Medical Xpress

Genetic testing could greatly benefit patients with depression, save health system millions

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A special kind of genetic test that helps determine the best antidepressant for patients with moderate-to-severe depression could generate substantive health system savings and greatly improve patient outcomes, according to new research from the University of British Columbia.

The study, published today in the *Canadian Medical Association Journal* (*CMAJ*), shows that in B.C. alone, implementing pharmacogenomic testing could save the provincial public health system an estimated $956 million over 20 years.

"Pharmacogenomic testing aims to match patients with medications that are more likely to be effective and cause less side effects, based on their genetic profile," said co-senior author Dr. Stirling Bryan (he/him), professor at UBC's school of population and public health, and senior scientist at Vancouver Coastal Health Research Institute (VCHRI). "Our findings show that the benefit to patients in B.C. could be enormous, including increased remission rates and better quality of life, while generating significant cost savings by keeping people out of hospitals and more intensive treatment pathways."

One in 10 Canadians will experience major depression at some point in their lives, making it one of the largest public health burdens. While more than 35 antidepressant medications are available in Canada, over half of patients don't respond to the antidepressant they are initially prescribed and roughly 27% report adverse effects.

Previous studies have shown that up to 42% of the variation in how patients respond to these medications is due to genetic factors. Pharmacogenomic testing uses genetic information, typically obtained using a cheek swab, blood test or saliva sample, to help guide medication selection and dosing.

"Genes play an important role in how our bodies metabolize different antidepressants, which ultimately influences their efficacy," said co-senior author Dr. Jehannine Austin, professor of medical genetics and psychiatry at UBC. "The genetic insights provided by pharmacogenomic testing can help physicians make more informed treatment decisions and reduce the lengthy trial-and-error process that many patients experience

in finding an effective medication."

For the study, the researchers worked with patient partners, clinicians and health system and government partners to develop a simulation model that would mimic the experience of patients with major depression, from diagnosis through to treatment, recurrence and recovery. By incorporating B.C. health administrative data, clinical trial data and defined treatment strategies, the model compared the projected journey of 194,149 adults with and without pharmacogenomic testing over a 20-year period.

The model showed that pharmacogenomic testing would result in 37% fewer patients experiencing treatment-resistant depression, a situation in which the patients' depression does not improve despite trying several kinds of treatment. Pharmacogenomic testing would also result in patients spending 15% more time without depression symptoms, resulting in an anticipated 1,869 fewer deaths and 21,346 fewer hospital admissions over 20 years.

"By incorporating the perspectives of patients with lived and living experience into this model, alongside robust data sets, we are able to carefully simulate the treatment journey of people with major depression," said first author Dr. Shahzad Ghanbarian, a mathematical modeler and health economist at the Centre for Clinical Epidemiology and Evaluation, a research group within the VCHRI and affiliated with UBC. "The simulation model is designed to be flexible and could be applied to other jurisdictions beyond B.C., where we might expect to see similar benefits, particularly within a comparable Canadian context."

Linda Riches, who lives in Salmon Valley, B.C., has been living with major depression for over 30 years and was one of the patient partners who helped undertake the study.

"All people with major depression deserve to feel hopeful about their life. Genetic testing may give them the opportunity to know what treatment they need, not the 10 they didn't need," said Riches.

Pharmacogenomic tests are not currently offered through the public health systems across Canada, but patients can pay for them through private companies.

The researchers say their analysis makes a strong case for including pharmacogenomic testing as part of routine, publicly-funded health care for people with major depression in B.C., but more work is needed to determine how such testing could be put into practice.

"We've shown here this can be effective, and our next step is to figure out the best way to do it, with input from patients, physicians, government and health sector partners," said Dr. Bryan. "Exploration of implementation strategies, such as which health-care professionals are best-suited to deliver pharmacogenomic testing, is the natural next step and remains unexplored in Canada."

More information: Cost-effectiveness of pharmacogenomic-guided treatment for major depression, *Canadian Medical Association Journal* (2023). DOI: 10.1503/cmaj.221785

Provided by University of British Columbia