Pharmacogenomic Testing in Community Pharmacies

18th Annual International Healthcare Summit

British Columbia
Pharmacy Association

Why Pharmacy?

- Pharmacists are medication management experts
- Pharmacists already tailor medications based on the individual
- Pharmacogenomics is another piece of information to enhance personalizing treatment

Genomics for Precision Drug Therapy in the Community Pharmacy: Phase 1 (2014 - 2015)

- Partnered with UBC Faculty of Pharmaceutical Sciences
- Received GenomeBC Funding
- 31 Pharmacies recruited 200 patients
- Demonstrating pharmacist delivered pharmacogenomic testing
- 16 new SOPs

Genomics for Precision Drug Therapy in the Community Pharmacy: Phase 2 (2017 - 2018)

- Receiving GenomeBC Funding
- Receiving contributions from Green Shield Canada & Pfizer Canada
- Examine PGx application in mental health
- Demonstrating pharmacist delivered PGx consultation & application
- Support business case for payers

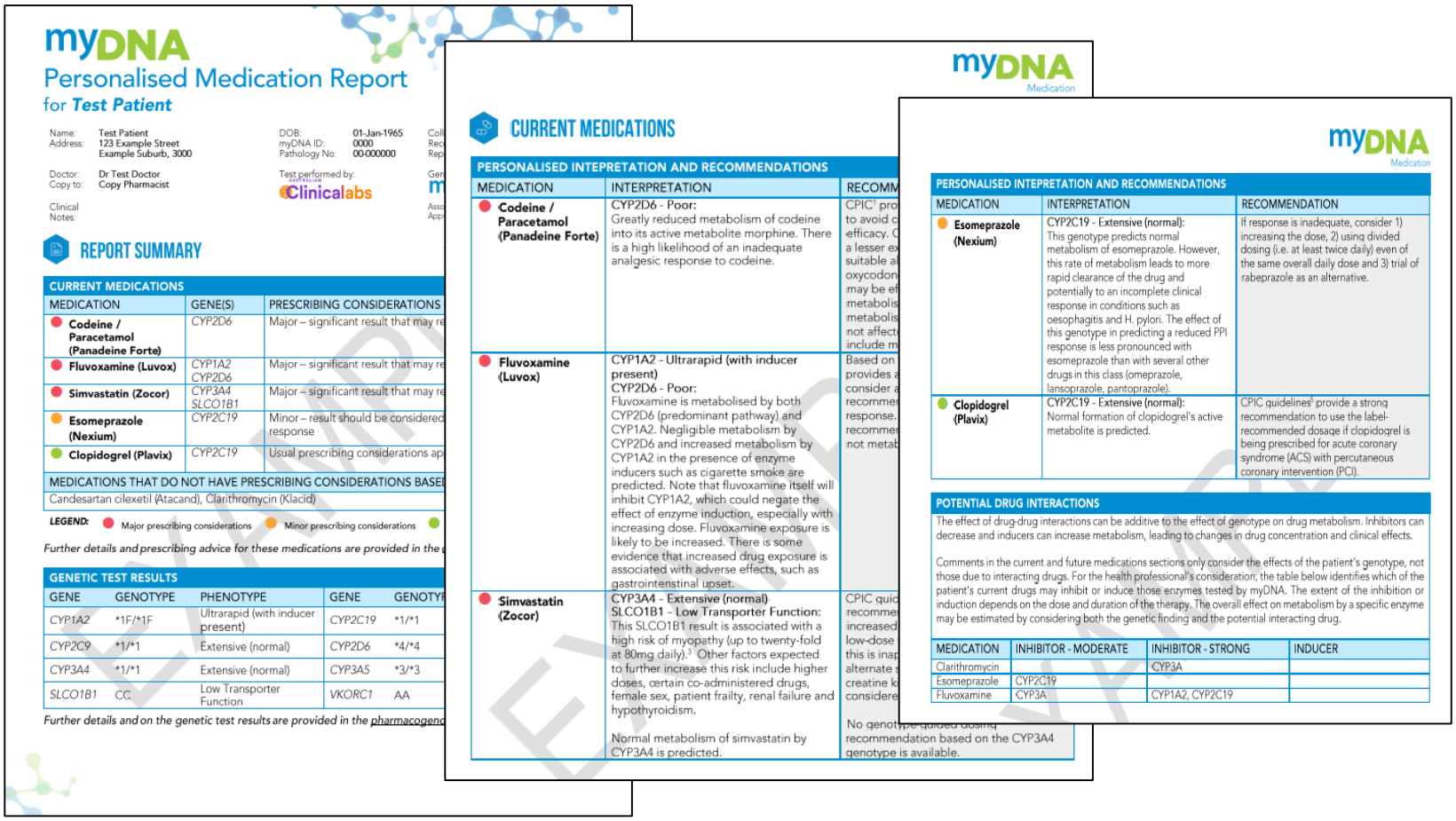
Creating an opportunity for pharmacists

RXOME
Pharmacogenomics Canada, Inc.

