

Specialized Spinal Cord Injury Rehabilitation

BACKGROUND:

As Ontario's health care system transitions to an integrated care model, Ontario Health Teams (OHTs) will be responsible for providing a full and coordinated continuum of care for all but the most specialized conditions and procedures, which will be delivered by existing specialized providers.

The provision of rehabilitation occurs at different points in the continuum of care and may require a general or a specialized approach depending on the patient population requiring treatment. The University of Toronto's Physical Medicine and Rehabilitation group alongside the GTA Rehab Network identified the following rehabilitation populations that require a specialized approach. These populations include acquired brain injury (ABI), amputee, burn, cardiovascular, complex trauma, oncology, pediatric, pulmonary, spinal cord injury and stroke. These specialized rehabilitation programs should continue to be provided regionally and/or provincially and be part of system-level planning and capacity building.

The need for specialized expertise and the lower volumes of patients for some populations may preclude the provision of rehabilitation close to home. However, rehabilitation for high volume populations (e.g., older adults with frailty, patients with progressive neurological conditions, musculoskeletal issues, or with injuries from minor trauma) should be provided as part of care that is close to home across all OHTs.

This document provides rehabilitative care best practice guidance for Ontario Health Teams to assist in determining when the expertise of a specially trained interprofessional team with a focused skill set is necessary to provide safe, effective and efficient care. It was developed by the GTA Rehab Network's Specialized Rehab Advisory Group and local rehabilitation expert working groups.

PURPOSE:

The purpose of this document is to provide a guide that:

- delineates what services and resources are required to provide specialized rehabilitation
- differentiates when specialized rehabilitation services are needed to support one of the ten rehabilitation populations (acquired brain injury, amputee, burn, cardiovascular, complex trauma, oncology, pediatric, pulmonary, spinal cord injury and stroke)

GUIDING PRINCIPLES:

There are a few guiding principles of specialized rehabilitation service provision that are common across all ten populations addressed in this document:

- Service is provided by a specially trained interprofessional team with a focused skill set. Rehabilitation professionals include audiologists, dietitians, kinesiologists, occupational therapists, physical medicine and rehabilitation specialists (physiatrists), physiotherapists, psychologists, rehabilitation nurses, respiratory therapists, social workers and speech-language pathologists, as well as other regulated health professionals.¹

¹ Rehabilitative Care Alliance. (Nov 2020). [Patient and System-Level Benefits of Rehabilitative Care A primer to support planning by OHTs and Ontario Health.](#)

Note: The Ontario Ministry of Health provides [additional information](#) on other regulated health providers.

- Expertise is demonstrated in programs that see higher volumes of patients. A critical mass of patients must be seen to maintain expertise and clinical efficiency and effectiveness.
 - Critical mass is a threshold for the volume of cases that must be seen by a rehabilitation program to maintain expertise.
- Service provision requires clinical coherence with other programs or services across the continuum of care.
 - Clinical coherence is a relationship between specialized rehabilitation program/service and a complementary service(s) across the continuum that support comprehensive integrated patient care. For example, inpatient ABI rehabilitation has clinical coherence with acute neuro/neurosurgery, outpatient ABI clinics and community care.
- Service provision requires specialized resources including extensive capital and/or operating resources.
- Specialized rehabilitation programs should be funded equitably across the province to ensure there is sufficient capacity to meet evidence-based requirements for rehabilitative care.

HOW TO USE THIS RESOURCE:

The tables that follow provide a description of what specialized rehabilitation provides for the population (Table A) and a description of the patient profile to facilitate determining the optimal rehabilitation sector/location (Table B). This resource will be used for the following rehabilitation populations:

- Acquired brain injury (ABI)
- Amputee
- Burn
- Cardiovascular
- Complex trauma
- Oncology
- Pediatric
- Pulmonary
- Spinal Cord Injury (SCI)
- Stroke

To find specialized rehabilitation programs, see [Rehab Finder](#).

KEY ASPECTS OF SPECIALIZED REHABILITATION PROGRAMS FOR PATIENTS FOLLOWING SPINAL CORD INJURY (SCI)

Table A

The following section describes four guiding principles for specialized rehabilitation programs. In order to be considered a specialized rehabilitation program, all aspects of these principles need to be in place and should not be considered in isolation.

