Mar 5, 2024

Dear Physician,

Re: Patient Name

Your patient has elected to receive information about his/her pharmacogenetic profile using the Pillcheck™ service by GeneYouIn. I am a consulting clinical pharmacist providing a review of your patient's pharmacogenetic profile and the medical information provided by the patient. This letter outlines considerations for current and/or future medication therapy where applicable.

Patient-reported medical conditions:

Fatigue, Hypertension, high blood pressure, Insomnia (trouble sleeping), Obesity, Obsessive-compulsive disorder (OCD)

Patient-reported medications:

Current Medications

DEXTROAMPHETAMINE

DOSAGE	EFFECTIVENESS	START DATE	SIDE EFFECTS
15mg	Not Effective	2021-02	Tremor

⚠ Dextroamphetamine – **Use with caution** – Enhanced drug clearance may lead to reduced clinical response and lower risk of side effects.

Consider methylphenidate or non-stimulant medications.

BIOMARKER	INTERPRETATION
CYP2D6	Ultrarapid metabolizer
OPRM1	Normal sensitivity to opioids

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Current Medications

PAXIL TAB 20MG

DOSAGE	EFFECTIVENESS	START DATE	SIDE EFFECTS
20mg	Not Effective	2021-03	Agitation

BIOMARKER	INTERPRETATION
CYP2D6	Ultrarapid metabolizer

Paroxetine – **Consider alternatives** – Increased metabolism to less active compounds when compared to extensive metabolizers. Lower/undetectable plasma concentrations may increase the probability of pharmacotherapy failure. Select alternative drug not predominantly metabolized by CYP2D6. Coadministration of paroxetine with other drugs that are metabolized by CYP2D6, including certain drugs effective in the treatment of major depressive disorder, should be avoided.

Consider (es)citalopram, sertraline or buproprione.

ABILIFY

DOSAGE	EFFECTIVENESS	START DATE	SIDE EFFECTS
2mg	Somewhat Effective	2022-05	

BIOMARKER	INTERPRETATION
CYP2D6	Ultrarapid metabolizer

Aripiprazole – **Use with caution** – Potentially decreased response due to accelerated clearance; higher doses might be required to achieve a clinical effect or consider alternative treatment with drugs NOT metabolized by CYP2D6. Adjust dosage at intervals of not less than 2 weeks, the time needed to achieve steady-state concentration.

If patient symptoms are not controlled, consider alternative antipsychotic medications (olanzapine or lurasidone).

OZEMPIC

DOSAGE	EFFECTIVENESS	START DATE	SIDE EFFECTS
1mg weekly	Somewhat Effective	2023-01	bloating

There are currently no pharmacogenetic recommendations for this medication.

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Current Medications

VYVANSE

DOSAGE	EFFECTIVENESS	START DATE	SIDE EFFECTS
60mg	Somewhat Effective	2022-01	

There are currently no pharmacogenetic recommendations for this medication.

Past Medications

Escitalopram

DOSAGE	EFFECTIVENESS	SIDE EFFECTS
20mg	Not Effective	

✅ Escitalopram – **Standard precaution** – Normal drug clearance is anticipated.

BIOMARKER	INTERPRETATION
CYP2C19	Normal metabolizer

ATIVAN SUBL TAB 0.5MG

DOSAGE	EFFECTIVENESS	SIDE EFFECTS
0.5 mg	Somewhat Effective	

⚠️ Lorazepam – **Use with caution** – Reduced drug clearance is anticipated, increasing clinical response and increasing risk of side effects. In patients with depression, benzodiazepines should not be used without adequate antidepressant therapy. Use with caution in patients with COPD or sleep apnea. Elderly or debilitated patients may be more susceptible to the sedative effects. Therefore, these patients should be monitored frequently and have their dosage adjusted according to patient response; the initial dosage should not exceed 2 mg.

BIOMARKER	INTERPRETATION
UGT2B15	Intermediate metabolizer

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Past Medications

Pantoprazole

DOSAGE	EFFECTIVENESS	SIDE EFFECTS
40mg		

Pantoprazole – **Standard precaution** – Initiate standard starting daily dose. Consider increased dose by 50-100% for the treatment of H. pylori infection and erosive esophagitis. Daily dose may be given in divided doses. Monitor for efficacy.

