Guidelines for Concussion / Mild Traumatic Brain Injury & Persistent Symptoms

Second Edition

For adults (18+ years of age)







Module 12: Return-To-Activity / Work / School Considerations

Ontario Neurotrauma Foundation
Fondation ontarienne de neurotraumatologie

MODULE 12: RETURN-TO-ACTIVITY/WORK/ SCHOOL CONSIDERATIONS

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Please note, the project team independently managed the development and production of the guideline and, thus, editorial independence is retained.

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The recommendations and resources found within the *Guidelines for Concussion/Mild Traumatic Brain Injury & Persistent Symptoms* are intended to inform and instruct care providers and other stakeholders who deliver services to adults who have sustained or are suspected of having sustained a concussion/mTBI. These guidelines are not intended for use with patients or clients under the age of 18 years. These guidelines are not intended for use by people who have sustained or are suspected of having sustained a concussion/mTBI for any self-diagnosis or treatment. Patients may wish to bring their healthcare and other providers' attention to these guidelines.

The recommendations provided in these guidelines are informed by best available evidence at the time of publication, and relevant evidence published after these guidelines could influence the recommendations made within. Clinicians should also consider their own clinical judgement, patient preferences and contextual factors such as resource availability in clinical decision-making processes.

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Unique Features & Symbols in the Current Guideline

Hyperlinks

To improve ease of use, the current guideline has embedded hyperlinks to improve navigation between sections, appendices, and so on. For example, by clicking any heading in the table of contents above, you will be taken directly to that particular section in the current PDF document. Also, anytime there is mention of a particular table, figure, appendix or section, you can simply click on it to go directly to that item.

Symbols

The following symbol has been placed to the left of each guideline recommendation that should be prioritized for implementation. This was determined by expert consensus members during the endorsement/prioritization process, where experts were allowed to provide 20 prioritization votes (see Methodology in the Complete Version). Guideline recommendations with a summed prioritization score greater than 20 are key clinical practice guidelines recommendations for implementation.

The following symbol has been placed to the left of one key guideline recommendation in each of the sections that did not include a recommendation with a prioritization score greater than 20 (determined by expert consensus members during the endorsement/prioritization process).

At the bottom of each page in the current document, there is a hyperlinked footer that can be used to return to the table of contents as desired. Also, clicking "Return to Last Page" will take you back to the previously viewed page. (Note: When scrolling through the pages, the "Return to Last Page" button will only return to the last page that was scrolled through).

12 Return-to-Activity/Work/School Considerations

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General Considerations Regarding Rest & Return to Activity

The majority of individuals (estimates range from 73-88%) who experience a concussion/mTBI are able to return to their principal occupation within a year of the injury.[1-4] Nevertheless, even when individuals return to work, school, or other pre-injury activities, they may still be experiencing symptoms, and resumption of these activities can be complicated and stressful. Patients who present to the Emergency Department or a health care provider's office following mTBI should have a period of rest to facilitate a prompt recovery; however, there are divergent opinions amongst researchers and health care professionals on the exact nature and duration of the rest period that is most beneficial for recovery.[5] Some evidence suggests that symptoms can be worsened by inactivity; thus, an initial period of minimal physical and mental exertion is recommended, with gradual resumption of pre-injury activities as soon as tolerated (with the exception of activities with high mTBI exposure risk).[5-8] In other words, while napping/graded rest may be useful during graduated return to activity, the idea of complete bed rest should be avoided.[5]

While the importance of physical rest has been stressed in the past, cognitive rest is an equally important consideration when returning to activity following mTBI.[9,10] Patients should be advised as to what cognitive rest is, in addition to physical rest, as the cognitive load of activities is not intuitive and can negatively impact symptom resolution. Suggestions to reduce physical and cognitive load include time off from work or school, no reading, no visually stimulating activities (e.g., computer or cell phone use, watching TV), no exercise or exertion, increased rest and sleep, and decreased social interactions that are highly demanding.[11] When planning return to activity, the patient's tolerance threshold for both cognitive and physical activity should also be considered. For example, while fatigue or other symptoms may be mildly elevated due to the activity, the temporarily increased symptoms should not incapacitate the patient or lead to decreased functioning the following day.

GENERAL CONSIDERATIONS REGARDING REST & RETURN TO ACTIVITY		
		GRADE
12.1	Immediately following any concussion/mTBI, individuals who present with and/or report post-injury symptoms should have a period of rest to facilitate a prompt recovery and should be provided with recommendations to avoid activities that would increase their risk for sustaining another concussion. This is particularly important during the recovery period. [a]	**C**
12.2	Bed rest exceeding 3 days is not recommended.	**C**
☆ 12.3	Individuals with mTBI should be encouraged to gradually return to normal activity (work, physical, school, duty, leisure) based upon their tolerance. [a]	**A**
12.4	If a person's normal activity involves significant physical activity, exertion testing can be conducted that includes stressing the body (e.g., graded treadmill exercise test). If exertion testing results in a return of symptoms, a monitored progressive return to normal activity as tolerated should be recommended. [a]	**C**
12.5*	*Low-level exercise for those who are slow to recover may be of benefit, although the optimal timing following injury for initiation of this treatment is currently unknown. However, 1 month post-injury has been proposed.*[5]	**C**

** THIS RECOMMENDATION IS DUPLICATED FROM SECTION/MODULE 5 (SAME AS 5.6).*

Return-to-Work Considerations

When interviewed about work-related expectations and experiences following mild to moderate TBI, a group of workers in the UK reported that some of the important issues they faced were the invisibility of their injury, continuing symptoms affecting their ability to do their job, and lack of advice and guidance on returning to work. In addition, return-to-work

a. Adapted from the *VA/DoD Management of Concussion/Mild Traumatic Brain Injury Clinical Practice Guideline (VA/DoD, 2009).*

Table 12.1. Factors Associated with Poor Functional Outcomes

- Dizziness[13]
- Number of symptoms reported at follow-up[14]
- Post-traumatic stress[14,15]
- Cognitive impairments on tests of memory and executive functioning[16]
- Reduced social interaction (compared to pre-injury)[17]
- Financial compensation-seeking[18]
- Loss of consciousness[19]
- Pre-existing mental health difficulties (i.e., anxiety, depression, mania, psychotic symptoms)[19]
- Lower pre-morbid intelligence/cognitive ability[19]
- Pre-injury work history (i.e., prior work stability, earnings)[20]

support systems were considered to be poorly coordinated and managed.[12] This is not so surprising given that research on the management of return to work following mTBI is limited. Although management strategies have not been specifically studied, there is evidence regarding predictors and factors influencing the outcome of return to one's principal occupation. Factors associated with poor functional outcomes are shown in Table 12.1. When evaluating and managing a patient's ability to return to principal occupation, the practitioner should take these factors into consideration.

