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The Future of Disability Management: How Pharmacogenetics is Changing the Game

for

Psychotropic Medications



THE CHALLENGE: MENTAL HEALTH, DISABILITY & DRUG SPEND

New 2026 data shows mental health conditions, disability claims, and drug costs continue to rise—driven in part by an unsustainable trial & error prescribing model.



MENTAL HEALTH ON THE RISE

1 IN 5

Canadians will experience a mental health problem in their lifetime¹

25% ↑

increase in antidepressant use from 2021 to 2025²

21% ↑

increase in anxiety disorder prevalence from 2019 to 2024³

Mental health conditions are a leading driver of disability and lost productivity.



DISABILITY IMPACT

1 IN 4

Canadians live with a disability visible or invisible⁴

72%

of mental health disability claims are due to depression, anxiety and stress⁵

30%

increase in mental health disability claims from 2021 to 2025⁶

Mental health conditions are the top driver of long-term disability claims.



DRUG SPEND

31.6%

of total drug plan spend is on specialty medications⁷ (up from 26.9% in 2022)

12.5% ↑

increase in specialty drug spend per claimant in 2025⁸

7.3% ↑

overall drug spend trend in 2025⁹

Spending continues to outpace inflation and plan growth.



THE ROOT CAUSE: TRIAL & ERROR PRESCRIBING



4 TO 8 WEEKS
to evaluate each medication change¹⁰



UP TO 50 TO 60%
of patients don't achieve remission after first line treatment¹¹



HIGHER COSTS
More medication changes mean more costs and more doctor visits¹²



REAL HUMAN IMPACT
Prolonged symptoms reduce quality of life and productivity¹³



Better insights. Better medication matching.
Better outcomes for individuals, employers and the healthcare system.

Sources:

1. CMHA Mental Health Facts 2023

2. IQVIA Anti-Depressant Market Report 2025

3. Statistics Canada, Canadian Community Health Survey 2024

4. Statistics Canada, Canadian Survey on Disability 2022

5. Sun Life Disability Trends Report 2025

6. Sun Life Group Benefits Disability Experience Study 2021–2025

7. Express Scripts Canada Drug Trend Report 2026

8. Express Scripts Canada Drug Trend Report 2026

9. Express Scripts Canada Drug Trend Report 2026

10. NIMH: Time to Response in Depression Treatment

11. Rush AJ et al. Am J Psychiatry 2006

12. IMS Health. Multiple Switches Increase Costs 2018

13. Deloitte. The ROI of Mental Health 2022



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The Hidden Cost of Trial & Error Prescribing in Mental Health

Why finding the right mental health medication is often more difficult, more expensive, and more disruptive than many other medical conditions.



WHAT IS TRIAL & ERROR PRESCRIBING?

In mental health treatment, clinicians often must determine the right medication and dose through a process of observation and adjustment because no routine test currently predicts with certainty which medication will work best for an individual.

This can result in:



Multiple medication changes



Dose increases and decreases



Additional medications being added



Weeks or months before effectiveness is known



Side effects that lead to discontinuation



WHY DOES IT HAPPEN?

Mental health medications are uniquely complex because response is influenced by:



Genetics and drug metabolism



Brain receptors and neurotransmitters



Biological pathways and signaling systems



Individual differences in response and tolerability



The same medication can work extremely well for one person and poorly for another.

THE REAL-WORLD IMPACT

40%

Mental health conditions account for nearly 2 in 5 LTD claims in Canada.

– HR Reporter, 2024

35%

Mental health represents the largest source of new and open disability claims.

– BBD, 2024

70%

Mental health claims account for approximately 70% of total disability costs due to longer durations and recurring absences.

– BBD, 2024

10.4%

Nearly 3.1 million Canadians live with a mental health-related disability.

– Statistics Canada, 2025

COSTS OF TRIAL & ERROR PRESCRIBING



FOR INDIVIDUALS

- Delayed symptom improvement
- Increased side effects
- Reduced quality of life
- Longer recovery periods



FOR EMPLOYERS

- Higher disability costs
- Increased absenteeism and presenteeism
- Lower productivity and engagement
- Greater mental health drug spend



FOR INSURERS & DISABILITY ORGANIZATIONS

- Longer claim durations
- Recurring disability episodes
- Higher pharmacy costs
- More complex claim management

WHY MENTAL HEALTH MEDICATIONS SUFFER FROM TRIAL & ERROR PRESCRIBING MORE THAN OTHER MEDICATIONS

Mental health conditions and treatments are uniquely complex, making it harder to predict how someone will respond to a medication.



