

Repetitive Transcranial Magnetic Stimulation for People With Treatment-Resistant Depression: Recommendation

Final Recommendation

- Ontario Health, based on guidance from the Ontario Health Technology Advisory Committee, recommends publicly funding repetitive transcranial magnetic stimulation for people with treatment-resistant depression

Rationale for the Recommendation

Although depression can often be effectively treated with antidepressant medications, psychotherapy, or both in combination, many people may not improve with these treatments.

The Ontario Health Technology Advisory Committee has reviewed the findings of the health technology assessment¹ and determined that, for some people, repetitive transcranial magnetic stimulation (rTMS) demonstrates meaningful improvement of symptoms, as well as higher response and remission rates, compared with sham treatment. Compared with electroconvulsive therapy (ECT), rTMS demonstrates similar response and remission rates. However, the overall effectiveness of rTMS depends on the treatment modality used (e.g., low- or high-frequency rTMS, intermittent or continuous theta burst stimulation). The committee noted that two commonly used rTMS modalities—high-frequency rTMS and intermittent theta burst stimulation—are highly likely to be cost-effective when used in a stepped care pathway, including ECT if necessary, compared with other currently available treatments.

The committee strongly supports that health care providers and patients discuss the limitations of each modality and acknowledge that rTMS is not always beneficial. There was consensus that health care providers should consult high-quality neurostimulation guidelines to determine where in the clinical pathway rTMS is best provided to patients.

The committee took into consideration the lived experience of patients with treatment-resistant depression and their family members, who described the challenges of finding and accessing effective treatment. The committee also acknowledged that publicly funding rTMS aligns with the health system's priority for mental health care.

Decision Determinants for Repetitive Transcranial Magnetic Stimulation for People With Treatment-Resistant Depression

Decision Criteria	Subcriteria	Decision Determinants Considerations
Overall clinical benefit How likely is the health technology/intervention to result in high, moderate, or low overall benefit?	Effectiveness How effective is the health technology/intervention likely to be (taking into account any variability)?	<p>Most rTMS modalities (except cTBS) likely result in lower depression scores than sham treatment. Most rTMS modalities (except cTBS and low-frequency rTMS) likely result in higher response rates than sham treatment.</p> <p>Three rTMS modalities (high-frequency rTMS, bilateral rTMS, and deep TMS) likely result in higher remission rates than sham treatment. Electroconvulsive therapy likely reduces depression scores, but likely results in no difference in response and remission rates compared with rTMS.</p> <p>When rTMS modalities were compared with one another, no difference in response or remission rates were observed.</p>
	Safety How safe is the health technology/intervention likely to be?	<p>A similar number of adverse events were reported for the intervention and comparators; the most common adverse events were headaches and scalp discomfort.</p>
	Burden of illness What is the likely size of the burden of illness pertaining to this health technology/intervention?	<p>In Ontario, an estimated 160,800 people 15 years of age or older have treatment-resistant depression.</p>
	Need How large is the need for this health technology/intervention?	<p>Given the high prevalence of treatment-resistant depression, we need several effective treatments available to manage this condition.</p>

Decision Criteria	Subcriteria	Decision Determinants Considerations
<p>Patient preferences and values</p> <p>How likely is adoption of the health technology/intervention to be congruent with patient preferences and values and with ethical or legal standards?</p>	<p>Patient preferences and values</p> <p>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? (Note: The preferences and values of family members and informal caregivers are to be considered as appropriate.)</p> <p>Autonomy, privacy, confidentiality, and/or other relevant ethical principles as applicable</p> <p>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? (Note: The preferences and values of the public are to be considered as appropriate.)</p>	<p>Patients and families value the ability to choose effective therapies to manage their depression. They also see rTMS as a potentially effective and less complex treatment (vs. ECT, which requires anesthesia) with minimal side effects.</p> <p>Patients value autonomy in choosing a treatment that effectively manages depression. Patients and families are concerned about the inequity of accessing rTMS across Ontario.</p>
<p>Equity and patient care</p> <p>How could the health technology/intervention affect equity of access and coordination of patient care?</p>	<p>Equity of access or outcomes</p> <p>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?</p> <p>Patient care</p> <p>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?</p>	<p>Currently, distribution of rTMS treatment is limited in the province and does not promote equity of access.</p> <p>Outpatient clinics can provide rTMS. Various modalities require different daily time commitments for patients. Unlike patients receiving ECT, patients receiving rTMS do not require a family member or friend to accompany them for treatment.</p>

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<p>Cost-effectiveness</p> <p>How efficient is the health technology/intervention likely to be?</p>	<p>Economic evaluation</p> <p>How efficient is the health technology/intervention likely to be?</p>	<p>High-frequency rTMS or iTBS (followed by ECT if necessary in stepped care) is less costly and more effective than ECT alone in treatment of adults with treatment-resistant depression in Ontario.</p> <p>High-frequency rTMS or iTBS (followed by ECT if necessary in stepped care) is cost-effective compared with pharmacotherapy alone in the treatment of adults with treatment-resistant depression in Ontario at a willingness to pay of \$50,000 per QALY (ICERs of \$22,868 and \$21,259 per QALY, respectively).</p> <p>At a willingness to pay of \$50,000 per QALY, high-frequency rTMS or iTBS (followed by ECT if necessary in stepped care) is highly likely to be cost-effective^a compared with ECT alone.</p> <p>At a willingness to pay of \$50,000 per QALY, high-frequency rTMS or iTBS (followed by ECT in stepped care) is highly likely to be cost-effective^a compared with pharmacotherapy alone.</p>
<p>Feasibility of adoption into health system</p> <p>How feasible is it to adopt the health technology/intervention into the Ontario health care system?</p>	<p>Economic feasibility</p> <p>How economically feasible is the health technology/intervention?</p> <p>Organizational feasibility</p> <p>How organizationally feasible is it to implement the health technology/intervention?</p>	<p>Publicly funding rTMS (high-frequency rTMS or iTBS) would result in additional costs of \$9.3 million in year 1 to \$15.76 million in year 5, for a total of \$63.2 million over the next 5 years.</p> <p>Treatment with rTMS is currently available in hospitals and private rTMS clinics in Ontario. More rTMS clinics are planned to be set up in the future.</p>

Abbreviations: cTBS, continuous theta burst stimulation; ECT, electroconvulsive therapy; ICER, incremental cost-effectiveness ratio; iTBS, intermittent theta burst stimulation; QALY, quality-adjusted life-year; rTMS, repetitive transcranial magnetic stimulation.

^aUncertainty was classified as one of five categories based on the Ontario Decision Framework²: highly likely to be cost-effective (80%–100% probability of being cost-effective), moderately likely to be cost-effective (60%–79% probability), uncertain if cost-effective (40%–59% probability), moderately likely to not be cost-effective (20%–39% probability), or highly likely to not be cost-effective (0–19% probability).

References

- (1) Ontario Health. Repetitive transcranial magnetic stimulation for people with treatment-resistant depression: a health technology assessment. Ont Health Technol Assess Ser [Internet]. 2021 May;21(4):1–232. Available from: <https://www.hqontario.ca/evidence-to-improve-care/health-technology-assessment/reviews-and-recommendations/repetitive-transcranial-magnetic-stimulation-for-people-with-treatment-resistant-depression>
- (2) Krahn M, Miller F, Bayoumi A, Brooker AS, Wagner F, Winsor S, et al. Development of the Ontario decision framework: a values based framework for health technology assessment. Int J Technol Assess Health Care. 2018;34(3):290-9.

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