

Abstract: Mild traumatic brain injuries (mTBIs), the most common type of brain injuries, are a major public health concern in Canadian children and youth. Currently it is virtually impossible to establish best practice guidelines using an evidence-based approach as there is a paucity of data to help direct the timing, intensity and duration of post-mTBI clinical care. Furthermore, while individual researchers are advancing the science of diagnostic biomarkers of pediatric brain injury in their own labs, the infrastructure for rapid and effective validation or clinical uptake of these innovations is severely lacking, particularly on a national scale. A critical component for accelerating the clinical uptake of research data pertains to the establishment and utilization of common databases. It can be challenging, if not impossible, to combine and/or compare data or studies in meaningful ways due to the variability of diagnostic terms and tools used to categorize, assess and stratify patients, interventions, and outcomes. A critical component for accelerating the clinical uptake of research data pertains to the establishment and utilization of common databases. We propose the following specific aims for this team grant over the next 5 years.

Specific aim 1: To identify and agree upon common data elements to be included in a national clinical/research data collection collaboration across pediatric and adolescent mTBI programs in Canada. We aim to capture areas of functioning that will contribute to establishing a diagnosis and to document outcome after mTBI in our population. Many of this team's clinician-scientists and knowledge-users work in mTBI follow-up programs that already collect clinical data on their innovative best practices individually while researchers build comprehensive databases for use in their own projects. Our collaborative work will bring us together (through an online survey followed by a 2-day workshop) to achieve consensus on the elements to include in our project, which will lead to innovative, applied, multi-disciplinary research on the recognition, early diagnosis, evaluation and management of children and youth post-mTBI.

Specific aim 2: To a) create the data collection/management system and b) implement the data collection process by means of a feasibility pilot project in selected mTBI follow-up programs across Canada. Members of our team who are clinician-scientists and have direct access to mTBI follow-up programs will participate in this 12 month pilot data collection project where children and youth will be assessed (to include information regarding the agreed upon common data elements mentioned above) from the time they enter the mTBI program and up to 6 months post-injury. Our combined programs (n=6) see in excess of 2000 new cases per year and the comprehensive nature of our collaboration will allow us to include 2 types of data: 1) information collected as part of our clinical work, and 2) data from selected research projects thought to target innovative new technology and promising outcome measures. These latter projects, which are currently funded in individual institutions, will be expanded to include multi-site data collection.

Specific aim 3: Use data collected to create a clinical prediction model/clinical decision rule that will stratify patients according to cognitive/social/behavioral outcomes at 1 month, 3 months and 6 months post-injury. This research will be the first of many anticipated projects emanating directly from the power of our combined data collection. Although many children appear to do well in the first few weeks after their mTBI, a number of studies demonstrate that some children present with unresolved impairments in the areas of balance, visual perception, visuo-motor response speed, or executive functions, for months post-injury, even in the absence of self-reported post-concussion symptoms. We propose the use of ecologically-valid and meaningful outcomes, such as social participation, self-efficacy in physical activities and academic performance, in the context of applied research in mTBI in children and youth.

To achieve these aims, we have assembled a team of nationally and internationally distinguished and recognized clinician scientists, researchers, and knowledge users from 4 provinces, whose innovative research programs and clinical initiatives have had significant impact on the field of pediatric mTBI. Working together will lead to increased knowledge-translation and more rapid clinical uptake of innovation in the diagnosis and treatment of children after mTBI.