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## Comments

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# INCOG 2.0 Guidelines for Cognitive Rehabilitation Following Traumatic Brain Injury: What's Changed From 2014 to Now?

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The opinions, results and conclusions reported are those of the authors. No endorsement by the Ontario Ministry of Health is intended or should be inferred.

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IT IS CRITICAL TO KEEP clinical practice guidelines (CPGs) up to date through integration of the latest evidence. Therefore, it is with great excitement that the INCOG team presents the *INCOG 2.0 Guidelines for Cognitive Rehabilitation Following Traumatic Brain Injury (TBI)*. In this brief introduction, we provide an overview of changes in the evidence from 2014; share insights into the current state and challenges implementing cognitive rehabilitation; and provide an overview of INCOG 2022.

## WHY ARE RECOMMENDATIONS FOR COGNITIVE REHABILITATION FOLLOWING TBI STILL A PRIORITY?

Prior to the publication of the first version of INCOG, the team prioritized cognitive rehabilitation among all other areas within the field of TBI rehabilitation for knowledge translation.<sup>1</sup> The decision to prioritize cognitive rehabilitation was based on a number of considerations. First, by its very nature, TBI causes diffuse damage to the brain networks that are essential for attention, memory, executive functions, and cognitive aspects of communication. Second, ongoing systematic reviews highlight that cognitive rehabilitation is one of

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the rapidly growing evidence bases within the field of TBI rehabilitation. Indeed, since the last publication of INCOG, more than 160 interventional studies on cognitive rehabilitation in moderate to severe TBI have been published, more than 40 of which are randomized controlled trials. In addition, observational studies, systematic reviews, and meta-analyses continue to be published at a rapid pace.<sup>2</sup> Third, there is a bias toward rehabilitation focused on inpatients and activities of daily living (ADL) function whereas cognition plays an extremely important role in instrumental activities of daily living (IADL) and return to activities for a generally younger rehabilitation population. Finally, the team recognized clinicians have challenges applying the evidence in this field to everyday practice, resulting in a significant knowledge-to-practice gap. These challenges are 2-fold; in addition to the long-established evidence-practice gap across all areas of medicine,<sup>3</sup> cognitive rehabilitation is an especially complex and highly individualized set of therapy interventions. Since 2014, none of these challenges have materially changed. The COVID-19 pandemic has necessitated a rapid pivot to telehealth-assisted rehabilitation and therefore we felt that updated evidence-based recommendations for in-person and virtual cognitive rehabilitation were both timely and necessary.<sup>4</sup>

### **WHAT IS THE CURRENT STATE OF, AND ONGOING CHALLENGE FOR, IMPLEMENTATION OF INCOG GUIDELINES?**

Broadly speaking, barriers to implementation of CPGs can be due to the nature of the intervention, the beliefs and awareness of potential adopters, and the practice environment; cognitive rehabilitation is no exception<sup>5,6</sup>:

1. *Barriers related to the nature of the intervention.* Cognitive rehabilitation is intrinsically challenging, given the need for comprehensive assessment of the cognitive strengths and weaknesses of persons with TBI, their priorities, the demands of their lifestyle and environment, and the availability of supports, as a basis for treatment planning and implementation. Clinicians in health professions often receive limited training in cognitive rehabilitation methods. Moreover, studies on which CPGs are based typically have incomplete descriptions of treatment methods; therefore, it is not always possible to identify active ingredients or critical aspects of treatment such as optimal dose and timing.<sup>7</sup>
2. *Barriers related to the potential adopters.* Many CPGs do not provide tools to guide implementation, such as decision rules or algorithms. Furthermore, CPG developers often provide lists of recommendations without considering which of them could be the focus of funders and health sys-

tem leaders.<sup>8–11</sup> The limited awareness and use of CPGs by potential adopters (ie, clinicians, funders, and healthcare leaders) also represent a significant barrier. A survey of potential users found that only 47% of the respondents knew of at least one practice guideline to support the rehabilitation of people with TBI and only 34% of documents named by respondents as guiding their practice actually met the definition of a CPG.<sup>12</sup> Respondents also felt ill-equipped to implement CPGs and identified cognitive and behavioral impairments as the most important areas for guidance.<sup>12</sup> As part of a multicenter implementation study, Poulin et al<sup>13</sup> found that only 25% of cognitive rehabilitation best practices were implemented in Quebec. In Australia, Downing et al<sup>14</sup> surveyed more than 200 clinicians regarding their practices and found that while practice broadly followed the recommendations, clinicians found implementation of the guidelines for executive function particularly challenging. This may be a function of both the inherent complexity of this intervention and the aforementioned lack of CPG implementation processes.

