



STANDARDS FOR POST- CONCUSSION CARE

from diagnosis to the interdisciplinary concussion
clinic

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Ontario Neurotrauma Foundation

Fondation ontarienne de neurotraumatologie

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Additional experts involved in this work, including more participants of the 2016 Summit to Develop Concussion Standards which led to this work, and external reviewers, is listed in Appendix 1.

Competing Interests

Participants involved with ONF in developing the Standards completed a Conflict of Interest (COI) statement to ensure that interested individuals can form their own judgements concerning conflicts of interest with full disclosure of the facts. The COI statement addressed the following:

- relationships with commercial companies or corporations that provide financial support for clinical, research or consulting work, or whose products or services are related to the development of concussion standards.
- financial interests (commercial) including employment, consultancies, stock ownership, honoraria, research funding and expert testimony.

A full listing of the conflicts declared by participants is listed in Appendix 2.

ONF is not responsible for Conflicts of Interest that were not declared.

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Glossary of Terms

Collective Competence: A way to see aspects of competence that are not reducible to the individual but emerge instead from social and organizational systems. It is more than the people on the team and how they function as members of that team. It's about what happens when individual experts are able to function with a sense of awareness of one another as well as an awareness of the various structures and resources in the system that either support them to work together or inhibit them from working together.¹⁷

Concussion: Concussion denotes the acute neurophysiological event related to blunt impact or other mechanical energy applied to the head, such as from sudden acceleration, deceleration or rotational forces. All concussions are mild traumatic brain injuries but not all mild brain injuries are concussions. Concussion can be sustained from a motor vehicle crash, sports or recreational injury, falls, workplace injury, assault or incident in the community.

Concussion clinic: A formal coordinated network of healthcare providers delivering post-concussion care in an environment called a clinic. For the purposes of post-concussion care, a clinic does not have to be a physical stand-alone environment but also refers to a network of providers who work collaboratively to provide post-concussion care/services.

Evidence-based: Information and treatments that are supported by rigorously executed scientific research.

Interdisciplinary care: Health care/services provided by a grouping of different types of practitioners, often multiple disciplines. Interdisciplinary care requires collaboration and communication around the needs of the patient, respecting practice scopes and the qualifications brought by the different providers. It may also be known as inter-professional practice.

Persistent symptoms: A variety of physical, cognitive, emotional and behavioural symptoms that may endure for weeks or months following a concussion. Symptoms persisting beyond 28 days are considered persistent.³²

Post-concussion care: Health care or services provided over time to individuals who have sustained a concussion, beginning with assessment and diagnosis from a specifically qualified professional.

Primary care provider (PCP): A medical health care practitioner who sees people who have common medical problems and can provide comprehensive management of a health issue. This person provides continuing care to patients and coordinates referrals to other health care practitioners. This person is most often a physician (family physician, pediatrician or sports medicine physician); however, a PCP may also be a nurse practitioner.

Scope of practice: The services a regulated health care practitioner is permitted to perform in keeping with the terms of their professional license and college regulations.

Purpose

The overarching vision of ONF in setting standards in post-concussion care is:
To have the right care, delivered at the right time, by the right provider, across the province.

Currently the health care system in Ontario does not have specific procedures and standards for post-concussion care. There is uncertainty regarding the needed pathway of care, the appropriate providers who should be delivering the care and how services should be organized.

This document is intended to:

1. Improve care/service processes and coordination through the post-concussion care trajectory.
2. Outline the optimal way that post-concussion care/services should be organized; in particular for the interdisciplinary concussion clinic, but generally for care provided throughout the post-concussion trajectory.
3. Inform and empower patients with concussion as to what they can expect from their post-concussion care/services.
4. Facilitate more collaboration, consultation and sharing of expertise, i.e. collective competence around post-concussion care.
5. Serve to inform post-concussion coordination for all concussions, regardless of the mechanism of injury and how services are covered.
6. Set the basis for discussions at regional levels about how to improve current levels of post-concussion care and service.

This document is **not** intended to:

1. Provide clinical practice or treatment guidelines for post-concussion care. These evidence-based clinical practice guidelines can be found at <http://concussionsontario.org/adult-concussion-guidelines/> and <http://concussionsontario.org/guidelines-for-pediatric-concussion/>.
2. Be a singular prescriptive approach for all Ontario regions to undertake. Recognizing regional, demographic and accessibility of resources differences, the goal is to provide a general framework with principles that can be adapted to suit regional needs.

Target Audience

- All health professionals providing service to patients who have experienced concussion, in concussion clinics, as individual providers. This includes professionals in hospital- or community-based care.
- Individuals who have sustained concussion and their families
- Persons interested in improving and delivering concussion services

Introduction and Background

The incidence of concussion is reaching epidemic proportions. The Institute for Clinical Evaluative Sciences (ICES) analyzed provincially-collected data and found that there were 148,710 **diagnosed** concussions in Ontario in 2013.² It is likely that the number of diagnosed concussions has increased in recent years as awareness of the need for diagnosis after a suspected concussion has increased.

Due to the varied nature of concussion, not all patients with concussion require all types of interventions from all providers; there is not one single course of treatment or recovery. It is necessary that all assessment and treatment be individualized.

The majority of concussions will resolve within weeks, spontaneously, with some relative rest, guidance, follow-up from a primary care provider, and a stepwise return to activity.

For patients who experience persistent symptoms and those at risk of a delayed recovery, it is necessary that they have access to appropriate and timely, coordinated, interdisciplinary and evidence-based care.

The growing epidemic of concussion over recent years, reflected in increased awareness, recognition and diagnosis, has resulted in a high degree of patient and family concern, an overabundance of information that is not always evidence-based, and a proliferation of providers offering to treat concussion. Treatment of post-concussion care has been described as the “wild west”, leading to the need to set the standard for appropriate post-concussion care. Post-concussion care in Ontario is currently provided by a combination of publicly, third party and privately funded services.

The overarching vision of ONF in setting standards in post-concussion care is: To have the right care, delivered at the right time, by the right provider, across the province.

There are several system-level problems that we have addressed in the preparation of these standards:

1. **Trajectory of post-concussion care:** Currently there is no accepted clear post-concussion care pathway and as a result patients often receive services in a haphazard and uncoordinated way. At times health care providers are well meaning but do not follow the elements of appropriate and optimal post-concussion care.
2. **Long waitlists:** The wait to receive specialized post-concussion care when symptoms of concussion do not resolve is currently far too long. Patients desperate to find treatment for persisting symptoms can be vulnerable to services that while accessible, may not be appropriate for their needs.
3. **Health care provider knowledge gaps:** There are inconsistencies and gaps in provider knowledge about the risk factors that might predispose a patient to have persistent symptoms, the need for interdisciplinary care, evidence-based effective treatments, and appropriateness of providers for specific elements of post-concussion care.

On April 15, 2016, the Ontario Neurotrauma Foundation (ONF) brought together 65 concussion care providers, traumatic brain injury experts, people with lived experience of concussion, and organizations and agencies with an interest in post-concussion care from around Ontario.

The longer term objectives of this work are to:

1. Develop and implement standards for concussion clinics throughout the province.
1. Establish collective competence in all elements of post-concussion care supports and facilitate networks for regionalized care.
2. Build an improved system for management and referrals.
3. Improve the knowledge of patients and families regarding what they can expect as optimal services.
4. Develop methods for assessment, coordination and measurement of standards.

The focus of our collective efforts in developing these standards has been to:

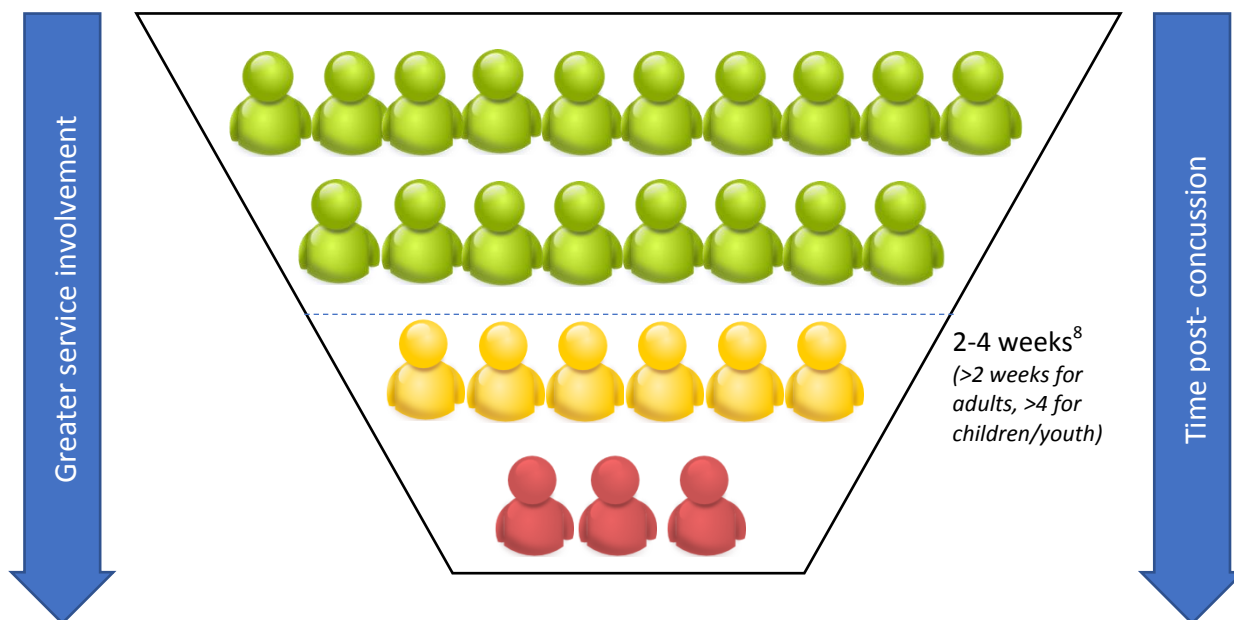
- Develop a pathway for post-concussion care recognizing the importance of collective competence among healthcare providers.
- Develop information for patients and family members to help them navigate what has become a complex and often disjointed system of assessment and treatment.
- Develop a strategy to educate the public and healthcare providers on the standards for post-concussion care.

The development of standards for concussion clinics in particular, but also for concussion care provided by others throughout the post-concussion pathway, is an important and necessary step in ensuring that every Ontarian regardless of age, cause of injury, or place of residence receives the most appropriate post-concussion care.

This document includes the standards and the rationale for why they have been developed. The standards are supported by comprehensive, evidence-based and feasible tools and resources intended to assist health care providers, people living with the effects of concussion, and planning and policy-makers to improve post-concussion care regardless of how the injury was sustained.

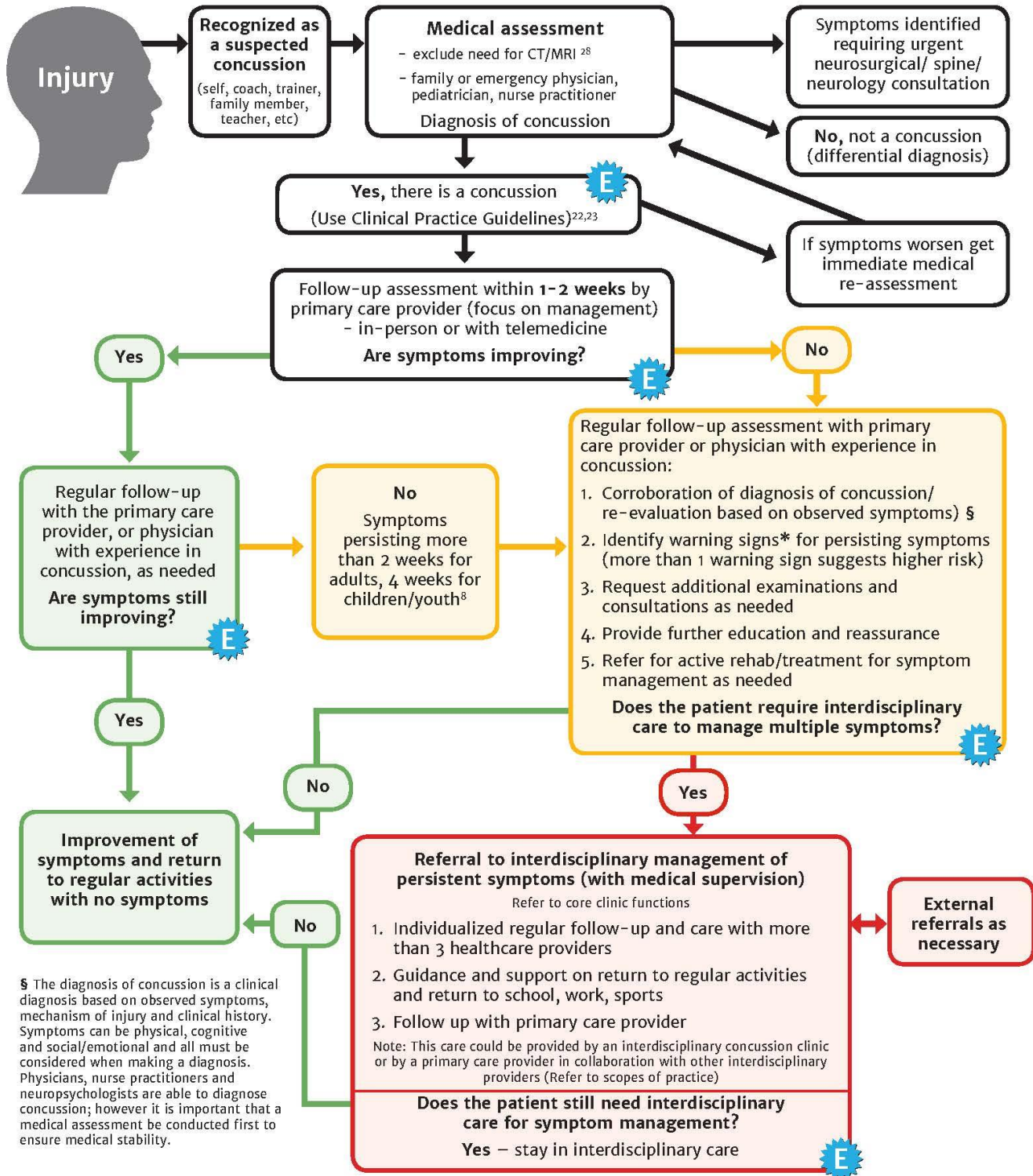
These standards can apply to publicly-funded, third-party and privately-funded clinics and post-concussion care in Ontario, since concussion can be sustained from a motor vehicle crash, sports or recreational injury, falls, workplace injury, assault or incident in the community. Post-concussion care is likely to be provided in an integrated way involving public, third party and privately delivered services regardless of how the concussion is sustained.

Concussion Recovery Pattern



- Follow-up with primary care provider – majority will recover over a few days to weeks, with education about symptom management.
- Follow-up required, further assessment may be required if symptoms are not resolving fully or considered as higher risk for a prolonged recovery.
- Persistent symptoms, interdisciplinary care required

Post-Concussion Care Pathway †



Legend:



Provide education (written and verbal), and where appropriate, reassurance



Patient has risk factors identified, or is experiencing persistent symptoms that aren't resolving and require specialized care



Warning sign that, while the patient was expected to recover, there is some persistence of symptoms that may need specialized care



Patient is improving towards recovery



Research suggests about 15%-20% of patients will take this pathway



Research suggests about 30% of patients will take this pathway



Research suggests about 55% of patients will take this pathway

† A patient can enter this pathway immediately, shortly following injury, or after a period of time when it is recognized that concussion-like symptoms are not resolving. It is necessary that all patients be properly assessed and diagnosed. Patients suspected of having had an earlier concussion should enter the pathway from the beginning so that they can be assessed and diagnosed by the appropriate professional.

