

GeneDose Genetic Response Report

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This report combines (i) an analysis of the patient’s DNA by Phi Life Sciences, LLC, identifying relevant genetic variants that are informative for medication efficacy, safety, and dosing, with (ii) an interpretation of the identified DNA variants by Coriell Life Sciences to bring you immediately actionable clinical guidance regarding safer, more effective medications and dosages for the patient. The Medication Report section lists the type of PGx guidance present on FDA-approved drug labels. Medications with no established FDA PGx guidance are provided solely for educational purposes.

Patient: Oh, Two Date of Birth: Jan 23, 1945 Sex: Female	Physician: Cassandra the Great Practice: Test Cassandra	Date Collected: May 01, 2023 Date Accessioned: May 04, 2023 Date Processed: Sep 15, 2023 Specimen type: Saliva Sample ID: 2023PGXA-02
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GeneDose Live

Individualized, additional therapeutic decision support information based on Two Oh's genetics, drug regimen, indications, demographics, and lifestyle indicators are available at GeneDose Live via this secured URL:
<http://checkdru.gs/>

GeneDose Key: AGX664R6F
Sample ID: 2023PGXA-02

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Genetic Summary Information

† When multiple activities are listed, check information in Medication Report Details (Pg. 16) for specific medication of interest.
Uncertain = No known diplotype/result (name) or activity for this combination of genetic variants; Uninterpretable Genotype.

Genetic Summary

Gene	Result	Activity †
ABCG2	G G	Normal function
ANKK1	G G	Normal function
ApoE	ε3 ε3	See ApoE Genotype Info
COMT(Val158Met)	A A	Poor function
CYP1A2	Unspecified Allele; Likely IM; or *1A *1K; or *1C *1F; or *1C *1N or *1A *1L; or *1C *1K; or *1C *1W or *1E *1L; or *1C *1L; or *1A *1F; or *1C *1J; or *1D *1K	Unknown Metabolizer
CYP2B6	*1 *1	Normal metabolizer
CYP2C19	*1 *1	Normal metabolizer
CYP2C9	*1 *2	Intermediate metabolizer

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GeneDose Genetic Response Report

Gene	Result	Activity †
CYP2D6	*4A *5	Poor metabolizer
CYP3A4	*1A *1A	Normal metabolizer
CYP3A5	*3B *3B; or *3 *3; or *3 *3B; or *3 *3.010; or Unspecified Allele; Likely PM; or *3.010 *3.010; or *3B *3.010	Poor metabolizer
DPYD	*1 *1	Normal metabolizer
F2	Not Tested	n/a
F5	C C	Negative
Factor V Leiden	Normal	See Thrombosis Profile
HTR2A(rs7997012)	rs7997012 A/G	Positive

Gene	Result	Activity †
HTR2C(2565G>C)	G/G	Positive
HTR2C(-759C>T)	C T	Positive
MTHFR (A1298C)	T G	Decreased function
MTHFR (C677T)	G G	Normal function
OPRM1(A118G)	A A	Normal function
Prothrombin (F2)	Normal	See Thrombosis Profile
SLCO1B1	*1 *5	Decreased function
TPMT	*1 *1	Normal metabolizer
VKORC1	*1 *2	Medium sensitivity to warfarin

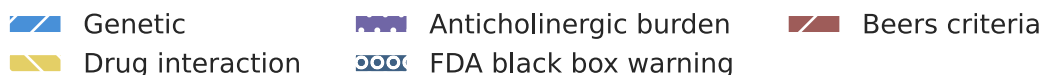
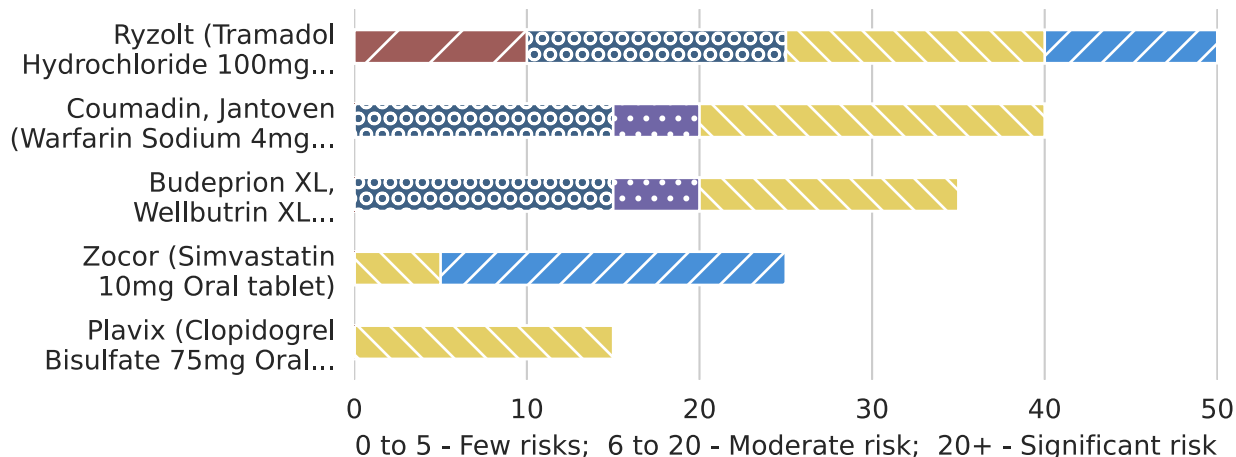
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Current Regimen Risk Chart

