

Peripheral Nerve Stimulation for Chronic Neuropathic Pain

Recommendation

DECEMBER 2024

Final Recommendation

Ontario Health, based on guidance from the Ontario Health Technology Advisory Committee, recommends publicly funding minimally invasive percutaneous peripheral nerve stimulation for the treatment of chronic neuropathic pain in adults.

Rationale for the Recommendation

The Ontario Health Technology Advisory Committee made the above recommendation after considering the clinical, economic, and patient preferences and values evidence reported in the health technology assessment.¹

The committee members noted the potential benefits of peripheral nerve stimulation (PNS) for pain relief, functional outcomes, and health-related quality life in adults with chronic neuropathic pain. Considering the opioid epidemic and the devastating nature of chronic neuropathic pain, the committee acknowledged the need to offer more treatment options and noted that the use of PNS to treat chronic neuropathic pain aligns with pain medicine clinical practice guidelines and consensus statements.²⁻⁴ They also recognized the heterogeneity of patient populations for PNS and the importance of involving a pain medicine physician to guide appropriate patient selection.

The primary economic evaluation showed that PNS in addition to standard care is more costly and more effective than standard care alone, with an incremental cost-effectiveness ratio (ICER) of \$87,211 per quality-adjusted life year (QALY) gained. However, the committee members noted that the economic evaluation took a conservative approach and that PNS could be considered cost-effective for managing chronic neuropathic pain. The estimated total 5-year budget impact of publicly funding PNS is reasonable at \$10.09 million, given that uptake is likely to be slow because of limitations in clinical resource capacity, emerging awareness of PNS, and patient preferences. Ongoing use of PNS comes with potential costs, such as the replacement of disposable patches and batteries. These costs should be included in the public funding of PNS to allow for equitable access and outcomes.

Ontario Health Technology Advisory Committee members considered the lived experience of people with chronic pain, who described the substantial negative impact of chronic pain on their daily living, mental health, social and family relationships, and work. People with chronic pain also reported difficulty finding effective options for pain relief, and preferences for non-drug treatments. As well, the committee considered the lived experience of people who have used PNS, who described reductions in pain with PNS, as well as positive impacts on their quality of life.

In making their recommendation, the committee acknowledged that at the time of writing only 1 PNS device has been licensed by Health Canada; additional devices could come to market in the future.

Decision Determinants for Peripheral Nerve Stimulation for Chronic Neuropathic Pain

Overall Clinical Benefit

Effectiveness

How effective is the health technology/intervention likely to be (taking into account any variability)?

Compared with placebo controls in adults with chronic neuropathic pain, permanent PNS likely decreases pain scores, and likely improves functional outcomes and health-related quality of life; however, it likely has little or no effect on the use of pain medications (all Grading of Recommendations, Assessment, Development and Evaluations [GRADEs]: Moderate). Compared with before implantation in adults with chronic neuropathic pain, permanent PNS may decrease pain scores and the use of pain medications, and it may improve functional outcomes and health-related quality of life (all GRADEs: Low).

Compared with placebo controls in adults with chronic postamputation pain, temporary PNS may decrease pain scores and the use of pain medications, and it may improve functional outcomes and health-related quality of life (all GRADEs: Low). Compared with before implantation in adults with chronic neuropathic pain, temporary PNS may decrease pain scores and the use of pain medications, and it may improve functional outcomes and health-related quality of life (all GRADEs: Low).

Safety

How safe is the health technology/intervention likely to be?

Implantation of a permanent or a temporary PNS system is reasonably safe; most adverse effects are localized and mild in intensity (GRADE: Moderate to Low).

Burden of Illness

What is the likely size of the burden of illness pertaining to this health technology/intervention?

Based on published Canadian prevalence statistics⁵ and the size of the Ontario population, we estimate that 302,000 to 537,000 people in Ontario have chronic neuropathic pain.

Need

How large is the need for this health technology/intervention?

Although the prevalence of chronic neuropathic pain is high, the number of patients who need PNS is uncertain. Eligibility for PNS implantation is based on multiple criteria, including medical history, physical examination, diagnostic tests, mental health, cognitive status, and patient preference.

Patient Preferences and Privacy

Patient Preferences and Values

Do patients have specific preferences, values, or needs related to the health condition, health technology/intervention, or life impact that are relevant to this assessment?

The people we interviewed who had experience with PNS perceived a substantial reduction in pain and spoke about its positive impact on their quality of life. All interviewees preferred having non-drug options for managing their pain.

Autonomy, Privacy, Confidentiality, and/or Other Relevant Ethical Principles as Applicable

Are there concerns regarding accepted ethical or legal standards related to patient autonomy, privacy, confidentiality, or other ethical principles that are relevant to this assessment?