Upon completion of the evaluation process, conclusions and recommendations should include whether the individual being evaluated is capable of attempting to return to a specific job at a particular workplace, and whether relevant supports, accommodations, or compensatory strategies are needed. Alternatively, for those individuals who continue to experience symptoms at the time of their return to principal occupation or who experience difficulty upon their return, modified job duties or alternative jobs or occupations may be more suitable. The evaluator should provide feedback, through written report to the individual being evaluated and relevant stakeholders, as per the consents established. Prescription of guidance should also take into consideration contextual work-related factors such as number of hours per work day/shift, opportunity for rest breaks, shift times (morning/afternoon/evening), pace of work, nature of work tasks (cognitive or physical, routine or variable, responsibility, support from supervisors or colleagues, operation of machinery), productivity demands, work environment (exposure to light, noise), and transport to and from work.

An assessment of an individual's psychosocial status is imperative to understanding his/her work abilities and ensuring that appropriate supports are instituted to facilitate success.[21] Studies show that mTBI can cause reorganization of a person's psychosocial identities, affecting his/her ability to perform. In turn, this is related to mood disorders, such as depression. Mood disorders post-injury create problems with interpreting and regulating emotions, displaying inappropriate responses to stimuli/events and cause the patient to be more/less susceptible to the need for approval in the workplace. As a result, other difficulties associated with mTBI may worsen due to poor job performance.[22] It is also important to note that mTBI impacts executive functions, affecting skills such as multitasking, prioritization, organization, prospective memory, and time management.[22] Variables that may be modified in order to improve return to work outcome include hours worked in the course of a day, shift, or week; intensity, quantity, or nature of tasks; and increased rest breaks. It is important to note that attempting to return to work prematurely can shift the focus away from the crucial first three to six months of rehabilitation

RETURN-TO-WORK CONSIDERATIONS: VOCATIONAL SCREENING		
		GRADE
12.6	In instances where there is high risk for injury/re-injury and/or there is a possibility that the individual may not be able to safely and competently complete specific work-related tasks and duties, a more in-depth assessment of symptoms should be conducted and necessary accommodations and work restrictions identified. [a]	**C**
12.7	Individually based work restriction should apply if: • There is a work-specific task that cannot be safely or competently completed based on symptoms • The work/duty environment cannot be adapted to the patient's symptom-based limitation • The deficits cannot be accommodated • Symptoms recur Examples of vocational modifications include: • Modification of the length of the work day • Gradual work re-entry (e.g., starting at 2 days/week and expanding to 3 days/week) • Additional time for task completion • Change of job • Environmental modifications (e.g., quieter work environment, enhanced level of supervision) [a]	**C**

a. Adapted from the *VA/DoD Management of Concussion/Mild Traumatic Brain Injury Clinical Practice Guideline (VA/DoD, 2009).*

and recovery effort, potentially resulting in long-term consequences on the patient's overall functions and employability.[22] See Algorithm 12.1, which outlines the key steps for managing return to work following mTBI. Readers interested in more thorough guidance on return to work following mTBI should consult the latest *Guideline for Vocational Evaluation following Traumatic Brain Injury: A Systematic and Evidence-based Approach*.[21]

RETURN-TO-WORK CONSIDERATIONS: VOCATIONAL EVALUATION		
		GRADE
12.8	Individuals who continue to experience persistent impairments following mTBI, or those who have not successfully resumed pre-injury work duties following injury, should be referred for a fuller in-depth vocational evaluation by clinical specialists and teams (e.g., occupational therapist, vocational rehabilitation counsellor, occupational medicine physician, neuropsychologist, speech language pathologist) with expertise in assessing and treating concussion/mTBI. This evaluation should include an assessment of the person, occupational and job demands, work environment, environmental supports, and facilitators and barriers to successful work/return to work (see Appendix 12.1).	**B**
RETURN-TO-WORK CONSIDERATIONS: COMMUNITY RE-INTEGRATION & FUTURE VOCATIONAL PLANNING		
		GRADE
12.9	A referral to a structured program that promotes community integration (e.g., volunteer work) may also be considered for individuals with persistent post-concussive symptoms that impede return to pre-injury participation in customary roles. [a]	**B**

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Return-to-School (Post-Secondary) Considerations

There has been an increasing appreciation of the impact that mTBI symptoms have on the ability for students to manage their academic programs. More specifically there is a growing body of literature indicating that cognitive exertion can exacerbate mTBI symptoms and affect recovery time from these injuries.[23] This has led to the development of specific academic management strategies for students who have sustained an mTBI to provide guidance on the steps that should be followed to resume cognitive activity. The essential premise of managing cognitive exertion is that cognitive activity must be paced in order to avoid exceeding the threshold at which mTBI symptoms are exacerbated.[24] Many individuals who sustain mTBI injuries are students who require integration into elementary, secondary, or post-secondary institutions. Following an mTBI, resuming academic activity requires students to manage work in the classroom that includes listening, note-taking, presentations, homework, assignments, and examinations, as well as managing additional volunteer activities and memberships in school-based clubs. The cognitive demands therefore span activities that would be conducted at school and also at home and in the community. Considerable focus in the literature has been placed on developing strategies to manage these cognitive demands, such as duration for cognitive rest, concessions, and accommodations, as well as education for school personnel on the symptoms and strategies for reintegration. It is recommended that the management strategies that are implemented should be highly individualized in the context of these guidelines because the manifestation of mTBI symptoms and their impact upon the student are as variable as is their recovery.[23,25-29] Contacting the school registrar immediately following mTBI is also important, even if symptoms are short-lived, to make sure that the student has as much support as possible.

However, many excellent guidelines focus primarily on cognitive management strategies that can be employed with the elementary and secondary school student in mind, and they have limited applicability for the post-secondary student. Not only does the nature of program requirements differ at the post-secondary level, but so does the nature of the accommodations

a. Adapted from the *VA/DoD Management of Concussion/Mild Traumatic Brain Injury Clinical Practice Guideline (VA/DoD, 2009).*

and concessions that can be provided, which limits the applicability of the aforementioned guidelines. The following post-concussive cognitive management strategies were developed to take into consideration the unique issues faced by students who are either entering post-secondary institutions with an identified mTBI and/or have sustained an mTBI in the course of their post-secondary program. The applicability of the recommendations provided for managing the cognitive demands of post-secondary education are considered to be pivotal to maximizing successful academic integration or reintegration. See Algorithm 12.2, which outlines key return-to-school timelines and considerations for students 18 years of age or older following mTBI.

Students, professors/instructors, and appropriate administrators may also require education regarding mTBI and the associated symptoms, the functional impact in the classroom, and the fact that this is an unseen/hidden injury but can be functionally very debilitating. Regular communication between the student, the primary care provider, and teachers/administrators regarding progress, challenges, and changes in symptoms (i.e., improvements or recurrences) are beneficial. Symptoms of anxiety and/or depression should also be monitored in students with persistent symptoms following mTBI.

