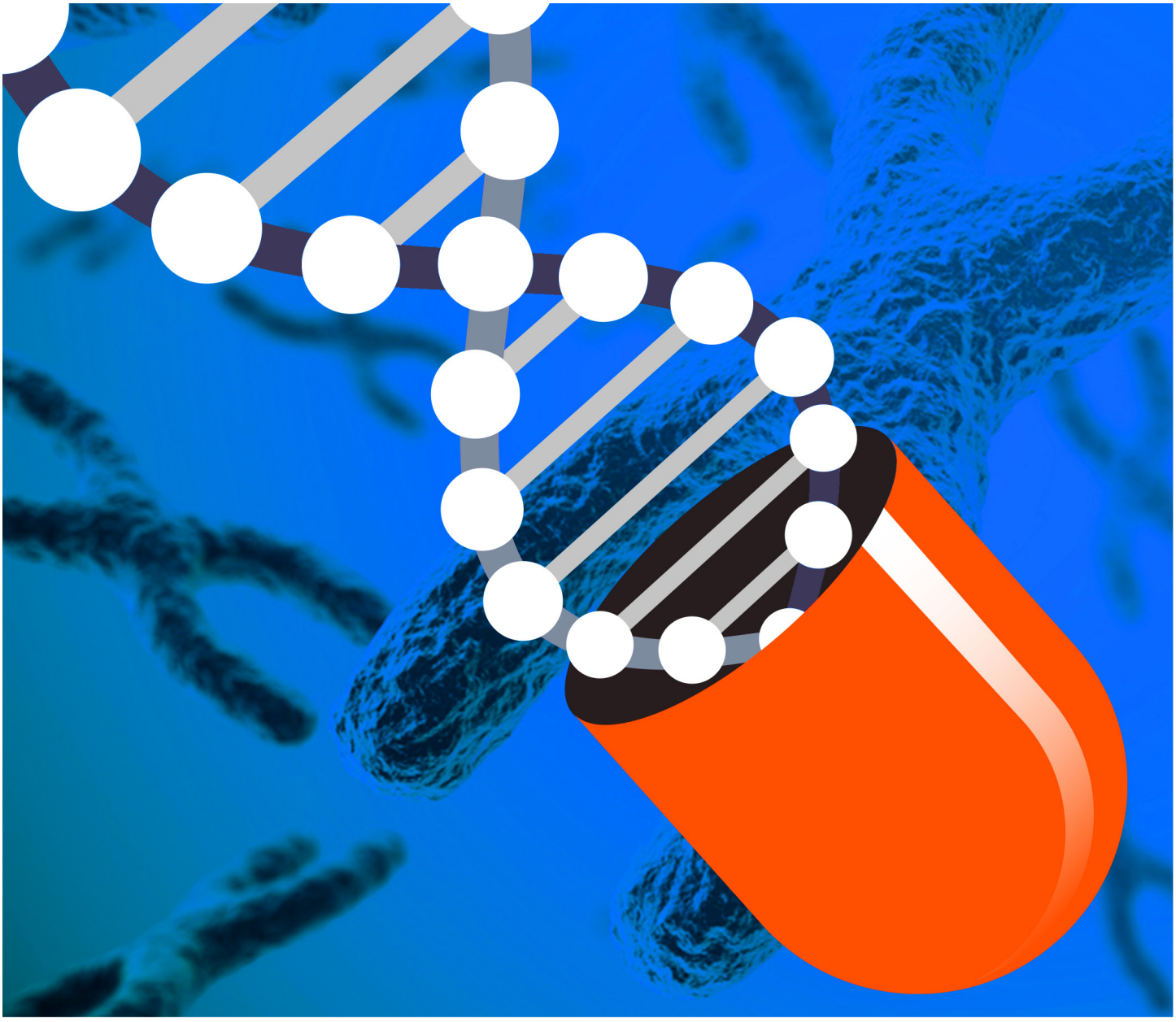
MAYO CLINIC
Mayo Medical Laboratories

FOCUSED PHARMACOGENOMICS PANEL

TESTING MORE VARIANTS PER GENE TO PROVIDE MORE ACCURATE RESULTS



WHAT IS PHARMACOGENOMICS (PGx), AND WHY IS IT IMPORTANT?

The drugs available today to treat diseases are powerful agents that work as intended in most patients. Yet, in some people, a particular drug at the standard dose might not work well enough or may even trigger a serious adverse reaction.

Genetic causes often play an important role in a patient's predisposition to experiencing adverse drug reactions or therapeutic failure. In a recent study at Mayo Clinic that clinically evaluated five genes, it was found that 99% of the subjects had an actionable variant in at least one gene.[1]

Therefore, the timely delivery of pharmacogenomic information (or drug/gene interaction warnings) helps maximize efficacy and minimize adverse events when treating patients with these powerful drugs.