3. *Barriers related to the practice environment.* Downing et al<sup>14</sup> and Nowell et al<sup>15</sup> highlighted clinicians' views of the importance of client self-awareness, family involvement, team collaboration, and goal setting as important ingredients for success of cognitive rehabilitation. Having a multidisciplinary team that understands TBI, working together with family on common goals in real-world contexts is an ideal practice environment that may not always be present. Even in well-developed health-care systems, human and technical resources are significantly limited. Most inpatient TBI rehabilitation programs aim for independence in basic self-care, mobility, and safety in the community, but outpatient and community-based rehabilitation programs, where most cognitive rehabilitation research is done, receive limited funding, may be too brief to fully execute cognitive rehabilitation protocols, and have faced closure and redeployment, retirement, or resignation of staff during the worst of the COVID-19 pandemic. It is also likely that in low- and middle-income countries, resources are further constrained and despite the prevalence of TBI, cognitive rehabilitation is not consistently implemented.<sup>16,17</sup>
4. *Barriers related to the comorbidities and impairments of the persons with TBI within the practice environment.* Comorbidities and impairments of the person with TBI within the practice environment can present another significant barrier to cognitive rehabilitation. In their international survey of cognitive rehabilitation providers, Nowell et al<sup>15</sup> also found the presence of mental health and

neuropsychiatric issues, such as depression or anxiety, and premorbid personality issues (narcissistic, borderline, paranoid personality). These issues are compounded by existing disparities and inequity of access to rehabilitation for underserved, vulnerable, and racialized populations.<sup>16-19</sup>

For all of the aforementioned reasons, we believe that it is safe to conclude that there are significant variations in implementation of best practice cognitive rehabilitation.

## WHAT'S NEW IN THE INCOG 2.0 GUIDELINES?

Concerted efforts are necessary to overcome the barriers mentioned earlier, and CPG developers should provide implementation tools that are easy to understand and use. Furthermore, they should highlight the 3 to 5 priorities that are necessary for administrators to implement. Service improvement efforts need to ensure that therapy teams have multidisciplinary representation, have regular opportunities for communication and community access, receive training in goal setting and evidence-based cognitive rehabilitation methods, and evaluate their outcomes in terms of what is meaningful to the person with TBI and their family. Recent evaluations of audit and feedback in brain injury rehabilitation programs have shown positive changes in adherence to CPGs and appear to be a promising approach to implementation.<sup>20</sup>

In response to the issues mentioned earlier, the INCOG team has enhanced the guidance for clinicians and healthcare administrators for cognitive rehabilitation throughout this special issue. The basic structure of each article is similar with an overview of the recommendations, tabulated references, rationales for the recommendations, algorithms to assist treatment decisions, and audit tools. As outlined in the methodology article, all previous recommendations were reviewed, modified, and/or updated with new evidence (INCOG 2.0: Methods, Overview, and Principles).<sup>21</sup> To assist clinicians, we revised the clinical algorithms that support decision making and individualizing intervention. Similarly, we revised the audit tools to determine adherence to best practices, to reflect the changes in the accompanying recommendations. In response to the need for guidance on use of groups and/or telerehabilitation, the general recommendations have been updated to address telerehabilitation and each topic area contains specific recommendations for providing individual or group-based intervention telerehabilitation to enhance that function.

The special issue mirrors the topics covered in the first version of INCOG. In article 2, the recommendations commence with an overview of the methods,