ADDITIONAL RETURN-TO-SCHOOL (POST-SECONDARY) CONSIDERATIONS		
		GRADE
12.10	*On presentation, the primary care provider should conduct a comprehensive review of every patient who has sustained mTBI (see Appendix 1.1). The assessment should include taking a history, examination, cognitive screen, post-concussive symptom assessment, and review of mental health (see Table 1.2).**	**A**
12.11	If symptomatic within the first 72 hours, the student should refrain from attending school and from participating in all academic activities, including apprenticeship, practicum, and shop-related activities, in order to support cognitive rest and facilitate recovery.	**C**
12.12	If asymptomatic within the first 72 hours, the student can attend school but should not undergo evaluations (tests/exams) or should write with accommodations (such as separate space/breaks). The student should also be monitored for the emergence of potential symptoms.	**C**
12.13	After 72 hours post-injury, the individualized profile of the student's symptoms should be considered: • If the student is symptom-free, then he/she should go back to academic and/or program-related activities gradually as tolerated, as long as he/she remains asymptomatic. • If still experiencing symptoms after 72 hours post-injury, the student should refrain from attending academic and/or program-related activities for one full week. The health care provider (with permission) should also notify student services or the special needs department that a concussion has occurred (see Appendix 12.2) and that the student will require time off, and may require accommodations and support for reintegration.	**C**
12.14	If symptoms are still functionally debilitating at one week post-injury, the student should refrain from attending academic and/or program-related activities for another week. The health care provider should notify student services or the special needs department that the student is still symptomatic and accommodations and support for reintegration will be required.	**C**
12.15	After two weeks following an mTBI, the student should start attending school (non-physical activities) very gradually as tolerated and with accommodations, even if he/she is still experiencing symptoms. Student services or the special needs department should be identified to notify teachers/professors to subsequently monitor progress with the student and adjust the return-to-school plan, as necessary.	**C**
12.16	If reintegration into school is ineffective or unproductive at 4 weeks (i.e., symptoms plateau/continue to get worse), consider the following: • Greater Accommodations: Work with the professor/instructor or appropriate administrator and the student to look at the cognitive demands of various classes, with consideration of the student's current symptoms, to determine if appropriate accommodations can be made in the following areas as necessary: curriculum, environment, activities, and timetable (see Appendix 12.3). • Move the student's courses to audit status, allowing him/her to participate in some academic activity without significant pressure from course requirements and examination. • Review whether the student should continue in the program for that term if there will be substantially negative consequences to his/her grades and program participation.	**C**

** THIS RECOMMENDATION IS DUPLICATED FROM SECTION/MODULE 1 (SAME AS 1.2).*

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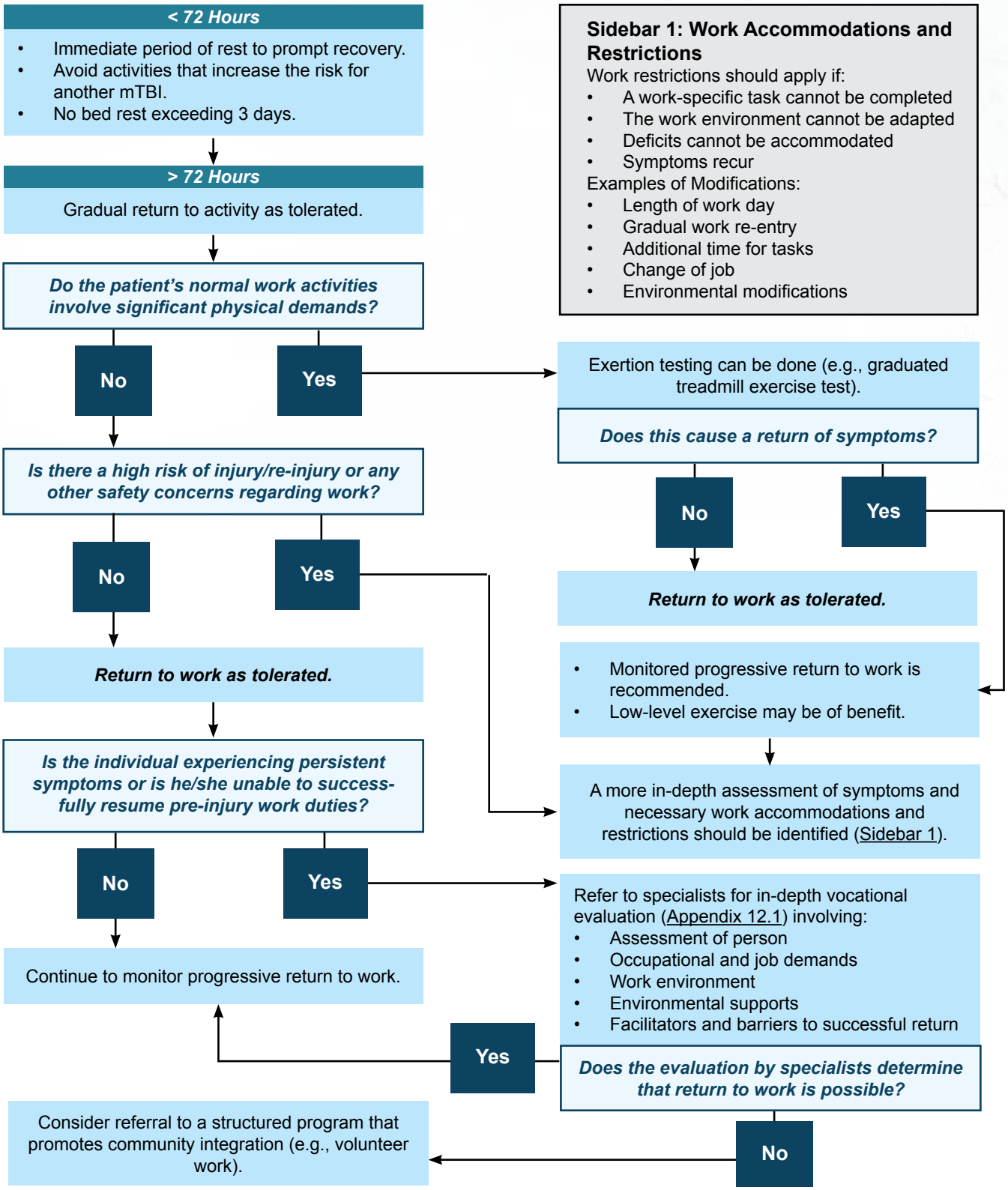
Table 1.2. Key Features of mTBI Assessment in an Emergency Department or Doctor's Office

(a) A medical history encompassing a review of: • Current symptoms and health concerns • Setting and mechanism of injury • Severity/duration of altered consciousness and immediate symptoms • Presence of co-occurring injuries • Pre-existing medical and mental health conditions, and • Potentially contributing psychosocial factors
(b) An examination including an assessment of: • Mental status and cognition • Cranial nerves • Extremity tone, strength, and reflexes, and • Gait and balance
(c) An assessment of the patient's clinical status, including whether there has been improvement or deterioration since the time of injury. This may require additional information from others, including eyewitnesses to the injury.
(d) Determination of the need for urgent neuroimaging to exclude a more severe brain injury, such as a structural abnormality or hemorrhage (see Figure 1.1 in Module 1, or the Complete or Clinical Versions).