WHY ADOPT PGX TESTING NOW?

- While 97.6% of physicians agree that genetic variations may influence drug response, only 12.9% of physicians routinely order PGx testing.[2]
- Ongoing research continues to uncover new drug/gene interactions that further increase the clinical relevance of PGx testing.
- PGx offers the maximum benefit when appropriate clinical decision support (CDS) is available. Rapidly increasing adoption rates of electronic health records mean that quality CDS tools are more widely available than ever.
- As the cost of genotyping continues to drop, the cost/benefit ratio of PGx testing becomes increasingly attractive.

FOCUSED PGx PANEL

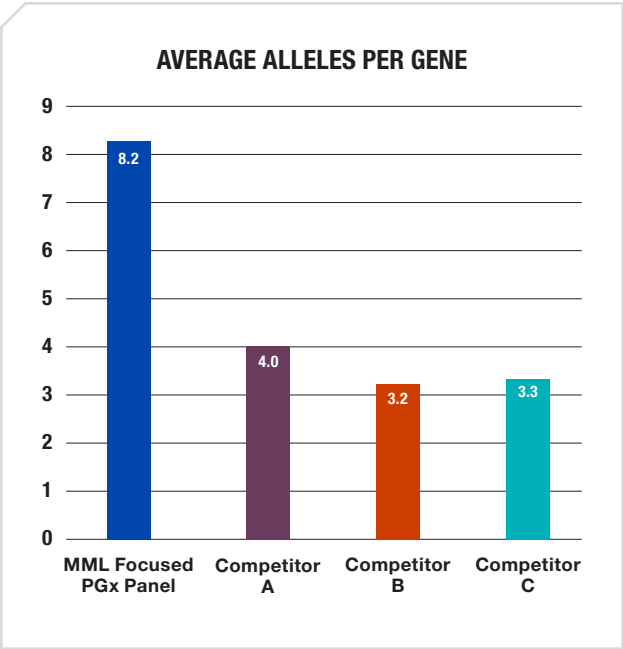
Until recently, pharmacogenomic tests have only been available by ordering one gene at a time. While this approach is appropriate in many cases, multiple genes can now be tested simultaneously and can be offered as a single cost-effective panel.

While many labs have yet to offer PGx panel testing, others have gone to the other extreme and only offer large panels. Mayo Clinic offers the best of both worlds with the focused PGx panel, smaller targeted panels, and also single-gene tests.

MORE ALLELES PER GENE

Among genotyping-based tests, our focused pharmacogenomics panel detects more alleles than other tests currently available for clinical use.

- Our panel offers an average of 8.2 alleles per gene vs. 3.5 across all competitors where data is available.
- By analyzing more variants per gene, the focused panel provides more accurate results and detects alleles that are more common in patient populations with diverse ethnic backgrounds.



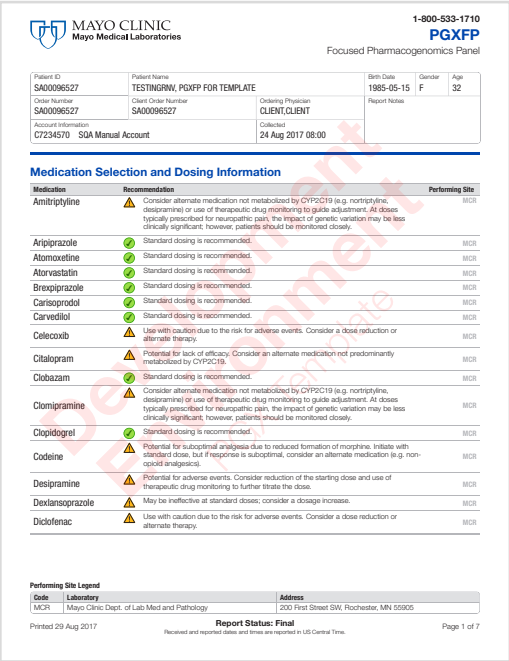
EVIDENCE-BASED APPROACH

Our focused PGx panel concentrates on commonly prescribed medications, specifically those with pharmacogenomics associations that display a very high level of evidence to support their clinical use.

- The medication list was developed based on the top 200 medications used in the U.S. and at Mayo Clinic and checked against the PGx associations for each.
- The most important drug/gene interactions were selected based on their occurrence in CDS alerts used every day at Mayo Clinic.
- Each medication was evaluated to identify well-established pharmacogenomic associations based on guidelines published by the Clinical Pharmacogenetics Implementation Consortium, information on FDA labels, guidelines published by the Dutch Pharmacogenetics Working Group, information curated by the Pharmacogenomics Knowledge Base (PharmGKB), and current literature.