COMPLEX BRAIN CHEMISTRY

Many neurotransmitters and pathways are involved, and they vary greatly between individuals.



HIGHLY INDIVIDUAL RESPONSE

What works for one person may not work—or may cause side effects—for another.



DELAYED TIME TO BENEFIT

It can take weeks to know if a medication is working, leading to multiple adjustments.



WIDE VARIETY OF MEDICATION CLASSES

Many classes (e.g., antidepressants, antipsychotics, mood stabilizers) with different mechanisms increase the guesswork.



SIDE EFFECTS AND TOLERABILITY

Side effects vary widely and can lead to stopping or switching medications multiple times.



IMPACT ON DAILY LIFE

Symptoms affect mood, motivation, and thinking—making the trial & error process more difficult.



MORE TRIAL. MORE TIME. MORE IMPACT.

Because responses are less predictable, individuals often try several medications before finding the right one—leading to more side effects, more frustration, and a bigger impact on quality of life.



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How Often Do Psychotropic Medications Fail?

The Reality of Trial & Error Prescribing in Mental Health Care



1 in 3

Only about one-third of patients achieve remission with their first antidepressant.

(Source: NIMH, STAR*D; 2022–2024 updates)



50%–66%

50%–66% of patients do not fully recover on their initial antidepressant medication.

(Source: C. Fava et al., World Psychiatry, 2023)



30%

Approximately 30% of patients develop Treatment Resistant Depression (TRD) after failing at least two adequate antidepressant trials.

(Source: Tyrka et al., World Psychiatry, 2024)



Chances of Remission Decline With Each Trial

1st Treatment	2nd Treatment	3rd Treatment	4th Treatment
~33%	~25–30%	~12–20%	~7–13%

(Source: NIMH, STAR*D long-term follow-up; 2022)



The Business Impact

- Mental health conditions account for approximately 40% of LTD claims¹
- Mental health claims represent roughly 70% of disability costs²
- Every unsuccessful medication trial can add weeks or months before stabilization and recovery

1. Disability Management Employer Coalition (DMEC), 2024.

2. Integrated Benefits Institute (IBI), 2024.



Why This Matters

Every Failed Medication Trial Can Lead To:



Longer disability durations



Higher pharmacy and healthcare costs



Increased absenteeism and presenteeism



More medication changes and augmentation therapies



Greater risk of treatment resistance



Increased frustration for patients and families



Mental health medications remain one of the few areas of healthcare where treatment selection is still largely trial and error.

Finding the right medication sooner may improve outcomes, shorten disability durations, and reduce overall mental health costs.



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WHAT IS PHARMACOGENETICS AND PHARMACOGENOMICS?

Both use your genes to guide medication decisions—but they look at different scopes.



PHARMACOGENETICS (PGx)

Focuses on how a few specific genes affect your response to medications.



Looks at a limited number of genes—most often those involved in drug metabolism (e.g., CYP450 genes).



Focuses primarily on how your body breaks down medications.



Provides insight into whether you may metabolize a medication too fast, too slow, or as expected.



Helps inform dosing and medication selection based on metabolism.



PHARMACOGENOMICS (PGx+)

Examines the impact of many genes across multiple biological pathways that influence medication response.



Evaluates a broad set of genes involved in drug metabolism, receptors, transporters, and downstream pathways.



Includes genes that influence both efficacy and the risk of side effects.



Provides a deeper understanding of how your body may respond to a medication—efficacy, risk of side effects, and optimal options.



Enables more precise medication selection, dosing, and reduces trial and error for better outcomes.



OUR GOAL

Use genetic insights to match the **right medication**, at the **right dose**, sooner—reducing trial and error and improving outcomes.



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WHAT IS PHARMACOKINETICS AND PHARMACODYNAMICS?

Together, they explain how a medication moves through your body and how it affects your body.



PHARMACOKINETICS (PK)

What the body does to the drug.

It describes the journey of a medication through the body.



ABSORPTION

How the drug enters the bloodstream.



DISTRIBUTION

How the drug spreads to tissues and organs.



METABOLISM

How the drug is broken down, mainly by the liver.



EXCRETION

How the drug or its byproducts are removed from the body.



PK influences how much drug reaches its target, how long it stays, and how often it should be dosed.



PHARMACODYNAMICS (PD)

What the drug does to the body.

It describes the effects of a medication on the body.



MECHANISM OF ACTION

How the drug produces its effects.



EFFICACY

The beneficial effect the drug is intended to produce.