Adapted from the NSW Health Guidelines: Initial Management of Closed Head Injury in Adults, 2nd Edition (NSW Health, 2011).

Algorithm 12.1

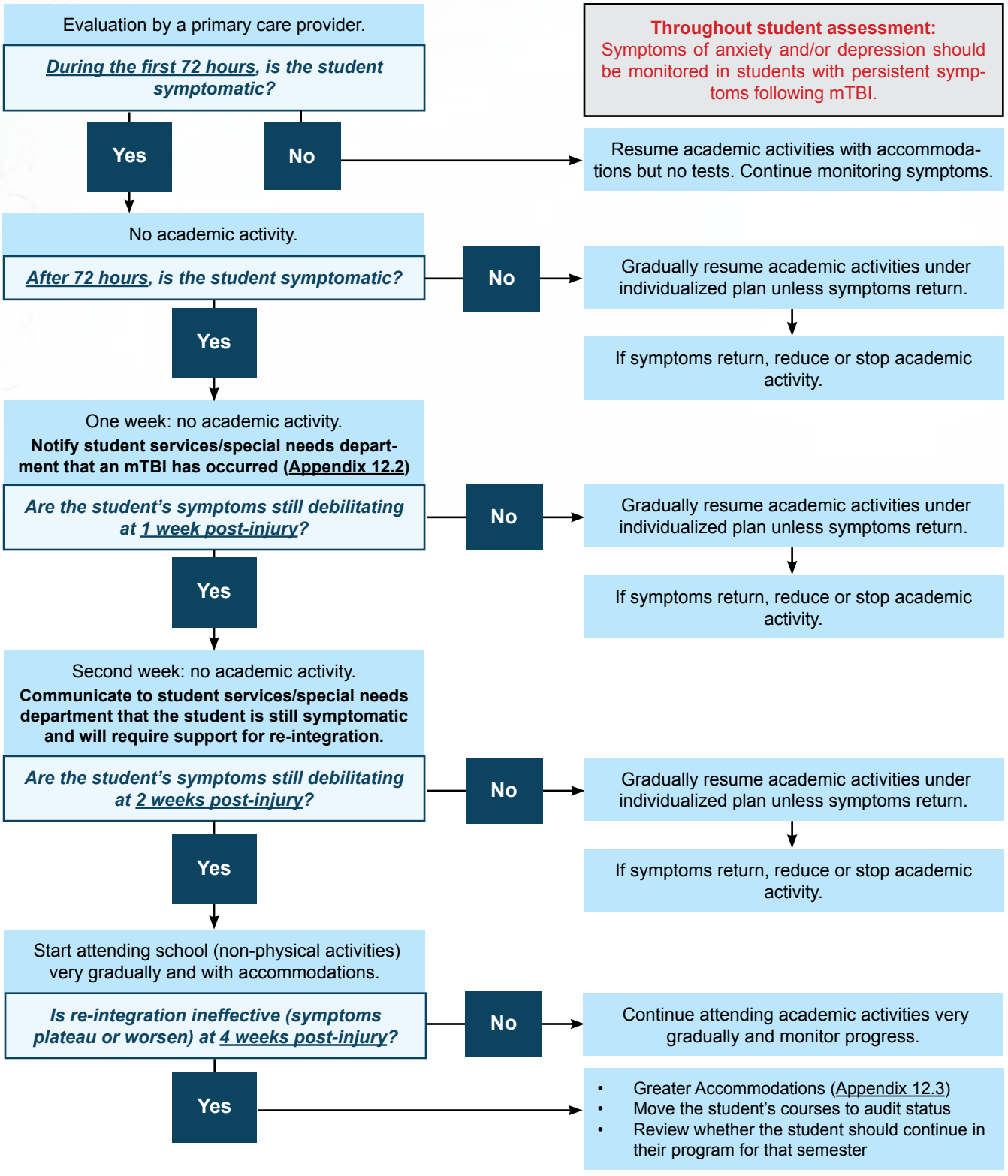
Return-to-Work Considerations



For a narrative description and guideline recommendations related to this algorithm, please refer to **Section 12.**

Algorithm 12.2

Return-to-School (Post-Secondary) Considerations



For a narrative description and guideline recommendations related to this algorithm, please refer to **Section 12**.

Appendix 1.1

Acute Concussion Evaluation (ACE): Physician/Clinician Office Version

ACUTE CONCUSSION EVALUATION (ACE)
PHYSICIAN/CLINICIAN OFFICE VERSION

Gerard Gioia, PhD[1] & Micky Collins, PhD[2]
[1]Children's National Medical Center
[2]University of Pittsburgh Medical Center

Patient Name:_____
DOB: _____ Age:_____
Date:_____ ID/MR#_____

A. Injury Characteristics **Date/Time of Injury**_____**Reporter: __Patient __Parent __Spouse __Other**_____

1. Injury Description _____

_____

1a. Is there evidence of a forcible blow to the head (direct or indirect)? __Yes __No __Unknown
1b. Is there evidence of intracranial injury or skull fracture? __Yes __No __Unknown
1c. Location of Impact: __Frontal __Lft Temporal __Rt Temporal __Lft Parietal __Rt Parietal __Occipital __Neck __Indirect Force
2. Cause: __MVC __Pedestrian-MVC __Fall __Assault __Sports (*specify)*_____Other_____
3. Amnesia Before (Retrograde) Are there any events just BEFORE the injury that you/ person has no memory of (even brief)? __ Yes __No Duration
4. Amnesia After (Anterograde) Are there any events just AFTER the injury that you/ person has no memory of (even brief)? __ Yes __No Duration
5. Loss of Consciousness: Did you/ person lose consciousness? __ Yes __No Duration
6. EARLY SIGNS: __Appears dazed or stunned __Is confused about events __Answers questions slowly __Repeats Questions __Forgetful (recent info)
7. Seizures: Were seizures observed? No__ Yes___ Detail_____

B. Symptom Check List* Since the injury, has the person experienced any of these symptoms any more than usual today or in the past day?
Indicate presence of each symptom (0=No, 1=Yes). ***Lovell & Collins, 1998 JHTR***

