Specialized Complex Trauma 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 A COMPLEX TRAUMA INJURY

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.

Guiding Principles for Specialized Services	REHABILITATION PROGRAM: COMPLEX TRAUMA REHABILITATION
Requires team expertise and competency	• Knowledgeable in management/treatment of multiple trauma or polytrauma, nerve injuries • Wound care management • Cognitive assessment and intervention • Psychosocial assessment and intervention • The interprofessional team utilizes skills and training from respective professions/roles and applies evidence-based practices to augment the recovery of patients with complex trauma through experience, communication and ongoing professional development. Interprofessional team members may include but are not limited to the following: physicians (including physical medicine and rehabilitation specialist), nurses, physical therapists, occupational therapists, occupational therapist assistants, physical therapist assistants, speech-language pathologists, social workers, dietitians, pharmacists, vocational therapists, recreational therapists, behavioural specialists, and spiritual care practitioners.
Provides services to a critical mass	• To be considered experts, rehabilitation clinicians should carry a caseload of patients requiring complex trauma rehabilitation on a regular basis to develop and maintain clinical skills to address patients' needs. • The volume of patients seen in specialized inpatient and/or outpatient rehabilitation programs should be inclusive of all complex trauma related levels of complexity and needs to be sufficient to maintain expertise in the complex trauma rehabilitation population, resulting in effective and efficient care. • Specialized complex trauma rehabilitation has the capacity to offer specialized services across multiple sectors/locations of care (e.g., inpatient rehabilitation and community-based/ outpatient rehabilitation including in-person, virtual rehabilitation or a hybrid of both)

Guiding Principles for Specialized Services	REHABILITATION PROGRAM: COMPLEX TRAUMA REHABILITATION
Services require clinical coherence with other programs	• Pain management services including neuropathic pain • Electromyography (EMG)/electrophysiology clinic for peripheral nerve injury management • Orthotist and prosthetist services for functional bracing • Complex wound care program • Mental health services including psychosocial/psychiatry support • Vocational rehabilitation program • Respiratory therapy consult for supplementary oxygen needs assessment • Dietitian consult including for percutaneous endoscopic gastrostomy (PEG) tube • Access to tertiary specialist across all fields including trauma surgery, intensive care unit (ICU), orthopaedics, plastic surgery, preferably from an accredited trauma centre
Services require specialized resources	• EMG and ultrasound machines for procedures • X-ray and laboratory services • Braces, air casts and splints • Wide variety of mobility equipment, assistive devices and specialty bed or seating surfaces (for skin integrity issues)

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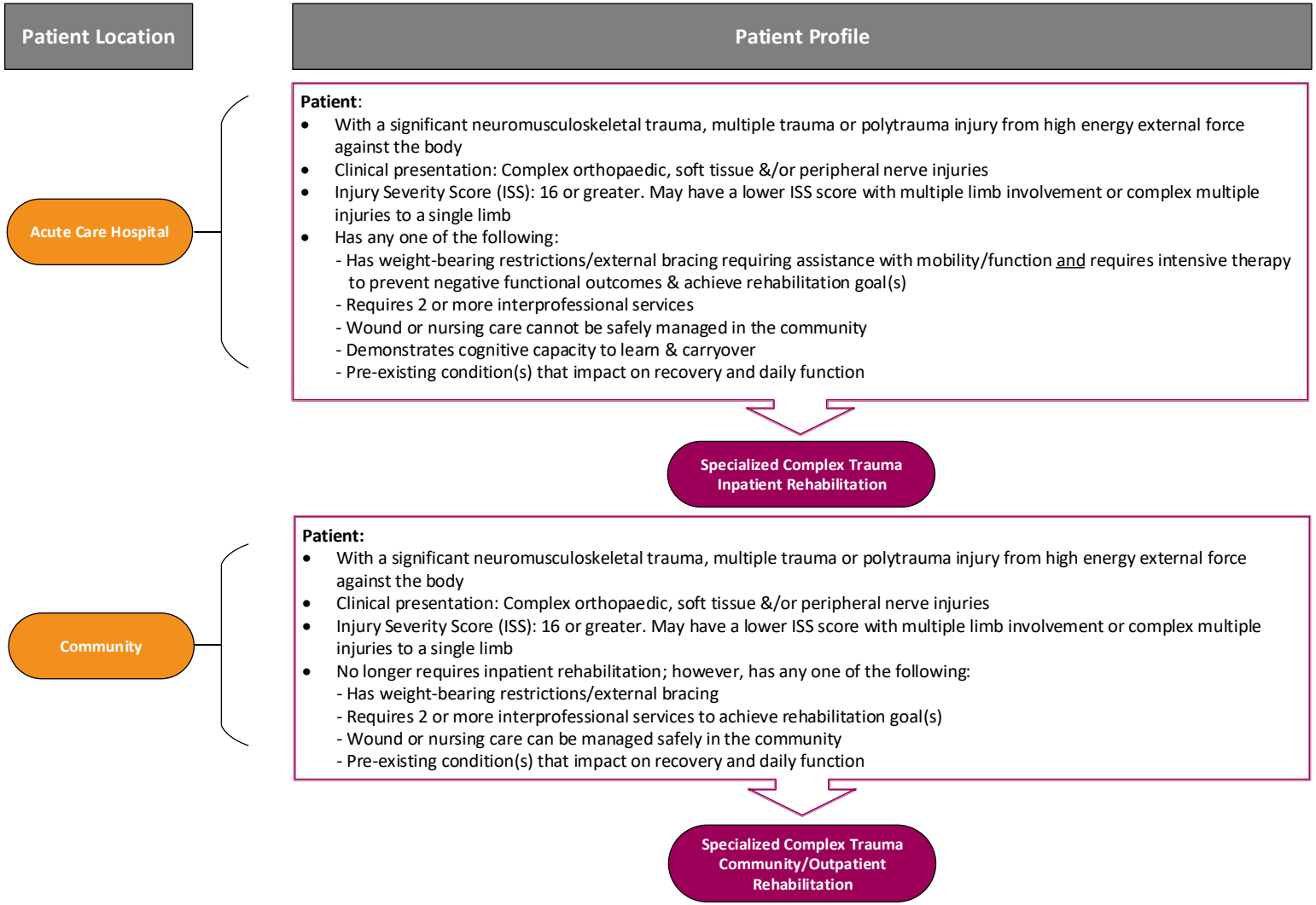
DETERMINING THE OPTIMAL SPECIALIZED REHABILITATION LOCATION BASED ON PATIENT PROFILE: COMPLEX TRAUMA INJURY