*** Warning Signs (risk factors) for poor prognosis**

- High score on the Post-Concussion Symptom Scale (PCSS) >40^{4,25}, OR on the Rivermead Post-Concussion Questionnaire¹⁵
- Previous Concussion History^{5,12,19,27}
- Persistent post –traumatic headache and migraine^{19,32}
- Depression/Anxiety^{2,16,19,21,24,26,27}
- Symptoms/signs of vestibulo-ocular abnormalities (problems maintaining visual stability during head movements)^{7,9,12}
- Signs/symptoms of cognitive difficulties (problems with perception, memory, judgment, and reasoning)^{5,12,18,26}
- Pre-injury history of sleep disturbance and/or post-injury changes in sleep patterns, difficulty sleeping^{2,29,31}
- Increased symptoms with return to school, work, or exercise⁹
- Returning to a contact/risk of contact sport activity^{8,21}

Note:

1. *Research has found that being female seems to be a risk factor for prolonged recovery and this should be considered along with the other risk factors when determining if multidisciplinary care is required^{3,4,6,14,26,32}*
2. *The impact that any single risk factor or combination of risk factors will have on a person's care must be assessed on an individual basis. Presence of one or more risk factors should be identified in care plans and referrals.*
3. *A recent pediatric study conducted in the emergency department indicates a risk profile with a combination of these factors that results in a risk factor score³². Research has not yet connected this risk score to long term prognosis.*

Standards for High Quality Post-Concussion Services and Concussion Clinics

The term “**concussion clinic**” in the standards below refers to the interdisciplinary care that will be required by the minority of patients who experience persistent symptoms post-concussion. The clinic can exist in one location, or as a formal coordinated network of healthcare providers.

In brief:

1. Every patient who is suspected to have had a concussion should be assessed by a qualified practitioner able to make a diagnostic decision (physician, nurse practitioner, or neuropsychologist).
2. Post-concussion care and concussion clinics should have direct access to a physician with experience in concussion management to provide ongoing involvement regarding medical stability, trajectory of care, need for medical speciality referral and decisions on clearance to return to activity. *(This can be provided through a physician working in a clinic or a physician associated through a formal arrangement.)*
3. Individuals with concussion should have access to the following types of care at the time points below, according to the post-concussion care pathway.

Diagnostic assessment

T1: as soon as it is recognized that the individual has incurred a suspected concussion.

Education, resource information and follow-up

T1: at diagnosis

T2: at 1-2 weeks when follow-up occurs

T3: at 3-4 weeks when flagged for further assessment and symptom management follow-up occurs.

T4: in an ongoing fashion as symptoms are monitored through follow-up

T5: upon referral to an interdisciplinary concussion clinic and in an ongoing fashion through involvement with the clinic.

Therapies and interventions once symptoms are deemed persistent

T5: upon referral to an interdisciplinary concussion clinic

4. Healthcare providers and concussion clinics should provide the following information and respond to the following questions/needs of the patient and family:
 - About concussion and the trajectory of recovery
 - Additional resources and information
 - Healthcare provider experience

- Services offered
 - Types of referrals available
5. Every patient diagnosed with concussion should receive follow-up (usually from his/her primary care provider) within 1-2 weeks.
 6. A person treating patients for concussion symptoms should be a regulated health care professional, licensed by a regulatory body under the *Regulated Health Professions Act, 1991*; and the *Social Work and Social Service Work Act, 1998*, who:
 - has had training involving direct patient care/contact and knowledge of traumatic brain injury and its biopsychosocial effects;
 - has experience in concussion management with a high volume of patients with concussion annually; practices according to the most up-to-date, evidence-based guidelines;
 - practices within their defined scope of practice and recognizes when to refer to other interdisciplinary providers as patient symptoms require.
 7. A concussion clinic or network of providers should offer/utilize an interdisciplinary team with varying scopes of practice, with a minimum of three (3) or more different regulated health care provider disciplines.
 8. A concussion clinic or network of providers should clearly outline for patients whether it is able to provide the full spectrum of care from initial management to longer term management of persistent symptoms (if required).
 9. A concussion clinic or network of providers should have the following core functions/services in place to manage patients comprehensively and provide the best post-concussion care:
 - Diagnosis and medical treatment decisions
 - Physical treatment
 - Cognitive, functional, emotional support
 - Coordination of care function
 - Education
 10. Concussion Clinic teams and networks should delineate each other's roles and professional scopes of practice.
 11. A concussion clinic or network of providers should follow practices and use treatments that are evidence- based or recommended by provincial, national or international guidance or consensus statements.

- 12.** Primary care practitioners, concussion clinic teams/networks of providers should follow referral indicators to refer patients to appropriate specialists, services and allied professionals.
- 13.** If post-concussion care is provided within a network of providers rather than a clinic, it should:
 - respond to individual patient needs
 - consist of qualified and experienced interdisciplinary providers including a physician
 - have a clear care pathway
 - engage in comprehensive follow-up practices
 - not unduly inconvenience patients (i.e. having to go to different settings/locales)
 - use a model of collaborative, shared care so that each practitioner is aware of the treatment of the others and that there is regular communication regarding progress and treatment plan
- 14.** A concussion clinic or network of providers should have clear internal and external communication mechanisms in order to improve coordination of care.
- 15.** A concussion clinic or network of providers should track timely access to service, use suggested reporting and common data elements, and collect patient-level clinical data, demographic data and administrative data.

1

Every person who is suspected to have had a concussion should be assessed by a qualified practitioner able to make a diagnostic decision (physician, nurse practitioner, neuropsychologist).

Background:

A diagnosis will clearly identify a course of recovery and potential treatments. As part of the diagnostic process it is important that an initial medical assessment occurs to rule-out conditions requiring medical follow up. There are other injuries that can look like a concussion that can be more severe, so a physician or nurse practitioner must conduct an initial assessment.

Medical assessment is the first part of the diagnostic process. A full diagnosis also involves an evaluation of the mechanism of injury, potential risk factors that may have a negative impact on recovery, clinical history and current symptom presentation.

There are only three types of practitioners who are regulated in Ontario to make a concussion diagnosis: physician, nurse practitioner and neuropsychologist. Each practitioner has a distinct role in the diagnostic process; one not replacing the other.

What this standard means:

Diagnosis can only be made those qualified and regulated to do so; other healthcare providers can suspect a concussion but cannot diagnose one. The diagnosis of concussion is a clinical diagnosis based on observed symptoms, mechanism of injury and clinical history. Symptoms after concussion can be physical, cognitive and social/emotional and all must be assessed to inform a concussion diagnosis. Physicians, nurse practitioners and neuropsychologists are able to diagnose concussion; however it is necessary that a medical assessment occur first to ensure medical stability.

A physician or nurse practitioner must complete the initial medical assessment to identify the key diagnostic elements of concussion and identify and act on any symptoms indicating other potentially serious issues that may need urgent and/or specialized medical care.

A physician is responsible for ruling out other medical diagnoses, considering co-morbidity or pre-morbidity, treatment decisions for medical issues and symptoms, medication management, specialist referral, and later providing clearance for return to work/school/play.

In some cases a nurse practitioner (NP) will be the available medical provider. Nurse practitioners are primary care providers who can diagnose concussion. There are some limitations to NPs that

preclude them for having all of these responsibilities without an involved physician, namely independently ordering imaging (MRI, CT, cervical spine x-rays) when required, and prescription medications that may be off label.

For those patients whose symptoms are not resolving quickly (within 10-14 days for adults and 4 weeks (28 days) for children and youth), neuropsychologists can be brought into the diagnostic process to provide a more a detailed assessment, corroborate the diagnosis and assist in the identification of appropriate symptom management strategies. They can assess for readiness and supports required for return to work/school/play but clearance must be provided by a medical practitioner.

In making a concussion diagnosis, practitioners should consider and instruct the patient on necessary follow-up steps. This sets in motion the post-concussion care pathway. Patients and families will thus be able to have confidence that other diagnoses or potential complications can be ruled out and/or managed.

Tools and Resources:

[Post-Concussion Care Pathway](#)

[Concussion Symptom Management](#)

2

Post-concussion care and concussion clinics should have direct access to a physician with experience in concussion management to provide ongoing involvement regarding medical stability, trajectory of care, need for medical speciality referral and decisions on clearance to return to activity. *(This can be provided through a physician working in a clinic or a physician associated through a formal arrangement.)*

Background:

The majority of individuals who experience concussion will recover within suggested timelines (10-14 days for adults and 4 weeks (28 days) for children and youth) with conservative management. For persons with a straightforward recovery, medical involvement for diagnosis and guidance of progressive recovery back to activities may be all that is required.

Some individuals will continue to experience persistent symptoms, and will require medical re-assessment and may need management by an interdisciplinary team. A physician should have the training to identify those patients at risk for persistent post-concussion symptoms and be able to ensure that all necessary follow-up, diagnostic testing, consultant referrals and treatment are provided in a timely, appropriate manner for these patients.

A physician is the only healthcare provider who can rule out other medical diagnoses, consider comorbidity or pre-morbidity, make treatment decisions for medical issues and symptoms, manage need for medications, make specialist referral, and provide clearance for return to work/school/play. While other healthcare providers may have some of the necessary knowledge and can advise a physician regarding trajectory of care and treatment decisions, a physician is regulated to make these decisions.

In some cases a nurse practitioner (NP) will be the available medical provider. There are some limitations to NPs that preclude them for having all of these responsibilities without an involved physician, when required, and prescription medications that may be off label.

What this standard means:

The physician involved could be a family or sport physician, a pediatrician, a physiatrist, or physician affiliated with a concussion clinic. It is necessary that there be appropriate medical communication (“hand-over” of the responsibility of care) as patients move through the post-concussion care pathway to ensure clarity about the most responsible physician (*OHIP term*) for care decisions.

It is incumbent upon all healthcare providers to ensure that patients seen for post-concussion care are followed by a medical practitioner. Although having a physician directly working at a concussion clinic is optimal, a formal arrangement is also acceptable involving a consulting physician with expertise in diagnosing and managing post-concussion care being in regular communication with the clinic, having agreed to see patients from the clinic and consult in a timely manner on an as needed basis with the clinic service providers.

Medical clearance decisions for return to activity can only be made by a physician or nurse practitioner. This is often made after consulting with other treating professionals involved in the care of the specific patient, such as neuropsychology or physiotherapy.

As indicated in Standard 1, neuropsychologists are regulated to diagnose a concussion and do so only after medical evaluation or in collaboration with a physician to ensure that any medical issues are identified and managed. They are trained to identify if patients should be seen by medical specialists for issues requiring medical management and/or would indicate a diagnosis other than concussion. They can assess for readiness and supports required for return to work/school/play but clearance must be provided by a medical practitioner.

Physicians and nurse practitioners will need to have completed the necessary training and educational materials so that they are appropriately prepared to act as the primary care provider coordinating and managing post-concussion care. This training should involve knowledge of Clinical Practice Guidelines, familiarity of local/regional post-concussion care providers and resources. If a medical practitioner does not feel that they have the necessary experience in concussion to fully manage a patient with persistent symptoms, it is recommended that he/she refer to a concussion clinic or network of providers with specialized training, knowledge and experience, while still maintaining medical oversight.

Tools and Resources:

[Post-Concussion Care Pathway](#)

[Concussion Symptom Management](#)

[Concussion Clinical Practice Guidelines: Adult, Pediatric, Sport](#)

3

Individuals with concussion should have access to care at the following time points, according to the attached pathway.

Diagnostic assessment

T1: As soon as it is recognized that the individual has incurred a suspected concussion.

Education, resource information and follow-up

T1: at diagnosis

T2: at 1-2 weeks when follow-up occurs

T3: at 3-4 weeks when flagged for further assessment and symptom management follow-up occurs

T4: in an ongoing fashion as symptoms are monitored through follow-up

T5: upon referral to an interdisciplinary concussion clinic and in an ongoing fashion through involvement with the clinic.

Therapies and interventions once symptom needs are deemed persistent

T5: Upon referral to an interdisciplinary concussion clinic

Background:

Delineation of a clear pathway and components of care is a necessary step in ensuring the right care is delivered at the right time. The goal of a pathway of care is to improve patient flow and access. Waitlists are currently viewed as too lengthy and detrimental to patient care. Pathways that include timelines inform the system about changes that need to be made in order to improve patient flow.

There are three key stages to the pathway that have been identified through review of the evidence and consensus among experienced healthcare practitioners: 1. diagnosis; 2. education and follow-up; and 3. treatment from an interdisciplinary concussion clinic.

A diagnosis will clearly identify a course of recovery and suggested treatments. Risk factors and potential confounding conditions can be identified and managed. Current evidence suggests it is more appropriate to flag patients who may have protracted or difficult recovery and to monitor them so that the decision to refer for therapy can occur without delay. Research has shown that the risk of persistent symptoms can be flagged earlier than previously believed. This will hopefully facilitate an earlier entry into receiving interdisciplinary care for those who are, or will be, at risk for a longer recovery.

Educational material about recovery, risk factors, trajectory of care and appropriate treatments and resources has not been provided to patients quickly, comprehensively and consistently over time. This has caused unnecessary anxiety and confusion among patients and their families.

Educational information must be provided to patients and families, so that they can begin to know and understand concussion from the outset. This should include directions for the initial few days, as well as reassurance that most concussions recover over time, and reasonable expectations for recovery.

What this standard means:

There have been practices that have become entrenched based on out-of-date evidence, or others that have been adopted but that may not be appropriate within scope of practice or evidence. The timeline and patient flow proposed in this standard will require changing and clarifying some existing practices. The development of the pathway is grounded in evidence. Education of healthcare providers will be required to ensure that current practices are brought into line with this standard and current evidence.

While it is optimal that diagnosis occurs shortly following the concussive event, it is acknowledged that some individuals may only seek care or diagnosis after some time has passed if symptoms do not resolve. Regardless of when diagnosis actually occurs, the pathway should be adhered to, as diagnosis is the first in many steps of an appropriate care flow.

It is important for patients to understand how to manage their activities post-concussion, while not inundating or overstimulating them with too much detail in the initial few days. Education is best provided in multiple formats, to allow patients to learn in the medium they can tolerate and are comfortable with, while providing clear sources for more information, as wanted or needed.

The majority of individuals who sustain concussion will recover spontaneously without need for medical or other healthcare involvement, but there is a percentage of individuals who do not. Patients who are living with persistent symptoms need to receive coordinated, collaborative, interdisciplinary care as defined in the post-concussion care pathway. By following the trajectory of care, patients should get to qualified care quickly, avoid long waitlists and experience less time struggling with symptoms for a protracted period of time.

Tools and Resources:

[Post-Concussion Care Pathway](#)

[Scopes of Practice](#)

[Providing Information to Patients and Families](#)

4

Healthcare providers and concussion clinics should provide the following information and respond to the follow questions/needs of the patient and family:

- About concussion and the trajectory of recovery
 - Additional resources and information
 - Healthcare provider experience
 - Services offered
 - Types of referrals available
-

Background:

Education regarding concussion is highly requested by patients and families and evidence has shown it to be valuable in normalizing and reducing the impact of symptoms. Education allows the patient to begin to know and understand concussion from the outset.

Education about concussion should involve the nature of the injury, expected recovery, prognosis, and expected responses to any needed treatment. Patients should expect to receive both verbal and written information and communication about their care as they move through the post-concussion care pathway.

In reality patients and families have not always been able to access clear and comprehensive information and this has led to confusion, uncertainty, anxiety and vulnerability. Due to long waitlists at some specialized concussion centres/clinics, patients have been forced to find services where they can. Because of the preponderance of businesses calling themselves concussion clinics, some patients may not be able to discern whether they are getting appropriate or necessary care from the right providers.

What this standard means:

Information about concussion and the trajectory of care should be provided to patients regardless of where diagnosis and post-concussion care is received. Patient feedback speaks to the need to portion information so as not to inundate or overstimulate patients with too much detail in the initial few days.

Education is best provided in multiple formats (website, pamphlet, over the telephone or in-person), to allow patients to learn in the medium they can tolerate and are comfortable with, with sources to more information available as wanted or needed.

The following elements should be included in information provided to all patients with concussion and their families. Healthcare providers should ensure that patients receive this information even if they suspect they might have received it from another provider.

- What is a concussion?
- Typical pattern and factors that may affect recovery, including risks and red flags.
- Reassurance that the majority of people recover (what is normal?)
- Things the individual should/should not do (return to play, work, or school).
- When to be concerned and what to do?
- Education on resources, including:
 - Types of services available in the near community
 - Places to get more information that are reliable and evidence-based
 - Support groups

Concussion clinics should be able to explain their services, who provides them, and the qualifications and experience of the providers at the clinic. The clinic should also be able to provide information to patients about the way the providers work together, the degree of support that the clinic will provide, whether there is evidence to support the therapies being offered, and what services are covered by OHIP and other payor sources. If patients are being asked to pay for some services out of pocket, they deserve to know that these therapies are necessary and appropriate. If services offered are too expensive the provider(s) should be upfront and endeavour to highlight other options that would be cheaper and also appropriate; most professional standards that guide the practice of healthcare professionals mandate this.

The following elements should be included in the information provided to patients and families before they start treatment and throughout the treatment process as needed:

Experience

- What experience does the clinic have in concussion?
- How many patients with concussion have you seen?
- Is there a particular population that your clinic focuses on? (age or cause of injury)
- What is the clinic's experience working with the school system? If needed do you speak with the school and get involved in the return to school plan?

