Genomic Diagnostics

LEADING THE WAY TO IMPROVE HEALTH

Pharmacogenomic Testing

TAILORING MEDICATION FOR EVERY INDIVIDUAL

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Pharmacogenomic Testing - Tailoring Medication for Every Individual

Pharmacogenomics (PGx) is the study of genetic variations that influence medication response.

Awareness of genetic variations can determine if patients:

- **Are at higher risk of side effects of toxicity from their medication**
- **Have a higher potential for therapeutic failure**
- **Are expected to experience symptom relief from a standard dose**

Why should PGx testing be performed?

PGx testing has the potential to improve the quality of care and outcomes for patients, through providing more personalised and effective treatment plans.

- Increased treatment success rates – patients are 71% more likely to achieve symptom remission when using PGx guided therapy[1-6]
- Improved medication selection – by choosing the most effective medication for each patient based on their genetic results
- Optimised dosing – medication doses can be adjusted based on a patient's metabolism profile
- Aid in predicting and preventing side effects - adverse drug reactions have been shown to be reduced by 30% in individuals who have had their treatment guided by PGx testing[12]
- Reduced inefficiency of trial-and-error prescribing that can be costly and time consuming
- Improved prescription adherence rates by boosting patient's confidence in the safety and efficacy of prescribed medications

What evidence supports PGx testing?

There is an ever-increasing volume of literature and evidence regarding the interactions between genetic variations and medication as the science continues to expand. This includes large Australian studies[7].

Worldwide, studies have been summarised into evidence-based published guidelines by the Clinical Pharmacogenetics Implementation Consortium (CPIC)[8] and the Royal Dutch Pharmacists Association – Pharmacogenetics Working Group. These guidelines are regularly updated and peer reviewed.

They are available at:

- https://cpicpgx.org/
- https://www.pharmgkb.org/ guidelineAnnotations

These resources provide more detailed recommendations on how to use pharmacogenetic information to guide medication prescribing and dosing decisions.

Only **50%** of patients respond to their initial treatment with antidepressants[9]

1 in 10 people may process certain medications too slowly, increasing their risk of side effects[10]

1 in 3 people may process certain medications too quickly, increasing their risk of treatment failure[10]

1 in 5 Australians suffer from persistent pain, making their risk of depression 4 x higher than those without pain[11]

When to request PGx testing

Pharmacogenomic testing can be requested under a wide range of clinical scenarios where additional information is helpful in optimising medication selection and dosing for individual patients. These include:

- For patients starting anti-depressants or other mental health medications for the first time
- For patients starting any medications where clinically relevant information is provided through the PGx testing panels
- For patients not achieving relief from symptoms or having side effects on current medication

Timely PGx testing can provide valuable knowledge to help your patients get back on the road to better health and reduce the likelihood of worsening symptoms or side effects.

Pharmacogenomic Panel options

Genomic Diagnostics offers three PGx panel options so you can choose which one will be best for each patient.

- **PGx Multi** - analysis of 9 genes covering all medications in the Mental Health and Pain PGx panels, in addition to proton pump inhibitors, statins, other cardiac medications and miscelleneous others.
- **PGx Mental Health (MH)** – analyses genes that are known to be involved in metabolism of 80% of medications used in mental health, including antidepressants, antipsychotics, anxiolytics and some ADHD medications.
- **PGx Pain** – analyses genes known to affect the drug response to several analgesics used to treat pain, including opioid analgesics, non-steroidal anti-inflammatory drugs (NSAIDs) and some neuropathic pain medications.

Interpreting the personalised PGx medication report

The patient's genetic results are released on a detailed report, which provides clinically relevant information about their predicted response to over 100 medications used in clinical practice.

All medications covered by this report are categorized as having major, minor or usual prescribing considerations based on the patient's unique PGx results.

This report provides clinically relevant information about drug metabolism and plasma concentrations (drug exposure), as well as the potential for altered clinical effects.

For each medication of interest the report offers:

- an interpretation of results
- actionable recommendations based on international guidelines

It is important to list on the patient's request form:

- current medications
- medications considered for the future
- past medications

For many medications covered in this report, evidence-based guidelines and drug label information are available and where relevant are referenced in this report.

Major prescribing considerations:

A significant effect to drug response is predicted. There may be guidelines recommending consideration be given to a change in the dose or the medication type.

MEDICATIONS WITH MAJOR PRESCRIBING CONSIDERATIONS		
Medication	**Interpretation**	**Recommendation**
Escitalopram (Antidepressants - SSRIs)	**CYP2C19** - Poor metaboliser: Negligible metabolism oaf escitalopram by CYP2C19 and greatly increased drug exposure are predicted. This may increase the risk of adverse effects.	CPIC guidelines provide a moderate recommendation to consider a 50% dose reduction of the recommended starting dose and titrate to response.

Minor prescribing considerations:

Altered drug response is possible, but the clinical significance is either thought to be minor or there is insufficient data available.

MEDICATIONS WITH MINOR PRESCRIBING CONSIDERATIONS		
Medication	**Interpretation**	**Recommendation**
Ibuprofen (NSAIDs)	**CYP2C9** - Intermediate metaboliser: Mildly reduced metabolism by CP2C9 and increased drug exposure are predicted. This effect may be exacerbated by high dosages or drug-drug interactions.	CPIC guidelines have a moderate recommendation to initiate therapy with the recommended starting does. In accordance with prescribing information, use the lowest effective dose for the shortest duration required. Monitor for adverse effects.

Usual prescribing considerations:

Genetic results are not predicted to affect drug response, and there are no additional prescribing considerations.

MEDICATIONS WITH USUAL PRESCRIBING CONSIDERATIONS		
Medication	**Interpretation**	**Recommendation**
Clopidogrel (Antiplatelet drugs)	**CYP2C19** - Normal metaboliser: Normal formation of clopidogrel's active metabolite by CYP2C19 is predicted.	CPIC guidelines provide a strong recommendation to use the label-recommended dosage if clopidogrel is being prescribed for cardiovascular or neurovascular indications.

Arranging Pharmacogenomic Testing

STEP 1: Patient Consultation:

- Discuss PGx testing options with your patient
- Order on standard pathology request form, noting all current, previous and future medications of interest

STEP 2: Prepare for Collection

- Patient is required to pay for the test prior to having their blood taken
- Payment occurs online at www.gdpay.com.au
- Patient notes their receipt number on the request form. There is NO Medicare rebate for this test

STEP 3: Sample collection

- Patient attends collection centre with their signed request form
- Blood is collected
- PGx testing is performed

STEP 4: Results discussion

- The pdf report is delivered to your patient software, via Medway or via a separate doctor portal

References:

1. https://pubmed.ncbi.nlm.nih.gov/16581694/
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12. https://pubmed.ncbi.nlm.nih.gov/36739136/

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Healius Pathology Pty Ltd (ACN 007 190 043) t/a Genomic Diagnostics_GD169_V1_Apr23