BIOMARKER	INTERPRETATION
CYP2C19	Normal metabolizer

ASPIRIN 81MG

DOSAGE	EFFECTIVENESS	SIDE EFFECTS
	Somewhat Effective	Nosebleed

There are currently no pharmacogenetic recommendations for this medication.

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Additional considerations for current therapy:

- Melatonin is thought to be metabolized by CYP 1A2; client has increased clearance of medications that depend on this enzyme and therefore, reduced therapeutic effect; consider increasing dose to 10 mg at bedtime.
- Caution advised if using codeine products for pain relief; due to intermediate metabolizer status of 2D6, conversion to active drug (morphine) is delayed; consider non opioids such as NSAIDs or acetaminophen or if requiring opioids for pain relief, morphine is better alternative

Pharmacogenetic Implications for Psychiatry:

Desvenlafaxine is one of the medications that is not impacted by genetic variations in the CYP2D6 and CYP2C19 and can be used at regular doses for depression and other mental health conditions.

Biomarker	Function	Summary
CYP2C9	Poor metabolizer	Metabolism of fosphenytoin and phenytoin may be significantly reduced. Suggest starting at standard loading dose, reduce maintenance dose by 50% and adjust according to therapeutic drug monitoring and response. Significantly reduced clearance of valproic acid and divalproex is possible. Consider starting at lower doses and adjust according to therapeutic drug monitoring and response. Patients of Chinese ancestry have found a strong association between the risk of developing SJS/TEN and the presence of HLA-B*1502.
CYP2D6	Ultrarapid metabolizer	Reduced response to tricyclic antidepressants, certain other antidepressants (fluoxetine, fluvoxamine, paroxetine, venlafaxine), certain antipsychotic medications (aripiprazole, clozapine, haloperidol, sertindole, zuclopenthixol), stimulants (atomoxetine and amphetamine). Avoid use of CYP2D6 dependent antidepressants and antipsychotics if possible; if not, suggest close monitoring for possible decreased efficacy. Possible decreased response to donepezil and amphetamine.
CYP3A4	Poor metabolizer	Significantly reduced metabolism of clonazepam, levomilnacipran, guanfacine, trazodone, vilazodone, eszopiclone, zopiclone is anticipated, increasing risk of side effects. Reduced quetiapine clearance by CYP3A4; check CYP3A5 metabolic status.
CYP3A5	Intermediate metabolizer	CYP3A5 intermediate metabolizers have increased clearance of certain drugs. Increased drug clearance of certain benzodiazepines (alprazolam and midazolam) and quetiapine may result in lower clinical response at usual doses. For quetiapine, check CYP3A4 metabolic status. Suggest increased monitoring for possible decreased efficacy.
UGT2B15	Intermediate metabolizer	Reduced clearance of lorazepam and oxazepam is anticipated, consider starting at lower doses.

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Pillcheck follows drug dosage guidelines from US FDA drug monographs and Clinical Pharmacogenetic Implementation Consortium (CPIC), which publishes the latest peer-reviewed guidelines for clinical practice (cpicpgx.org). More information about Pillcheck is available at pillcheck.ca/providers.

Attached for your reference is a summary table of Pillcheck-tested medications for your patient. Your patient may **grant you online access to their full results** by sharing a secure link and passcode with your email address.

Please contact me with questions.

Sincerely,

Pharmacist Name, PharmD
Clinical Pharmacist
License #
Email address

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Treatment Areas

Medicine	Consider alternatives	Use with caution	Standard precaution
Analgesics	Buprenorphine Celecoxib Codeine Flurbiprofen Ibuprofen Lornoxicam Meloxicam Oxycodone Piroxicam Tenoxicam Tolperisone Tramadol and acetaminophen	Diclofenac Hydrocodone Lofexidine Nabumetone	Carisoprodol Fentanyl Hydromorphone Methadone Morphine Naloxone Naltrexone Naproxen Propofol
Antibacterial		Isoniazid	Dapsone Nitrofurantoin
Antiemetics	Aprepitant Dronabinol Fosaprepitant Meclizine	Dolasetron Ondansetron Palonosetron Tropisetron	
Antifungal	Itraconazole Posaconazole	Terbinafine	Voriconazole
Antiviral	Fosamprenavir	Maraviroc	Atazanavir Dolutegravir Efavirenz Nevirapine Raltegravir Remdesivir