Services offered

- Will a medical doctor or nurse practitioner be involved in my care?
- Who makes the decisions about my treatment?
- What professionals are involved in your clinic?
- What services and treatments are offered at your clinic?
- What services, treatments at your clinic are covered by OHIP? By Group Benefits? By other insurance? By the patient?
- How will you help/support me to return to work/school/play?
- If I require services or treatments outside of your clinic will you continue to see me?

Referrals

If you have been seen at the clinic for a considerable amount of time, you might want to ask these questions.

- If I have problems from my concussion that are outside of what your clinic offers do you know who to refer me to?
- Will your clinic continue to see me if I am referred to someone else?
- What happens while I am waiting for the referral appointment?

Available Resources

- available at the clinic
- available beyond the clinic
- websites that are reliable (evidence-based information/treatments)

Tools and Resources:

[Providing Information to Patients and Families](#)

[Information Clinic/Networks Should Be Able to Provide to Patients](#)

5

Every patient diagnosed with a concussion should receive follow-up (usually from his/her primary care provider) within 1-2 weeks.

Background:

The strength of the evidence is improving with respect to risk factors for those who are likely to experience persistent symptoms. By having a diagnostic assessment close after the concussive event and follow-up within the first 1-2 weeks, facilitates monitoring risk factors and ensures that patients who are not recovering quickly can be identified and receive timely necessary care.

Currently post-concussion care is not being provided in a standardized way following a consistent care pathway. This has meant that some patients do not get follow-up until significant problems have developed and the patient is in considerable distress. Follow-up ensures the patient is being clinically observed.

What this standard means:

It is important that the primary care practitioner have a thorough understanding of the patient's history and current circumstances so that an accurate assessment of risk factors can be made.

The primary care practitioner will need to make decisions about additional, further follow-up care if symptoms are not abating, keeping track of potential risk factors that may make for a protracted recovery. A follow-up appointment should be booked prior to the patient leaving.

If a general medical practitioner does not feel that they have the necessary experience in concussion to fully manage a patient with persistent symptoms, it is recommended that he/she refer to a concussion clinic or network of providers with the necessary specialized training, knowledge and experience, while still maintaining medical oversight.

Tools and Resources:

[Post-Concussion Care Pathway](#)

[Risk factors table](#)

6

A person treating patients for post-concussion symptoms should be a regulated health care professional, licensed by a regulatory body under the *Regulated Health Professions Act, 1991*; and the *Social Work and Social Service Work Act, 1998*, who:

- has had training involving direct patient care/contact and knowledge of traumatic brain injury and its biopsychosocial effects;
 - has experience in concussion management with a high volume of patients with concussion annually; practices according to the most up-to-date, evidence-based guidelines;
 - practices within their defined scope of practice and recognizes when to refer to other interdisciplinary providers as patient symptoms require.
-

Background:

It is necessary that patients get the right care from the right provider to ensure that persistent symptoms are managed effectively. Direct and regular experience with patients with concussion is required, in addition to appropriate qualifications to ensure that providers are appropriately able to manage the persistent post-concussion symptoms relevant to their scope of practice.

An understanding of the scope of practice for each healthcare profession typically involved in post-concussion care provides guidance to healthcare providers and also to patients seeking the suitable provider. Better understanding of what individual professions do and are regulated to provide, facilitates an improved collective competence in post-concussion care.

What this standard means:

No one person or discipline is a concussion expert, as it often takes the expertise of interdisciplinary healthcare professionals to manage and treat the persistent symptoms of concussion.

Healthcare professionals are encouraged to speak to their scope of practice, training, knowledge and experience, and what these contribute to their services, rather than to speak of themselves as experts. Persons can refer to themselves as concussion experts but should adhere to the specific criteria that exist for the use of this term.²⁰

There needs to be an increase in the application of evidence-based clinical practice guidelines, and avoiding treatments that may be ineffective, potentially harmful and costly.

The core group of practitioners within a concussion clinic should be regulated healthcare professionals. There is value, for patients, in working with regulated health professionals as there is a complaints process available to them and quality assurance measures in place. Non-regulated

professionals may be knowledgeable, capable and competent, and work in a clinic or interdisciplinary team, however, there are no regulatory bodies overseeing their practices.

Regulated healthcare professionals whose scopes of practice include assessing and treating concussion can benefit from additional education and training regarding concussion and post-concussion management to further their competencies. For providers who are not trained or qualified to provide care within their specific scope of practice, a stand-alone course is not sufficient to be able to provide safe, quality, or comprehensive care in the domains of function affected by concussion.

In Ontario, regulatory bodies for healthcare professions provide general direction in the form of standards of practice. It is important to refer to the defined scopes of practice for each regulated healthcare profession and the controlled acts they are able to perform. Currently, many regulatory bodies are considering whether they should be developing more specific scopes of practice for post-concussion care.

Tools and Resources:

[Scopes of Practice](#)

[Concussion Symptom Management](#)

7

A concussion clinic or network of providers should offer/utilize an interdisciplinary team with varying scopes of practice, with three (3) or more different regulated health care provider disciplines.

Background:

No one provider or discipline is sufficient to manage and treat all persistent symptoms of concussion. Interdisciplinary care requires that patients have access to a variety of different practitioners according to their symptom cluster. There is a need for the clinic/network of providers to have a shared approach/philosophy and an integrated, inter-professional plan of patient-centred care (not several individual plans of care).

A concussion clinic or network of providers cannot be considered interdisciplinary unless a patient is seen by, and can access three (3) or more different health care provider disciplines. Thus, a concussion clinic or network of providers does not meet the standard if fewer than three (3) different providers are providing care through the clinic.

Evidence regarding the provision of post-concussion care demonstrates that symptom presentation is broad and encompasses three major areas (physical, emotional, and cognitive) calling for a symptom-based approach. Thus, post-concussion care requires the access to, or capacity to, integrate interdisciplinary care based on the constellation of symptom presentation¹⁰.

What this standard means:

Persistent symptoms can be classified as physical, emotional and cognitive and no one provider has the training and scope of practice to manage all of these elements in isolation. Collaboration with other providers is necessary to ensure that support be provided in each of these areas.

The core functions required to manage post-concussion symptoms include: diagnosis and access to medical services; physical treatment options; cognitive evaluation and treatment; evaluation and treatment of emotional conditions; functional integration; provision of education; and coordination of care. These functions will involve a wide range of regulated healthcare professionals who can provide specialized and general care.

Individual providers offering post-concussion care where concussion clinics do not exist, provide valuable care, but cannot call their practice a concussion clinic. In order to meet this standard, a concussion clinic must be interdisciplinary. Where providers are not in one setting, care can occur through a network of providers, with a physician affiliated through a formal arrangement, provided that the providers are operating in an interdisciplinary manner.

Tools and Resources:

[Scopes of Practice](#)

[Post-Concussion Care Pathway](#)

[Core Services/Functions](#)

8

A concussion clinic or network of providers should clearly outline for patients whether they are able to provide the full spectrum of care from initial management to longer term management of persistent symptoms (if required).

Background:

Patients will have different needs throughout the continuum of care, and provision of the right care at the right time can lead to early identification of risks and persistent symptoms, while allowing for appropriate use of healthcare resources. Patients with persistent symptoms may need to be followed by an interdisciplinary clinic for an extended period of time and may also need considerable guidance in resuming regular activities.

Given the potential complexity of persistent symptoms and the profound effect that they can have on functioning, it is crucial that patients be accurately informed regarding the services that they might need, where they can access these services and how long they will be connected to services.

Currently in Ontario there are not many full service concussion clinics, yet there are many patients who will need interdisciplinary post-concussion care. This creates the opportunity for fragmented care that may not meet the longer term needs of patients.

Patients need to understand how care being offered will fit into current, mid and longer term needs so that they can make informed decisions about who is best suited to provide the right care at the right time.

What this standard means:

It is important to be upfront with patients about services provided and the length of time they can be provided, i.e. a specified period of time due to payor restrictions, or until the patient is mainly symptom free. As some of the healthcare costs are likely borne by the patient, it is important that patients be transparently informed regarding the availability of all pertinent services and the potential costs so that they are able to make an informed decision about their options. If the service(s) proposed are too expensive the provider(s) should be upfront and endeavour to highlight other options that would be cheaper and also appropriate; most professional standards that guide the practice of healthcare professionals mandate this.

Some clinic or network of provider environments are better at managing acute symptoms and have limited experience managing longer term persistent symptoms. The trajectory of care for patients with persistent symptoms is likely to involve support for symptom management and return to regular activity. It is important that patients understand what services from this

trajectory can be provided by a specific clinic or network of providers. Patients need to be able to make informed decisions regarding the appropriateness of the proposed care and where they can access needed support.

Service providers within a clinic or network of providers must be fully aware of not only their own scopes of practice, but those of other healthcare providers who are able to manage post-concussion symptoms and return to activity. Providers need to understand within the larger service delivery environment when referrals to other providers or disciplines are necessary.

Tools and Resources:

[Core Services/Functions](#)

[Referral Indicators](#)

[Questions for the clinic](#)

9

A concussion clinic or network of providers should have the following core functions/services in place to manage patients comprehensively and provide the best post-concussion care:

- Diagnosis and medical treatment decisions;
 - Physical treatment;
 - Cognitive, functional, emotional support;
 - Coordination of care function
 - Education
-

Background:

Core functions/services should be available in all concussion clinics or networks of post-concussion care providers. Evidence regarding the provision of post-concussion care demonstrates that symptom presentation is broad and encompasses three major areas (physical, emotional, and cognitive) calling for a symptom-based approach.

With persistent symptoms, return to activity and management of symptoms is complex, and may require a number of providers, therefore a coordination function is required to properly support patients.

By viewing the care provided by an interdisciplinary clinic from the perspective of core functions rather than healthcare disciplines allows for needed clinical and fiscal flexibility. There may be several professions within a given core function who can provide appropriate care consistent with their scopes of practice.

What this standard means:

This standard does not aim to direct what disciplines should be present in a concussion clinic, but rather provide information on which functions should be provided. This enables a clinic to build its interdisciplinary profile of services based on comprehensively addressing patients' symptoms.

Concussion clinics will be able to map the providers available in the clinic or network to these core functions. This mapping can be useful to present to patients so that they know who the key providers are in their care, and useful to providers to ensure focus and efficiency of service delivery.

To date, the term “concussion clinic” has been used broadly to describe many types of service provision entities. There are many “clinics” that only provide half of the core functions and are also not well connected to other providers to enable patients to obtain the full range of services. Patients can be left with the burden of identifying and finding their own ad hoc network of services and providers to help them manage their persistent symptoms.

Adoption of this standard will mean that patients will be able to receive the interdisciplinary post-concussion care that is required for persistent symptoms in one locale or organized network, reducing the pressure to identify and create their own interdisciplinary network of providers. Many of the “clinics” that currently exist will have to expand the services and functions that they are able to provide in order to call themselves concussion clinics.

Tools and Resources:

[Core Services/Functions](#)
[Scopes of Practice](#)

10

Concussion Clinic teams and networks should delineate each other's roles and professional scopes of practice.

Background:

Patients must be able to make informed choices about treatment plans and healthcare providers. Each practitioner should outline which areas of the necessary core functions he/she addresses (i.e. cognition, psychosocial functioning, physical support etc.). Clarity in roles will promote informed decision-making around care plans and increase the clinical accountability of providers among themselves. Care of a post-concussion patient must not be provided outside of a regulated health professional's scope of practice. Scopes of practice describe the procedures, actions, and functions that healthcare practitioners are permitted to undertake in keeping with their professional license. These are the functions that providers are trained to provide and about which they will receive ongoing education and support from their regulatory body. Providers operating outside their scope of practice may be in violation of their licensing agreement and the standards for practice within Ontario.

What this standard means:

Patients and professionals should have an understanding how the services needed for the individual and the available providers fit within allowable scopes of practice. This understanding should further strengthen collective competence in post-concussion care. Patients and their families need to be able to make informed decisions about which healthcare professionals are best qualified (training, regulation and experience) to treat specific symptoms. It is also important for healthcare providers to know the limits of their practice and personal experience and by extension, know who they can refer patients to get appropriate care if they are not able to provide it.

In Ontario, the regulatory bodies for the recognized healthcare professions provide general direction in the form of standards of practice. Currently, many regulatory bodies are considering whether they should be developing scopes of practice, specific for post-concussion care.

Tools and Resources:

[Core Services/Functions](#)
[Post-Concussion Care Pathway](#)
[Scopes of Practice](#)

11

A concussion clinic or network of providers should follow practices and use treatments that are evidence-based or recommended by provincial, national or international guidance or consensus statements.

Background:

Post-concussion care or treatments must be evidence-based, or if evidence is not available, recommended through the consensus of recognized leaders in concussion, and be within the scope of practice of the treating care provider.

A research-to-practice gap exists such that some practices shown to be effective by scientific research may not be used in clinical practice, but some therapies are not empirically validated and may be ineffective or even harmful. Because scientific research, especially when synthesized across multiple, high-quality, experimental studies, is generally recognized as the most valid source of evidence for determining what is effective, prioritizing such evidence-based practices over other ineffective approaches should result in better patient outcomes.

What this standard means:

The evidence is continually evolving in the area of clinical research in post-concussion care and healthcare providers need to keep current regarding the latest evidence. This can be done through consultation of clinical practice guidelines. Regulating bodies also have an obligation to summarize the latest research, update practice guidelines and disseminate these changes to their membership.

In the absence of a solid body of scientific evidence, regulating bodies for healthcare providers have a role in disseminating consensus-based updates to clinical practices based on the experience of leaders in their profession in collaboration with leaders of other healthcare professions (i.e. consensus statement from Berlin).

Concussion clinics need to justify the appropriateness of therapies and whether there is strong evidence to support them; patients must know that therapies being recommended are appropriate or whether they are evidence-based. This is necessary for patients and families to be able to informed decisions about their care.

There are some new therapies being offered for which there is no research or consensus of recognized clinical experts to support their use. While these may be anecdotally helpful there is no strong support for these practices. Providers need to be upfront when there is not an evidence base to support the use of a suggested therapy, especially when there is no payment coverage for those therapies.

Tools and Resources:

[Concussion Clinical Practice Guidelines: Adult, Pediatric, Sport](#)

12

Primary care practitioners, concussion clinic teams/networks of providers should follow referral indicators to refer patients to appropriate specialists, services and allied professionals.

Background:

It is recognized that concussion clinics or networks of care will not have all the specialists that may be required to comprehensively manage every potential persistent concussion symptom. It is also important for all health care professionals to acknowledge the limits of their own expertise and scope of practice, and to work collaboratively with specialized providers as needed. Collective competence increases the likelihood patients will receive the right treatment, at the right time, from the right provider.

Referral networks should be established by each primary care provider and concussion clinic, in order to make appropriate and timely referrals to additional experts as required by the needs of the patient. This also applies when interdisciplinary care is being provided by a physician/nurse practitioner in collaboration with other healthcare professionals through a network of providers. Persons can refer to themselves as concussion experts but should adhere to the specific criteria that exist for the use of this term²⁰.

Concussion management is symptom-based and will likely involve multiple health providers, It is important that qualified healthcare professionals practicing within their scope of practice are involved to ensure that appropriate treatment and supports are received for the underlying cause of the symptoms.

What this standard means:

It would be desirable to have healthcare professionals performing the core post-concussion care functions co-located (in one setting); however, it may be necessary to refer externally to other providers. Not every patient will require every service/function. Knowledge of referral indicators can guide healthcare providers to attend to, and respond to; specific patient symptoms by ensuring appropriate referrals to regulated healthcare professionals.

It is incumbent upon healthcare professionals to understand and work within their legislated scopes of practice and individual level of competency. This necessitates that referrals be made to appropriate professionals when presenting symptoms are outside a healthcare professional's scope of practice or level of competency, or when the symptoms are not responding to a course of treatment and something else should be tried.

Tools and Resources:

[Referral Indicators](#)

13

If post-concussion care is provided within a network of providers, it should:

- respond to individual patient needs;
- consist of qualified and experienced interdisciplinary providers including a physician;
- have a clear care pathway;
- engage in comprehensive for follow-up practices;
- not unduly inconvenience patients (i.e. having to go to different settings/locales);
- use a model of collaborative, shared care so that each practitioner is aware of the treatment of the others and that there is regular communication regarding progress and treatment plan.