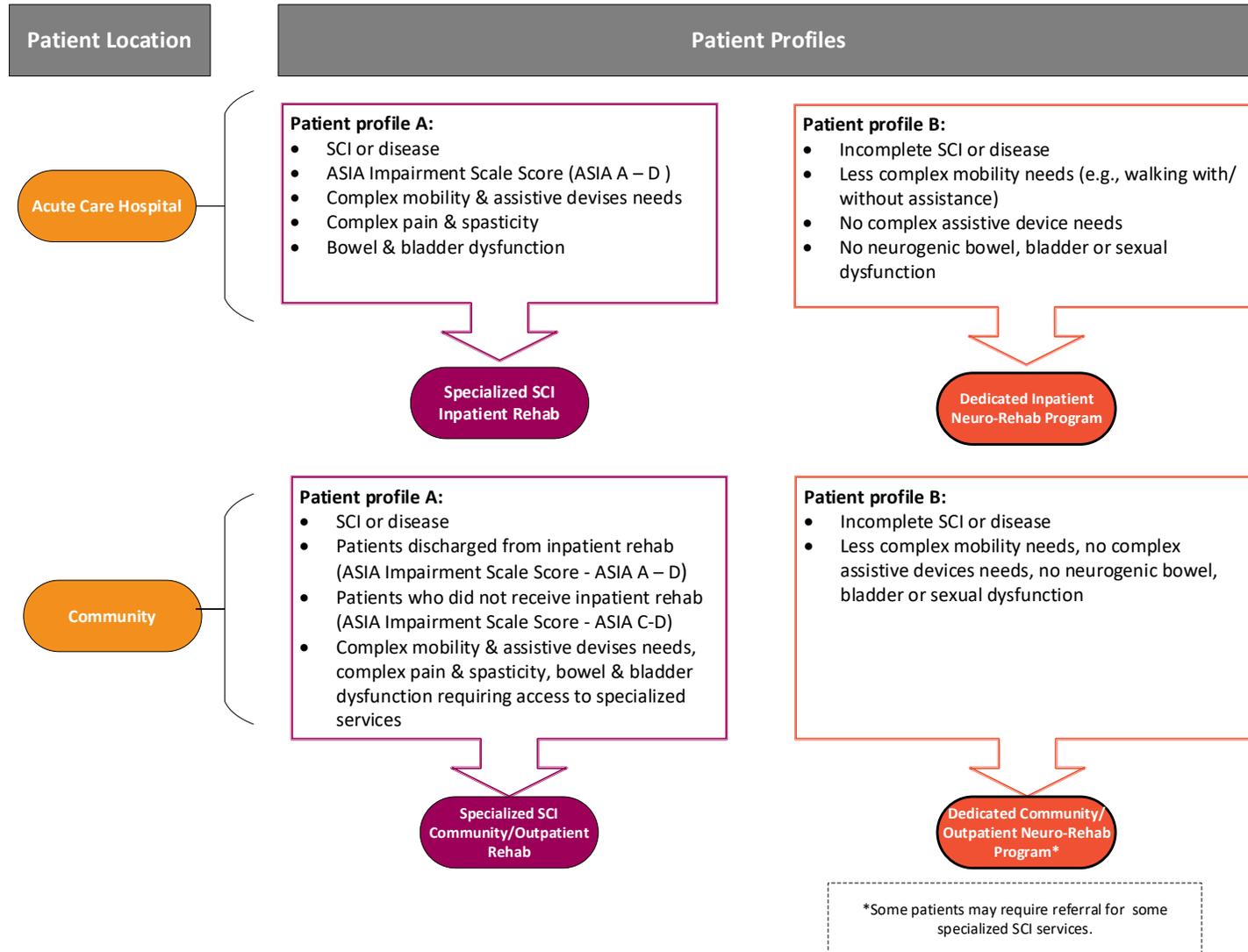
Unless otherwise stated, these principles apply to dedicated SCI Rehabilitation Programs and dedicated Neuro-Rehabilitation Programs that see patients with SCI as defined in the patient profile sections below.