This chart summarizes the various risk factors associated with each medication entered into GeneDose™ Live for Two Oh. The length of each colored segment represents the relative contribution of a risk category (detailed in the below legend) to the overall risk associated with the use of a medication. For further information, consult the [Current Regimen Risk Details Pg. 4](#) section.

For further assistance in choosing alternative medications to reduce this patient's risk, use the modeling tool at <http://checkdru.gs/>.



Current Regimen Risk Detail

Severe Risks

Genetic warning for Zocor 10mg Tablet (Simvastatin)

Individuals with decreased function of this gene frequently present with significantly increased risk of side effects. This medication should be avoided.

American Geriatric Society guidelines

The following products appear on the American Geriatric Society's Beers Criteria for Potentially Inappropriate Medication Use in Older Adults:

- Tramadol Hydrochloride 100mg Oral tablet, extended release

Black box warning for Coumadin 4mg Tablet and bleeding

Black box warning for Ryzolt 100mg Extended-Release Tablet and neonatal opioid withdrawal syndrome

Black box warning for Ryzolt 100mg Extended-Release Tablet and respiratory depression

Black box warning for Ryzolt 100mg Extended-Release Tablet and psychological dependence

Black box warning for Wellbutrin XL 150mg Extended-Release Tablet and suicidal ideation

Major Risks

Genetic warning for Ryzolt 100mg Extended-Release Tablet (Tramadol)

Poor metabolizers of this medication frequently present with lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.

Significant regimen anticholinergic burden

The cumulative effect of taking multiple medicines with anticholinergic properties termed as anticholinergic burden can adversely impact cognition, physical function and increase the risk of mortality.

Moderate Risks

Plavix 75mg Tablet may have its effect reduced by Ryzolt 100mg Extended-Release Tablet

- consider alternative drug therapy
- monitor for altered clinical response to drug therapy

Coadministration reduces clopidogrel's inhibition of platelet aggregation. Consider a parenteral antiplatelet agent in acute coronary syndrome patients requiring an opioid agonist, such as tramadol.

Plavix 75mg Tablet causes additive effects that may result in increased risk of bleeding with Coumadin 4mg Tablet

- monitor for evidence of bleeding

Carefully monitor patients for signs and symptoms of bleeding during coadministration of warfarin and clopidogrel. Both agents independently affect hemostasis.

Wellbutrin XL 150mg Extended-Release Tablet may have side effects increased by Plavix 75mg Tablet

- monitor for signs of drug toxicity
- dosage reduction may be required

Monitor for an increase in bupropion-related adverse reactions during coadministration of clopidogrel as concurrent use may increase bupropion exposure. A bupropion dose adjustment may be necessary.

Zocor 10mg Tablet may increase potential side effects of Coumadin 4mg Tablet

- use combination with caution
- monitor for evidence of bleeding
- monitor international normalized ratio (INR) or prothrombin time

Simvastatin can potentiate the anticoagulant effects of warfarin. Simvastatin should be prescribed cautiously in patients receiving warfarin, with appropriate INR monitoring.

Coumadin 4mg Tablet has its pharmacodynamic parameters altered by Wellbutrin XL 150mg Extended-Release Tablet

- monitor for evidence of bleeding
- monitor international normalized ratio (INR) or prothrombin time

Dosage adjustments of warfarin and more frequent monitoring of the INR may be required during smoking cessation therapy with bupropion, as tobacco smoking quantity decreases.