Background:

The goal of this standard for patients with persistent symptoms is medically- supervised interdisciplinary care for management of symptoms, guidance on resumption of regular activities and return to school/ work /sports, and regular follow-up with a primary care provider as per the core functions of a concussion clinic. It is recognized that in some areas, there may not be an interdisciplinary concussion clinic within a reasonable distance for patients to attend and receive services as they require.

The necessary key elements of post-concussion care are:

- responsivity to individual patient needs;
- qualified and experienced interdisciplinary providers including a physician;
- a clear care pathway;
- an organized process for follow-up;
- care that does not unduly inconvenience patients (i.e. having to go to different settings/locales);
- a model of shared care.

What this standard means:

While the interdisciplinary clinic is the ideal for addressing persistent symptoms, this standard can still be achieved by:

- a) a physician with expertise in concussion management working in collaboration with other interdisciplinary providers that are more proximal to the patient; or
- b) use of telemedicine to access additional providers.

What is the most important is that there be an organized, coordinated network of providers who have established and regular mechanisms of communication and coordination, respecting scopes of practice. From the perspective of patients the care should be seamless, comprehensive, timely and integrated.

Tools and Resources:

[Post-Concussion Care Pathway](#)

14

A concussion clinic or network of providers should have clear internal and external communication mechanisms in order to improve coordination of care.

Background:

Continuity of care is enhanced by both internal and external communication mechanisms. Up to this point post-concussion care in Ontario has been fragmented due to the absence of a clear post-concussion pathway and a clear structure for concussion clinics and networks of providers. One of the core functions of a concussion clinic is “Coordination”; this is in recognition of the important role of both internal and external communication and the potential number of different practitioners and service providers involved managing persistent symptoms.

Within an interdisciplinary care environment it is important that someone plays the role that ensures communication occurs, both within the clinic/network of providers and external to the clinic/network. External communication can be vital between post-concussion care providers and non-healthcare settings to arrange accommodations and support return to regular activity.

What this standard means:

Internal communication: By observing a universal post-concussion pathway with clear roles and timelines, communication should be improved leading to coordinated, seamless and efficient post-concussion care. In order to practice as an interdisciplinary team, providers at the clinic should have access to one another’s reports and/or progress notes on the patient. If care is being provided within an interdisciplinary network of care, healthcare providers should remain updated on the patient’s progress to date, with case conferences being preferable.

External communication: Communication beyond the healthcare professionals can be essential with schools, workplaces, and support organizations (i.e., non-healthcare settings). Having clear communication processes and preferably a designated person to perform this role will be required to ensure that patients are optimally supported to return to activity.

Tools and Resources:

[Core Services/Functions](#)

15

A concussion clinic or network of providers should track timely access to service, use suggested reporting and common data elements, and collect patient-level clinical data, demographic data and administrative data.

Background:

It is envisioned that having common data elements (CDEs) will facilitate the implementation of these concussion clinic standards. This will take time to implement but it should be something that clinics and networks of providers work towards. This is an important way of measuring clinical effectiveness, engaging in system-level planning and assessing the degree to which clinics and networks of providers are meeting standards for post-concussion care. By collecting uniform data and following an accepted post-concussion care pathway, comparisons across the province can be made regarding clinical and system outcomes.

What this standard means:

There has already been some work done by acute sites; to identify the population seeking post-concussion treatment and to track patient flow through the healthcare system. It is now time to bring this work into community-based healthcare by encouraging other settings to engage in this level of data collection. Such data can be used to drive policy development, funding decisions and improved understanding of post-concussion care. This will also further increase the understanding of how well the regions and the province are serving the needs of patients post-concussion. It will allow for there to be evidence from across the province to be analyzed; to see what outcomes are common, after what time periods, and after what types of treatments.

Clinics and networks of providers should make every attempt to collect minimum information on their patients, including: age, gender, mechanism/cause of injury, prior concussions, wait time to access care, services used, time to discharge/length of service, referrals and outcomes.

Tools and Resources:

Ontario Concussion Care Strategy

Methods

The Concussion Advisory Committee was formed by the Ontario Neurotrauma Foundation (ONF) ABI Advisory Committee to advance the work completed at the April 2016 Concussion Summit, with the mandate to move forward on developing the Standards for Post-Concussion Care in Ontario. Following the Summit it was clear that there were four key areas that needed to be addressed:

1. **Define the multiple competences and scopes of practice of different healthcare providers** that deliver post-concussion services, in order to support collective competence for post-concussion care.
2. **Develop a pathway** or system for ensuring that patients were connected to the appropriate healthcare professional at the right time.
3. **Develop information for patients and family members** to help them navigate what has become a complex and often disjointed system of post-concussion care.
4. **Develop a strategy to educate the public and healthcare providers on the Standards** for Post-Concussion Care in Ontario.

To effectively address these key areas, four working groups were developed. Each working group had an identified Chairperson who led the sessions of their group during the Fall of 2016. Staff from the ONF oversaw the activities of the four working groups to maintain continuity in process, support complementarity, ensure that there were no major gaps in content, and to reduce any overlap in content between working groups. Each of the working groups was tasked to provide a rationale and practical leadership directions for the draft Standards based upon the consensus outcomes from the Concussion Summit.

The goals and accomplishments of the four working groups:

Collective Competence

- Developed a profile of service that various healthcare practitioners working with concussions contribute based upon their defined scope of practice (within Ontario), and the training required to work with concussed patients.
- Drafted a profile of typical concussion related symptom clusters and map this onto the scopes of practice of various healthcare professionals.
- Defined the service functions that a concussion clinic should offer and draft a model for concussion symptom management.

Improving the System for Management and Referrals

- Created a pathway to standardize the flow of service from the point of injury to diagnosis, follow-up and longer term referrals.
- Developed an evidence-based list of risk factors related to the development of persistent concussion symptoms to allow for earlier and more effective management.

- Coordinated common concussive symptoms as indicators for referrals to healthcare providers with management of specific symptoms in their scope of practice.
- Examined the regionalism of current concussion services to create a provincial network of centres of excellence to enhance links between health care professionals/clinics.

Developing Patient Information

- Developed information package for patients synthesizing key information from current evidence-based resources.
- Identified questions that patients should ask their service provider, and information that providers should be prepared to answer regarding concussive injuries, management and expected outcomes.
- Identified methods of disseminating information packages to providers, networks and appropriate channels.

Education on the Standards

- Identified primary and secondary audiences and delivery mechanisms for short term education of the Standards for Concussion Clinics. Primary audiences are those who should be addressed in the first effort and involve those directly involved in the treatment, planning and funding of service provision for individuals post-concussion. Secondary audiences are those one step removed from direct service provision, but are important nonetheless. Identified delivery mechanisms involved print-based, electronic and in-person methods, with variations by audience.
- Developed a preliminary strategy to disseminate and educate professionals and the general public on the Standards for Concussion Clinics.
- Identified common knowledge gaps in relation to the Standards for Concussion Clinics in order to set priorities for the education on the Standards. These gaps are in relation to understanding the type of interdisciplinary care that is required, the scopes of practice of different healthcare professionals, the trajectory of care and the need for the Standards for Concussion Clinics, and how standards could be clinically helpful.

The ONF Concussion Advisory Committee and ONF Acquired Brain Injury Committee then reviewed a report created from the working groups and provided feedback and further editing. The information was then compiled by ONF staff into a formal standards document and sent for external review and feedback from participants from the original 2016 Summit, as well as professional associations and select stakeholder organizations.

Feedback was obtained from four external reviewers. The document was also sent for feedback to the following:

- All participants of the 2016 Summit on Concussion Standards
- Ministry of Health and Long-Term Care
- Health Quality Ontario
- WSIB Medical Director and Team

- Ontario Brain Injury Association
- Ontario College of Family Physicians
- Ontario Association of Family Health Teams
- College of Nurses of Ontario
- Ontario Chiropractic Association
- College of Occupational Therapists of Ontario
- College of Physiotherapists of Ontario
- College of Psychologists of Ontario
- College of Audiologists and Speech Language Pathologists of Ontario
- Ontario Athletic Therapist Association
- Ontario College of Social Workers
- College of Massage Therapists of Ontario
- College of Optometrists of Ontario
- Various Professional Associations
- Ontario Provincial Lead for Emergency Medicine

The Concussion Advisory Committee reviewed feedback and approved final changes.

Conclusions

The overarching goal of our work on the Standards for Post-Concussion Care is to fix “the wild west” that describes the current care landscape for post-concussion. We have done this by setting out standards that should improve life for patients after concussion and help the system be accountable for the care that they should be providing.

Currently post-concussion care can be quite disjointed and challenging to navigate. The goal of the ONF Standards for Concussion Clinics is to help patients navigate and evaluate the process of quality care. There are several frameworks by which integrated post-concussion care can be provided. These include providers who are part of a virtual network of providers, individual providers in an *ad hoc* network of providers, and clinics with integrated services at one site.

At the Concussion Summit in April 2016, it was recognized that post-concussion care management involves both acute and persistent symptoms. Post-concussion care, regardless of how the concussion was sustained, requires a pathway of care that is appropriately coordinated and integrated across a number of health care professions, as needed. Based on the existing literature, no single healthcare profession ‘owns’ concussion; therefore, the application of the collective competence of multiple healthcare professions can be required from the time of injury through to the process of recovery. The majority of concussions resolve quickly and without the need for interdisciplinary support, but for those patients who experience persistent symptoms it is necessary that they have access to coordinated, interdisciplinary care that adheres to regulated scopes of practice.

The Standards provide direction for the key elements that should be part of post-concussion care and outline a set of referral indicators. Post-concussion care provided by a primary care provider and a concussion clinic or network of providers must encompass a set of core functions that must be provided or be accessible to ensure appropriate care within this broad care framework. These functions can be provided in most cases by more than one healthcare professional operating within a regulated scope of practice. Referral indicators are outlined to ensure that referrals are made to ensure appropriate care.

Given that one of the strongest areas of evidence in concussion management is associated with education, provision for the integration of concussion education for both patients and their families is integrated throughout the post-concussion care pathway. The Standards set out guidelines for the type of education on concussion, services, and treatment that should occur to ensure that unnecessary anxiety and vulnerability does not occur.

In summary, the goal in developing these Standards for post-concussion care was to facilitate the right care, provided at the right time, by the right providers, for individuals who have sustained concussive injuries.

Tools and Resources

1. Post-Concussion Care Pathway
2. Concussion Symptom Management
3. Scopes of Practice
4. Providing Information to Patients and Families (Patient Education)
5. Information Clinic/Networks Should Be Able to Provide to Patients
6. Core Services/Functions
7. Referral Indicators
8. Concussion Clinical Practice Guidelines: Adult, Pediatric, Sport

1. Post-Concussion Care Pathway

There are a few caveats that must be noted right upfront:

1. A large proportion of persons who sustain a concussion will experience resolution of symptoms within the first several weeks. This proportion would follow the green parts of the pathway diagram below. A smaller proportion (approximately 15 - 20%) of individuals will go on to require interdisciplinary concussion clinic care and they would follow the yellow through to the red parts of the pathway diagram below.
2. Treatment and care should be consistent with the best practice Guidelines for Concussion/mTBI & Persistent Symptoms: Second Edition (<http://onf.org/documents/guidelines-for-concussion-mtbi-persistent-symptoms-second-edition>) or the Guidelines for Diagnosing and Managing Pediatric Concussion . (<http://onf.org/documents/guidelines-diagnosing-and-managing-pediatric-concussion>).
3. At multiple times after the incidence of the concussion it is essential that both written and verbal education be provided regarding recovery, treatment and symptoms. This is shown by the blue starbursts in the diagram below.

A pathway of post-concussion care was developed that would be applicable across the province to patients while accounting for the vast regional differences.

All suspected concussions should be assessed by a medical professional as per the pathway. This is to rule out the presence of other medical conditions and ensure that any symptoms that develop or worsen get the needed medical follow-up. If someone were to seek treatment from a health care provider without having been medically assessed, they should be directed to the top of the pathway.

In the minority of cases where symptoms are not resolving within 10- 14 days for adults, and 4 weeks (28 days) for children and adolescents, it is recommended that there be re-evaluation by a physician and additional diagnostic assessment(s). The diagnosis of concussion is a clinical diagnosis based on observed symptoms, mechanism of injury and clinical history. Symptoms after concussion can be physical, cognitive and social/emotional and all must be assessed to inform a concussion diagnosis. Physicians, nurse practitioners and neuropsychologists are able to diagnose concussion; however it is important that a medical assessment be conducted first to ensure medical stability.

For patients requiring interdisciplinary care it is desirable to have providers who are treating the same patient located in the same clinic as this helps inter-professional communication and collaboration; however, this is not always possible. When it is not possible for providers to be in the same location, providers should still collaborate within a formal network of post-concussion care providers to allow for inter-professional communication,

improved patient follow-up and increased efficiency of treatment. Telemedicine is an option in this case.

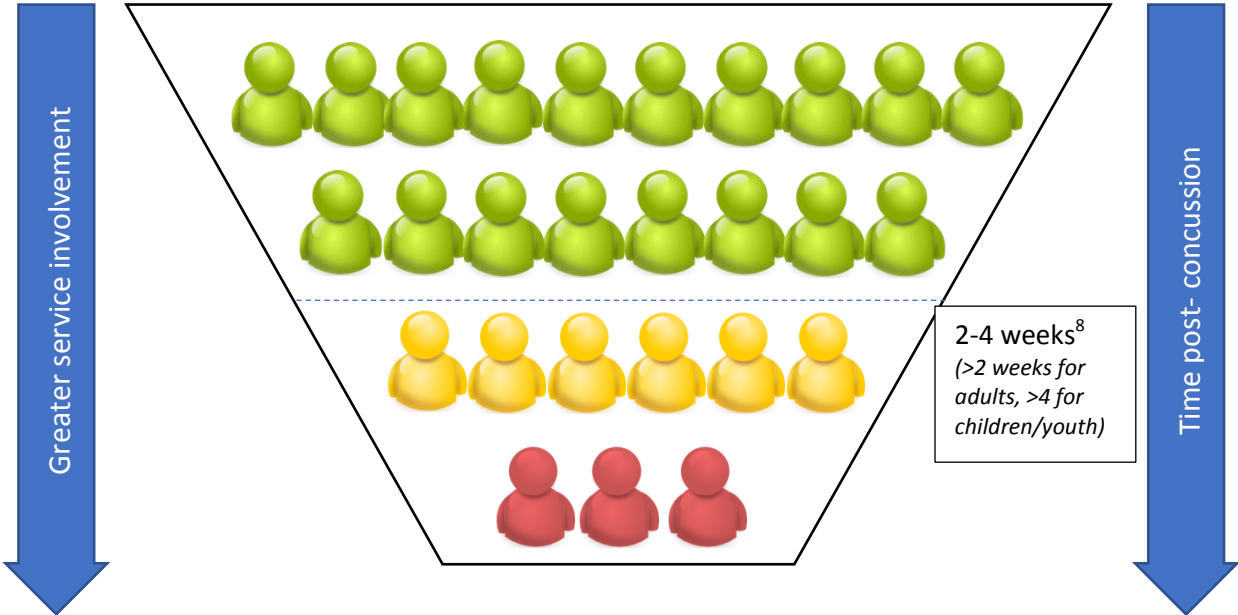
The pathway emphasizes that the patient should be seen by a healthcare professional for which it is within their scope of practice to provide a diagnosis of concussion and/or treatment based upon their professional competencies. The intention is that this pathway be a navigational tool through the current system of available care so that patients can receive appropriate, effective and timely care.

The Post-Concussion Pathway presented is a **general** overview to show how patients can navigate through appropriate post-concussion care, integrating both the public and private healthcare systems. It should be noted that there may be referrals to other healthcare practitioners to rule out concurrent diagnoses (i.e., medical specialists), and these other practitioners could also refer into this pathway to rule out the diagnosis of concussion. When there are co-existing, more physical injuries (for example, orthopedic injuries) some treatment can be initiated within the first few weeks without waiting the suggested time for determination of persistent symptoms that require interdisciplinary care. In the interests of simplicity, all these possibilities are not included in the diagram. Evidence has been provided where possible to support the elements and the timing of care represented in the Pathway.