- ✓ Support pharmacies in expanding their professional services offering
- ✓ Strong research links and interest
- ✓ Focused on training, education and awareness

Growing Pharmacy Network

The myDNA Personalized Report



myDNA
Personalised Medication Report
for *Test Patient*

Name: Test Patient
Address: 123 Example Street, Example Suburb, 3000
DOB: 01-Jan-1965
myDNA ID: 0000
Pathology No: 00-000000
Doctor: Dr Test Doctor
Copy to: Copy Pharmacist
Test performed by: Clinicalabs
Clinical Notes:

REPORT SUMMARY

CURRENT MEDICATIONS

MEDICATION	GENE(S)	PRESCRIBING CONSIDERATIONS
Codeine / Paracetamol (Panadeine Forte)	*CYP2D6*	Major – significant result that may re
Fluvoxamine (Luvox)	*CYP1A2* *CYP2D6*	Major – significant result that may re
Simvastatin (Zocor)	*CYP3A4* *SLCO1B1*	Major – significant result that may re
Esomeprazole (Nexium)	*CYP2C19*	Minor – result should be considered response
Clopidogrel (Plavix)	*CYP2C19*	Usual prescribing considerations ap

MEDICATIONS THAT DO NOT HAVE PRESCRIBING CONSIDERATIONS BASE
Candesartan cilexetil (Atacand), Clarithromycin (Klacid)

LEGEND: Major prescribing considerations; Minor prescribing considerations

Further details and prescribing advice for these medications are provided in the

GENETIC TEST RESULTS

GENE	GENOTYPE	PHENOTYPE	GENE	GENOTY
CYP1A2	*1F/*1F	Ultrarapid (with inducer present)	*CYP2C19*	*1/*1
CYP2C9	*1/*1	Extensive (normal)	*CYP2D6*	*4/*4
CYP3A4	*1/*1	Extensive (normal)	*CYP3A5*	*3/*3
SLCO1B1	CC	Low Transporter Function	*VKORC1*	AA

Further details and on the genetic test results are provided in the pharmacogen

myDNA Medication

CURRENT MEDICATIONS

PERSONALISED INTEPRETATION AND RECOMMENDATIONS

MEDICATION	INTERPRETATION	RECOMM
Codeine / Paracetamol (Panadeine Forte)	CYP2D6 - Poor: Greatly reduced metabolism of codeine into its active metabolite morphine. There is a high likelihood of an inadequate analgesic response to codeine.	CPIC[1] pro to avoid c efficacy. C a lesser ex suitable al oxycodon may be ef metabolis metabolis not affect include m
Fluvoxamine (Luvox)	CYP1A2 - Ultrarapid (with inducer present) CYP2D6 - Poor: Fluvoxamine is metabolised by both CYP2D6 (predominant pathway) and CYP1A2. Negligible metabolism by CYP2D6 and increased metabolism by CYP1A2 in the presence of enzyme inducers such as cigarette smoke are predicted. Note that fluvoxamine itself will inhibit CYP1A2, which could negate the effect of enzyme induction, especially with increasing dose. Fluvoxamine exposure is likely to be increased. There is some evidence that increased drug exposure is associated with adverse effects, such as gastrointenstinal upset.	Based on provides a consider a recomme response. recomme not metab
Simvastatin (Zocor)	CYP3A4 - Extensive (normal) SLCO1B1 - Low Transporter Function: This SLCO1B1 result is associated with a high risk of myopathy (up to twenty-fold at 80mg daily).[3] Other factors expected to further increase this risk include higher doses, certain co-administered drugs, female sex, patient frailty, renal failure and hypothyroidism. Normal metabolism of simvastatin by CYP3A4 is predicted.	CPIC quic recomme increased low-dose this is inap alternate s creatine k considere No genotype-guided dosing recommendation based on the CYP3A4 genotype is available.

myDNA Medication

PERSONALISED INTEPRETATION AND RECOMMENDATIONS

MEDICATION	INTERPRETATION	RECOMMENDATION
Esomeprazole (Nexium)	CYP2C19 - Extensive (normal): This genotype predicts normal metabolism of esomeprazole. However, this rate of metabolism leads to more rapid clearance of the drug and potentially to an incomplete clinical response in conditions such as oesophagitis and H. pylori. The effect of this genotype in predicting a reduced PPI response is less pronounced with esomeprazole than with several other drugs in this class (omeprazole, lansoprazole, pantoprazole).	If response is inadequate, consider 1) increasing the dose, 2) using divided dosing (i.e. at least twice daily) even of the same overall daily dose and 3) trial of rabeprazole as an alternative.
Clopidogrel (Plavix)	CYP2C19 - Extensive (normal): Normal formation of clopidogrel's active metabolite is predicted.	CPIC guidelines[2] provide a strong recommendation to use the label-recommended dosage if clopidogrel is being prescribed for acute coronary syndrome (ACS) with percutaneous coronary intervention (PCI).

POTENTIAL DRUG INTERACTIONS

The effect of drug-drug interactions can be additive to the effect of genotype on drug metabolism. Inhibitors can decrease and inducers can increase metabolism, leading to changes in drug concentration and clinical effects.

Comments in the current and future medications sections only consider the effects of the patient's genotype, not those due to interacting drugs. For the health professional's consideration, the table below identifies which of the patient's current drugs may inhibit or induce those enzymes tested by myDNA. The extent of the inhibition or induction depends on the dose and duration of the therapy. The overall effect on metabolism by a specific enzyme may be estimated by considering both the genetic finding and the potential interacting drug.

MEDICATION	INHIBITOR - MODERATE	INHIBITOR - STRONG	INDUCER
Clarithromycin		CYP3A	
Esomeprazole	CYP2C19		
Fluvoxamine	CYP3A	CYP1A2, CYP2C19	

www.bcpharmacy.ca

Using Tools Available Today