Coumadin 4mg Tablet may have side effects increased by Ryzolt 100mg Extended-Release Tablet

- monitor for evidence of bleeding
- monitor international normalized ratio (INR) or prothrombin time

Monitor prothrombin time and adjust the warfarin dose as needed if administered with tramadol. Advise patients of the increased bleeding risk associated with concomitant use.

Wellbutrin XL 150mg Extended-Release Tablet may reduce effect of Ryzolt 100mg Extended-Release Tablet

- monitor for altered clinical response to drug therapy
- warn against driving or operating machinery or performing other hazardous tasks until drug effects are known
- monitor for signs or symptoms of serotonin syndrome
- monitor for seizure activity

Monitor for reduced efficacy of tramadol, signs of opioid withdrawal, seizures, or serotonin syndrome if coadministration of tramadol and bupropion is necessary. Discontinue all serotonergic agents if serotonin syndrome occurs.

Thrombosis Profile

Tested Gene (Allele)	Genotype	Predicted Phenotype	Clinical Guidance
Prothrombin (F2)	Normal	Normal risk expected based on the patient's genotype.	The absence of these variant alleles of Prothrombin (Factor II) and Factor V Leiden suggests that the patient does not have the elevated risk of thrombosis associated with these genetic markers.
Factor V Leiden	Normal		
MTHFR (A1298C)	Heterozygous		
MTHFR (C677T)	Normal		

General Description

Genetic analyses of three genes (four alleles) considered to increase the risk for venous thromboembolism were performed using molecular genetic techniques. The presence of the Prothrombin (Factor 2) gene allele c.*97G>A (previously designated as 20210G>A) and Factor V Leiden allele c.1601G>A (previously designated as 1691G>A) are risk factors for venous thromboembolism. This risk may be further increased by the use of estrogen therapy, oral contraceptives, pregnancy, and surgery.

Patients who are homozygous for MTHFR C677T or MTHFR A1298C may have a further increased risk for venous thromboembolism if they also possess the Factor V Leiden c.1601G>A allele. However, the MTHFR alleles alone do not predict a significant risk for venous thromboembolism.

References

- Zhang S, et al.; ACMG Laboratory Quality Assurance Committee. Venous thromboembolism laboratory testing (factor V Leiden and factor II c.*97G>A), 2018 update: a technical standard of the American College of Medical Genetics and Genomics (ACMG). Genet Med. 2018 Dec;20(12):1489-1498. doi: 10.1038/s41436-018-0322-z. Epub 2018 Oct 5. PMID: 30297698.
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- Lim MY, et al.; Thrombophilic risk of individuals with rare compound factor V Leiden and prothrombin G20210A polymorphisms: an international case series of 100 individuals. Eur J Haematol. 2016 Oct;97(4):353-60. doi: 10.1111/ejh.12738. Epub 2016 Feb 18. PMID: 26773706.
- Saemundsson Y, et al.; Homozygous factor V Leiden and double heterozygosity for factor V Leiden and prothrombin mutation. J Thromb Thrombolysis. 2013 Oct;36(3):324-31. doi: 10.1007/s11239-012-0824-5. PMID: 23054468.
- Stevens SM, et al.; Guidance for the evaluation and treatment of hereditary and acquired thrombophilia. J Thromb Thrombolysis. 2016 Jan;41(1):154-64. doi: 10.1007/s11239-015-1316-1. PMID: 26780744; PMCID: PMC4715840.

ApoE Genotype Information[†]

Tested Genes (Alleles)	Genotype	Predicted Phenotype	Clinical Guidance
ApoE (ε2, ε3, ε4)	ε3 ε3	Often associated with normal lipid metabolism.	Typical cardiovascular disease risk expected.

General Description

Genetic analysis in the ApoE gene was performed using molecular genetic techniques. The genotype is based on genotyping results for this patient at SNPs rs429358 and rs7412.

ApoE ε3 is the most common allele—found in about 60% of people. The presence of ε2 or ε4 alleles may be a risk factor for multiple conditions including cardiovascular disease. ApoE ε2 carriers may be more likely to develop familial dysbetalipoproteinemia or type III hyperlipoproteinemia.

† Predicted phenotype, clinical significance, relative risk, and interpretations reported for each genotype are associated with cardiovascular risk only. The interpretations should not be used to determine the relative risk of other diseases. Other factors important to understanding total risk should be considered.