Overview – Complex Trauma Injury Rehabilitation (see Table B for details)



PATIENT PROFILE FOR THOSE REQUIRING SPECIALIZED COMPLEX TRAUMA 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, complex trauma 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: COMPLEX TRAUMA REHABILITATION
Inpatient Rehabilitation	**Patient profile:** • Patients with significant neuromusculoskeletal trauma, multiple trauma or polytrauma injury who clinically present with complex orthopaedic, soft tissue and/or peripheral nerve injuries sustained from high energy, external force(s) impact against the body, requiring inpatient rehabilitative care from an interprofessional team.[2] [3] The Injury Severity Score (ISS) of patients with complex trauma is 16 or greater (i.e., indicative of severe injury).[3] [4] [5] However, a small subset of patients with multiple limb involvement (e.g., multiple fractures on both feet) or complex multiple injuries to a single limb may have a lower ISS score but would still qualify as having sustained multiple trauma.[4] • In addition, any one of the following description or condition contributes to patients requiring inpatient rehabilitative care: – Injuries with weight-bearing restrictions/external bracing components that require assistance with transfers, ambulation, donning/doffing, and require supervised intensive therapy to prevent negative physiologic or functional outcomes (i.e., contractures/deconditioning)

[2] University of Toronto Physical Medicine and Rehabilitation. Fellowship description for trauma rehabilitation. Available from https://domapp.utoronto.ca/fellowship/dom_index.php?listall=1&divisions=15

[3] Lecky, F. et al. (2010). Epidemiology of Polytrauma. Damage Control Management in the Polytrauma Patient. In H.-C. Pape A. Petizman, C. Schwab, P. Giannoudis. (Eds). Damage control management in the polytrauma patient (pp. 439-450). Springer Science and Business Media. Available from https://link.springer.com/content/pdf/10.1007%2F978-0-387-89508-6.pdf

[4] University of Toronto Physical Medicine and Rehabilitation and GTA Rehab Network's Specialized Rehab Initiative (Phase 1).

[5] National Institute for Health and Care Excellence (NICE). (2016). *Major trauma: service delivery for major trauma. NICE guideline 40*. Available from: https://www.nice.org.uk/guidance/ng40/evidence/full-guideline-pdf-2313258877

LOCATION OF REHABILITATION	PATIENT PROFILE: COMPLEX TRAUMA REHABILITATION
	– Need for 2 or more of interprofessional services and requiring assistance with self-care activities of daily living and ambulation – Wound care or other nursing consideration cannot be safely managed in community. – Demonstrate cognitive capacity to learn and carryover – Pre-existing conditions (e.g., previous stroke, Parkinson's disease, lower/upper limb amputation injury) in addition to the complex trauma injury, that impact on patients' recovery and daily function **Other Considerations:** • Patients with brain injury, spinal cord injury or an amputation injury in addition to a complex trauma injury may need to seek the care of a specialized brain injury, spinal cord or amputation injury rehabilitation program. – Assessment to screen for clinical presentation of a brain injury in the inpatient rehabilitation setting is important. The rehabilitative program of a patient with concurrent complex trauma injury and brain injury depends on the health human resources of the rehabilitation team, severity of the brain injury and patient needs. To address cognitive-related treatment needs, a patient may require either a) a consultation from another specialized rehabilitation team, b) transfer to a specialized brain injury inpatient program, or c) referral to a specialized outpatient rehabilitation program following inpatient rehabilitation stay. • Based on a systematic review, there is a gap in evidence regarding rehabilitation settings, components, intensity, duration and types of therapy, and long-term outcomes for patients who have experienced multiple trauma.[6]
Community-Based/Outpatient Rehabilitation Specialized complex trauma rehabilitation can be provided in-	**Patient profile:** • Patients with significant neuromusculoskeletal trauma, multiple trauma or polytrauma injury who clinically present with complex orthopaedic, soft tissue and/or peripheral nerve injuries sustained from high energy, external force(s) impact against the body, requiring outpatient rehabilitative care

