

# 10-kHz High-Frequency Spinal Cord Stimulation for Adults With Chronic Noncancer Pain: Recommendation

## FINAL RECOMMENDATION

- The Quality business unit at Ontario Health, based on guidance from the Ontario Health Technology Advisory Committee, recommends publicly funding spinal cord stimulation at frequencies up to and including 10 kHz in adults with chronic noncancer pain that is refractory to medical management

## RATIONALE FOR THE RECOMMENDATION

The Ontario Health Technology Advisory Committee has reviewed and accepted the findings of the health technology assessment.<sup>1</sup>

Ontario Health Technology Advisory Committee members noted that 10-kHz high-frequency spinal cord stimulation appears to reduce pain intensity and pain-related functional disability in carefully selected people with chronic noncancer pain, and that some patients treated with spinal cord stimulation may be able to reduce their use of prescription opioids. The committee also recognized that 10-kHz high-frequency spinal cord stimulation does not cause the tingling in the legs that patients may experience with low-frequency (40 Hz to 60 Hz) and moderate-frequency (up to 1.2 kHz) spinal cord stimulation.

Committee members also recognized the results of the budget impact analysis that suggested there would be cost savings if 10-kHz high-frequency spinal cord stimulation were offered to adults whose symptoms had not been substantially improved with spinal cord stimulation at frequencies up to 1.2 kHz.

Committee members took into account the lived experience of people with chronic noncancer pain and people who had experience with spinal cord stimulation therapy. They also considered the 2005 Ontario Health Technology Advisory Committee recommendation on spinal cord stimulation<sup>2</sup> and agreed that the 2005 recommendation should be expanded to include spinal cord stimulation at frequencies up to 10 kHz.

## Decision Determinants for 10-kHz High-Frequency Spinal Cord Stimulation for Adults With Chronic Noncancer Pain

Decision Criteria	Subcriteria	Decision Determinants Considerations
<b>Overall clinical benefit</b> How likely is the health technology/intervention to result in high, moderate, or low overall benefit?	<b>Effectiveness</b> How effective is the health technology/intervention likely to be (taking into account any variability)?	10-kHz high-frequency spinal cord stimulation (SCS) reduces pain intensity (GRADE: Moderate), decreases functional disability (GRADE: Moderate), improves quality of life (GRADE: Moderate) and may decrease opioid use (GRADE: Low).
	<b>Safety</b> How safe is the health technology/intervention likely to be?	There is no increased risk of adverse events with 10-kHz high-frequency SCS compared with SCS at frequencies up to 1.2 kHz.
	<b>Burden of illness</b> What is the likely size of the burden of illness pertaining to this health technology/intervention?	The estimated prevalence of chronic pain in Canadian adults ranges from 11% to 44%. The psychosocial morbidity, physical functional disability, and sleep impairment related to chronic pain represent a heavy burden for patients, making it a costly disease for patients, families, employers, and the health care system.
	<b>Need</b> How large is the need for this health technology/intervention?	Spinal cord stimulation at frequencies up to 1.2 kHz is available in Ontario through existing programs. However, no other treatments are available when it or other pain management options fail.
<b>Consistency with patient values and with expected societal and ethical values<sup>a</sup></b> How likely is adoption of the health technology/intervention to be congruent with societal and ethical values?	<b>Patient values</b> How likely is adoption of the health technology/intervention to be congruent with expected patient values?	Participants reported that currently available SCS reduced their pain. They felt it improved their quality of life and their ability to carry out activities of daily living.
	<b>Societal values</b> How likely is adoption of the health technology/intervention to be congruent with expected societal values?	Participants reported feeling that currently available SCS improved their overall health and reduced their pain, and 10-kHz high-frequency SCS may reduce the tingling sensation associated with conventional SCS. Adopting a treatment that is effective and cost-saving is likely congruent with societal values to use public resources efficiently.
	<b>Ethical values</b> How likely is adoption of the health technology/intervention to be congruent with expected ethical values?	Adoption of 10-kHz high-frequency SCS is likely to be congruent with expected ethical values of beneficence or doing good.
<b>Cost-effectiveness</b> How efficient is the health technology/ intervention likely to be?	<b>Economic evaluation</b> How efficient is the health technology/intervention likely to be?	There was limited evidence about the effectiveness of 10-kHz high-frequency SCS in people who had first tried SCS at frequencies up to 1.2 kHz. Therefore, we could not develop an economic evaluation of this pathway of care (SCS at frequencies up to 1.2 kHz followed by 10-kHz high-frequency SCS), and we could not estimate the cost-effectiveness of this health technology for Ontario.

