Personalised Prescribing: **A Clinician's Guide to Pharmacogenomics (PGx)**

Redefining the Standard of Care

Pharmacogenomics (PGx) is the study of how genetic variations influence an individual's response to medications. PGx is now enabling doctors to test for specific genetic changes to predict whether a patient may have a normal response, a poor response, or a higher risk of side effects before prescribing a specific medication.

The myDNA PGx test identifies actionable genetic variations in genes that encode key CYP450 drug-metabolising enzymes and genes encoding key drug transporters that are involved in regulating how drugs enter and exit target cells in the body. Variations in these genes affect metabolism and bioavailability of various medications — potentially increasing the risk of side effects/toxicity or leading to lack of treatment response for certain medications.

Understanding Metaboliser Status

For drug metabolising enzymes, the myDNA PGx report identifies four phenotypes to help you predict drug exposure and toxicity risk for your patient:

Metaboliser Status (predicted phenotype)	Enzyme Activity	Predicted Effect on Active Drugs* (e.g., SSRIs)	Predicted Effect on Prodrugs^ (e.g., Codeine)
Poor	Absent / Minimal	**Side Effects and Toxicity:** Impaired clearance leads to drug accumulation and increased risk of adverse effects and toxicity.	**Lack of Treatment Response:** Reduced conversion to active metabolite results in poor efficacy.
Intermediate	Reduced	**Increased Risk of Side Effects:** Slower metabolism may necessitate lower-than-standard dosing.	**Sub-therapeutic Response:** Reduced conversion rate may limit clinical benefit.
Normal	Standard	**Expected Response:** Standard metabolism rate; conventional dosing typically applies.	**Expected Response:** Standard conversion rate; conventional dosing typically applies.
Rapid / Ultrarapid	Increased	**Lack of Treatment Response:** Rapid clearance may prevent drugs from reaching therapeutic levels.	**Risk of Toxicity:** Accelerated conversion causes a rapid increase in active metabolite levels.

*Active Drugs: Medications that exert a therapeutic effect in their ingested form and require enzymes primarily for inactivation and clearance.

^Prodrugs: Pharmacologically inactive compounds that require enzymatic conversion (bioactivation) within the body to become therapeutically active.

Figure 1 below illustrates how standard dosing for a specific active drug may be adjusted according to a patient's predicted metaboliser phenotype to ensure efficacy and minimise toxicity.

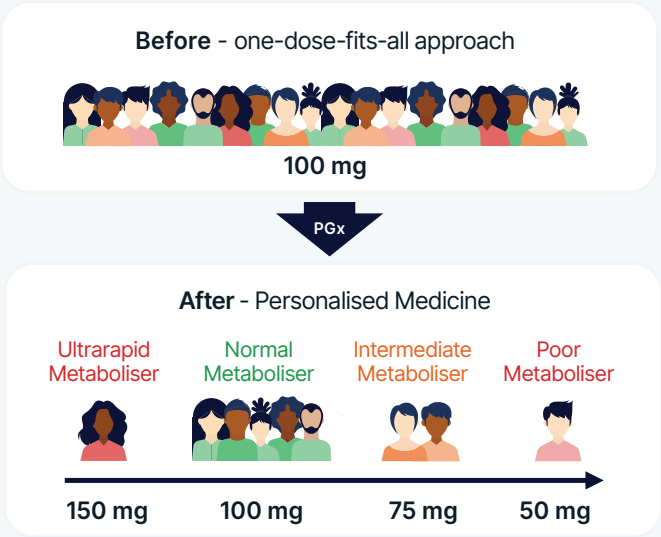

Figure 1 - Personalised Prescribing

Clinically Actionable Insights

The myDNA PGx report translates complex genetic data into simple colour coded prescribing categories for over 100 medications in clinical use (traffic light colour scheme):

- **Major Considerations:** Significant effect predicted. Adjust dose or select alternative.
- **Minor Considerations:** Altered response possible; clinical significance may be minor.
- **Usual Considerations:** No genetic impact predicted. Follow standard protocols.

Supporting Evidence

The clinical application of PGx testing is informed by established international guidelines and complemented by recent studies indicating potential improvements in patient outcomes:

- **CPIC** (Clinical Pharmacogenetics Implementation Consortium) and **DPWG** (Dutch Pharmacogenetics Working Group) guidelines (available at www.clinpgx.org)
- **FDA Table of Pharmacogenetic Associations**, detailing established gene-drug pairs with prescribing information.
- A **30% reduction** in clinically relevant adverse drug reactions (The Lancet, 2023)[1].
- A **1.41x higher likelihood** of symptom remission in major depression (Meta-analysis of 13 RCTs)[2].

For enquiries and support please email - clinical@mydna.life

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Who Should Be Tested?

While all patients may benefit, PGx is most impactful for those:

- Commencing or currently prescribed:
  - Medications covered by the test (e.g. certain psychotropics, analgesics, statins and PPIs).
  - With a history of significant side effects or poor therapeutic response.
- Requiring dosages outside the standard recommended range.

How to Order: Two Simple Pathways

Option 1:
Buccal Swab (At-Home)

1. **Request:**
   Download PGx Request form from the myDNA website and provide it to the patient; they can then scan the QR code on the form to order and pay for their kit.
2. **Collect and Register:**
   Patient receives kit, completes cheek swab and online registration and returns sample via included reply paid envelope.
3. **Results:**
   Sent to the nominated doctor via Healthlink/Encrypted email in 7–10 business days after sample receipt at lab.

Option 2:
Blood Sample (Pathology)

1. **Order:**
   Write "myDNA PGx test" on standard pathology form.
2. **Collect:**
   Patient visits any participating centre - Genomic Diagnostics* or 4Cyte Pathology.

   * Genomic Diagnostics Pathology brands include: Laverty, Dorevitch, QML, Western, Abbott, and TML Pathology.
3. **Results:**
   Delivered directly to your clinic for follow-up within 7-10 days.

Cost to Patient

Multiple Category Test: $198

Mental Health Category: $149

Please refer to our website regarding Private Health Insurance Rebates.

Testing accuracy and cost remain identical across both collection methods (Buccal Swab or Blood Sample).

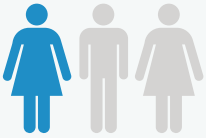
Clinical Considerations & Limitations

PGx testing is a powerful tool but should be used alongside clinical judgment.

- **Scope:** Does not cover all medications or all rare genetic variants.
- **Complexity:** Many other factors like age, drug-drug interactions, and liver or renal impairment can also affect drug response.

Did you know?

Up to **1 in 10 people** may process certain medications too slowly, increasing their risk of side effects[3].



Up to **1 in 3 people** may process certain medications too quickly, increasing their risk of treatment failure[3].

References:

1. Swen JJ, et al. A 12-gene pharmacogenetic panel to prevent adverse drug reactions: an open-label, multicentre, controlled, cluster-randomised crossover implementation study. Lancet. 2023 Feb. https://pubmed.ncbi.nlm.nih.gov/36739136/
2. Brown LC, et al. Pharmacogenomic Testing and Depressive Symptom Remission: A Systematic Review and Meta-Analysis of Prospective, Controlled Clinical Trials. Clin Pharmacol Ther. 2022 Dec. https://pubmed.ncbi.nlm.nih.gov/36111494/
3. Hicks JK, et al. Clinical pharmacogenetics implementation consortium guideline (CPIC) for CYP2D6 and CYP2C19 genotypes and dosing of tricyclic antidepressants: 2016 update. Clin Pharmacol Ther. 2016.

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