Medication Summary (more alternatives discoverable at GeneDose Live)

Secured URL: <https://app.genedose.com/?token=AGX664R6F>

Addiction			
Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Analgesics, Opioid	Buprenorphine Methadone (CYP2B6)		
Cardiology			
Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Antiarrhythmics		Flecainide Propafenone	
Anticoagulants	Warfarin	Acenocoumarol	
Antiplatelet Agents	Clopidogrel		

Cardiology

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
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Prasugrel Ticagrelor			
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Beta Blockers

Nebivolol Propranolol	Carvedilol Metoprolol Timolol		
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Statins

Atorvastatin		Simvastatin
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Dyskinesia

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
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Vesicular monoamine transporter 2 inhibitor

	Deutetrabenazine Valbenazine	
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Endocrinology

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
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Dipeptidyl peptidase-4 (DPP-4) inhibitor

Saxagliptin		
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Sulfonylurea

	Gliclazide Glimepiride Glyburide Tolbutamide	
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Gastroenterology

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
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Antiemetics

	Ondansetron Tropisetron	
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Prokinetic agents

	Metoclopramide	
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Gastroenterology

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Proton Pump Inhibitors (PPIs)	Esomeprazole Rabeprazole	Dexlansoprazole Lansoprazole Omeprazole Pantoprazole	

Gaucher's disease

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Enzyme Inhibitors		Eliglustat	

Gout

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Xanthine Oxidase Inhibitor	Allopurinol		

Immunology

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Cholinergic Agonists		Cevimeline	
Immunosuppressants	Azathioprine Cyclosporine Sirolimus	Tacrolimus	
Purine antagonists	Mercaptopurine		

Infectious Disease

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Antifungals	Ketoconazole		

Infectious Disease

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
	Voriconazole		
Non-nucleoside reverse transcriptase inhibitors	Efavirenz Nevirapine		

Neurology

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Anticonvulsants	Brivaracetam Clobazam	Phenytoin	
Benzodiazepines	Alprazolam Clonazepam Diazepam		
Central Monoamine-Depleting Agents		Tetrabenazine	
Central Nervous System Agents			Dextromethorphan-Quinidine
Cholinesterase Inhibitors		Donepezil Galantamine	

Oncology

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Antiestrogens			Tamoxifen
Antimetabolites		Methotrexate	
EGFR Inhibitors		Gefitinib	
Platinum-containing compounds	Cisplatin		

Oncology

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Purine analogs	Thioguanine		
Purine antagonists	Mercaptopurine		
Xanthine Oxidase Inhibitor	Allopurinol		

Pain

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Analgesics, Opioid	Alfentanil Buprenorphine Fentanyl Fentanyl (OPRM1) Hydromorphone Methadone (CYP2B6) Morphine Oxycodone Oxycodone (CYP3A4) Sufentanil	Hydrocodone Oxycodone (CYP3A5) Tramadol	Codeine
Atypical antipsychotics	Olanzapine		
Muscle Relaxants	Carisoprodol		
Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)		Celecoxib Diclofenac Flurbiprofen Ibuprofen Lornoxicam Meloxicam	Piroxicam
Selective Serotonin Reuptake Inhibitors (SSRIs)		Vortioxetine	
Serotonin and Norepinephrine		Duloxetine	Venlafaxine

Pain

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Reuptake Inhibitors (SSNRI)			
Serotonin Receptor Antagonists and Reuptake Inhibitors (SARIs)	Trazodone		
Tetracyclic antidepressants	Mirtazapine		
Tricyclic antidepressants			Amitriptyline (CYP2C19, CYP2D6) Amoxapine Clomipramine (CYP2C19, CYP2D6) Desipramine Doxepin (CYP2C19, CYP2D6) Imipramine (CYP2C19, CYP2D6) Nortriptyline Protriptyline Trimipramine (CYP2C19, CYP2D6)

Psychiatry

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Alpha-2-adrenergic agonists	Guanfacine		
Antidepressants	Bupropion		
Anxiolytics	Buspirone		
Atypical antipsychotics	Olanzapine Quetiapine	Aripiprazole Brexpiprazole Clozapine	

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Psychiatry

Therapeutic Class

Standard
Precautions

Caution / Info

Change
recommended

CNS Stimulants

 Iloperidone
Risperidone

 Amphetamine
Dexmethylphenidate
Dextroamphetamine
Lisdexamfetamine
Methylphenidate
(COMT)

Hypnotics

Eszopiclone

Monoamine Oxidase
Inhibitors

Moclobemide

Selective Serotonin
Reuptake Inhibitors
(SSRIs)
 Citalopram
Escitalopram
Fluoxetine
Sertraline