Non-drug treatment options such as PNS could enhance patient autonomy by allowing people greater choice based on their preferences and values. We identified no issues related to privacy or confidentiality.

Equity and Patient Care

Equity of Access or Outcomes

Are there disadvantaged populations or populations in need whose access to care or health outcomes might be improved or worsened that are relevant to this assessment?

Access to PNS is inequitable, because only those who can afford to pay for the device out of pocket or through private insurance can obtain it. As well, those who live in rural and remote communities have more difficulty in accessing pain specialists.

Patient Care

Are there challenges in the coordination of care for patients or other system-level aspects of patient care (e.g., timeliness of care, care setting) that might be improved or worsened that are relevant to this assessment?

Publicly funding PNS is not expected to impact patient care or coordination.

Cost-Effectiveness

Economic Evaluation

How efficient is the health technology/intervention likely to be?

In adults with chronic neuropathic pain, PNS in addition to standard care was associated with 0.24 QALYs gained and an additional cost of \$21,063 per person compared with standard care alone,

resulting in ICER of \$87,211 per QALY over a 3-year time horizon from a Ministry of Health perspective. At a willingness-to-pay of \$50,000 per QALY, the probability that PNS in addition to standard care would be cost-effective is 1.02% (highly likely not to be cost-effective); however, at a willingness-to-pay of \$100,000 per QALY, the probability that PNS in addition to standard care would be cost-effective is 64.88% (moderately likely to be cost-effective). From a societal perspective, the ICER was \$72,569 per QALY gained.

Feasibility of Adoption Into Health System

Economic Feasibility

How economically feasible is the health technology/intervention?

We estimate that publicly funding PNS in Ontario for the treatment of chronic neuropathic pain would cost an additional \$0.97 million in year 1 (60 implants), increasing to \$3.15 million in year 5 (140 implants), for a total of \$10.09 million over 5 years.

Organizational Feasibility

How organizationally feasible is it to implement the health technology/intervention?

At the time of writing, PNS was available in 1 hospital-based and 2 community-based pain clinics in Ontario. Provincial neuromodulation centres and some private pain clinics with expertise in ultrasound or fluoroscopic imaging have the clinical capacity and infrastructure to implement PNS.

References

- 1) Ontario Health. Peripheral nerve stimulation for chronic neuropathic pain: a health technology assessment. *Ont Health Technol Assess Ser* [Internet]. 2024 Dec;24(10):1–131. Available from: [hqontario.ca/evidence-to-improve-care/health-technology-assessment/reviews-and-recommendations/peripheral-nerve-stimulation-for-chronic-neuropathic-pain](https://www.hqontario.ca/evidence-to-improve-care/health-technology-assessment/reviews-and-recommendations/peripheral-nerve-stimulation-for-chronic-neuropathic-pain)
- 2) Strand N, D’Souza RS, Hagedorn JM, Pritzlaff S, Sayed D, Azeem N, et al. Evidence-based clinical guidelines from the American Society of Pain and Neuroscience for the use of implantable peripheral nerve stimulation in the treatment of chronic pain. *J Pain Res*. 2022;15:2483-504.
- 3) Li AH, Bhatia A, Gulati A, Ottestad E. Role of peripheral nerve stimulation in treating chronic neuropathic pain: an international focused survey of pain medicine experts. *Reg Anesth Pain Med*. 2023;48(6):312-8.
- 4) Bates D, Schultheis BC, Hanes MC, Jolly SM, Chakravarthy KV, Deer TR, et al. A comprehensive algorithm for management of neuropathic pain. *Pain Med*. 2019;20(Suppl 1):S2-S12.
- 5) VanDenKerkhof EG, Mann EG, Torrance N, Smith BH, Johnson A, Gilron I. An epidemiological study of neuropathic pain symptoms in Canadian adults. *Pain Res Manag*. 2016;2016:9815750.

[About Ontario Health](#)

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

[How to Obtain Recommendation Reports](#)

[Disclaimer](#)

Ontario Health
500–525 University Avenue
Toronto, Ontario
M5G 2L3
Toll Free: 1-877-280-8538
TTY: 1-800-855-0511
Email: OH-HQO_HTA@OntarioHealth.ca
hqontario.ca

ISBN 978-1-4868-8634-0 (PDF)

© King's Printer for Ontario, 2024

Citation

Ontario Health. Peripheral nerve stimulation for chronic neuropathic pain: recommendation [Internet]. Toronto (ON): King's Printer for Ontario; 2024 Dec. 7 pp. Available from: hqontario.ca/evidence-to-improve-care/health-technology-assessment/reviews-and-recommendations/peripheral-nerve-stimulation-for-chronic-neuropathic-pain

Need this information in an accessible format? 1-877-280-8538, TTY 1-800-855-0511, info@OntarioHealth.ca

Document disponible en français en contactant info@OntarioHealth.ca