

SCOPE OF WORK 2019-3 – WD MID-TERM EVALUATION ECONOMIC IMPACT STUDY (AND SUMMARY OF REFERENCES)

1. Introduction/Background

The Praxis Spinal Cord Institute (Praxis) has received funding from Western Economic Diversification Canada (WD) for activities from April 1, 2018 to March 31, 2022. This follows a previous WD investment over 5 years (2013-2018).

Between May 2019 and June 2020, Praxis will undertake a formative (mid-term) evaluation of the current agreement and relevant activities from the 2013-2018 agreement

Starting in and around September 2019, the economic impact study will be completed on or before the end of November 2019. The economic impact study will be contracted separately from the evaluation, the results of which will stand on their own and be used as a line of evidence within the evaluation.

1.1 Profile

The Rick Hansen Institute is a not-for-profit organization that drives research and innovation of spinal cord injuries (SCI) around the world. Praxis accelerates the innovation adoption, resulting in better health outcomes for Canadians with SCI, reduced healthcare costs, and enhanced economic growth in the biomedtech sector.

Praxis's vision is a world without paralysis after spinal cord injury. Its mission is:

- To lead collaboration across the global SCI community by providing resources, infrastructure, and knowledge;
- To identify, develop, validate, and accelerate the translation of evidence and best practices to reduce the incidence and severity of paralysis after SCI; and
- To improve healthcare outcomes, reduce long-term costs, and improve the quality of life for those living with SCI.

1.2 Context

It is estimated that over 86,000 people are living with traumatic and non-traumatic spinal cord injuries in Canada, and thousands of new injuries occur each year.¹ While the incidence of SCI in Canada is low compared to other chronic health conditions, SCI is the second most expensive condition for which to care.² Response to an individual traumatic SCI includes acute, rehabilitative, emergency, primary, mental health, home and long-term care and adaptive equipment.

The estimated present value lifetime cost of a traumatic SCI ranges from \$1.5 million to \$3.1 million (2015 CAD), depending on the severity of injury. The annual economic burden associated with traumatic SCI in Canada is estimated at \$2.75 billion (2015 CAD).³

Many of these costs are believed to be avoidable and present significant potential for cost savings.

¹ Noonan V, Fingas M, Farry A, et al. The incidence and prevalence of spinal cord injury in Canada: a national perspective. *Neuroepidemiology*. 2012;38(4):219–226.

² The most common is infant respiratory distress syndrome. Winslow C, Bode RK, Felton D, Chen D, Meyer PR Jr. Impact of respiratory complications on length of stay and hospital costs in acute cervical spine injury. *Chest*. 2002;121(5):1548–1554.

³ Krueger H, Noonan VK, Trenaman LM, Joshi P, Rivers C. The economic burden of traumatic spinal cord injury in Canada. *Chronic Dis Inj Can*. 2013;33(3):113–122.

2. Economic Research Questions

The planned mid-term evaluation includes two evaluation questions on outcome achievement that will draw on the economic impact study, specifically:

- To what extent have Praxis activities as funded by WD contributed to reduced health care and consumer costs?
 - This is an assessment of existing and anticipated cost reductions from 2013-18 delivery of care changes (e.g. pressure ulcers, pain, standing and walking, or similar).

- How does Praxis compare to similar organizations with similar characteristics?
 - This is a descriptive measure within the evaluation and will compare Praxis to other organizations on the basis the size and nature of the affected population, the budget and personnel capacity of the organizations, their respective contributions to increased knowledge, improved delivery of care, and innovations demonstrated and ready to use.

The first question is heavily dependent on the economic impact study. The second question will draw from the economic impact study to a significantly lesser extent. The economic impact study will not include a comparator organization. It will provide context and details where information on the identified characteristics are available for the indicators from Praxis-WD agreements.

3. Population, Setting, Intervention, Control/Comparison Group and Outcomes

The planned economic impact study will cover four selected key performance indicators of WD funded Praxis activities within the 2013 – 2018 WD-Praxis agreement. Following the logical progression of likely / potential changes, the study will identify associated economic impacts for each indicator. These could include cost savings or increased benefits to individuals with SCI, or savings to the health care system, or increased economic activity in the related industry. The associated economic impacts will be identified using existing publications/literature/references.

For each indicator, potential outputs, outcomes and costs are included in the table as a starting point for the study. The cost information included in the table is taken from an initial summary of references which will be available to the successful contractor. Its format is included in Appendix A. The initial summary of references includes information from Praxis-related SCI economic publications.

The economic impact study would review existing documents and literature to refine such cost analyses as well as add any new information identified to the summary of references.