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Medicine	Consider alternatives	Use with caution	Standard precaution
Cardiovascular	Acenocoumarol Amlodipine Atorvastatin Azilsartan Candesartan Dronedarone Fenofibrate / simvastatin Fluvastatin Guanfacine Irbesartan Losartan Lovastatin Mavacamten Metoprolol Phenprocoumon Pitavastatin Pravastatin Propafenone Rosuvastatin Rosuvastatin / ezetimibe Sildenafil Simvastatin Tadalafil Ticagrelor Valsartan Vardenafil Warfarin	Apixaban Cilostazol Flecainide Mexiletine Nebivolol Procainamide Propranolol Ranolazine Rivaroxaban Timolol Vernakalant	Alirocumab Carvedilol Clopidogrel Evolocumab Hydralazine Labetalol Prasugrel Quinidine
Dermatology and Dental			Abrocitinib Pamidronate
Endocrinology	Eliglustat		
Gastroenterology		Metoclopramide	Dexlansoprazole Esomeprazole Lansoprazole Omeprazole Pantoprazole Rabeprazole

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Medicine	Consider alternatives	Use with caution	Standard precaution
Gynecology	Desogestrel Elagolix Ethinylestradiol Norelgestromin and ethinyl estradiol Ospemifene		Flibanserin
Hematology	Acenocoumarol Avatrombopag Eltrombopag Lusutrombopag Phenprocoumon Warfarin	Apixaban Rivaroxaban	Methylene blue Toluidine blue
Immune therapy	Methotrexate Siponimod Tacrolimus	Azathioprine Cyclosporine Sirolimus	Abrocitinib Leflunomide
Musculoskeletal		Amifampridine	
Neurology	Cannabidiol Eletriptan Fosphenytoin Phenytoin Trazodone Valproic acid / divalproex Zonisamide Zopiclone	Deutetrabenazine Dextromethorphan and quinidine Galantamine Midazolam Tetrabenazine Valbenazine	Brivaracetam Lacosamide Rasagiline
Oncology	Cabazitaxel Erdafitinib Regorafenib Ruxolitinib Sunitinib	Azathioprine Cisplatin Gefitinib Imatinib Mercaptopurine Tamoxifen Temsirolimus Thioguanine	Belinostat Capecitabine Enzalutamide Erlotinib Flucytosine Fluorouracil Irinotecan Nilotinib Pazopanib Rasburicase Tegafur Toluidine blue

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Medicine	Consider alternatives	Use with caution	Standard precaution
Psychiatry (part 1)	Amitriptyline Amoxapine Atomoxetine Buprenorphine Cariprazine Chlordiazepoxide and amitriptyline Clomipramine Clonazepam Desipramine Doxepin Eszopiclone Guanfacine Imipramine Levomilnacipran Lurasidone Nortriptyline Paroxetine Protriptyline Trimipramine Vilazodone	Alprazolam Amphetamine Aripiprazole Brexpiprazole Clozapine Dextroamphetamine Diazepam Donepezil Duloxetine Fluoxetine Fluoxetine and olanzapine Flupentixol Fluvoxamine Haloperidol Iloperidone Lorazepam Maprotiline Mirtazapine Modafinil Nefazodone Oxazepam Perphenazine Pimozide Pitolisant Quetiapine Risperidone Sertindole Thioridazine Thiothixene Venlafaxine	Bupropion Caffeine Chlorpromazine Citalopram Clobazam Escitalopram Fluphenazine Ketamine Loxapine Olanzapine Sertraline
Psychiatry (part 2)		Vortioxetine Zuclopenthixol	
Pulmonology		Dextromethorphan and promethazine	Indacaterol Salbutamol Salmeterol
Rheumatology	Flurbiprofen Lesinurad Piroxicam Upadacitinib	Allopurinol Cevimeline	

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Medicine	Consider alternatives	Use with caution	Standard precaution
Urology	Mirabegron	Darifenacin Fesoterodine Tamsulosin Tolterodine	

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