SAFETY

The potential for side effects or adverse reactions.



DOSE-RESPONSE RELATIONSHIP

How the drug's effects change with different doses.



PD influences how effective the drug is and the risk of side effects.



THE BIG PICTURE

PK determines the drug exposure.
PD determines the drug effect.



Understanding both helps healthcare providers choose the **right medication, at the right dose, for the right patient** for better outcomes and fewer side effects.



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GEN 1 vs GEN 2: PHARMACOGENETICS vs PHARMACOGENOMICS

Evolving science. Deeper insight. Better outcomes.

 GEN 1 PHARMACOGENETICS (Traditional PGx)	VS.	GEN 2 PHARMACOGENOMICS (Next Generation) 
 FOCUS	Looks at how a few specific genes affect drug metabolizing enzymes (PK).	Examines multiple genes and biological pathways (PK + PD + other pathways) that influence medication response.
 WHAT IT ANALYZES	A limited set of genes (mostly CYP450 enzymes). Focus on drug metabolism.	A much broader set of genes, receptors, transporters, neurotransmitter systems, signaling pathways and more.
 DEPTH OF INSIGHT	Limited insight into why a drug works, side effects, or optimal options.	Deep, multi-dimensional insight into efficacy, side effect risk, tolerability, and the best medication choice.
 CLINICAL IMPACT	Helpful in some cases. May reduce trial-and-error for certain medications.	Improves accuracy of medication selection, reduces trial-and-error, supports better outcomes , and lowers risk of side effects and discontinuation.
 REAL-WORLD RESULT	Better than no genetic information, but still misses much of the bigger picture .	A more complete understanding leads to better matching, better outcomes, and better recovery potential .
 BOTTOM LINE	Gen 1 looks at genes.	Gen 2 looks at the whole system.



THE BOTTOM LINE

When it comes to mental health medications, **deeper insight** makes all the difference.



RIGHT MEDICATION
SOONER



BETTER
OUTCOMES



IMPROVED QUALITY
OF LIFE



LOWER COSTS



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WHO ARE THE IDEAL PARTNERS FOR PGx?

Pharmacogenomics (PGx) delivers the greatest impact when partnered with organizations and individuals committed to better outcomes.

IDEAL PARTNERS



INSURERS & PLAN SPONSORS

Seeking innovative solutions to manage drug spend, reduce claims costs, improve member outcomes and satisfaction.



EMPLOYERS & HR LEADERS

Focused on employee well-being, productivity, and reducing absenteeism and long-term disability related to mental health.



HEALTHCARE PROVIDERS & PHARMACISTS

Committed to personalized care, better treatment responses, fewer side effects, and stronger patient relationships.



BENEFIT ADVISORS & BROKERS

Looking for high-value differentiators that help clients stand out, retain business, and deliver measurable impact.



INDIVIDUALS STRUGGLING WITH TRIAL AND ERROR

Those who have not found relief after trying multiple medications and want answers, better options, and better outcomes.

OUR CURRENT PARTNERS



Stronger together for better member outcomes.



Innovating for healthier people and communities.



Equitable
Life of Canada®

Advancing health and well-being for Canadians.



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FOR EMPLOYERS

The Shift from Reactive to Preventive Mental Health Strategy



FOR INSURERS & DISABILITY ORGANIZATIONS

Mental Health Claims Require New Approaches

Traditional disability management approaches are becoming increasingly challenged by:



growing
mental health
prevalence



longer
duration
claims



recurring
absences



treatment
resistance



rising
drug
costs

The pressure to innovate is increasing.

WHERE GEN 2 PGx MAY FIT



1. COMPLEX MENTAL HEALTH CLAIMS

Especially where:

- ✓ multiple medication failures exist
- ✓ stabilization is delayed
- ✓ recovery progress has plateaued

These claims often require more insight to help guide the next best step.



2. RETURN-TO-WORK STRATEGIES

Medication instability is often a hidden barrier to:

- ✓ cognitive functioning
- ✓ emotional regulation
- ✓ workplace readiness

More personalized medication support may help improve functional recovery discussions.



3. HIGH-COST CLAIM MANAGEMENT

Targeted deployment within:

- ✓ complex claims
- ✓ long-duration claims
- ✓ recurring mental health disability

may create opportunities for:

- ✓ better member experiences
- ✓ improved stabilization
- ✓ potential duration reduction



4. PRODUCT & MARKET DIFFERENTIATION

Employers increasingly expect carriers to provide:

- ✓ innovative mental health support
- ✓ personalized solutions
- ✓ measurable outcomes
- ✓ proactive tools

The mental health landscape is becoming more competitive.