PHYSICAL (10)		COGNITIVE (4)		SLEEP (4)	
Headache	0 1	Feeling mentally foggy	0 1	Drowsiness	0 1
Nausea	0 1	Feeling slowed down	0 1	Sleeping less than usual	0 1 N/A
Vomiting	0 1	Difficulty concentrating	0 1	Sleeping more than usual	0 1 N/A
Balance problems	0 1	Difficulty remembering	0 1	Trouble falling asleep	0 1 N/A
Dizziness	0 1	**COGNITIVE Total (0-4)** _____		**SLEEP Total (0-4)** _____	
Visual problems	0 1	**EMOTIONAL (4)**			
Fatigue	0 1	Irritability	0 1		
Sensitivity to light	0 1	Sadness	0 1		
Sensitivity to noise	0 1	More emotional	0 1		
Numbness/Tingling	0 1	Nervousness	0 1		
PHYSICAL Total (0-10) _____		**EMOTIONAL Total (0-4)** _____			
(Add Physical, Cognitive, Emotion, Sleep totals) Total Symptom Score (0-22)		_____			

Exertion: Do these symptoms worsen with:
Physical Activity __Yes __No __N/A
Cognitive Activity __Yes __No __N/A

Overall Rating: How different is the person acting compared to his/her usual self? (circle)
Normal 0 1 2 3 4 5 6 Very Different

C. Risk Factors for Protracted Recovery *(check all that apply)*

Concussion History? Y ___ N___	√	Headache History? Y ___ N___	√	Developmental History	√	Psychiatric History
Previous # 1 2 3 4 5 6+		Prior treatment for headache		Learning disabilities		Anxiety
Longest symptom duration Days__ Weeks__ Months__ Years__		History of migraine headache __ Personal __ Family_____		Attention-Deficit/ Hyperactivity Disorder		Depression
						Sleep disorder
If multiple concussions, less force caused reinjury? Yes__ No__				Other developmental disorder_____		Other psychiatric disorder _____

List other comorbid medical disorders or medication usage (e.g., hypothyroid, seizures)_____

_____

D. RED FLAGS for acute emergency management: Refer to the emergency department with sudden onset of any of the following:

*** Headaches that worsen**	*** Looks very drowsy/ can't be awakened**	*** Can't recognize people or places**	*** Neck pain**
*** Seizures**	*** Repeated vomiting**	*** Increasing confusion or irritability**	*** Unusual behavioral change**
*** Focal neurologic signs**	*** Slurred speech**	*** Weakness or numbness in arms/legs**	*** Change in state of consciousness**

E. Diagnosis (ICD): __Concussion w/o LOC 850.0 __Concussion w/ LOC 850.1 __Concussion (Unspecified) 850.9 ___Other (854) _____
__No diagnosis

F. Follow-Up Action Plan **Complete *ACE Care Plan* and provide copy to patient/family.**
___ **No Follow-Up Needed**
___ **Physician/Clinician Office Monitoring**: Date of next follow-up _____
___ **Referral:**
___ Neuropsychological Testing
___ Physician: Neurosurgery____ Neurology____ Sports Medicine____ Physiatrist____ Psychiatrist____ Other_____
___ Emergency Department

ACE Completed by:_____

This form is part of the "Heads Up: Brain Injury in Your Practice" tool kit developed by the Centers for Disease Control and Prevention (CDC).

ACE Instructions

The ACE is intended to provide an evidence-based clinical protocol to conduct an initial evaluation and diagnosis of patients (both children and adults) with known or suspected MTBI. The research evidence documenting the importance of these components in the evaluation of an MTBI is provided in the reference list.

A. Injury Characteristics:

1. Obtain **description of the injury** – how injury occurred, type of force, location on the head or body (if force transmitted to head). Different biomechanics of injury may result in differential symptom patterns (e.g., occipital blow may result in visual changes, balance difficulties).
2. Indicate the **cause of injury**. Greater forces associated with the trauma are likely to result in more severe presentation of symptoms.

3/4. **Amnesia:** Amnesia is defined as the failure to form new memories. Determine whether amnesia has occurred and attempt to determine length of time of memory dysfunction – before (retrograde) and after (anterograde) injury. Even seconds to minutes of memory loss can be predictive of outcome. Recent research has indicated that amnesia may be up to 4-10 times more predictive of symptoms and cognitive deficits following concussion than is LOC (less than 1 minute).[1]

5. **Loss of consciousness (LOC)** – If occurs, determine length of LOC.
6. **Early signs.** If present, ask the individuals who know the patient (parent, spouse, friend, etc) about specific signs of the concussion that may have been observed. These signs are typically observed early after the injury.
7. Inquire whether **seizures** were observed or not.

B. Symptom Checklist: [2]

1. Ask patient (and/or parent, if child) to report presence of the four categories of symptoms since injury. It is important to assess all listed symptoms as different parts of the brain control different functions. One or all symptoms may be present depending upon mechanisms of injury.[3] Record "1" for Yes or "0" for No for their presence or absence, respectively.
2. For all symptoms, indicate presence of symptoms as experienced within the past 24 hours. Since symptoms can be present premorbidly/at baseline (e.g., inattention, headaches, sleep, sadness), it is important to assess change from their usual presentation.
3. **Scoring**: Sum total number of symptoms present per area, and sum all four areas into Total Symptom Score (score range 0-22). (Note: most sleep symptoms are only applicable after a night has passed since the injury. Drowsiness may be present on the day of injury.) If symptoms are new and present, there is no lower limit symptom score. Any score > 0 indicates positive symptom history.
4. **Exertion:** Inquire whether any symptoms worsen with physical (e.g., running, climbing stairs, bike riding) and/or cognitive (e.g., academic studies, multi-tasking at work, reading or other tasks requiring focused concentration) exertion. Clinicians should be aware that symptoms will typically worsen or re-emerge with exertion, indicating incomplete recovery. Over-exertion may protract recovery.
5. **Overall Rating:** Determine how different the person is acting from their usual self. Circle "0" (Normal) to "6" (Very Different).

C. Risk Factors for Protracted Recovery: Assess the following risk factors as possible complicating factors in the recovery process.

1. **Concussion history:** Assess the number and date(s) of prior concussions, the duration of symptoms for each injury, and whether less biomechanical force resulted in re-injury. Research indicates that cognitive and symptom effects of concussion may be cumulative, especially if there is minimal duration of time between injuries and less biomechanical force results in subsequent concussion (which may indicate incomplete recovery from initial trauma).[4-8]
2. **Headache history:** Assess personal and/or family history of diagnosis/treatment for headaches. Research indicates headache (migraine in particular) can result in protracted recovery from concussion.[8-11]
3. **Developmental history**: Assess history of learning disabilities, Attention-Deficit/Hyperactivity Disorder or other developmental disorders. Research indicates that there is the possibility of a longer period of recovery with these conditions.[12]
4. **Psychiatric history**: Assess for history of depression/mood disorder, anxiety, and/or sleep disorder.[13-16]

D. Red Flags: The patient should be carefully observed over the first 24-48 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. CT Scan to rule out intracranial bleed or other structural pathology).[17]

E. Diagnosis: The following ICD diagnostic codes may be applicable.

850.0 (Concussion, with no loss of consciousness) – Positive injury description with evidence of forcible direct/ indirect blow to the head (A1a); plus evidence of active symptoms (B) of any type and number related to the trauma (Total Symptom Score >0); no evidence of LOC (A5), skull fracture or intracranial injury (A1b).