as well as general principles for cognitive rehabilitation (INCOG 2.0: Methods, Overview, and Principles).<sup>21</sup> This article has been enhanced and updated with a new section on telerehabilitation. The next article, concerning management of posttraumatic amnesia (PTA), has been revised to reflect new and emerging evidence regarding assessment and therapy during this phase, with a recent randomized controlled trial showing the value of a structured error-controlled and procedural learning approach to training ADL during PTA (INCOG 2.0, Part I: Posttraumatic Amnesia).<sup>22</sup> The fourth article concerns rehabilitation of attention and processing speed. This article probably contains the least changes, given the ongoing limitations in the evidence for behavioral interventions in this domain, but does provide stronger evidence underpinning pharmacological interventions for attention (INCOG 2.0, Part II: Attention and Information Processing Speed).<sup>23</sup> Executive functions are the subject of the fifth article, which documents the evolving and strengthening evidence for metacognitive strategy instruction and the use of telerehabilitation to promote recovery in this domain (INCOG 2.0, Part III: Executive Functions).<sup>24</sup> Recommendations for treatment of cognitive-communication disorders are the topic of the next article (INCOG 2.0, Part IV: Cognitive-Communication and Social Cognition Disorders).<sup>25</sup> These recommendations have been revised and updated as a result of ongoing strengthening of the evidence, and there has been an inclusion of recommendations on telerehabilitation. A further enhancement is inclusion of rehabilitation for impairments of social cognition, defined as the cognitive processes underlying Theory of Mind (ie, understanding another's thoughts, also known as perspective taking and cognitive empathy), and emotion perception and emotional empathy. Inclusion of social cognition in INCOG 2.0 recognizes the developments in this area and recognizes the role of social cognition in forming and maintaining relationships after TBI. Memory rehabilitation (INCOG 2.0, Part V: Memory)<sup>26</sup> is influenced strongly by severity of impairment of memory. There is a continuing focus on teaching of strategies, which are the most widely utilized cognitive rehabilitation interventions by clinicians.<sup>15</sup> The final article in the series reflects the future of INCOG and how changing evidence and technology may affect the future of guidelines (The Future of INCOG (Is Now)).<sup>27</sup>

The project team has been gratified with the response to the first version of the INCOG recommendations. We recognize that much work remains and hope that INCOG 2.0 is a positive step toward promoting better outcomes for those living with the effects of TBI and their families. The INCOG Team is outlined in Table 1.

**TABLE 1** INCOG 2.0 guidelines expert panel (2022)

Australia	Canada	United States
<p><b>Dr Peter Bragge, PhD</b>, Associate Professor and Director, Monash Sustainable Development Institute Evidence Review Service, BehaviourWorks Australia, Monash University, Melbourne, Australia  <i>Specialty: Knowledge translation, quality improvement research, evidence mapping and synthesis, guideline development</i></p> <p><b>Professor Jacinta Douglas, PhD, MSc (Psych)</b>, Emerita Professor, Living with Disability Research Centre, La Trobe University, Bundoora, Victoria, Australia; Summer Foundation, Melbourne, Australia  <i>Specialty: Brain injury, cognition, communication</i></p> <p><b>Dr Adam McKay, PhD, MPsy (Clinical Neuropsychology)</b>, Monash Epworth Rehabilitation Research Centre, Turner Institute for Brain and Mental Health, School of Psychological Sciences, Monash University, Melbourne, Australia; Epworth Healthcare, Melbourne, Australia  <i>Specialty: Neuropsychology, brain injury rehabilitation</i></p> <p><b>Professor Jennie Ponsford, PhD, AO, MA (Clinical Neuropsychology)</b>, Professor of Neuropsychology, Turner Institute for Brain and Mental Health, School of Psychology and Psychiatry, Monash University, Melbourne, Australia; Director, Monash-Epworth Rehabilitation Research Centre, Turner Institute for Brain and Mental Health, School of Psychology and Psychiatry, Monash University, Melbourne, Australia; Epworth Healthcare, Melbourne, Australia</p>	<p><b>Dr Mark Bayley, MD, FRCPC</b>, Psychiatrist-in-Chief and Program Medical Director, Neuro Rehabilitation Program, KITE Research Institute, Toronto Rehabilitation Institute–University Health Network, Temerty Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada  <i>Specialty: Neurorehabilitation, knowledge translation, guideline development</i></p> <p><b>Dr Robin Green, CPsych</b>, Toronto Rehabilitation Institute, Canada Research Chair (II) Traumatic Brain Injury, Toronto, Ontario, Canada  <i>Specialty: Traumatic brain injury, neuropsychology, neurorehabilitation, MRI</i></p> <p><b>Shannon Janzen, MSc</b>, Lawson Health Research Institute, Parkwood Institute, London, Ontario, Canada  <i>Specialty: Evidence-based review, neurorehabilitation</i></p> <p><b>Amber Harnett, MSc, BScN, RN (c)</b>, Lawson Health Research Institute, Parkwood Institute, London, Ontario, Canada  <i>Specialty: Evidence-based review, neurorehabilitation</i></p> <p><b>Dr Eilivas Jeffay, PhD, CPsych</b>, KITE Research Institute, Toronto Rehabilitation Institute–University Health Network, Toronto, Ontario, Canada  <i>Specialty: Traumatic brain injury, neuropsychology, neurorehabilitation</i></p> <p><b>Ailene Kua, MSc, PMP</b>, Research Associate, KITE Research Institute, Toronto Rehabilitation Institute–University Health Network, Toronto, Ontario, Canada  <i>Specialty: Knowledge translation, guideline development</i></p> <p><b>Lyn Turkstra, PhD, Reg-CASLPO</b>, Assistant Dean and Professor, Speech-Language Pathology Program, School of Rehabilitation Science, McMaster University, Hamilton, Ontario, Canada  <i>Specialty: Cognition, communication, guideline development, traumatic brain injury rehabilitation</i></p> <p><b>Dr Shawn Marshall, MD, MSc, FRCPC</b>, Professor, The Ottawa Hospital-Rehabilitation Center, University of Ottawa, Ottawa, Ontario, Canada; Bruyere Research Institute, Ottawa, Ontario, Canada  <i>Specialty: Brain injury rehabilitation, epidemiology, driving, medicine, pharmacology</i></p> <p><b>Amanda McIntyre, PhD (candidate), RN</b>, Lawson Health Research Institute, Parkwood Institute, London, Ontario, Canada  <i>Specialty: Evidence-based review, neurorehabilitation</i></p> <p><b>Eleni Patsakos, PhD (candidate), MSc</b>, KITE Research Institute, Toronto Rehabilitation Institute–University Health Network, Toronto, Ontario, Canada</p>	<p><b>Professor Mary Kennedy, PhD, CCC-SLP</b>, Professor, Communication Sciences and Disorders, Chapman University, Irvine, California  <i>Specialty: Cognition, communication</i></p>