OPTIMIZED REPORTING

Our report is easy to use, including both symbols and text to guide medication prescription and includes clear recommendations on how to interpret results for each medication. The information you need is readily available on the report without the need to log into a separate portal or to follow footnotes to find the information you need.



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1-800-533-1710
PGXFP
Focused Pharmacogenomics Panel

Patient ID	Patient Name		Birth Date	Gender	Age
SA00096527	TESTINGRNV, PGXFP FOR TEMPLATE		1985-05-15	F	32
Order Number	Client Order Number	Ordering Physician	Report Notes		
SA00096527	SA00096527	CLIENT,CLIENT			
Account Information		Collected			
C7234570 SQA Manual Account		24 Aug 2017 08:00			

Medication Selection and Dosing Information

Medication	Recommendation	Performing Site
Amitriptyline	Consider alternate medication not metabolized by CYP2C19 (e.g. nortriptyline, desipramine) or use of therapeutic drug monitoring to guide adjustment. At doses typically prescribed for neuropathic pain, the impact of genetic variation may be less clinically significant; however, patients should be monitored closely.	MCR
Aripiprazole	Standard dosing is recommended.	MCR
Atomoxetine	Standard dosing is recommended.	MCR
Atorvastatin	Standard dosing is recommended.	MCR
Brexpiprazole	Standard dosing is recommended.	MCR
Carisoprodol	Standard dosing is recommended.	MCR
Carvedilol	Standard dosing is recommended.	MCR
Celecoxib	Use with caution due to the risk for adverse events. Consider a dose reduction or alternate therapy.	MCR
Citalopram	Potential for lack of efficacy. Consider an alternate medication not predominantly metabolized by CYP2C19.	MCR
Clobazam	Standard dosing is recommended.	MCR
Clomipramine	Consider alternate medication not metabolized by CYP2C19 (e.g. nortriptyline, desipramine) or use of therapeutic drug monitoring to guide adjustment. At doses typically prescribed for neuropathic pain, the impact of genetic variation may be less clinically significant; however, patients should be monitored closely.	MCR
Clopidogrel	Standard dosing is recommended.	MCR
Codeine	Potential for suboptimal analgesia due to reduced formation of morphine. Initiate with standard dose, but if response is suboptimal, consider an alternate medication (e.g. non-opioid analgesics).	MCR
Desipramine	Potential for adverse events. Consider reduction of the starting dose and use of therapeutic drug monitoring to further titrate the dose.	MCR
Dexlansoprazole	May be ineffective at standard doses; consider a dosage increase.	MCR
Diclofenac	Use with caution due to the risk for adverse events. Consider a dose reduction or alternate therapy.	MCR

Performing Site Legend

Code	Laboratory	Address
MCR	Mayo Clinic Dept. of Lab Med and Pathology	200 First Street SW, Rochester, MN 55905

Report Status: Final
Received and reported dates and times are reported in US Central Time.

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Mayo Medical Laboratories sample report.

FEATURED TEST PANEL

Focused Pharmacogenomics Panel (Mayo ID: PGXFP)

CONSULT WITH MAYO CLINIC EXPERTS ABOUT DIAGNOSES AND TREATMENTS

When you partner with Mayo Medical Laboratories, you extend your network to include some of the world's leading genetic experts. Mayo Clinic clinicians, laboratorians, and genetic counselors are available to discuss testing options, interpret results, or help with case review and coordination.

COMPREHENSIVE SUPPORT AND BILLING SOLUTIONS

- Our pharmacogenomics testing is full-service. We encourage clients to call and speak with one of our laboratory directors or genetic counselors, free of charge, should they have questions.
- Mayo Laboratory Inquiry answers all calls personally, 24 hours a day, every day. We resolve more than 99% of inquiries with a single phone call.
- Dedicated support teams located in your region offer support on any laboratory matter.
- Our service and logistics experts guide you through reimbursement or other billing-related questions.

CLINICAL REFERENCES

1. Ji Y, Skierka JM, Blommel JH, et al. Preemptive pharmacogenomic testing for precision medicine: a comprehensive analysis of five actionable pharmacogenomic genes using next-generation DNA sequencing and a customized CYP2D6 genotyping cascade. *J Mol Diagn.* 2016; 18(3):438-445.
2. Stanek EJ, Sanders CL, Taber KA, et al. Adoption of pharmacogenomic testing by US physicians: results of a nationwide survey. *Clin Pharmacol Ther.* 2012; 91(3):450-458.

FOR MORE INFORMATION ABOUT PGx TESTING, VISIT:

MayoMedicalLaboratories.com

 mayomedicallaboratories.com  news.mayomedicallaboratories.com  /mayoclinliclabs  @mayocliniclabs

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