850.1 (Concussion, with brief loss of consciousness < 1 hour) – Positive injury description with evidence of forcible direct/ indirect blow to the head (A1a); plus evidence of active symptoms (B) of any type and number related to the trauma (Total Symptom Score >0); positive evidence of LOC (A5), skull fracture or intracranial injury (A1b).

850.9 (Concussion, unspecified) – Positive injury description with evidence of forcible direct/ indirect blow to the head (A1a); plus evidence of active symptoms (B) of any type and number related to the trauma (Total Symptom Score >0); unclear/unknown injury details; unclear evidence of LOC (A5), no skull fracture or intracranial injury.

Other Diagnoses – If the patient presents with a positive injury description and associated symptoms, but additional evidence of intracranial injury (A 1b) such as from neuroimaging, a moderate TBI and the diagnostic category of 854 (Intracranial injury) should be considered.

F. Follow-Up Action Plan: Develop a follow-up plan of action for symptomatic patients. The physician/clinician may decide to (1) monitor the patient in the office or (2) refer them to a specialist. Serial evaluation of the concussion is critical as symptoms may resolve, worsen, or ebb and flow depending upon many factors (e.g., cognitive/physical exertion, comorbidities). Referral to a specialist can be particularly valuable to help manage certain aspects of the patient's condition. (Physician/Clinician should also complete the ACE Care Plan included in this tool kit.)

1. **Physician/Clinician serial monitoring –** Particularly appropriate if number and severity of symptoms are steadily decreasing over time and/or fully resolve within 3-5 days. If steady reduction is not evident, referral to a specialist is warranted.
2. **Referral to a specialist –** Appropriate if symptom reduction is not evident in 3-5 days, or sooner if symptom profile is concerning in type/severity.
   - Neuropsychological Testing can provide valuable information to help assess a patient's brain function and impairment and assist with treatment planning, such as return to play decisions.
   - Physician Evaluation is particularly relevant for medical evaluation and management of concussion. It is also critical for evaluating and managing focal neurologic, sensory, vestibular, and motor concerns. It may be useful for medication management (e.g., headaches, sleep disturbance, depression) if post-concussive problems persist.

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* Taken with permission from the authors. Gioia GA, Collins M, Isquith PK. Improving identification and diagnosis of mild traumatic brain injury with evidence: psychometric support for the acute concussion evaluation. *Journal of Head Trauma Rehabilitation*. 2008;23(4):230-42.

Appendix 12.1

Components of the Vocational Evaluation following mTBI*

Assessment of the Person

1. An ***assessment of the person*** should begin by gathering background information from the individual being evaluated regarding his/her educational and work history, work goals, self-perceptions of work performance, strengths, weaknesses and concerns.
2. This should be followed by a thorough assessment of the person in ***physical***, ***neuropsychological/cognitive***, ***psychosocial***, ***communication***, ***functional domains***, and ***work-related skills*** and ***behaviours*** and consideration of these skills and abilities in relation to work goals and/or work demands. Please see Table I for a summary of the relevant areas within each personal domain.

Table I. Assessment of Person Domains

Domain	Element(s) Requiring Assessment
Physical	• Physical symptoms (e.g. headaches, fatigue, dizziness) • Sensory impairments/sensitivities (e.g. vision, hearing, smell) • Physical abilities and related work restrictions (e.g. *mobility/ambulation, upper extremity gross motor, dexterity and co-ordination, standing, bending, etc.)
Neuropsychological/ Cognitive	• Intelligence/pre-morbid functioning; academic achievement (where available) • Visual perception; praxis • Attention and concentration • Information processing • Memory • Insight, awareness and denial • Self-regulation; executive functions
Psychosocial	• Presence of mental health diagnoses (e.g. mood disorders, schizophrenia, substance abuse) • Ability to engage in and balance multiple roles and responsibilities, including meaningful non- work roles (e.g. parenting, volunteering) • Psychosocial adjustment and social adaptive skills (e.g. coping style/behaviours, self-esteem, self-confidence and self-efficacy, social appropriateness, ability to develop positive relationships with peers)
Communication	• Auditory perception and hearing • Speech production • Auditory and reading comprehension • Verbal and written expression • Conversation and non-verbal communication (e.g. facial expression, tone of voice, body posture) • Social communication and pragmatics (e.g. ability to understand and respond to verbal-social cues, modulate affect)
Functional	• Functional status and level of independence during task performance in the areas of self-care, household or community activities (e.g. meal preparation, financial) • Performance in unfamiliar tasks, those that require new learning and dual task performance • Speed, timing and accuracy of performance • Level of independence and need for structure • Monitoring, error detection and avoidance of critical errors • Strategy retrieval and use of feedback

* Adapted from Stergiou-Kita M, Dawson D, Rappolt S. Inter-professional clinical practice guideline for vocational evaluation following traumatic brain injury: a systematic and evidence-based approach. *Journal of Occupational Rehabilitation*. 2012;22(2):166-181.

Domain	Element(s) Requiring Assessment
Work-related Skills and Behaviours	• How physical, cognitive, psychosocial, behavioural, communication impairments, identified in standardized assessments, affect performance of work-related tasks and duties • Productivity (e.g. quality and quantity of work, ability to meet deadlines) • Ability to management changes and problems encountered in work situations

Assessment of Occupation and Job Demands

3. The evaluator should complete an assessment of the ***occupational requirements*** through the completion of a ***job analysis***. This should include:
   a. Identification of the occupational/job title/category/classification (e.g. National Occupational Classification, O'Net; Dictionary of Occupational Titles, DOT)
   b. A description of the job
   c. A description of job demands (See Table II below for summary of categories of job demands)

Table II. Job Demand Categories

Category	Examples
Physical	• Lifting, carrying, pushing, stamina
Neuropsychological/ Cognitive	• Initiation, problem-solving, decision-making, flexibility, adaptability
Psychological/ Emotional	• Emotional stability
Behavioural Demands	• Self-monitoring, changes in behaviours required
Communication	• Verbal, non-verbal, written
Responsibilities and Expectations	• Responsibilities related to own job, supervision of others, working with the public, customers, clients, level of independence required to complete job tasks
Work Time	• Work hours, shifts, breaks, overtime
Safety Requirements	• Related to equipment use, driving

Assessment of Work Environment and Environmental Supports

An assessment of the ***work environment*** and ***environmental supports*** and barriers to work or return to work should be completed. This should include an assessment of the: **a) physical workplace environment; b) workplace culture; c) supports and opportunities within the workplace and the individuals support network.**

4. An assessment of the physical workplace environment should be completed.
5. An assessment of the workplace culture should be completed.