(continues)

**TABLE 1** INCOG 2.0 guidelines expert panel (2022) (Continued)

Australia	Canada	United States
<p>Specialty: <i>Neuropsychology, traumatic brain injury rehabilitation</i></p> <p><b>Professor Leanne Togher, PhD, BAppSc (Speech Path)</b>, Professor of Communication Disorders Following Traumatic Brain Injury, Senior NHMRC Research Fellow, Speech Pathology, Faculty of Health Sciences, The University of Sydney, Camperdown, New South Wales, Australia</p> <p>Specialty: <i>Communication disorders following acquired brain injury; evidence-based review, communication partner training</i></p> <p><b>Dr Jessica Trevena-Peters, DPsych</b>, Monash-Epworth Rehabilitation Research Centre, Turner Institute for Brain and Mental Health, School of Psychological Sciences, Monash University, Melbourne, Australia; Epworth Healthcare, Melbourne, Australia</p> <p>Specialty: <i>Neuropsychology, traumatic brain injury rehabilitation</i></p>	<p>Specialty: <i>Knowledge translation</i></p> <p><b>Dr Robert Teasell, MD, FRCPC</b>, Schulich School of Medicine &amp; Dentistry, University of Western Ontario, London, Ontario, Canada; St Joseph's Health Care London, London, Ontario, Canada; Lawson Health Research Institute, Parkwood Institute, London, Ontario, Canada</p> <p>Specialty: <i>Evidence-based review, neurorehabilitation</i></p> <p><b>Dr Diana Velikonja, PhD, MScCP</b>, Associate Professor, Department of Psychiatry and Behavioural Neurosciences, DeGroot School of Medicine, McMaster University, Hamilton, Ontario, Canada; Acquired Brain Injury Program, Hamilton Health Sciences, Hamilton, Ontario, Canada</p> <p>Specialty: <i>Neuropsychology, traumatic brain injury rehabilitation, guideline development</i></p> <p><b>Penny Welch-West, MCiSc, SLP Reg CASLPO</b>, Parkwood Institute, London, Ontario, Canada; St Joseph's Health Care London, London, Ontario, Canada; Lecturer, School of Communication Sciences and Disorders, University of Western Ontario, London, Ontario, Canada</p> <p>Specialty: <i>Cognitive-communication disorders</i></p> <p><b>Dr Catherine Wiseman-Hakes, PhD, Reg CASLPO</b>, Speech Language Pathology Program, School of Rehabilitation Science, McMaster University, Hamilton, Ontario, Canada; KITE Research Institute, Toronto Rehabilitation Institute—University Health Network, Toronto, Ontario, Canada</p> <p>Specialty: <i>Cognitive-communication disorders, community reintegration, pediatric rehabilitation, sleep, traumatic brain injury</i></p>	

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