Guiding Principles for Specialized Services	REHABILITATION PROGRAM: SCI REHABILITATION
<p>Requires team expertise and competency</p>	<ul style="list-style-type: none"> • Accredited program with adequate staffing levels, SCI-specific experience, training and expertise in assessing and managing complex needs of patients with traumatic/non-traumatic SCI, concomitant injuries and co-morbidities, prevention and management of long term secondary complications. • Interprofessional team provides SCI rehabilitation of sufficient intensity tailored to the patient's goals, impairment and abilities while providing and evaluating patient family education, goal attainment and disability adjustment. • Established protocols for spasticity, and neuropathic pain • <u>Dedicated SCI Program only</u>: Established protocols for weaning non-invasive ventilation, LVA/cough assist, pressure injury prevention and management, AD, OH, VTE prophylaxis, bone health, neurogenic bowel/bladder, neurologic recovery or decline.
<p>Provides services to a critical mass</p>	<ul style="list-style-type: none"> • Expertise of the team is demonstrated in programs that see higher volumes of patients (n≥40/year) and are led by clinicians with specialty training who use data and reflective practice to inform service delivery. • To be considered experts, rehabilitation clinicians should spend at least 50% of their time over the course of a year with patients with SCI. As such, it is suggested that they carry a caseload of these patients on a regular basis to develop/maintain clinical skills to address physical and psychosocial problems associated with spinal cord injury including mobility, bowel and bladder function, sexuality, skin integrity, cardiovascular status, respiratory condition and/or any other impairments, as well as prescription of specialized equipment and education/referral to funding programs/resources to support SCI needs.

Guiding Principles for Specialized Services	REHABILITATION PROGRAM: SCI REHABILITATION	
	ENT = Ears nose throat = otolaryngologist OH= Orthostatic Hypotension PMR = Physical Medicine and Rehabilitation= Physiatrist PT= Physiotherapist RecT= Recreational Therapist RT= Respiratory Therapist SLP= Speech Language Pathologist VTE= Venous thromboembolism	LVA= Lung volume augmentation OT = Occupational Therapist RD= Registered Dietitian RN= Registered Nurse SCI= Spinal Cord Injury SW = Social Worker
Services require specialized resources	<p><u>Dedicated SCI Program only:</u></p> <ul style="list-style-type: none"> • Neuro Urology clinics - routine diagnostics (intravesical botulinum toxin) • Respiratory care • Sexual health and fertility services • New technologies to advance treatment • Skin and wound clinic • Bone health clinic • SCI patient and family education resources including classes and written materials • May have access to the following in collaboration with surgical programs: <ul style="list-style-type: none"> ○ Surgical pressure injury flap program ○ Peripheral nerve transplant and tendon transfer rehabilitation ○ Intrathecal Baclofen Pump Program <p><u>Dedicated SCI and Neuro-rehabilitation Programs:</u></p> <ul style="list-style-type: none"> • Spinal Cord Injury Ontario (SCIO) partnership for peer support and vocational rehabilitation • SCI patient and family education written materials 	

DETERMINING THE OPTIMAL SPECIALIZED REHABILITATION LOCATION BASED ON PATIENT PROFILE: SPINAL CORD INJURY

Overview - Spinal Cord Injury Rehabilitation (see Table B for details)



PATIENT PROFILE FOR THOSE REQUIRING SPECIALIZED SPINAL CORD INJURY REHABILITATION

Table B

The following section describes the patient profile for those who require specialized rehabilitation. It is not meant to reflect comprehensive admission criteria.

To achieve optimal functional outcomes, SCI rehabilitation requires a coordinated and collaborative interprofessional team approach that should be holistic and person-centred addressing the specific needs of the patient. Patients and families are viewed as partners in service delivery and the interprofessional team works in collaboration with them to deliver care.

LOCATION OF REHABILITATION	PATIENT PROFILE: SCI REHABILITATION
Inpatient Rehabilitation	<p>Patients who have sustained a spinal cord injury require specialized rehabilitation.² Earlier admission to specialized, interdisciplinary SCI care is associated with reduced length of total hospital stay and greater and faster rehabilitation gains with fewer medical secondary complications.^{3 4}</p> <p>Depending on the severity of the injury and/or the presence of associated sequelae or co-morbidities, a patient should be seen in either a dedicated spinal cord injury program or in a neuro-rehabilitation program that has the clinical expertise based on seeing ≥ 40 cases per year. The differentiating criteria for each of these patient profiles is described below.</p>

² See the Patient Profile sections for criteria that differentiate between patients who require inpatient rehabilitation and outpatient rehabilitation.