Please see Table III for a summary of relevant physical and cultural elements of the workplace.

6. An assessment of the ***supports*** (i.e., formal and informal) available within the workplace and the individual's support network should be completed. This should include: availability of accommodations and/or job modifications (e.g. work activities, hours, workstation modification, adaptive aids, devices and employment of compensatory strategies, supervision and identification of individual(s) able to provide on-going assessment and feedback re: work performance); availability of instrumental support (e.g. housekeeping) from natural community supports (e.g. family, volunteer or hired assistance); availability of vocational rehabilitation supports and services; availability of transportation services, if unable to drive

* Adapted from Stergiou-Kita M, Dawson D, Rappolt S. Inter-professional clinical practice guideline for vocational evaluation following traumatic brain injury: a systematic and evidence-based approach. *Journal of Occupational Rehabilitation*. 2012;22(2):166-181.

Table III. Physical and Cultural Workplace Elements

Physical Elements	• Light, noise, level of distractions • Temperature control • Outdoor/indoor work • Proximity to co-workers (e.g. in relation to both supports and possible distractions) • Proximity to supervision • Travel required (e.g., to and from work; associated with work demands) and its effect on work performance • Potential risks (e.g. heights, dangerous machinery, heavy lifting); • Length of working day and flexibility in work hours/schedule
Workplace Cultural Elements	• Tolerances for differences amongst employees • Positive attitudes towards individuals with disabilities (e.g. an environment free of harassment & discrimination) • An understanding of or willingness to learn about TBI • A willingness to involve employment specialists in a collaborative work planning process • Opportunities for social participation and team work

* Adapted from Stergiou-Kita M, Dawson D, Rappolt S. Inter-professional clinical practice guideline for vocational evaluation following traumatic brain injury: a systematic and evidence-based approach. *Journal of Occupational Rehabilitation*. 2012;22(2):166-181.

Appendix 12.2

Example Concussion/mTBI Accessibility Intake Package for Student Services/Special Needs Department*

Student Intake Form – Concussion/Head Injury
Confidential Information Form

Date: _____

Last name: _____

First name: _____

Student Number: _____ Age: _____ Gender: _____

Permanent/Sessional Address: _____

City: _____ Postal Code: _____

E-mail Address: _____

Telephone:

Type:	Phone Number:	Session(s):	May we leave a message?
Primary O Home O Work O Cell O Pager	(_____) _____	O Sessional O Permanent	O Yes O No O Name & phone # only.

Have you used special student services before?
O Yes O No If yes, who was your primary contact _____
and when were you here? _____

What is your current status at (enter University, College or other Post Secondary Institution)?
O Part-Time Student (0.5 to 2.5 courses)
O Full-Time Student (3.0 or more courses)
O Visiting or Foreign Student

Undergraduate students: How many credits have you earned to date?
O 0 - 3.5 O 4.0 - 8.5 O 9.0 -13.5 O 14 or more

Program:	Enter Faculty and Degree:	Graduate Studies:
O Academic Bridging Program O Transitional Year Program O Regular Program	_____ _____	**Degree:** _____ **Program:** _____ **Stage in program:** O Course work O Comprehensive O Thesis

* Adapted from the Concussion Intake Guidelines for the University of Toronto.

With which areas do you need assistance?

O Chronic Health Problem (e.g. epilepsy/MS/MD/IBD/Cancer)
O Mobility/Functional Disability (e.g. CP/Polio/RSI)
O Mental Health Condition (e.g. Depression/Bipolar/Anxiety Disorder/OCD)
O Learning Disability or ADHD
O Head Injury
O Sensory Disability (e.g. Hearing/Vision)
O Temporary (Please describe):

_____

_____

O Other (Please describe):

_____

_____

THE INFORMATION ON THIS FORM IS CONFIDENTIAL.
IF YOU NEED ASSISTANCE COMPLETING THIS FORM, PLEASE ASK AT THE FRONT DESK.

Accessibility Services
Initial Questionnaire for Students with a Concussion

If you require assistance completing this form or need it in alternative format, please ask at the front desk.

Please answer the following questions as completely as possible. The information you provide will help us to develop an accommodation plan that meets your individual needs.

1. When did you receive your concussion? (Date) _____

2. How did your concussion occur? (Please check one)
   - O while playing/practicing sports
   - O from a fall
   - O from a motorcycle/car or bike accident
   - O pedestrian accident
   - O assault
   - O other (please specify)_____

3. Did you see a doctor/attend a clinic or hospital after your injury? O Yes O No

   If yes, indicate who you saw:

   _____

4. Were x-rays, CT of the brain or MRI of head undertaken? _____

5. Are you undergoing any treatment for your concussion? O Yes O No

   If yes, please describe:

   _____

   _____

6. Have you been referred to/seen a specialist? O Yes O No

* Adapted from the Concussion Intake Guidelines for the University of Toronto.

If yes, please describe:

_____

_____

7. Do you currently have accommodations related to your concussion? O Yes O No

8. Have you missed class as a result of your injury? O Yes O No

9. Have you missed a test(s) as a result of your injury? O Yes O No

10. Have you spoken to your course coordinator/Registrar about your injury? O Yes O No

11. Since the date of your concussion, you may have experienced a number of physical and/or cognitive symptoms. Please check all the boxes that apply as they relate to the LAST WEEK only.
    - O headaches
    - O sensitivity to light
    - O neck pain
    - O noise sensitivity
    - O blurred vision
    - O ringing/buzzing in ears
    - O sleep disturbance
    - O reduced or lost sense of smell/taste
    - O difficulty concentrating
    - O difficulty paying attention
    - O difficulty organizing work
    - O difficulty remembering old information
    - O difficulty reading
    - O difficulty generating the right words
    - O feeling “foggy”
    - O more irritable
    - O lowered mood/crying

12. Have you ever been told you have?
    A learning disability O Yes O No
    Attention Deficit Disorder O Yes O No
    Mental health condition O Yes O No

13. Have you had any prior concussions/head injuries? O Yes O No

14. If you answered yes above, please provide details of prior head injuries:

    Date: _____

    Symptoms: _____

    _____

15. Have you ever been on academic probation or suspension? O Yes O No

16. Do you have student funding? O Yes O No

    If yes, are you eligible for student funding? O Yes O No

_____

* Adapted from the Concussion Intake Guidelines for the University of Toronto.