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WHEN IS THE BEST TIME TO USE PGx?

PGx can be used at two critical points to **reduce or eliminate trial & error prescribing** and help individuals get the right medication, at the right dose, sooner.



1. DIAGNOSTIC INTERVENTION (AT TIME OF NEED)

Use PGx when an individual is struggling and treatment has not been effective.



For individuals who have tried multiple medications without relief or experienced side effects.



PGx insights help identify the medications most likely to work and those to avoid.



Reduces the trial & error cycle, lowers side effects, and helps individuals feel better, sooner.



GOAL: Reduce or eliminate trial & error and find the right treatment faster.

OR



2. PREVENTIVE MEASURE (BEFORE TREATMENT)

Use PGx early—before the first or next medication is prescribed.



Helps identify the right medication and dose from the start.



Can help prevent side effects, non-response, and unnecessary medication changes.



Saves time, improves outcomes, and reduces the emotional and financial burden of trial & error.



GOAL: Prevent trial & error and start the right treatment, at the right dose, sooner.



THE RIGHT TIME. THE RIGHT DATA.

Whether used at the point of need or proactively, PGx ensures the right medication, at the right dose, sooner—reducing trial & error and improving lives.



WHERE DOES GEN 2 PGx FIT?



IT IS NOT INTENDED TO REPLACE EXISTING CARE

Gen 2 PGx works best as part of a broader ecosystem that may include:



Physicians



Psychiatrists



Psychopharmacists



Therapists



EAPs



Disability
Management
Teams



Pharmacy
Programs



Virtual Care



Workplace
Mental Health
Strategies

It complements care rather than replacing it.

POTENTIAL ECOSYSTEM INTEGRATION



EMPLOYERS

- ✓ Benefits strategies
- ✓ Wellness initiatives
- ✓ Disability prevention
- ✓ Mental health support programs



INSURERS

- ✓ Complex claims support
- ✓ Innovation strategies
- ✓ Mental health initiatives
- ✓ Pharmacy management programs



PHARMACY

- ✓ Medication optimization
- ✓ Adherence support
- ✓ Prescribing collaboration
- ✓ Specialty mental health services



HEALTHCARE PROVIDERS

- ✓ Prescribing support
- ✓ Treatment planning discussions
- ✓ Side effect reduction considerations
- ✓ Medication optimization



PLAN ADVISORS

- ✓ Benefits strategy alignment
- ✓ Vendor evaluation support
- ✓ Plan design consultation
- ✓ Cost and outcomes optimization



GROUP BENEFIT CONSULTANTS

- ✓ Renewal strategy support
- ✓ Market trend insights
- ✓ Plan performance analysis
- ✓ Innovative solution recommendations



Gen 2 PGx brings personalized medication insights into the care journey—supporting **better decisions**, **improving outcomes**, and helping reduce the human and financial burden of mental health conditions.



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Manulife's Personalized Medicine Program

Results from using Second Generation Pharmacogenomics



Personalized Medicine: Getting you more for your money

Manulife's Personalized Medicine program can help get members on the right mental health medication quicker to help prevent productivity loss and ineffective drug spend.

DRUG PLAN



<https://www.manulife.ca/business/news/group-benefits-news/personalized-medicine-helps-members-with-mental-health-condition.html>



Early directional results from the Personalized Medicine program show that members who access a test and have a change in medication average an **8-point reduction** in PHQ-9.



Early program results show **53%** of members that take the test change their mental health medication, and **82%** of members that change medication report an improvement in symptoms.



Using it has a potential **6:1 return on investment** based on the success we've seen with our Personalized Medicine program and our research.



Personalized pharmacogenetic insights help members get on the right medication, sooner—improving outcomes and creating value.



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Personalized Prescribing Inc. (PPI)

Advancing Mental Health Care Through Pharmacogenomics

A Canadian company committed to improving mental health outcomes through science, innovation, and personalized care.



Canadian company, started Journey in 2014



Developed a comprehensive pharmacogenomic test panel for psychotropic drugs in 2018



Offers **Second Generation** Pharmacogenomics – including pharmacokinetics and pharmacodynamics



Proprietary algorithms based on high level scientific evidence



Pharmacist's recommendation to assist doctors and their patients



Proven with excellent outcomes



Lab owned by PPI and is CAP Certified



ISO9001 and ISO27001 Certified



Cheek swab sample needed



TAT = 5 – 7 business days

Accredited. Certified. Trusted.