Key Messages

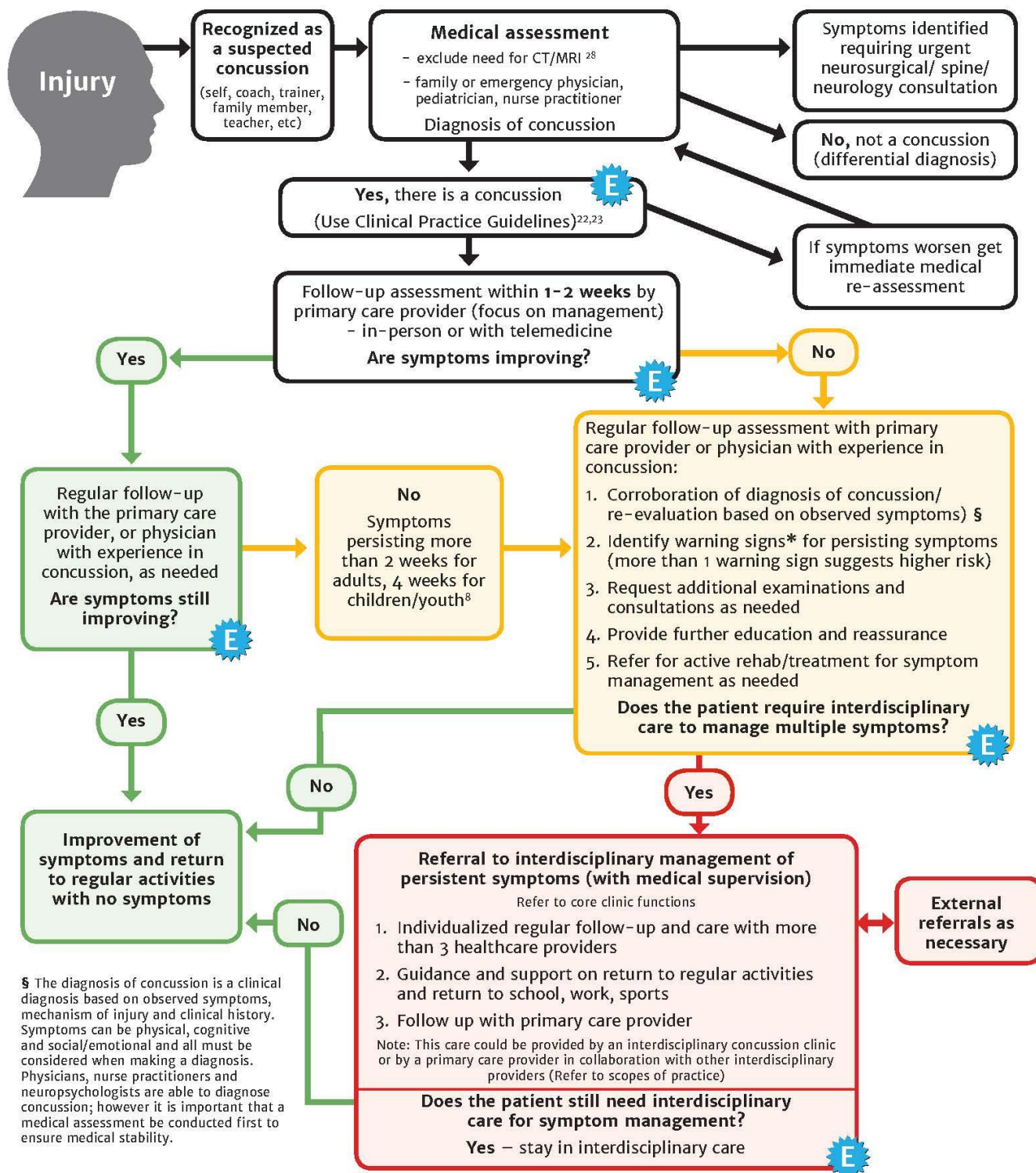
- The proposed pathway is grounded in evidence and is consistent with best practice guidelines and established scopes of practice for different licensed healthcare professionals.
- Not everyone enters the pathway in the same way so it must allow for flexibility
- **Not everyone will need an interdisciplinary clinic, but there is still the need for all patients to get knowledgeable and appropriate care when needed.**
- Persons whose symptoms have not resolved within 10-14 days for adults and 4 weeks (28 days) for children should be re-assessed and considered for referral to an interdisciplinary clinic
- There may be a need for referral to healthcare providers who are not directly involved in the Concussion Clinic. Referral indicators and risk factors have been identified.

Concussion Recovery Pattern



- Follow-up with primary care provider – majority will recover over a few days to weeks, with education about symptom management.
- Follow-up required, further assessment may be required if symptoms are not resolving fully or considered as higher risk for a prolonged recovery.
- Persistent symptoms, interdisciplinary care required

Post-Concussion Care Pathway †



Legend:

- E** Provide education (written and verbal), and where appropriate, reassurance
- Patient has risk factors identified, or is experiencing persistent symptoms that aren't resolving and require specialized care
- Warning sign that, while the patient was expected to recover, there is some persistence of symptoms that may need specialized care
- Patient is improving towards recovery
- Research suggests about 15%-20% of patients will take this pathway
- Research suggests about 30% of patients will take this pathway
- Research suggests about 55% of patients will take this pathway

† A patient can enter this pathway immediately, shortly following injury, or after a period of time when it is recognized that concussion-like symptoms are not resolving. It is necessary that all patients be properly assessed and diagnosed. Patients suspected of having had an earlier concussion should enter the pathway from the beginning so that they can be assessed and diagnosed by the appropriate professional.

*** Warning Signs (risk factors) for poor prognosis**

- High score on the Post-Concussion Symptom Scale (PCSS) >40^{4,25}, OR on the Rivermead Post-Concussion Questionnaire¹⁵
- Previous Concussion History^{5,12,19,27}
- Persistent post-traumatic headache and migraine^{19,32}
- Depression/Anxiety^{2,16,19,21,24,26,27}
- Symptoms/signs of vestibulo-ocular abnormalities (problems maintaining visual stability during head movements)^{7,9,12}
- Signs/symptoms of cognitive difficulties (problems with perception, memory, judgment, and reasoning)^{5,12,18,26}
- Pre-injury history of sleep disturbance and/or post-injury changes in sleep patterns, difficulty sleeping^{2,29,31}
- Increased symptoms with return to school, work, or exercise⁹
- Returning to a contact/risk of contact sport activity^{8,21}

Note:

4. Research has found that being female seems to be a risk factor for prolonged recovery and this should be considered along with the other risk factors when determining if multidisciplinary care is required^{3,4,6,14,26,32}
5. The impact that any single risk factor or combination of risk factors will have on a person's care must be assessed on an individual basis. Presence of one or more risk factors should be identified in care plans and referrals.
6. A recent pediatric study conducted in the emergency department indicates a risk profile with a combination of these factors that results in a risk factor score³². Research has not yet connected this risk score to long term prognosis.

2. Concussion Symptom Management

It is recognized that providers are trained, qualified and regulated to manage **specific** post-concussion symptoms and will need to refer to other professionals in order for all potential post-concussion symptoms to be effectively and appropriately managed within legislated scopes of practice. The Symptom Management Chart has been developed to demonstrate which providers are regulated to manage and treat specific symptoms.

Only the diagnosing healthcare professionals, for whom it is within their legislated scope of practice to provide diagnosis for neurologically-based conditions, can make a concussion diagnosis (*Physicians, Nurse Practitioners and Neuropsychologists*). A full diagnosis involves an evaluation of the mechanism of injury, potential risk factors that may have a negative impact on recovery, clinical history and current symptom presentation.

Medical assessment must first be made by a *Physician and/or Nurse Practitioner* in order to address any medical issues and conditions related to or concurrent with concussion. They will take any necessary actions and make referrals for medical management and treatment. *Neuropsychologists* are also regulated to diagnose a concussion and do so after medical evaluation or in collaboration with a physician to ensure that any medical issues are identified and managed. Final clearance decisions regarding return to activity (i.e. work, school, sports), can only be made by *Physicians and Nurse Practitioners*, after consulting with other treating professionals involved in the care of the specific patient.

In addition to regulated healthcare professionals, non-regulated professionals or para-professionals (i.e., athletic therapist, occupational therapist assistant / physical therapist assistant, recreation therapist) can also provide care for persons after concussion. There are many community-based organizations (i.e., local brain injury associations) that provide both beneficial information and peer support and should be considered in addition to professionally-provided treatment and management from regulated health care professionals.

Key Messages

- Treatment activities must be performed within the established scope of practice of specific providers.
- Multiple healthcare providers may be necessary to effectively and appropriately manage post-concussion symptoms
- Only regulated healthcare treatment activities are profiled here; there is acknowledgement that non-regulated healthcare professional can provide helpful services for post-concussion symptom management

The following are the different types of health care professionals for whom it is within their recognized scope of practice to perform the core discipline specific functions:

1. **Diagnosis, Medical Treatment and Clearance Decisions**
2. **Physical Treatment**
3. **Cognitive, Functional and Emotional Support**

1. Diagnostic Activities

(Physician, Nurse Practitioner, Neuropsychologist)

- **Medical Assessment** *(Physician, Nurse Practitioner)*: triage symptoms, rule-out need for specialist medical follow up for any significant medical/neurological/musculoskeletal issues
- **Diagnostic Assessment** *(Physician, Nurse Practitioner, Neuropsychologist)*: an evaluation of the mechanism of injury, potential risk factors that may have a negative impact on recovery, and current symptom presentation. *Note: Neuropsychologists can make the clinical diagnosis but not any medical diagnoses. Other healthcare providers can suspect a concussion but cannot diagnose one.*
- **Medical clearance** *(as a diagnosis of health status, this can only be made by Physician or Nurse Practitioner in Ontario)*: return to activity (work, school, play, recreation, etc.). *Note: Other healthcare providers can assess for readiness and supports required for return to work/school/play but clearance must be provided by a medical practitioner (Physician or Nurse Practitioner).*

Medical Treatment and Referral Decisions post-concussion

The following may be identified during medical assessment and diagnosis and will warrant follow up and possible referral to appropriate medical specialists and healthcare providers consistent with their scopes of practice.

- Cervicogenic headaches and whiplash-type injuries
- Vestibular and oculomotor dysfunction
- Migraine and post-traumatic headaches
- Psychiatric/psychological disorders
- Management strategies related to cognitive remediation, reintegration to work, life, sports and school
- Hearing impairment or temporal bone pathology
- Sleep disorders
- Structural brain or spine injury
- Co-existing orthopedic injury
- Seizure disorders

2. Concussion Symptom Management: Physical Treatment

Physical	Service Providers
Headache (i.e., tension, migraine, cervicogenic):	Physician (Family Physician, Pediatrician, Physiatrist, Neurologist, Sports Medicine Physician, Neurosurgeon)

Physical	Service Providers
	Nurse Practitioner Registered Nurse Physiotherapist (vestibular, muscle tension, cervical spine) Kinesiologist Chiropractor (cervical spine) Clinical Psychologist (Cognitive Behavioural Therapy for symptom management ¹³) Neuro-ophthalmologist Medical specialist in headache management Massage Therapist
Nausea	Physician (Family Physician, Pediatrician, Ear, Nose, and Throat Physician [ENT], Sports Medicine Physician) Nurse Practitioner Registered Nurse
Vomiting	Physician (Family Physician, Pediatrician, Sports Medicine Physician) Nurse Practitioner Registered Nurse
Dizziness/ Balance	Physician (Family Physician, Pediatrician, Sports Medicine Physician, ENT) Nurse Practitioner Physiotherapist (vestibular specialty) Kinesiologist Athletic Therapist Optometrist (visual assessment) Chiropractor(cervical spine)
Fatigue-Physical	Physician (assess medical cause; Family Physician, Pediatrician, Sports Medicine Physician, Psychiatrist) Nurse Practitioner Registered Nurse Physiotherapist Occupational Therapist Kinesiologist Athletic Therapist
Seizures	Physician (Emergency Physician, Family Physician, Pediatrician, Psychiatrist, Sports Medicine Physician, Neurologist, Neurosurgeon)
Visual Changes (blurry, double vision, oculomotor dysfunction)	Optometrist (with certification in vision therapy, developmental and functional optometry) Neuro-ophthalmologist Neurologist Physiotherapist

Physical	Service Providers
Phono and Photo –phobia	Physician (Family Physician, Pediatrician, Sports Medicine Physician, ENT) Nurse Practitioner Registered Nurse Neuropsychologist Audiologist Optometrist (with certification in vision therapy, developmental and functional optometry) Ophthalmologist
Sleep	Physician (Family Physician, Pediatrician, Sports Medicine Physician, Psychiatrist, Neurologist, sleep MD) Nurse Practitioner Registered Nurse Clinical Psychologist/Neuropsychologist Occupational Therapist Social Worker
Tinnitus/hearing impairment	Physician (Family Physician, Pediatrician, Sports Medicine Physician, ENT) Audiologist Physiotherapist (with vestibular therapy training)
Disorders of taste and smell	Physician (Family Physician, Pediatrician, Sports Medicine Physician, ENT, Neurologist)
Disorders of motor speech and swallowing	Physician (Family Physician, Pediatrician, Sports Medicine Physician, ENT, Neurologist) Speech language Pathologist
Structural brain or spine injury	Primary Management: Neurosurgeon, Orthopedic Surgeon Follow-up Management: Physician (Physiatrist, Sports Medicine Physician)
Orthopaedic injury co-occurring	Physician (Family Physician, Pediatrician, Sports Medicine Physician, Orthopedic Surgeon, Physiatrist) Physiotherapist Occupational Therapist Chiropractor
C-spine dysfunction (neck pain, postural issues)	Neurosurgeon Orthopedic Surgeon Physiotherapist Chiropractor

3. Concussion Symptom Management: Cognitive, Functional and Emotional Support

Cognitive	Service Providers
Fatigue - Mental/Cognitive	Physician (Family Physician, Pediatrician, Physiatrist, Sports Medicine Physician, Neurologist, Psychiatrist) Neuropsychologist Occupational Therapist
Cognitive Communication; Attention/Concentration; Memory; Processing Speed; Word Finding,	Neuropsychologist Speech Language Pathologist Occupational Therapist
Functional	Service Providers
Triage/Diagnosis/Management of Symptoms and Decisions about Return to Learn, Return to School and Work, Return to Play	Physician (Emergency Physician, Family Physician, Pediatrician, Sports Medicine Physician, Physiatrist, Neurosurgeon, Neurologist) Nurse Practitioner Neuropsychologist (not medical clearance decisions)
Functional and Treatment Support: For any or all of: <ul style="list-style-type: none"> • Return to Learn • Return to School and Work • Return to Play 	Each discipline has specific and defined roles and it will vary who is involved depending on the specific support needs of individual patients and the practice scope of the healthcare professional. Occupational Therapist Physiotherapist Speech Language Pathologist (social communication) Chiropractor Neuropsychologist Psychiatrist Physician (Family Physician, Pediatrician, Sports Medicine Physician) Optometrist Social Worker Kinesiologist Athletic Therapist
Lability/Irritability; Depressed Affect, Anxiety related symptoms including phobias and Post Traumatic Stress; Performance Issues (fear of re-injury)	Clinical Psychologist/Neuropsychologist Psychiatrist Social Worker (with specific training in therapeutic techniques)

Functional

Difficulties (in relation to daily activities and return to learn/work/sport)

Service Providers

Occupational Therapist
Neuropsychologist
Social Worker
Speech Language Pathologist
Vocational Rehabilitation Worker
Accommodation Specialists/ Academic Coach

3. Scopes of Practice

To provide guidance to healthcare providers and to patients seeking the appropriate healthcare providers for the appropriate care, an understanding of the scope of practice for each healthcare profession typically involved in concussion care will be provided. This should further strengthen collective competence in concussion care. Professional regulating bodies in Ontario were contacted to determine the guidance and information they provide to their members related to standards of care for concussive injuries. There is value in working with regulated health professionals as there is a complaints process available to them and quality assurance measures in place. This is not the case with non-regulated healthcare professionals. This does not imply that non-regulated professionals are not knowledgeable, capable and competent; it is just to point out that there is no regulatory body that they are accountable to and who will act to protect the public from professional misconduct.

In Ontario, the regulatory bodies for the recognized healthcare professions provide general direction in the form of standards of practice. There is no defined scope of practice for concussion for each discipline, except for Speech Language Pathology. In some cases, general information about education, assessment, and/or treatment for brain injury formed the sole guiding standards.

In the absence of specific standards of practice or guidelines related to concussion care, it is important to use the defined scopes of practice for each regulated healthcare profession and the protected acts they are able to perform. Currently, many regulatory bodies are considering whether they should be developing specific scopes of practice for concussion care. ONF will be working collaboratively with the professional regulating bodies to facilitate and encourage the development of specific scopes of practice for concussion care as they have indicated interest in developing this relationship.

The chart below provides a summary of the defined scopes of practice for various healthcare professionals.