Appendix 12.3

Greater Accommodations for Students with Persistent Symptoms following mTBI

Activities	• Students should not participate in any physical education or other classes with physical or safety demands (e.g., music, woodworking, automotive, welding) until cleared by a physician or a neuropsychologist. • However, to decrease social isolation and or anxiety/ depression and to support inclusion and optimism, efforts could be made to allow the student to audit or participate in non-competitive/contact activities with their peers/classmates (e.g. scorekeeping at a game, sit with classmates who may be using machinery, other tasks). • Students should have limited computer (and tablet) demands initially as screens are often a trigger for cognitive fatigue and headaches.

Curriculum	• A reduced course load may be beneficial and or necessary, if the student is experiencing ongoing cognitive symptoms.
	• Upon initial return the student should refrain from taking tests and exams, and have limited to no assignments. These should be re-implemented in close consultation with the instructor/professor, student and possibly a neuropsychologist and or speech language pathologist. Consider also the involvement of occupational therapists/academic coaching services.
	• The student may also benefit from accommodations for testing to reduce the memory load, such as:
	  • Written advanced notice of tests
	  • A review sheet of what will be included on test
	  • The option for oral testing
	  • Writing tests in a quiet room
	  • Allowing testing in natural light situations (light sensitivity)
	  • Extra time/no time limits and regular breaks
	  • Chunking of longer tests into short sections written at different times
	  • De-cluttered test format (i.e., not too many questions or information on each page to facilitate easy visual scanning and reduce processing demands)
	  • Provision of formula and data sheets to reduce memory load
	  • Use of a computer to type answers with screen shield on computer,
	  • Use of reduced contrast coloured paper for exams
	  • Return to class but deferral of examinations to next exam period
	• Consideration should also be given to the following:
	  • Amount and complexity of reading required;
	  • Memory load (e.g. are there expectations for remembering formulas);
	  • Sustained and divided attention demands;
	  • Computer time and expectations;
	  • Processing of large amounts, and or complex information;
	  • Speed of processing;
	  • “Catching up” - attempt to emphasize only vital assignments and course content needed for successful completion of course. Consideration should be given to waiving ‘non critical’ assignments and tests during the catch-up process where possible.

Environment	• Upon initial return, the student may benefit from having various environmental accommodations to reduce the cognitive burden (e.g., preferential seating, studying/testing in a quiet room, extra time to complete tasks and regular breaks).
Timetable	• If the student is experiencing fatigue and or sleep disturbance, the initial return should be tailored to late morning and or early afternoon.

Appendix 12.4

Managing Your Return to Post-Secondary Activities: Package Template and Activity Log

Name of Student: _____ **Current Date:** _____

Identification Number: _____

Date of Birth: _____

Injury Description

1. Did the injury occur before or after you arrived at your post-secondary institution? *Yes* *No*
   a. Did you sustain a direct blow to the head or indirectly though other forces: *Direct* *Indirect* *Unknown*
   b. Is there evidence of intracranial injury or skull fracture? *Yes* *No* *Unknown*
   c. If forces were sustained directly to your head, what was the location:
   Frontal *Left Temporal* *Right Temporal* *Left Parietal* *Right Parietal* *Occipital* *Neck*
2. Cause of injury:
   Motor Vehicle Collision (MVC), *Pedestrian-MVC,* *Bicycle Fall,* *Assault,* *Sports (Specify)* _____
   Other _____
3. Did you sustain in disruption in your memory for events:
   a. Do you remember the impact and/or event (i.e., loss of consciousness or conscious awareness)?
   b. Are there any events from before the injury that you do not remember (i.e., what you were doing just prior to the impact of event)? *Yes* *No*
   If yes, then duration: _____
   c. Are there any events from after in the injury that you do not remember, (i.e., what happened after the impact or event)? *Yes* *No*
   If yes, then duration: _____
   d. Any immediate symptoms of balance problems, being dazed, confused, unaware of where you were?
   Yes *No*
   *If yes, then describe:*_____
4. Were seizures observed or reported? *Yes* *No*

Current Activities

1. What is your academic status? *Full Time* *Part Time* *Transitional* *Other* _____
2. Do you have co-ooperative placements? *Yes* *No*
3. Do you have practical placements or labs related to your courses? *Yes* *No*
   a. If yes, do you work with equipment, chemicals or other potential hazards? *Yes* *No*
4. Do you participant in extra-curricular activities either at post-secondary school or outside of school? *Yes* *No*
   a. If yes, what activities do you participate in? Include clubs, intramural sports, varsity sports, student government, residence staff, residence and faculty representation, employment, and anything else you participate in at or outside of school apart from your classes. Describe your role in each of these commitments.
   _____
   _____
   _____
   _____
   _____
   _____
5. Have you attended class since your injury? *Yes* *No*

a. If yes, have you experienced any of the following ***more than usual?***
(Circle any of the items below if they are NEW symptoms since your injury or worsened since your injury)

a.	Nervousness before tests	Worsened	New
b.	Feeling overwhelmed when studying	Worsened	New
c.	Difficulty paying attention while studying	Worsened	New
d.	Procrastination	Worsened	New
e.	Not understanding assignments	Worsened	New
f.	Forgetting lessons/lectures	Worsened	New
g.	Difficulties with time management	Worsened	New
h.	Unable to manage your regular schedule of events	Worsened	New
i.	Feeling nervous and anxious	Worsened	New
j.	Feeling very sad and sdepressed	Worsened	New
k.	Unusual sense of irritability	Worsened	New
l.	Difficulty being around people	Worsened	New
m.	Problems maintaining regular friendships	Worsened	New
n.	Experiencing strained friendships and/or relationships	Worsened	New
o.	Unusually tired	Worsened	New
p.	Dizzy or light-headed	Worsened	New
q.	Headaches	Worsened	New
r.	Difficulties maintaining physical balance (i.e., feeling unsteady)	Worsened	New
s.	Sensitivity to light	Worsened	New
t.	Sensitivity to noise	Worsened	New

Please follow Algorithm 12.2 to manage return to school and return to extra-curricular activities.

Use the following symptom/activity monitoring log to monitor your symptoms to facilitate your return-to-school and other activities:

Date:							
Time:							
Activity: (e.g., class, homework, extra-curricular, work, home, lab, shop, waiting for bus, with friends, etc.)							
Alone? (Yes or no) If yes, number of people present?							
Symptomatic? (Yes or no) If yes, list symptoms.							
Symptom Intensity: 1 = low intensity; 10 = highest intensity							

Date:	**Time:**	**Activity:** (e.g., class, homework, extra-curricular, work, home, lab, shop, waiting for bus, with friends, etc.)	**Alone?** (Yes or no) If yes, number of people present?	**Symptomatic?** (Yes or no) If yes, list symptoms.	**Symptom Intensity:** 1 = low intensity; 10 = highest intensity

Appendix A

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* The recommendations in this document are those of the Ontario Neurotrauma Foundation, identified by the guideline development team and expert consensus group members, and do not necessarily represent agreement of or endorsement by the Centers for Disease Control and Prevention.

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