	WD 2013-18 Performance Indicators (Outputs)	Related Outcomes	Cost Per	Total Cost
Pressure Ulcers	In 2017/2018, there were 200+ SCI patients admitted to the healthcare facilities that adopted the RHSCIR pressure ulcer best practices (conduct comprehensive, systematic and consistent assessment of risk factors in individuals with SCI; structured education and provision of specific information)	Preliminary observational data suggest this would mean 5 - 10 fewer participants developing one or more pressure injuries in <i>rehabilitation</i>	Reduced secondary complication – pressure injury e.g., proposed expected cost of a pressure ulcer closer to. \$35,000 ¹	This would equal approx. \$175-350K in direct avoided costs
Physical Activity	Guideline published in Oct 2017 in Spinal Cord. Use of guidelines - these guidelines had 21 citations as of June 6 2019 (in 97%-98% percentile) Estimate – 1 participant benefits from the published guidelines	Being physically active has been shown to improve health outcomes including cardiorespiratory fitness, power output, muscle strength, body composition, reducing cardiovascular risk, and subjective well-being ²⁻⁴	Greater functional capacity e.g.: 1. US\$290K to \$435K in lifetime cost savings (few hospitalizations and less reliance on assistive care) if people with SCI start routine physical activity in 1 st post-injury year and experience typical motor function improvements (and higher motor function 5 years after injury is associated with higher employment rates) ⁵ 2. A 5pt increase in motor FIM has been estimated to result in annual savings in direct cost of US\$25k in 1 st year & US\$4k annually after; 5-20pt increase is reasonable with chronic exercise ^{6,7}	For one individual this would equal: <ul style="list-style-type: none"> • First Year • Annually • Five Years • Lifetime • Direct cost savings • Indirect cost savings
Neuro-Recovery (Prospective)	Patients as of January 2018 Estimate – 1 patient benefits from participation	Demonstration of improved neurologic recovery following a spinal cord injury.	Greater functional capacity	For one individual this would equal: <ul style="list-style-type: none"> • First Year • Annually • Five Years • Lifetime • Direct costs • Indirect costs
Accreditation	The total number of eligible programs accredited is 15 of 30, or 50%. (Seven Acute and eight Rehabilitation programs.) Estimate - 1 person benefits from better care as a result of accreditation	Participants benefit in terms of – (better assessment), better care, fewer secondary complications, greater functional capacity	Reduced secondary complications e.g.: <ul style="list-style-type: none"> - Pressure injury - proposed expected cost of a pressure ulcer closer to \$35,000¹ - Urinary tract infection – clinically significant UTI costs upwards to \$23,667 in Ontario (hospital acquired)¹ Greater functional capacity	For one individual this would equal: <ul style="list-style-type: none"> • First Year • Annually • Five Years • Lifetime • Direct costs • Indirect costs

4. Budget and Schedule

Study activities are planned in 2019 and/or 2020. The table below shows the proposed timeline for the study, described by tasks/activities and their end dates. All project deliverables will be provided to Praxis in English.

The budget for this study is CDN\$9,000.

TASKS	Schedule
	TBD
Request Proposals/Review/Select and Set Up Contract	
Start Up Meeting/Confirm Scope of Work	
Develop Research Plan	
Conduct Research	
Summarize Results	
Draft/Final Report	

References

1. Barry A.B. White, Nicolas Dea, John T. Street, Christiana L. Cheng, Carly S. Rivers, Najmedden Attabib, Brian K. Kwon, Charles G. Fisher, and Marcel F. Dvorak. The Economic Burden of Urinary Tract Infection and Pressure Ulceration in Acute Traumatic Spinal Cord Injury Admissions: Evidence for Comparative Economics and Decision Analytics from a Matched Case-Control Study. *Journal of Neurotrauma*. Oct 2017.
2. Hicks, A. L. *et al.* The effects of exercise training on physical capacity, strength, body composition and functional performance among adults with spinal cord injury: a systematic review. *Spinal Cord* **49**, 1103–27 (2011).
3. Martin Ginis, K. A. *et al.* Evidence-based scientific exercise guidelines for adults with spinal cord injury: an update and a new guideline. *Spinal Cord* **56**, 308–321 (2018).
4. de Oliveira, B. I. R. *et al.* SCIPA Com: outcomes from the spinal cord injury and physical activity in the community intervention. *Spinal Cord* **54**, 855–860 (2016).
5. Miller, L. E. & Herbert, W. Health and economic benefits of physical activity for patients with spinal cord injury. *Clin. Outcomes Res.* **8**, 551–558 (2016).
6. Durán, F. S., Lugo, L., Ramírez, L. & Eusse, E. Effects of an exercise program on the rehabilitation of patients with spinal cord injury. *Arch. Phys. Med. Rehabil.* **82**, 1349–54 (2001).
7. Lugo, L. H., Salinas, F. & García, H. I. Out-patient rehabilitation programme for spinal cord injured patients: evaluation of the results on motor FIM score. *Disabil. Rehabil.* **29**, 873–81 (2007).

Appendix A – Summary of References

Main Topic	Secondary Topic	Information	Citing Reference	Limitations	Source