³ Harnett A., Bateman A., McIntyre A., Parikh R., Middleton J., Arora M., Wolfe D., & Mehta S. (2020). [Spinal Cord Injury Rehabilitation Practices](#). In Eng J.J., Teasell R.W., Miller W.C., Wolfe D.L., Townson A.F., Hsieh J.T.C, Noonan V., Mehta S., McIntyre A, Queree M., editors. Spinal Cord Injury Rehabilitation Evidence. Version 7.0: 1-100.

⁴ Harnett et al. "In contrast to a specialized SCI rehabilitation program, general rehabilitation programs are designed for individuals who have a medically stable disability, without additional active medical problems that could affect participation in therapies, with identifiable rehabilitation goals and a high potential to achieve those goals towards upgrading or maintenance of independence in the home and community... A general program of rehabilitation may not be able to provide acute medical services and diagnostics, especially for complex medical conditions that involve multiple body systems such as SCI with or without impaired cognition."

LOCATION OF REHABILITATION	PATIENT PROFILE: SCI REHABILITATION
	<p>Dedicated SCI Rehabilitation Program - Patient Profile:</p> <ul style="list-style-type: none"> • Patients have a primary diagnosis of spinal cord injury or disease (traumatic and non-traumatic) and are medically and surgically stable • Patients with any ASIA Impairment Scale Score (ASIA A – D)⁵ who may also have complex mobility and assistive device needs (including specialized seating), complex pain and spasticity (e.g., flexor withdrawal), and bowel and bladder dysfunction. • These patients require specialized SCI rehabilitation that can address all aspects of spinal cord injury (complex psychosocial, physical, bowel and bladder, sexuality, complex pain, community reintegration, and patient safety) to allow the SCI client to reach maximum potential from an emotional, physical and vocational perspective. • These patients also require access to specialized programs including community integration, sport and leisure including public transportation training, patient apartment, and access to accessible exercise equipment • Patients have access to SCI patient education and community services such as Spinal Cord Injury Ontario (SCIO). <p>Dedicated Neuro-rehabilitation Program – Patient Profile:</p> <ul style="list-style-type: none"> • These are patients with an incomplete SCI who have less complex mobility deficits (e.g., already walking with or without assistance) and no complex assistive device needs. • No neurogenic bowel, bladder or sexual dysfunction as part of the patient’s impairment • They are medically and surgically stable. <p>Other considerations:</p> <ul style="list-style-type: none"> • There is a population of patients who do not have spinal cord injury or disease, but meet all the other complex needs of a specialized SCI or neuro-rehabilitation program. This group of patients has chronic but not progressive disease and are not classified under the ISNCSCI (A-D classification system). They have monoplegia, paraplegia or tetraplegia as a result of severe peripheral nerve disease or injury: Guillain-Barré syndrome (GBS), chronic inflammatory demyelinating polyneuropathy (CIDP), critical illness polyneuropathy, severe brachial plexus or lumbosacral plexus injury.

⁵ A=Complete; B=Sensory incomplete; C=Motor incomplete; D-motor incomplete. See [International Standards for Neurological Classification of Spinal Cord Injury](#), 2019

LOCATION OF REHABILITATION	PATIENT PROFILE: SCI REHABILITATION
<p>Community-Based/ Outpatient Rehabilitation</p> <p>Specialized spinal cord injury rehabilitation can be provided in person, virtually or as a hybrid of both.⁶</p>	<p>Patients who have sustained a spinal cord injury require specialized rehabilitation and should have clearly identified outpatient follow-up. Depending on the severity of the injury and/or the presence of associated sequelae or co-morbidities, a patient should be seen in a dedicated spinal cord injury rehabilitation program or in a dedicated neuro-rehabilitation program. The differentiating criteria for each of these patient profiles is described below.</p> <p>For patients who have been seen in an inpatient neuro-rehabilitation program, their outpatient follow-up should include outpatient rehabilitation and physiatry in the same organization where inpatient rehabilitation was provided or via an arrangement with another organization with relevant expertise.</p> <p>Dedicated SCI Rehabilitation Program - Patient profile:</p> <ul style="list-style-type: none"> • Patients may have been discharged from an inpatient program or may have been discharged directly from acute care • Patients have a primary diagnosis of spinal cord injury or disease (traumatic and non-traumatic) as described in the inpatient Dedicated SCI Rehabilitation Program patient profile, who are already residing in the community and who no longer need 24-hour hospital care. • Patients with ASIA Impairment Scale Score (ASIA C-D) who did not receive inpatient rehabilitation. • Patients require access to specialized services, e.g., neurogenic bowel and bladder training, urology clinic, gynaecology, sexual/fertility counselling, specialized seating clinic, bone densitometry, expanded AAC clinic for assistive technology, wound clinic • Patients require: <ul style="list-style-type: none"> ○ Spasticity management ○ Specialized rehabilitation specific to spinal cord injury (e.g., KAFO, FES training, advanced wheelchair skills for spinal cord injured patients) ○ More complex wound management issues that have not been managed in the community • Patients may require referrals to specialized programs in the community including community integration, sports and leisure, public transportation training and accessible exercise equipment