Decision Criteria	Subcriteria	Decision Determinants Considerations
<b>Feasibility of adoption into health system</b> How feasible is it to adopt the health technology/intervention into the Ontario health care system?	<b>Economic feasibility</b> How economically feasible is the health technology/intervention?	<p>We estimated that the average annual cost of SCS therapy with a new wireless system was approximately \$34,660, including a device cost of approximately \$22,350. We estimated that the average annual cost of SCS therapy with currently available (wired) devices was approximately \$47,860 (including the costs of the procedure, complications, and device).</p> <p>Using 10-kHz high-frequency SCS with a new wireless device to treat adults with chronic noncancer pain in whom currently available SCS therapies have not been effective may result in cost savings of about \$0.1 million to \$0.2 million/y over the next 5 y, for a potential total 5-y net cost savings of about \$0.73 million.</p>
	<b>Organizational feasibility</b> How organizationally feasible is it to implement the health technology/intervention?	Ontario has existing SCS programs, and 10-kHz high-frequency SCS can be integrated into these programs.

Abbreviation: GRADE, Grading of Recommendations Assessment, Development, Evaluation; SCS, spinal cord stimulation.

<sup>a</sup>The anticipated or assumed common patient, societal, and ethical values held in regard to the target condition, target population, and/or treatment options. Unless there is evidence from scientific sources to corroborate the true nature of the patient, societal, and ethical values, the expected values are considered.

## REFERENCES

- (1) Ontario Health (Quality). 10-kHz high-frequency spinal cord stimulation for adults with chronic noncancer pain: a health technology assessment. Ont Health Technol Assess Ser [Internet]. 2020 Mar;20(6):1–109. Available from: <https://hqontario.ca/Evidence-to-Improve-Care/Health-Technology-Assessment/Reviews-And-Recommendations/10-kHz-High-Frequency-Spinal-Cord-Stimulation-for-Adults-With-Chronic-Noncancer-Pain>
- (2) Health Quality Ontario. OHTAC recommendation: spinal cord stimulation for the management of neuropathic pain [Internet]. Toronto (ON): Queen’s Printer for Ontario; 2005 [cited 2019 Mar 5]. Available from: <http://www.ontla.on.ca/library/repository/mon/10000/253081.pdf>

### [Disclaimer](#)

### [About Ontario Health \(Quality\)](#)

### [About the Ontario Health Technology Advisory Committee](#)

### [How to Obtain Recommendation Reports](#)

Ontario Health (Quality)  
130 Bloor Street West, 10<sup>th</sup> Floor  
Toronto, Ontario  
M5S 1N5  
Tel: 416-323-6868  
Toll Free: 1-866-623-6868  
Fax: 416-323-9261  
Email: [EvidenceInfo@hqontario.ca](mailto:EvidenceInfo@hqontario.ca)  
[www.hqontario.ca](http://www.hqontario.ca)

ISBN 978-1-4868-3717-5 (PDF)

© Queen’s Printer for Ontario, 2020

#### **Citation**

Ontario Health (Quality). 10-kHz high-frequency spinal cord stimulation for adults with chronic noncancer pain: recommendation [Internet]. Toronto (ON): Queen’s Printer for Ontario; 2020 Mar. 4 p. Available from: <https://hqontario.ca/Evidence-to-Improve-Care/Health-Technology-Assessment/Reviews-And-Recommendations/10-kHz-High-Frequency-Spinal-Cord-Stimulation-for-Adults-With-Chronic-Noncancer-Pain>