Key Messages

- Most of the healthcare professional regulating bodies do not have specific standards of practice or guidelines related to concussion care; the general scope of practice is the default practice guideline
- Healthcare providers must be mindful to always work within their scope of practice and their level of competence
- ONF will be working with the professional regulating bodies to facilitate and encourage the development of specific scopes of practice for concussion care

Information Provided on Scope by Professional Regulating Bodies

PROFESSION	REGULATING BODY	GENERAL SCOPE	SCOPE DEFINED FOR CONCUSSION	GENERAL INFORMATION PROVIDED
AUDIOLOGISTS SPEECH-LANGUAGE PATHOLOGISTS	<u>College of Audiologists and Speech-Language Pathologists of Ontario</u>	<u>“Identify, diagnose and treat communication and swallowing disorders across the lifespan.”</u>	Not from the College, but <u>“Concussion and Speech Language Pathology: How we can help”</u> was produced by OSLA	Document entitled "Practice Standards and Guidelines for Acquired Cognitive Communication Disorders". College of Audiologist and Speech Language Pathologists of Ontario
CHIROPRACTORS	<u>College of Chiropractors of Ontario</u>	<u>“Assessment of conditions related to the spine, nervous system and joints and the diagnosis, prevention and treatment, primarily by adjustment of:</u> <ul style="list-style-type: none"> - <u>dysfunctions or disorders arising from the structures or functions of the spine and the effects of those dysfunctions or disorders on the nervous system; and</u> - <u>dysfunctions or disorders arising from the structures or functions of the joints.”</u> 	No	Evidence-based practices from <u>Canadian Chiropractic Guideline Initiative:</u> <ul style="list-style-type: none"> - Descriptive information about concussion - Detailed guidelines regarding treatment of headaches
KINESIOLOGISTS	<u>College of Kinesiologists of Ontario</u>	<u>“Assessment of human movement and performance and its rehabilitation and management to maintain, rehabilitate or enhance movement and performance.”</u>	No	None
MASSAGE THERAPISTS	<u>College of Massage Therapists of Ontario</u>	<u>“Assessment of the soft tissue and joints of the body and the treatment and prevention of physical dysfunction and pain of the soft tissue and joints by manipulation to develop, maintain, rehabilitate or augment physical function, or relieve pain.”</u>	No	None
NURSES	<u>College of Nurses of Ontario</u>	<u>“Health care for promoting, maintaining and restoring</u>	No	None

PROFESSION	REGULATING BODY	GENERAL SCOPE	SCOPE DEFINED FOR CONCUSSION	GENERAL INFORMATION PROVIDED
NURSE PRACTITIONERS		<u>health. Prevention, treatment and palliation of illness and injury, primarily by assessing health status, planning and implementing interventions, and coordinating health services.”</u>		
OCCUPATIONAL THERAPISTS	<u>College of Occupational Therapists of Ontario</u>	<u>“Assessment of function and adaptive behaviour and the treatment and prevention of disorders which affect function or adaptive behaviour to develop, maintain, rehabilitate or augment function or adaptive behaviour in the areas of self-care, productivity and leisure”</u>	No	ONF guidelines
OPTOMETRISTS	<u>College of Optometrists of Ontario</u>	<u>“The practice of optometry is the assessment of the eye and vision system and the diagnosis, treatment and prevention of:</u> <ul style="list-style-type: none"> - <u>disorders of refraction;</u> - <u>sensory and oculomotor disorder and dysfunctions of the eye and vision system; and</u> - <u>prescribed diseases”</u> 	No	None
PHYSICIANS	<u>College of Physicians and Surgeons of Ontario</u> And registered with CPSO	1. <u>“Every physician’s scope of practice is unique.”</u> 2. <u>“A physician’s scope of practice is determined by the patients the physician cares for, the procedures performed, the treatments provided, and the practice environment.”</u> <u>“A physician’s ability to perform competently in his or her scope of practice is determined by the physician’s knowledge, skills and judgment, which are developed through training and experience in that scope of practice.”</u>	No	Tool for head and neck pain that was developed by the Centre for Effective Practice
PHYSIOTHERAPISTS	<u>College of</u>	<u>“Assessment of</u>	No	General “concussion

PROFESSION	REGULATING BODY	GENERAL SCOPE	SCOPE DEFINED FOR CONCUSSION	GENERAL INFORMATION PROVIDED
	<u>Physiotherapists of Ontario</u>	<u>neuromuscular, musculoskeletal and cardio respiratory systems, the diagnosis of diseases or disorders associated with physical dysfunction, injury or pain and the treatment rehabilitation and prevention or relief of physical dysfunction injury or pain to develop, maintain, rehabilitate or augment function and promote mobility.”</u>		101” information
PROFESSION	Regulating body	General Scope	Scope defined for concussion	General information provided
PSYCHOLOGISTS (CLINICAL)	<u>College of Psychologists of Ontario</u>	“Assessment of behavioral and mental conditions, the diagnosis of neuropsychological disorders and dysfunctions and psychotic, neurotic and personality disorders and dysfunctions and the prevention and treatment of behavioral and mental disorders and dysfunctions and the maintenance and enhancement of physical, intellectual, emotional, social and interpersonal functioning.”	No	Recent evidence-based guideline for assessment and treatment of concussion <u>Definition of Practice Areas for Psychology and Clinical Neuropsychology</u>
SOCIAL WORKERS	<u>Ontario College of Social Workers and Social Service Workers</u>	“Assessment, diagnosis, <u>treatment and evaluation of individual, interpersonal and societal problems through the use of social work knowledge, skills, interventions and strategies, to assist individuals, dyads, families, groups, organizations and communities to achieve optimum psychosocial and social functioning.”</u>	No	None

4. Information for Patients and Families (Patient Education)

- The Importance of Providing Education
- About Concussion
- Concussion Do's and Don'ts
- Typical pattern of recovery and factors that may affect recovery
- What if I'm not getting better?
- Supports available at a clinic
- Information that Patients should ask Clinics or Networks of providers
- Supports available beyond the clinic or network of providers
- Reliable websites

The Importance of Providing Education

Education regarding concussive injuries is highly requested by patients and families and is one of the most well-established functions supported by the current base of evidence.

In the context of clinical care from healthcare professionals, provision of education for patients and their families regarding concussion must be part triage, diagnosis, and treatment. Education should involve the nature of the injury, expected recovery, prognosis, and expected responses to treatment. Patients should expect to receive both verbal and written information and communication about their care as they move through the concussion care pathway.

There are key points when patients should be given information:

1. **time of diagnosis:** verbal/written information on what is a concussion, warning signs, typical recovery across all areas (physical, emotional, return to activity, psychosocial), and who they can call for further information/support
2. **at follow-up:** additional information on how to manage any ongoing symptoms, when to initiate further treatment, warnings signs and who to call for further support/information
3. **during treatment:** specific symptoms and how to manage them, progress on treatment, key milestones of treatment, process for determining degree of progress

Patients have indicated that they find the wealth of information that exists overwhelming and would appreciate some clear concise information that can get them started in their understanding of concussion. Information should be easily to follow (physically, cognitively and visually), clearly explained, and if web-based, should not require many "clicks" through websites to avoid provoking symptoms. Patients have expressed a need to access information in multiple formats, such as video, auditory, and visual (print and electronic).

The information provided here is to address patients' needs by presenting the most important information that patients should receive, with a link to a curated list of key resources if they wish

to review further information. It is hoped that what follows could be used as a standard educational tool used in concert with other resources that exist (such as local supports). This information will be provided on concussionsontario.org and will also be available via video and paper handouts. References are contained within hyperlinks to minimize visual noise that may aggravate post-concussive symptoms.

About Concussion

What is a concussion?

Concussion is a brain injury that can be caused by a sudden acceleration of the head and/or neck resulting from a blow to the head or contact to the body. You do not need to lose consciousness to have sustained a concussion. Concussions can occur from many different activities including falls, motor vehicle collisions, sports, assault or being struck by an object. Symptoms can appear immediately or in some cases, hours to days following the initial injury.

When to be concerned and what to do:

“In rare cases, a dangerous blood clot may form on the brain in a person with a concussion and crowd the brain against the skull. Contact your health care professional or emergency department right away if you have any of the following danger signs after a bump, blow, or jolt to the head or body:” – [Center for Disease Control \(CDC\)](http://www.cdc.gov)

Danger signs in adults:

- A constant severe headache that gets worse
- Sudden severe vomiting or nausea
- Fainting or blacking out or if people can't wake you up
- Very drowsy
- Seizures or convulsions
- Cannot recognize people or places
- Increasing confusion, restlessness, or agitation
- Weakness, numbness or decreased coordination
- Slurred speech, trouble talking, or not making sense
- Fluid or bleeding from the ear or nose
- Unusual or strange behaviour
- Have one pupil larger than the other (brainline.org)

Danger signs in children:

- Any of the adult danger signs
- Will not stop crying and cannot be consoled
- Will not nurse or eat

The above information was abstracted from:

- [The Centre for Disease Control \(CDC\)](http://www.cdc.gov)
- [Sunnybrook Health Sciences Centre](http://www.sunnybrook.ca)

Typical pattern of recovery and factors that may affect recovery:

After a concussion, some people experience one symptom and others experience many. These symptoms may start right away, or a few days after the injury and can last for days, weeks, or longer. There are different types of symptoms that you can experience: Problems with thinking, headaches and other physical problems, and changes in emotions and sleep patterns. Most people who experience a concussion make a full recovery, and the symptoms only last 1 to 4 weeks.

Here are some examples of the symptoms a person might experience after a concussion:

- **Thinking:** fogginess and difficulty thinking clearly, feeling slowed down, difficulty remembering and concentrating, difficulty finding words
- **Physical:** headaches, nausea, dizziness, sensitive to light and noise, blurred or double vision, balance problems, ringing in ears, low energy
- **Emotional/Mood:** irritable, nervous/anxious, frustration, anger sadness
- **Sleep:** sleeping more or less than usual, difficulty falling and staying asleep

Recovery may take longer for individuals who:

- are older adults, and teens
- are female
- return to work, school, or exercise too quickly
- have had a concussion in the past
- have a history of migraine, depression or anxiety
- have a history of sleep difficulties
- are showing signs of vestibular and/or visual abnormalities (e.g., blurred vision, dizziness, difficulty focusing, motion sensitivity)

Just because it takes longer does not mean that you will not recover.

Concussion Do's and Don'ts: the first few days



The individual with concussion SHOULD:

✓ **See a doctor or nurse practitioner for help**

✓ **The first 24–48 hours – physical AND mental rest!**

Sleep at night, rest during the day.

✓ **Take it slowly returning to daily activities and sport**

Talk with your doctor or nurse practitioner about when you can return to work or school.

Talk with your doctor or nurse practitioner about a return to play protocol.

Talk with your employer or teacher about returning bit by bit.

As you start to feel better, it's important to get back to doing your normal activities as you can tolerate them. Start by doing just a little, and if you feel okay, then you can try to do a bit more. Take lots of rests and give yourself extra time.

✓ **Conserve your energy**

After a concussion, your brain has less energy to spare than it normally does. It is important to save physical and mental energy so that your brain can fully recover.

If symptoms return or you get new ones as you become more active, this is a sign that you are pushing yourself too hard.

✓ **Take care of basic needs**

Eating well can improve your mood, sleep and mental focus. Try to eat regular meals and snacks.

Stay away from stimulants such as coffee, caffeine, pop and energy drinks. Stimulants can put added stress on your brain.

Keep a regular sleep schedule. Talk to your doctor, nurse practitioner or health care provider if you have trouble getting a good night's sleep.

✓ **Manage stress**

Stress, emotional upset and worry can make symptoms feel worse and get in the way of doing things that will help you get better. Try to do things that help you relax and feel calm.

Talk about your worries with someone you trust—like your doctor, nurse practitioner, health care provider, family member, or friend – this can help you feel better. Let others know how they can help you.



The individual with concussion should NOT (until or unless your doctor or nurse practitioner says it's okay):

✗ **Be woken up every hour**

Increased sleep need is normal and necessary in the acute stage.

✗ **Be put in a dark room; avoiding all activity**

In the past, patients were told to have absolute rest and it is now accepted that light and cautious activity can be part of the healing process. Respect your brain and your body and have a conversation with your doctor or nurse practitioner about what this can look like for you.

✗ **Exercise/play sports, heavy household chores, or any activities that could lead to another concussion or cause symptoms to worsen**

Some people who have had repeated concussions may have serious long-term problems, including chronic difficulty with concentration, memory, headache, and sometimes physical skills (e.g., balance and coordination).

✗ **Return to full study or work**

Sometimes the demands of work/school can trigger symptoms following a concussion. You may need to take some time off work/school to rest and recover; or reduce your responsibilities for a short period of time.

✗ **Use electronic devices (e.g., looking at computer, phone, tablet, and TV screens)**

✗ **Drive, ride a bike, or work with machinery or ladders**

Reaction time, vision, and thinking may be impaired by a concussion. Do not drive a car until your doctor or nurse practitioner advises you it is okay.

✗ **Use non-prescription drugs, including alcohol**

Using non-prescription drugs (including alcohol) may add to concussion symptoms and increase recovery time. Only take medications your doctor has approved.

The above information was abstracted from:
[The Center for Disease Control](#)
[Hamilton Health Sciences](#)
[Holland Bloorview Kids Rehabilitation Hospital](#)
[St Joseph's Health Care London](#)
[Sunnybrook Health Sciences Centre](#)

What if I'm not getting better?

In the first weeks

It is difficult for patients who have had a concussion to know when they will feel better and the answer is not simple. For most people, symptoms improve in the first weeks. Some people panic if they are not better in a few days, and this is not helpful for them. You need to give your brain a chance to recover.

In the first months

For others, it may take longer for symptoms to improve. Research has shown over the past fifteen years that the majority of people recover by three months, and this is when persistent symptoms have traditionally been formally identified in the remaining smaller percentage of people who take longer to recover.

More recently with growing research and clinical knowledge, we can address concussion symptoms earlier and find ways to reduce the impact of persistent symptoms. Recent research has shown that about 30% of children and youth can still be symptomatic at one month³².

When to see a specialist

Not everyone needs to see a specialist or be seen by an interdisciplinary concussion clinic. It's a matter of giving your brain a chance and the time to heal, but not waiting too long to get the appropriate care if you are not starting to improve. That's why we have developed the concussion pathway. It's important that you begin with your primary care provider as the lead on your concussion management. This can be a family physician, pediatrician, sports medicine physician or nurse practitioner.

If symptoms are not starting to improve, your primary care provider can start to work with other providers who may have specific expertise in treating problem symptoms. At this point, you may be referred to a concussion clinic or if you are in a more remote area, a network of providers who need to work together with your primary care provider to manage your symptoms.

General information about recovery

It is important to get the right care, from the right provider at the right time.

It is an unfortunate fact that some concussion clinics have long wait lists. Work is being done at a number of levels to improve these wait times. We would also caution you not to jump at the first available health provider either. Just because someone can see you right away does not mean they are the right provider for you. It is important if you are not getting better, that you are seen by a group of healthcare professionals who all have different expertise and scope of practice to help you with your symptoms.

We have prepared information for patients to ask their clinic or group of providers, so they can judge whether they are getting the right care from the right provider.

Please try to be patient and look after your whole self. It's a complicated balance if your symptoms are persistent (longer than a month), but with the right group of providers they should be able to help you. We hope that this information is helpful to you.

If, after a few months you are not improving, consider seeking care from another provider with additional experience in the particular area of concern (e.g., sleep difficulties, persisting headaches, ongoing difficulties returning to activities).

The above information was abstracted from:

[The CDC](#)

[Holland Bloorview Kids Rehabilitation Hospital](#)

[Sunnybrook Health Sciences Centre](#)

Supports available at a clinic

Concussion **Clinics should have:**

At least 3 different types of regulated providers (disciplines) performing 5 key functions:

1. Diagnosis/medical clearance decisions:

- Medical doctor (Physician, Neurologist or Psychiatrist)
- Nurse practitioner
- Neuropsychologist (diagnosis)

2. Physical treatment:

- Physiotherapist
- Vestibular therapist
- Chiropractor
- Sleep medicine physician

3. Functional, cognitive and emotional support:

- Occupational therapist
- Social worker
- Neuropsychologist/psychologist
- Speech-language pathologist

4. Coordination can be provided by any or all providers in the clinic, functions include:

- Managing clinic appointments and external referrals
- Liaison with school, work, play settings
- Ensuring communication back to the primary care provider

5. Education can be provided by any or all providers in the clinic:

- This is the foundational work of the clinic

Clinics often have:	Clinics may have:
<ul style="list-style-type: none"> - Medical Doctor <ul style="list-style-type: none"> o Sport medicine physician o Psychiatrist o Access to a psychiatrist o Pediatrician - Physiotherapist - Occupational Therapist - Social worker - Speech-language pathologist - Neuropsychologists 	<ul style="list-style-type: none"> - Nurse practitioner - Clinical Psychologist - Neurologist - Chiropractor - Optometrist - Nutritionist - Therapeutic recreationist - Nurse - Vestibular therapist - Neurosurgeon

Information that Patients should ask Clinics or Networks of providers

Questions have been prepared to guide patients or prospective patients on what to ask post-concussion care providers. Also provided for patients are guiding points for evaluating their health care professional's answers to the questions.