[6] Khan, F., Amatya, B., Hoffman, K. (2012). Systematic review of multidisciplinary rehabilitation in patients with multiple trauma. *British Journal of Surgery, 99*(Suppl 1), 88-96. https://doi.org/10.1002/bjs.7776

LOCATION OF REHABILITATION	PATIENT PROFILE: COMPLEX TRAUMA REHABILITATION
person, virtually or as a hybrid of both.[7]	from an interprofessional team.[8] [9] The Injury Severity Score of patients with complex trauma is 16 or greater (i.e., indicative of severe injury). [9] [10] [11] However, a small subset of patients with multiple limb involvement (e.g., multiple fractures on both feet) or complex multiple injuries to a single limb may have a lower ISS score but would still qualify as having sustained multiple trauma.[10] • Patient no longer requires supervised daily intensive therapy in an inpatient setting to prevent negative physiologic or functional outcomes (i.e., contractures/deconditioning); however, has any one of the following description or condition: – Patient has injuries with weight-bearing restrictions/external bracing components – Need for 2 or more of interprofessional services and requiring assistance with ambulation, self-care, home and community living skills as well as vocational re-integration – Wound care or other nursing consideration can be safely managed in community. – Pre-existing conditions (e.g., previous stroke, Parkinson's disease, lower/upper limb amputation injury) in addition to the complex trauma injury, that impact on patients' recovery and daily function **Other Considerations:** • Patients with brain injury, spinal cord injury or an amputation injury in addition to a complex trauma injury may need to seek the care of a specialized brain injury, spinal cord or amputation injury rehabilitation program. – Assessment to screen for clinical presentation of a brain injury in the outpatient rehabilitation setting is important. The rehabilitative program of a patient with concurrent complex trauma injury and brain injury depends on the available resources and competencies of the rehabilitation

[7] See Appendix A for key considerations for virtual rehabilitation

[8] University of Toronto Physical Medicine and Rehabilitation. Fellowship description for trauma rehabilitation. Available from https://domapp.utoronto.ca/fellowship/dom_index.php?listall=1&divisions=15

[9] Lecky, F. et al. (2010). Epidemiology of Polytrauma. Damage Control Management in the Polytrauma Patient. In H.-C. Pape A. Petizman, C. Schwab, P. Giannoudis. (Eds). Damage control management in the polytrauma patient (pp. 439-450). Springer Science and Business Media. Available from https://link.springer.com/content/pdf/10.1007%2F978-0-387-89508-6.pdf

[10] University of Toronto Physical Medicine and Rehabilitation and GTA Rehab Network's Specialized Rehab Initiative (Phase 1).

[11] National Institute for Health and Care Excellence (NICE). (2016). *Major trauma: service delivery for major trauma. NICE guideline 40*. Available from: https://www.nice.org.uk/guidance/ng40/evidence/full-guideline-pdf-2313258877

LOCATION OF REHABILITATION	PATIENT PROFILE: COMPLEX TRAUMA REHABILITATION
	team, the severity of the brain injury and patient needs. To address cognitive-related treatment needs, a patient may require a referral to another specialized outpatient rehabilitation program. • Based on a systematic review, there is a gap in evidence regarding rehabilitation settings, components, intensity, duration and types of therapy, and long-term outcomes for patients who have experienced multiple trauma.[12] • Access many years following the injury to support community independence is recommended (e.g., high-level cognitive rehabilitation, advanced gait training, advanced prosthetic training, vocational evaluation and other community re-entry programming).[13]

[12] Khan, F., Amatya, B., Hoffman, K. (2012). Systematic review of multidisciplinary rehabilitation in patients with multiple trauma. *British Journal of Surgery, 99*(Suppl 1), 88-96. https://doi.org/10.1002/bjs.7776

[13] U.S. Department of Veterans Affairs. (2014). *Polytrauma Rehabilitation Centre: Design Guide*. Report prepared by U.S. Department of Veterans Affairs Office of Construction & Facilities Management. Available from https://www.cfm.va.gov/til/dGuide/dgPRC.pdf

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., Rossettini, 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 Physiatrist-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. Peter Kaas Broadhurst	Physician (Physical Medicine and Rehabilitation Specialist), Sunnybrook Health Sciences/St. John's Rehab Lecturer, University of Toronto [a]	Complex Trauma Rehab
Dr. Robert Simpson	Physician (Physical Medicine and Rehabilitation Specialist), Sunnybrook Health Sciences (Trauma, Acute Care) Assistant Professor, University of Toronto [a] Associate Scientist, Evaluative Clinical Sciences, St. John's Rehab Research Program, Sunnybrook Research Institute	Complex Trauma Rehab

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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 Iafrate Sharon Ocampo-Chan

SPECIALIZED REHAB WORKING GROUP – COMPLEX TRAUMA REHAB	
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