th>SOCIAL/EMOTIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headaches</td>
<td>Visual problems</td>
<td>Feeling foggy</td>
</tr>
<tr>
<td>Sensitivity to Light</td>
<td>Sensitivity to Noise</td>
<td>Memory loss</td>
</tr>
<tr>
<td>Vomiting</td>
<td>Nausea</td>
<td>Feeling slowed down</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Dizziness</td>
<td>Difficulty concentrating</td>
</tr>
<tr>
<td>Balance Problems</td>
<td>Tingling</td>
<td></td>
</tr>
</tbody>
</table>

Based on the current symptoms, he/she is ___ permitted to return to school. OR ___ is excused for ___ days. As general guidance, the student can return to school when:

(1) They can concentrate on school work for 30 minutes before symptoms worsen significantly, AND
(2) Symptoms reduce or disappear with cognitive rest breaks, allowing return to activity.

The student requires the following physical restrictions until cleared by a health professional:

* No physical activity during recess
* No PE class
* No Sports
* Other ____________________________

Health Care Provider Signature ____________________________ Date ______________

Contact information: ____________________________

SCHOOL SUPPORTS

Students with post-concussion symptoms and/or neuropsychological dysfunction often need support to perform school related activities. The following accommodations and adjustments to the student’s school program may be helpful to support the specific targeted symptoms.

- Shortened day
- Shortened classes
- Rest breaks during the day as needed
- Reduced/modified homework
- Support for prioritizing, organization and planning coursework
- No significant classroom or standardized testing
- Extended time to complete coursework, assignments, tests
- Alternative/modified grading or reduced make up work
APPENDIX C. URGENT CARE TRANSITION LETTER TO PRIMARY CARE 
(OR ED FOR MORE EVALUATION).

CONCUSSION - INITIAL EVALUATION

Date of Incident ________________

__ Transition Care to EMERGENCY DEPARTMENT/ Neurosurgical Evaluation

The patient is experiencing the following symptoms (circle):

<table>
<thead>
<tr>
<th>Worsening headache</th>
<th>Poor arousal/responsiveness</th>
<th>Can’t recognize people or places</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seizure activity</td>
<td>Repeated vomiting</td>
<td>Increasing confusion</td>
</tr>
<tr>
<td>Significant irritability</td>
<td>Slurred speech</td>
<td>Weakness or numbness</td>
</tr>
<tr>
<td></td>
<td>Unusual behavior change</td>
<td>Prolonged loss of consciousness</td>
</tr>
</tbody>
</table>

__ Transition Care to PEDIATRICIAN (no signs necessitating Emergent Care)

The patient is experiencing the following symptoms (circle):

<table>
<thead>
<tr>
<th>PHYSICAL</th>
<th>COGNITIVE</th>
<th>SOCIAL/EMOTIONAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headaches</td>
<td>Visual problems</td>
<td>Feeling foggy</td>
</tr>
<tr>
<td>Sensitivity to Light</td>
<td>Sensitivity to Noise</td>
<td>Memory loss</td>
</tr>
<tr>
<td>Vomiting</td>
<td>Nausea</td>
<td>Feeling slowed down</td>
</tr>
<tr>
<td>Fatigue</td>
<td>Dizziness</td>
<td>Difficulty concentrating</td>
</tr>
<tr>
<td>Balance Problems</td>
<td>Tingling</td>
<td>Feeling more emotional</td>
</tr>
</tbody>
</table>

Specific Exam Findings (neuro/balance/vision):

__________________________________________________________________________

__________________________________________________________________________

School Restrictions:

_____ permitted to return  _____ excused for _____ days

Physical Restrictions (until clearance by healthcare professional):

_____ no physical recess    _____ no PE class    _____ no contact sports    _____ no risk activities

__ Other: __________________________________________________________________

[Health Care Provider Signature]

Contact information:________________________________________________________________

ED/UC to PCP 6.2016 V1
REFERENCES