Note that just because a clinic calls itself a post-concussion clinic does not mean that it meets the standards. It is up to patients and families to ask questions about the care and the care providers available in any clinic to ensure that they are getting qualified care.

You should ask your health care professional the following questions to determine if the treatment environment is right for you.

Experience

- What experience does the clinic have in concussion and traumatic brain injury?
- How many patients with concussion are seen at your clinic?
- Is there a particular population of patients with concussions that your clinic focuses on? (age or cause of injury)
- What is the clinic's experience working with the school system? If needed do you speak with the school and get involved in the return to school plan?

Services offered

- Will a medical professional be involved in my care?
- Who makes the decisions about my treatment?
- What professionals are involved in your clinic?
- Do the professionals here work as a team to support my care? (Do you work as part of a team?)
- What is the expected wait time?
- What services and treatments are offered at your clinic?
- What services, treatments at your clinic are covered by OHIP? By Group Benefits? By other insurance? By myself?
- If I am not able to pay for all the services you offer, what are my other options?
- Which healthcare professional will clear me to return to work/school/sports?
- If I require services or treatments outside of your clinic, will you continue to see me?

If you have been seen at the clinic for a considerable amount of time, you might want to ask these questions.

- If I have problems from my concussion that are outside of what your clinic offers, do you know who to refer me to?

- Will your clinic continue to see me if I am referred to someone else?
- What happens while I am waiting for the referral appointment?

Notes on types of answers to look for

A healthcare provider should be able to easily and clearly provide the needed answers to each of the questions above.

Some points to keep in mind when evaluating the answers that are provided:

1. It is important that as a patient you have access, either directly or indirectly, to providers who are trained and experienced in treating patients with concussion. There should be at least one provider who:
 - a. has training and extensive experience working in concussion
 - b. can closely supervise and provide regular guidance to those providers who do not have extensive experience.
2. There is no one individual or discipline that can call themselves a “concussion expert.” There are usually several different providers needed to address persistent symptoms of concussion. [Persons can refer to themselves as concussion experts but should adhere to the specific criteria that exist for the use of this term.](#)²⁰

Quality, evidenced-based concussion care is best described as:

- a) closely involving a physician
 - b) interdisciplinary (more than one profession) model of care that addresses
 - cognition function
 - physical function
 - emotional function
3. A medical professional should be involved in your care. This may be:
 - a. your own family physician (GP) or nurse practitioner who is consulted by other healthcare professionals involved in your care, or
 - b. a separate physician or nurse practitioner who is directly involved in the Concussion Clinic.
 4. There should be collaboration and consultation among **all** the healthcare providers involved in your care. For you to receive the most efficient and effective treatment possible, it is important that healthcare providers:
 - a. create a web of linked services,
 - b. maintain discussion on your challenges,
 - c. collaborate on treatment pacing and share progress information

- d. provide consultation to the physician or nurse practitioner who will provide clearance for you to return to work, school and play.
5. A clinic should work with you to help you get the healthcare that you can afford and that is appropriate for you. It is the responsibility of the providers to indicate both the costs of the services not covered by OHIP and ways of obtaining more affordable services; most professional standards that guide the practice of healthcare professionals mandate this.

Supports available beyond the clinic or network of providers:

<p>Brain injury associations/organizations</p> <ul style="list-style-type: none"> - Ontario Brain Injury Association (OBIA) <ul style="list-style-type: none"> o provides support, education and advocacy. o list of 21 affiliated community brain injury associations o Concussion Handbooks o Directory of ABI services o Support line - Brain Streams 	<p>Education</p> <ul style="list-style-type: none"> - Holland Bloorview Concussion Handbook - St. Joseph Health Care (London) <ul style="list-style-type: none"> o ABI 101 series o Archived Webcasts of the Survivor & Family Education Series o Pacing Points Program (video) - Sunnybrook Mild Traumatic Brain Injury / Concussion Handbook <ul style="list-style-type: none"> o 	<p>Support groups</p> <ul style="list-style-type: none"> - OBIA Peer Support Program - St. Joseph Health Care (London) Psychosocial Support Group - Holland Bloorview Peer Support Program
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Reliable websites:

You are best advised to access these through ConcussionsOntario.org because these are hyperlinked.

Here are some sites that offer concussion education/information:

- [Holland Bloorview Kids Rehabilitation Hospital](#)
- [Sunnybrook Health Sciences Centre](#)
- [Toronto ABI network](#)
- <http://www.cattonline.com/>
- [Parachute](#)

Here are some educational concussion videos:

- Dr. Mike Evans – [Concussion management and return to learn](#)

- U of T ABI Research – [Concussion in the Workplace](#)
- St Joseph’s Health Care London – [Patient Stories](#)

Here are some printable resources on concussion:

- [ONF Guidelines for Concussion/mTBI & Persistent Symptoms, 2nd ed.](#)
- [ONF Guidelines Diagnosing and Managing Pediatric Concussion](#)
- [St Joseph’s Health Care London Patient Information Handout](#)
- Can Child
 - o [Return to activity guidelines for children and youth](#)
 - o [Return to school guidelines for children and youth](#)
 - o [Activity Suggestions for Recovery Steps After Concussion](#)
- [Parachute, Concussion Guidelines for the Athlete](#)

Here are some websites with information about prevention:

- [Parachute](#)
- [Centers for Disease Control and Prevention](#)

5. Information Clinics/Networks Should Be Able to Provide to Patients

Patients have expressed the need for clinics or networks of providers to answer questions about the services offered, clinical experience with concussion care, and general and specific information about treatment course.

Questions clinics should be prepared to answer for patients and prospective patients

Answers can be provided using a variety of modalities (website, pamphlet, over the telephone or in-person).

Experience

- What experience does the clinic have in concussion and traumatic brain injury?
- How many patients with concussion are seen at your clinic?
- Is there a particular population that your clinic focuses on? (age or cause of injury)
- What is the clinic's experience working with the school system? If needed do you speak with the school and get involved in the return to school plan?

Services offered

- Will a medical professional be involved in my care?
- Who makes the decisions about treatment?
- What professionals are involved in your clinic?
- Do the professionals here work as a team to support care? (Do you work as part of a team?)
- What is the expected wait time?
- What services and treatments are offered at your clinic?
- What services, treatments at your clinic are covered by OHIP? By Group Benefits? By other insurance? By myself?
- If patients are not able to pay for all the services offered, what other options are available to them?
- Which healthcare professional will clear patients to return to work/school/sports?
- If patients require services or treatments outside of your clinic will you continue to see them?

If patients have been seen at the clinic for a considerable amount of time, you might want to provide answers to these questions.

- If the symptoms a patient is experiencing are outside of what your clinic offers where else can patients be referred?
- Will your clinic continue to see patients if they are referred to someone else?
- What should happen while patients are waiting for a referral appointment?

6. Core Services/Functions

Core services/functions should be available in a concussion clinic or within a network of post-concussion care providers. Current evidence suggests that post-concussion care requires access to or capacity to integrate interdisciplinary care based on the constellation of symptom presentation (physical, affect, and cognition).

Currently in Ontario post-concussion services are provided within different funding and service models, including research-based clinics, sites with a specific mandate, or clinics involving a mix of publicly- and privately-funded services within a single structure or network of providers with additional capacity for external referrals. There is no known entirely publically-funded concussion clinic that provides the full breadth of interdisciplinary service.

This landscape of variable models of funding has been accounted for in this model of service provision.

The core functions required to manage post-concussion symptoms include:

- provision of education;
- diagnosis and access to medical services;
- physical treatment options;
- cognitive evaluation and treatment;
- evaluation and treatment of emotional conditions;
- functional integration; and
- co-ordination of care.

The diagram below shows how these functions can be grouped together and provides some examples of symptoms that can be treated within each category. Core **functions** of concussion clinics are defined rather than stipulating specific regulated healthcare disciplines that must be present.

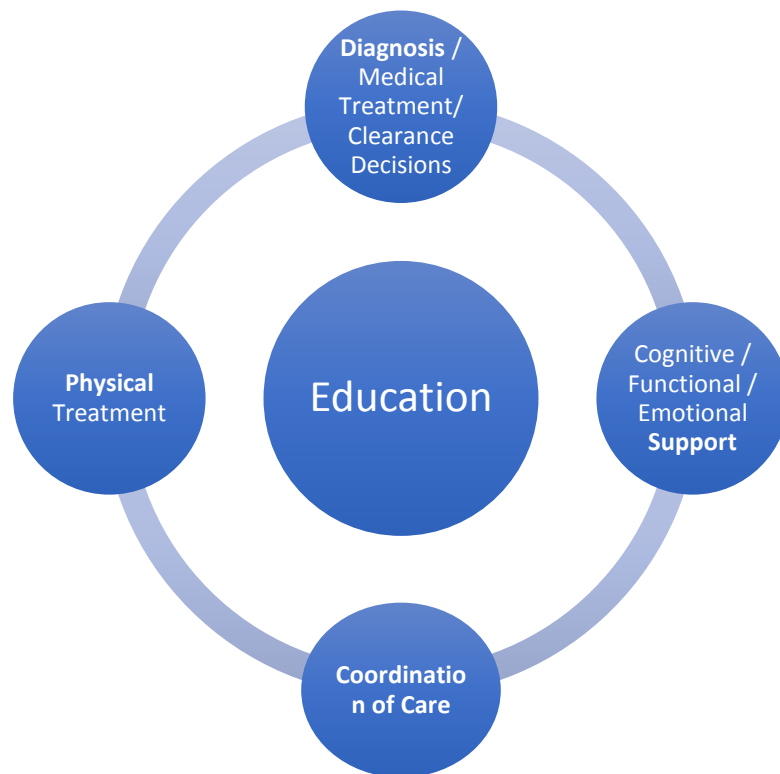
Key Messages

- Core **functions** of Concussion Clinics are defined rather than stipulating specific regulated healthcare disciplines that must be present.
- Each function can be performed by more than one regulated health care provider health operating within their scopes of practice. Each regulated healthcare provider brings their own unique contribution so more than one provider may be necessary within each core function area.

Concussion Clinic/Services: Core Functions and Management

Every clinic/network of providers **must** be able to provide 5 key functions that would involve at least three (3) different healthcare provider disciplines. *Note that any of these functions must be performed by **only** those professionals regulated to perform them within their scopes of practice. See other sections for details on the eligible healthcare professionals.*

1. **Diagnosis/Medical Treatment and Clearance Decisions**
2. **Physical Treatment:** Treatment of headache, balance problems, vision, nausea, musculoskeletal problems, sleep, etc.
3. **Cognitive, Functional and Emotional Support:** Return to living support (school, work, play, emotional, and social communication), therapy (cognitive-communication, psychological, psychiatric) and management strategies (pacing, compensatory).
4. **Coordination of Care:** Can be done by any of the above or another person (clinical or administrative); managing clinic appointments and external referrals, liaison with school/work/play settings and ensuring communication back to Family Physician.
5. **Education** is at the foundation of clinic functions and should be provided at various points throughout service delivery to patients and family. The content should address details of the concussive injury: symptoms, course of recovery, current evidence based management strategies. Some repetition of content is expected.



7. Referral Indicators

In an ideal world it would be desirable to have numerous different healthcare professionals working in one setting who can address all potential persistent symptoms. However, this may not be a good use of resources and expertise. The variation of patient needs and symptoms sometimes call for a referral to healthcare professionals who are external to a clinic or network providing post-concussion care.

It is incumbent upon all healthcare professionals to understand and work within their regulated scopes of practice and individual level of competency, which **requires** that referrals be made when symptoms are outside of a healthcare professional's scope of practice or level of competency.

Referral indicators were developed to guide healthcare providers to address specific patient symptoms by ensuring appropriate referrals to other regulated healthcare professionals. The intention is to get patients the appropriate and required care within a timely manner.

Key Messages

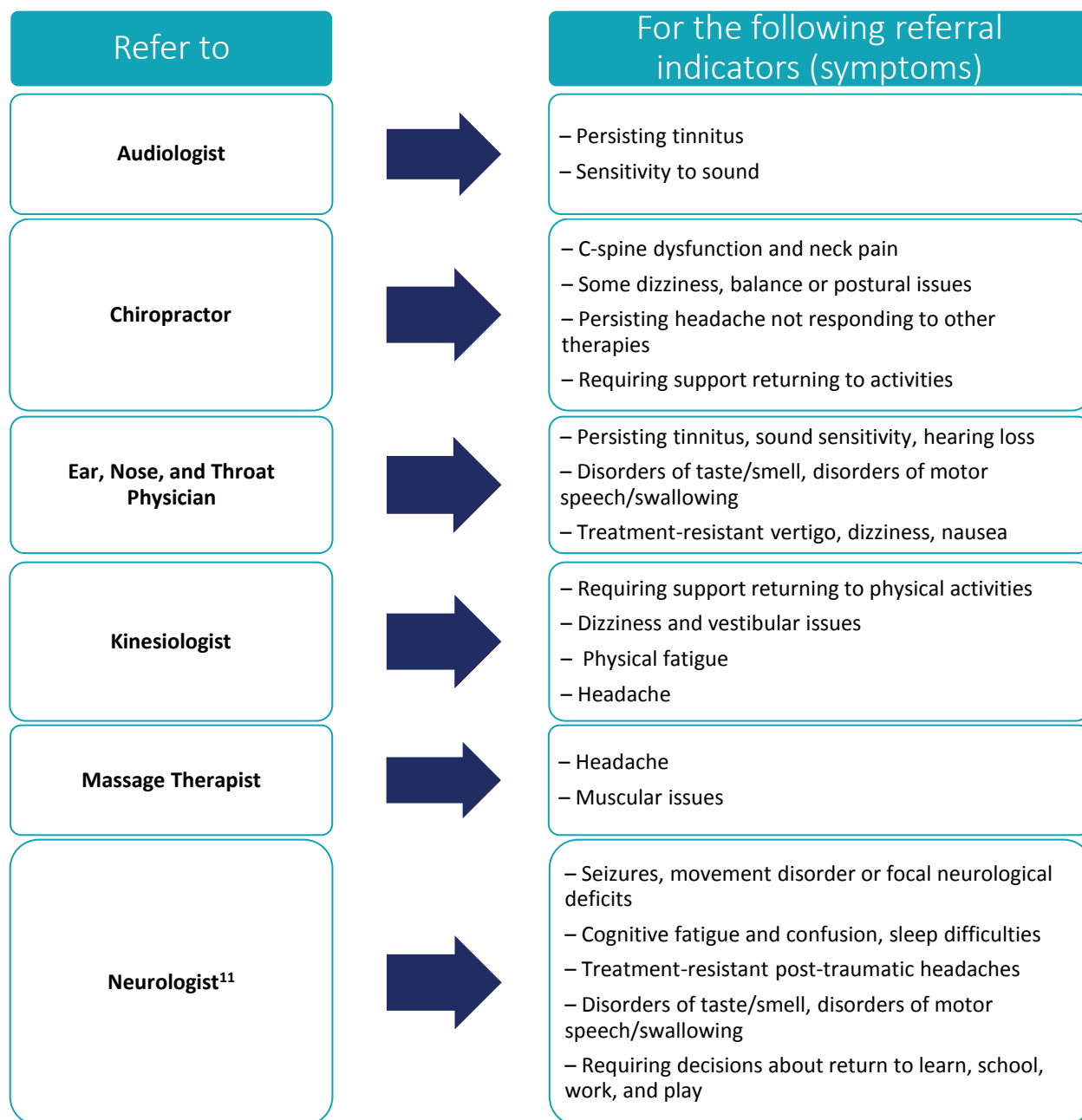
- Concussion management is symptom-based
- Referral indicators were developed to guide healthcare providers to facilitate appropriate referrals
- Healthcare providers must be mindful to always work within their scope of practice and their level of competence
- Focus should be on getting patients the right care in a timely manner