PPI is committed to the highest standards of quality, security, and patient care.



Combining advanced science, clinical expertise, and compassionate care to deliver **personalized insights** that improve lives.

Better insights. Better decisions. Better outcomes.



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Competitive Advantage

The Only Second-Generation Pharmacogenomics Service Provider Worldwide

	Personalized Prescribing Inc. (PPI)	Other Competitors
 Provider Type	Second-generation PGx	First-generation PGx
 Auto-generated Report	✓✓	✓✓
 Gene- Drug Interaction Insights	✓✓	✓✓
 Analyze PK and PD Genes	✓✓	Some companies test for SLC6A4 and HTR2A only that is not enough
 Polygenic Interpretation	✓✓	XX
 Specific Drug Recommendation	✓✓	XX
 Pharmacist's Service	✓✓	XX (Some companies provide only upon request)
 Laboratory	Own lab (CAP) accredited	Most companies work with other labs
 Insurance	Exclusively Approved by Insurers (Manulife, Equitable Life and RBC Insurance)	XX (In some cases, patients get a small discount)
 Certifications	ISO 9001 (Quality) and ISO 27001 (Security)	Varies with each company
 Patient Feedback (Google Review)	Almost 100% 5 star	Minimal or no verified reviews

Test Process

A simple, seamless process from ordering to actionable insights.

Go to PPI's website



Visit

www.personalizedprescribing.com

Purchase Rx-Report® Psychiatry P.A.



Cost \$540 + HST

Case-pharmacist



Sandee Horvath
Pharmacist

Cindy Hecht
Pharmacist

Sara Tombs
Pharmacist

Patient is assigned to a case-pharmacist who reaches out to patients for their clinical and medication history.

Sign consent form



Patient receives a separate email to sign consent form

Receive sample kit



PPI sends a DNA swab sample collection kit with instruction

Post-test consultation



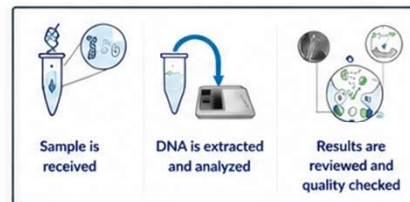
Patients may schedule post-test consultation with case-pharmacist (optional)

Receive/ view test report



Case pharmacist interprets and sends personalized report to patients and directs to www.rxreport.com

Sample processing



PPI lab processes the sample, and the results are uploaded to PPI software.

Home sample collection



Patients collect samples and send back to PPI lab with pre-paid envelope enclosed within kit. <https://youtu.be/PkmpnQtUbKU>



From start to actionable insight—PPI makes precision mental health care simple, accessible, and impactful.



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Bringing It All Together

Better Insights. Better Decisions. Better Outcomes.



Mental Health Is a Population Health Priority

Rising prevalence and complexity call for earlier, smarter, and more personalized approaches.



Trial & Error Has Real Human and Financial Costs

Ineffective medication trials delay recovery, increase costs, and impact quality of life and productivity.



Gen 2 PGx Enables More Personalized Care

Gen 2 PGx provides unique insights to support more precise medication choices for individuals.



Integration Creates Greater Impact

PPI, PGx, and care ecosystem partners working together can improve outcomes at scale.



Better Outcomes Drive Better Results

Healthier individuals lead to stronger workplaces, reduced costs, and more sustainable benefits.



The Opportunity Is Now

The future belongs to organizations that embrace innovation, prevention, and personalization.



At Personalized Prescribing Inc., we combine PPI and Gen 2 PGx to deliver personalized mental health insights that support better decisions, better outcomes, and better lives.

PPI + PGx = Personalized Care with Population Impact.

Better care for individuals. Better outcomes for organizations. Better future for all.



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Research and Development

We continue to push the envelope in developing genetic analyses that may be helpful in improving mental wellness.



IntraMind



A self-optimization platform designed to identify the biological drivers of mental distress



Analyzes genes that influence baseline levels of the “Big Three” neurotransmitters: serotonin, dopamine, and noradrenaline



Identifies the gap between your genetic foundation and current symptoms to indicate possible neurochemical imbalance



Provides a personalized roadmap to restore neurochemical balance focusing on non-medication strategies such as nutrition, lifestyle optimization, and cognitive protocols to support optimal brain function





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Thank You!



**Better Insights.
Better Decisions.**



Better Outcomes.



**Better Future
for All.**

**Together, we can transform mental health care
and create meaningful impact for populations everywhere.**



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