⁶ See Appendix A for key considerations for virtual rehabilitation care.

LOCATION OF REHABILITATION	PATIENT PROFILE: SCI REHABILITATION
	<p>Dedicated Neuro-rehabilitation Program – Patient Profile:</p> <ul style="list-style-type: none"> • Patients with an incomplete SCI, as described in the inpatient Dedicated Neuro-rehabilitation Program patient profile, are residing in the community. They may have been discharged from an inpatient neuro-rehabilitation program or were discharged directly from acute care. • These patients require community-based rehabilitation to achieve higher functional goals and/or to address a specific rehabilitative care need, which may be an impairment or a participation issue that requires assessment and/or treatment by a health professional. • Patients may require access to neurogenic bowel and bladder training, urology clinic, gynaecology, spasticity management clinic and orthotics clinic. <p>Other considerations:</p> <ul style="list-style-type: none"> • There is a population of patients who do not have spinal cord injury or disease, but meet all the other complex needs of a specialized SCI or neuro-rehabilitation program. This group of patients has chronic but not progressive disease and are not classified under the ISNCSCI (A-D classification system). They have monoplegia, paraplegia or tetraplegia as a result of severe peripheral nerve disease or injury: Guillain-Barré syndrome (GBS), chronic inflammatory demyelinating polyneuropathy (CIDP), critical illness polyneuropathy, severe brachial plexus or lumbosacral plexus injury.

APPENDIX A: KEY CONSIDERATIONS ON VIRTUAL REHABILITATION

There are several benefits of providing virtual rehabilitation for patients and clinicians. These include: reducing travel time for patients and increasing the ability to reach patients in more remote communities.¹ There are also challenges with providing virtual rehabilitation. These may include the lack of equipment and/or comfort with using technology, the absence of contextual factors that are more available during in-person sessions, limitations around safety (e.g., hands on assistance with exercises), and limitations in the ability to conduct some assessments and interventions.^{1, 2, 3} The following are key considerations for conducting virtual rehabilitation:

- Select patients carefully. Not every patient or every patient's goals are suitable and the decision to use a virtual format should be considered on a case-by-case basis using professional clinical judgment.⁴
- Confirm that the patient has the required technology and the needed support/assistance for virtual rehabilitation and that the patient's setting is in a safe, secure and confidential environment.⁵
- Follow professional regulatory college guidelines about obtaining consent; the collection, use and retention of personal health information; safety considerations and emergency planning, and having the proper skills and training to provide virtual rehabilitation.^{2, 4, 5}
- Use the most effective and secure virtual platform to provide high quality and confidential virtual rehabilitation (e.g., use high speed internet, a confidential setting, and a platform that is compliant with the [Personal Information Protection and Electronics Document Act \(PIPEDA\)](#)).⁵
- Have support processes in place to provide technical support and address technical issues for both the patient and provider and to address language, communication or other accessibility issues.⁴
- Consider use of virtual, in-person or a mix of the two formats (e.g., hybrid model) depending on the patient's resources, needs, and goals.
- Use indicators to evaluate the impact, effectiveness, quality and safety of virtual rehabilitation.⁴

References:

¹ Bland, K., Bigaran, A., Campbell, K., Trevaskis, M., & Zopf, E. (2020). Exercising in isolation? The role of telehealth in exercise oncology during the COVID-19 pandemic and beyond. *Physical Therapy, 100* (10), 1713-1716. <https://doi.org/10.1093/ptj/pzaa141>