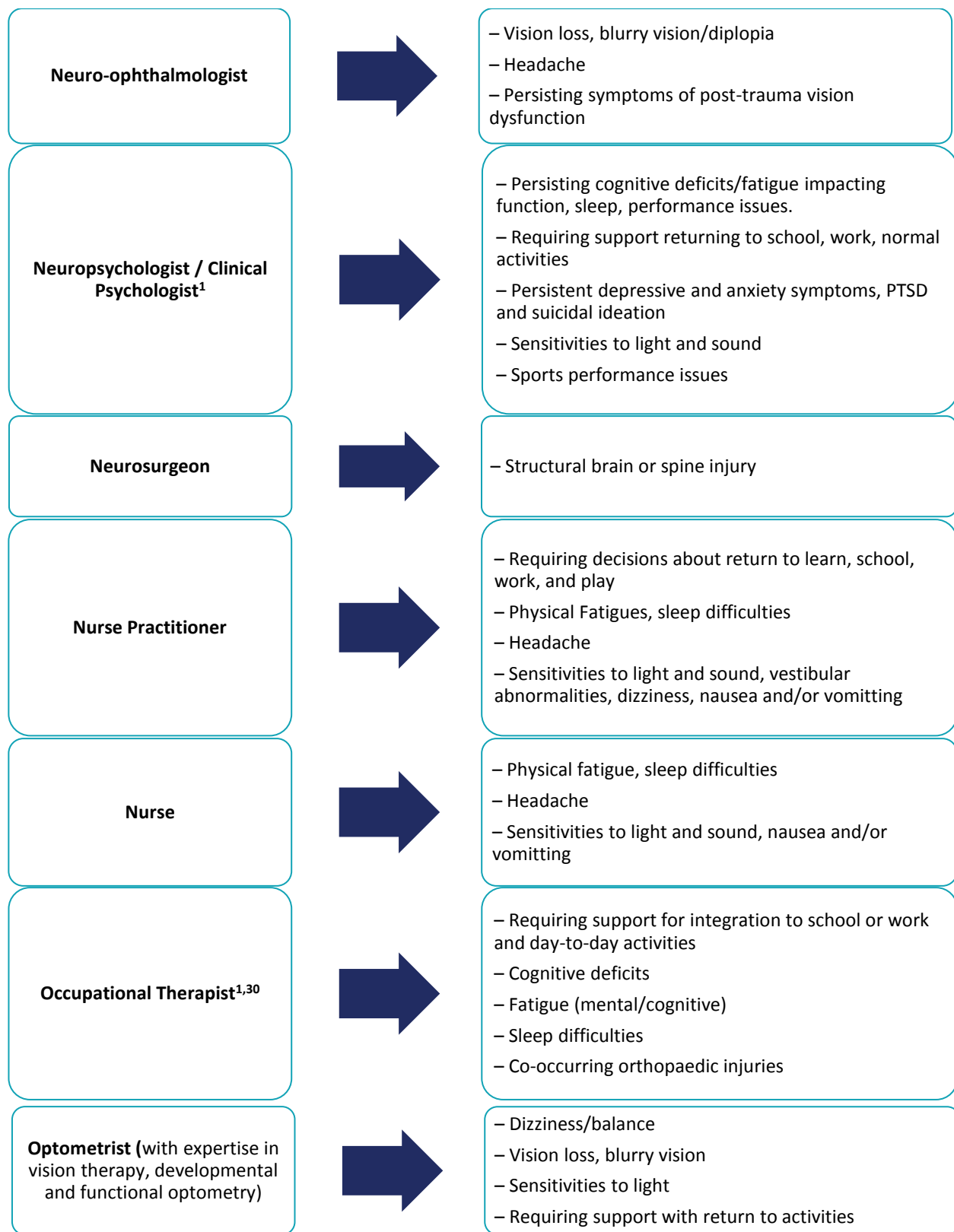
Information that is Important to Include in a Referral to Health Care Providers

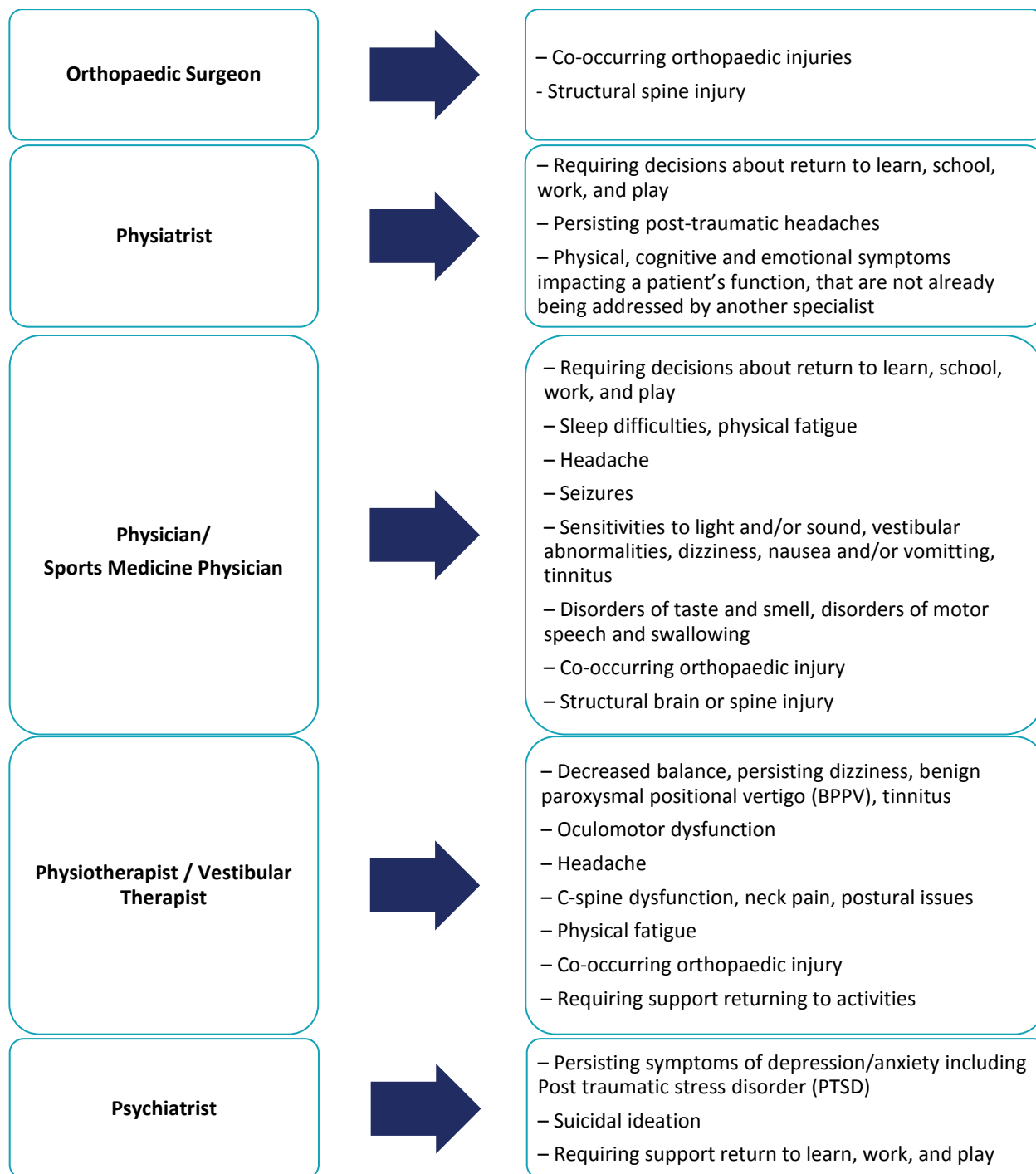
The following information is considered critical to convey in a referral as it improves the quality/appropriateness of the referral (including risk factors) which can thus improve triage.

- Age
- Date of injury
- Specific reason for referral
- Presence of risk factors:
 - high score on either the Post-Concussion Symptom Scale (PCSS) >40, or the Rivermead Post-Concussion Questionnaire
 - female gender
 - previous concussion history
 - migraines/headaches
 - history of neurological conditions or complex medical issues/conditions
 - premorbid history of mental health issues, learning disabilities, behavioural issues, attentional problems
 - current symptoms consistent with depression/anxiety or other mental health conditions
 - signs/symptoms of vestibular abnormalities
 - signs/symptoms of visual abnormalities
 - signs/symptoms of cognitive difficulties
 - changes in sleep patterns, difficulty sleeping
 - increased symptoms with return to school, work, or exercise
 - returning to a contact sport activity

It is incumbent on the practitioner making the referral to consider the underlying etiology of the symptom when making the referral, in order to choose the appropriate registered healthcare professional to refer to. For example, headache may be cervicogenic, tension, migraine or vestibular/ocular in origin, thus the referral would go to different practitioners depending on scope of practice.







Social Worker¹



- Need Education/support of family members
- Depression/anxiety
- Sleep difficulties
- Financial difficulties
- Difficulty with return to regular activity (fatigue, sleep, performance issues) and community integration

Speech Language Pathologist³⁰



- Cognitive communication deficits (word finding, word formulation, reading comprehension, processing)
- Requiring support for return to activity (social communication , school)
- Disorders of motor speech and swallowing

8. Concussion Clinical Practice Guidelines: Adult, Pediatric, Sport

[Guidelines for Concussion/MTBI and Persistent Symptoms](#)

[Guidelines for Diagnosing and Managing Pediatric Concussion](#)

[Consensus statement on concussion in sport — the 5th international conference on concussion in sport, Berlin. Published April 2017.](#)

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Appendix 1: Development Team and Other Experts

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Katie Muirhead, BA - Ontario Brain Injury Association
Dennis Radman, HBSc, RRP, CBIST, Patient/Family Expert - Brainworks
Richard Riopelle, MD, FRCPC, FCAHS - Ontario Neurotrauma Foundation
Irene Sullivan, (Hon)BA Dip.CS, Accessibility Services, University of Toronto
Deborah Tang, PhD, CPsych - Peel Halton Dufferin Acquired Brain Injury Services
Jessica Trier, MD, FRCPC - Providence Care Hospital
Catherine Varner, MSc, MD, CCFP (EM) - Provincial Leads for Emergency Medicine
Penny Welch-West, MCISc SLP (C), Reg CASLPO - Parkwood Institute, Acquired Brain Injury
Outpatient Services

Additional participants of the Summit on Concussion Standards

Andrew Baker, MD, FRCPC - St. Michael's Hospital
Sundeep Banwatt, MD, CCFP, MPH - Ontario College of Family Physicians
Kent Bassett-Spiers, BBA, DHA, CHE - Ontario Neurotrauma Foundation
Denyse Beaumont, PT, - Sports Medicine Trainers Choice, Inc
Neil Dilworth, CCFP (EM) (SEM), Dip. Sport Med, MSsCH HPTe - Sports Medicine, University of
Toronto and Emergency Medicine Georgetown Hospital
Andrea Doxey, BA - Ontario College of Family Physicians
Lisa Fischer, MD, FRCPC - Fowler Kennedy Sport Medicine Clinic
Sue Good, BSc - Ontario Telemedicine Network (OTN)
Kristian Goulet, MB, BCh, FRCPC - Pediatric Sports Medicine Clinic of Ottawa
Hannah Hakes, Patient/Family Expert - Western University
Terri Irwin, BSc, MN - Health Quality Ontario (HQO)
Eric Koelink, MD - Hamilton Health Sciences - David Braley Sport Medicine & Rehabilitation
Centre
Laura Langer, Toronto Rehabilitation - University Health Network
Elizabeth MacDonald, BPHE, MOT - Canadian Institute for Health Information
Doug Maynard, BSc, MBA - Canadian Association of Pediatric Health Care Centres
Christine McCool, MHSc, Reg CASLPO - TRAC Group - Concussion Rehabilitation Clinic
Cherisse McKay, PhD CPsych - SVA Concussion Clinic
Dave McKee, MD, FRCPC - Lakehead University Concussion Clinic
Michael O'Connor, MD, FRCPC, MMed - KOPI Sports Medicine Clinic
Cristina Saverino, BSc, MA Student - Hull-Ellis Concussion Clinic - Toronto Rehabilitation
Institute
Heather Shepherd, MScOT, Patient/Family Expert - Alberta Health Services
Sara Sommers, MSW - Thames Valley Children's Centre - Paediatric ABI Community Outreach
Program
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TBI Clinic
Elizabeth Theriault, PhD - Ontario Brain Institute
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Christopher Woollam, MD, Dip. Sports Med - The Sports Clinics (U of T Mississauga)

External Reviewers:

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Noah Silverberg, PhD, ABPP-CN – University of British Columbia

Kathryn Schneider, PT, PhD, DipManipPT – University of Calgary.

Phil Fait, Ph.D., AT(Cert) - Université de Québec à Trois Rivières

Appendix 2: Declared Conflicts of Interest

Of those declaring a conflict of interest,

- 50% provide fee for service clinical service for concussion
- 32% have a concussion focused business
- 55% are engaged in funded research (from external funding agencies) that might be seen as a conflict
- 18% are engaged in non-funded research (internal to their organization) that might be seen as a conflict

Due to the large number of persons involved in research, these are not listed here but are recognized that these conflicts may have played a role in the individuals' interests.

Specific conflicts declared other than for research included:

- Carol Di Salle: I am working collaboratively with St. Michael's Head Injury Clinic team regarding the Ontario Concussion Care Strategy and they are submitting grant proposals.
- John Crawford: I am a Chiropractor who provides fee for service concussion assessment and rehabilitation. Shift Concussion Management is involved in Baseline testing, post injury management, Concussion Management Training, data collection and research. Shift Concussion Network provides thousands of tests across Canada with varying prices depending on the level of testing requested. We have a business manager, CEO, and strategic partners in this area. We received financial support from a corporation for testing and research. We work closely with IMPACT and are working on two additional relationships that are not finalized at this time.
- Cameron Marshall: I am the founder and current president of Complete Concussion Management Inc. (CCMI), an organization that provides education to healthcare professionals on the assessment, diagnosis, and treatment of concussions. Partnered clinical facilities also conduct baseline testing for high-risk athletes and provide educational seminars to coaches, trainers, teachers, and other frontline personnel. Certain services are covered by OHIP, however much of the rehabilitation is carried out by therapists in a fee for service manner. I am also a chiropractor and provide fee for service concussion treatments, rehabilitation, and baseline testing.
- Shannon McGuire: I own my own company that provides a one-day Concussion Management Workshop for healthcare professionals, separate from my position at Parkwood Institute.
- Nick Reed: Our Concussion Centre at Holland Bloorview Kids Rehabilitation Hospital has a baseline testing / pre-injury program for children and youth. This service, as not an 'essential' service (as per OHIP), is fee for service. All funds are re-invested into a social enterprise model and used to support concussion research, education, and care at Holland Bloorview. We employ a Director of Business Development at Holland Bloorview. We receive support for research, education and clinical care from

private/corporate donors, stewarded through the Holland Bloorview Kids Rehabilitation Hospital Foundation.

- Dennis Radman: Brainworks charges a fee for service and has a formal business model to promote our concussion services.
- Michael Hutchison: As part of our interdisciplinary concussion care model at the David L. MacIntosh Sport Clinic, fees are charged to patients for appointments with healthcare professionals not covered by OHIP (i.e, therapists, neuropsychologist, kinesiologists). We also offer non-essential fee for service pre-season/baseline screening as part of our clinical research program. We have received support research and clinical care from private donors and organizations. Personally, I have received to act as a consultant for the NHLPA
- Irene Sullivan: T.H.I.N.C. Consultants - Business partner. Service conducts neuropsychological assessments for individuals with head injuries, MS, learning disabilities and also provides transition planning/accommodation planning for students entering post-secondary studies
- Tara Baldisera: At my medical clinic, I charge fee for service for services that are not covered by OHIP. A Chiropractic Clinical Science Specialist colleague in my clinic charges fee for service. We have received grant money through the Northern Ontario Academic Medicine Association for a varsity athlete interdisciplinary concussion management program. We have charged fees for pilot project baseline assessment of athletes.
- Diana Velikonja: At Hamilton Health Sciences, we charge fee for non-physician services and baseline testing.
- Drew Laskoski: At the Upper Canada Sports Medicine clinic, we charge a fee for baseline testing of athletes.
- Shannon Bauman: At Concussion North, physiotherapists and athletic therapists charge fee for service.
- Carolyn Glatt: At Concussion North, physiotherapists and athletic therapists charge fee for service.
- Michael Ellis: At the Pan Am Concussion Program, cervical physiotherapists charge a fee for service and all other services are covered by patient Manitoba Health coverage or are provided by specialists paid through provincial government funding. I serve as a fee-for-service private consultant for the Winnipeg Jets, Manitoba Moose, and Winnipeg Blue Bombers