Commentary

The value of a model to consider the cost-effectiveness of interventions for the treatment of major depressive disorder in Canada

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Major depressive disorder (MDD) remains a leading cause of disability in Canada, and increasingly so, despite considerable advances in treatment options and the availability of antidepressant medications.[1] Only about 30% of people with MDD remit after taking first-line pharmacotherapy.[2] For the considerable proportion who do not, an often frustrating process (for both patient and provider) of medication trial and error ensues. Pharmacogenomic testing can reduce the guesswork by guiding prescribers toward treatment that is optimally efficacious and tolerable. In related research, Ghanbarian and colleagues[3] explored whether pharmacogenomic-guided treatment was associated with better clinical outcomes and represented good value for money using a rigorous, validated economic model that simulated a cohort of 194 149 people with MDD and considered the cost-effectiveness of pharmacogenomic testing in the British Columbian health care system. They found that pharmacogenomic testing in patients with moderate-to-severe MDD could lead to total cost savings of $956 million and 74 023 quality-adjusted life years (QALY) gained over a 20-year time horizon. Although understanding the cost-effectiveness of pharmacogenomic testing in MDD is useful, the contribution of the related research is potentially much more extensive. We discuss how the model used therein could contribute to advancing evidence-informed decision-making in Canadian health care more generally.

Identification of interventions that are both cost saving and improve clinical outcomes is rare.[4] One visual presentation of cost-effectiveness analyses is the incremental cost-effectiveness plane (Figure 3 in the related research).[3] This graph, divided into 4 quadrants and centred at 0 for both incremental cost and QALYs, plots the incremental cost on the y-axis and incremental QALYs on the x-axis. Most interventions in health care fall into the upper-right quadrant, meaning they are both more effective and more costly than the standard alternative. The lower-right quadrant is nicknamed the "no-brainer" quadrant since the interventions that map to that quadrant cost less and are more effective than current practice and, from a health care system perspective, their adoption should be an easy "yes."[4]

Key points

- Related research finds that the use of pharmacogenomic testing to guide treatment for people with major depressive disorder (MDD) is both cost-saving and improves clinical outcomes, a rarity in health care.
- However, cost-effectiveness is only 1 consideration in evidence-informed decision-making, with affordability of an upfront investment being a major challenge in systems where all funds are already allocated.
- Access to, and public funding for, treatment options for MDD varies across Canada, and evaluations of the cost-effectiveness of pharmacogenomic testing should take into account all available, guideline-recommended MDD treatment options, not only those that are locally available.
- The robust model developed in the related research represents valuable, necessary research infrastructure that should be used repeatedly to support evidence-informed decision-making in health care systems.

Of course, cost-effectiveness is only 1 consideration feeding into evidence-informed decision-making in health care when resources are finite. Other considerations include whether an intervention is immediately life saving, the impact on quality of life, the number of people eligible for the intervention, the underlying baseline health of the treatment-eligible population, the likelihood of the treatment being successful and the impact of the intervention on equity.[5,6] In reality, adoption of an intervention that maps to the "no-brainer" quadrant on the incremental cost-effectiveness plane still requires an additional upfront investment. In the case of pharmacogenomic testing, that would be the $121 million to fund the infrastructure for the testing. For systems in which all funds are allocated, affordability and the opportunity cost associated with finding the immediate funding in a budget remain challenging.

The cost-effectiveness of pharmacogenomic testing will also depend on access to guideline-recommended treatment options.

Particularly within the context of mental health services, variation in publicly funded treatments across Canada is substantial.[7] For example, repetitive transcranial magnetic stimulation (rTMS), a guideline-recommended treatment option for patients for whom at least 1 antidepressant has failed,[8] is not publicly funded in BC, yet is publicly funded in other jurisdictions in Canada.[9,10] Ghanbarian and colleagues did not consider rTMS within their economic model. To be more broadly relevant, pharmacogenomic testing would need to be assessed in relation to all other effective treatment options rather than only those that are available in a given jurisdiction.

However, the detailed model used by Ghanbarian and colleagues[3] represents valuable, necessary research infrastructure. The model carefully simulates the disease progression of MDD by moving a cohort of people from diagnosis of MDD through treatments, maintenance phases, recurrence and recovery on a weekly cycle; it is extensively validated, which means it can numerically demonstrate that it is working the way it should; and it was co-developed with patients, which, while rare in economic models, is necessary for incorporating patient-important outcomes and decisions. With the example of this model, the cost-effectiveness of any kind of intervention for people with MDD could now be assessed rapidly. A decision-maker could have information on the cost-effectiveness of a novel or emerging therapeutic such as ketamine or collaborative care models for treating depression within primary care from a trusted source within weeks.[11]

The investment of time, human resources and research funding into Ghanbarian and colleagues' model has been immense.[3] Now that this Canadian research infrastructure has been created, it should be used, over and over again, to inform evidence-informed, value-based decision-making.

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