² McGuff, R., Cotie, L., Harris, J., Baer, C., Brisco, K., Chipperfield, D., Moran, B., Pike, R., Ross, M., Yeung, C., Blacquiere, D., Mountain, A., Gierman, N., Lindsay, P. (Eds.), on behalf of Heart and Stroke Foundation of Canada in collaboration with the Canadian Association of Cardiovascular Prevention and Rehabilitation. (2021). *Virtual Cardiovascular Prevention and Rehabilitation Implementation Toolkit*. Heart and Stroke Foundation of Canada. Available from <https://www.heartandstroke.ca/-/media/1-stroke-best-practices/vcr-toolkit-final-2021.ashx?rev=e2d73b476e6e4ef1abc09624992566d0>

³ Turolla, A., Rossetini, G., Viceconti, A., Palese, A., & Geri, T. (2020). Musculoskeletal physical therapy during the COVID-19 pandemic: Is telerehabilitation the answer? *Physical Therapy, 100* (8), 1260-1264. <https://doi.org/10.1093/ptj/pzaa093>

⁴ Rakover, J., Laderman, M., & Anderson, A. (2020). [Telemedicine: Centre Quality and Safety](#). *Healthcare Executive, 35*(5), 48-49.

⁵ O'Neil, J. (n.d.) [Tele-Rehabilitation in times of COVID-19](#). Canadian Physiotherapy Association. <https://physiotherapy.ca/times-covid-19>

APPENDIX B: STAKEHOLDER ENGAGEMENT

UNIVERSITY OF TORONTO, TEMERTY FACULTY OF MEDICINE, DIVISION OF PHYSICAL MEDICINE & REHABILITATION ^a		
PM&R Specialist	Job Title and Affiliation	Specialized Rehab Population
Dr. Mark Bayley	Medical Director and Psychiatrist-in-Chief, University Health Network/Toronto Rehab and Altum Health Professor, University of Toronto ^a Vice-Chair, Coordinating Council, GTA Rehab Network Adjunct Scientist, Institute of Clinical and Evaluative Sciences, Sunnybrook Health Sciences Centre	All Populations
Dr. Larry Robinson	Program Chief, Rehabilitation Services, Sunnybrook Health Sciences Centre Director and Professor, Division of Physical Medicine and Rehabilitation, University of Toronto ^a Senior Scientist, Evaluative Clinical Sciences, St. John’s Rehab Research Program, Sunnybrook Research Institute	All Populations
Dr. Sivakumar Gulasingam	Physician (Physical Medicine and Rehabilitation Specialist), University Health Network/Toronto Rehab Assistant Professor, University of Toronto ^a	Cardiovascular Rehab Spinal Cord Injury Rehab
Dr. Anthony Burns	Physician (Physical Medicine and Rehabilitation Specialist), and Co-Director (Intrathecal Baclofen Clinic), University Health Network/Toronto Rehab Professor, University of Toronto ^a	Spinal Cord Injury Rehab
Dr. Beverley Catharine Craven	Physician (Physical Medicine and Rehabilitation Specialist), University Health Network/Toronto Rehab Professor, University of Toronto ^a	Spinal Cord Injury Rehab
Dr. Colleen McGillivray	Physician (Physical Medicine and Rehabilitation Specialist), University Health Network/Toronto Rehab Assistant Professor, University of Toronto ^a	Spinal Cord Injury Rehab

SPECIALIZED REHAB ADVISORY GROUP	
Organization	Member
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Sinai Health System/Hennick Bridgepoint Hospital	Wendy Cameron
Sunnybrook Health Sciences Centre/St John's Rehab	Dr. Larry Robinson (Co-Chair) Siobhan Donaghy
Unity Health Toronto/ Providence Healthcare	Anna Marie Sneath
University Health Network/ Toronto Rehab	Dr. Mark Bayley (Co-Chair) Joanne Kwong
West Park Healthcare Centre	Angela Dowd
GTA Rehab Network	Charissa Levy Sue Balogh Sanja Milicic lafrate Sharon Ocampo-Chan

SPECIALIZED REHAB WORKING GROUP – SCI REHAB	
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Sunnybrook Health Sciences Centre/St John's Rehab	Dr. Barathi Sreenivasan
Unity Health Toronto/ Providence Healthcare	Stephanie Middleton
University Health Network/ Toronto Rehab	Heather Flett Lynn Keats
GTA Rehab Network	Charissa Levy Sue Balogh