 Fluvoxamine
Paroxetine
Vortioxetine
Serotonin and
Norepinephrine
Reuptake Inhibitors
(SSNRI)
 Atomoxetine
Duloxetine

Venlafaxine

Serotonin Receptor
Antagonists and
Reuptake Inhibitors
(SARIs)

Trazodone

Tetracyclic
antidepressants

Mirtazapine

Tricyclic
antidepressants
 Amitriptyline (CYP2C19,
CYP2D6)
Amoxapine
Clomipramine
(CYP2C19, CYP2D6)
Desipramine
Doxepin (CYP2C19,
CYP2D6)

Psychiatry

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
			Imipramine (CYP2C19, CYP2D6) Nortriptyline Protriptyline Trimipramine (CYP2C19, CYP2D6)
Typical antipsychotics	Flupenthixol	Haloperidol Perphenazine Pimozide Zuclopenthixol	Thioridazine

Reproductive

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Contraceptives	Estrogen-containing oral contraceptives		

Urology

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
Adrenergic alpha-1 Receptor Antagonists		Tamsulosin	
Anticholinergic Agents		Fesoterodine Tolterodine	
Beta-3 Adrenergic Agonists	Mirabegron		

Other Drugs

Therapeutic Class	 Standard Precautions	  Caution / Info	 Change recommended
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Legend

Typical response is expected

Consider alternative therapy

Change recommended

Additional information available

Response is uncertain

Clinical Evidence Level

Strong

Moderate

Emerging

Medication Report Details (by therapeutic class)

Drug	Finding	Recommendation	Concern	Evidence
Adrenergic alpha-1 Receptor Antagonists				
Tamsulosin (Flomax) <i>FDA drug label: Actionable PGx</i>	CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Alpha-2-adrenergic agonists				
Guanfacine (Tenex, Intuniv) <i>FDA drug label: Not established for PGx</i>	CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Analgesics, Opioid				
Alfentanil (Rapifen, Alfenta) <i>FDA drug label: Not established for PGx</i>	 OPRM1(A118G): Normal function. Two alleles with normal activity.	Individuals with normal function of this gene are expected to show typical response. No additional therapeutic recommendations.		
Buprenorphine (Butrans, Buprenex) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Codeine <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Fentanyl (Duragesic, Sublimaze) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Fentanyl (OPRM1) (Duragesic, Sublimaze) <i>FDA drug label: Not established for PGx</i>	 OPRM1(A118G): Normal function. Two alleles with normal activity.	Individuals with normal function of this gene are expected to show typical response. No additional therapeutic recommendations.		
Hydrocodone <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Hydromorphone (Dilaudid) <i>FDA drug label: Not established for PGx</i>	 OPRM1(A118G): Normal function. Two alleles with normal activity.	Individuals with normal function of this gene are expected to show typical response. No additional therapeutic recommendations.		
Methadone (CYP2B6) (Dolophine, Methadose) <i>FDA drug label: Not established for PGx</i>	 CYP2B6: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Morphine (MS-IR) <i>FDA drug label: Not established for PGx</i>	 OPRM1(A118G): Normal function. Two alleles with normal activity.	Individuals with normal function of this gene are expected to show typical response. No additional therapeutic recommendations.		
Oxycodone (Oxycontin) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Typical response expected. No additional therapeutic recommendations.		
Oxycodone (CYP3A4) (Oxycontin) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Oxycodone (CYP3A5) (Oxycontin) <i>FDA drug label: Not established for PGx</i>	 CYP3A5: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Sufentanil (Sufenta) <i>FDA drug label: Not established for PGx</i>	 OPRM1(A118G): Normal function. Two alleles with normal activity.	Individuals with normal function of this gene are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Tramadol (Ultracet, Ultram) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. Be alert to lack of efficacy; monitor the patient's response to guide dosing.	Efficacy	
Antiarrhythmics				
Flecainide (Tambocor) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	
Propafenone (Rythmol) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Anticholinergic Agents				
Fesoterodine (Toviaz) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Tolterodine (Detrol) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Anticoagulants				
Acenocoumarol (Sintrom, Acitrom) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication frequently present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Warfarin (Coumadin) <i>FDA drug label:</i> <i>Actionable PGx</i>	 Multigenic: VKORC1, CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Individuals with this combination of alleles may benefit from the standard dose of Warfarin. The FDA table recommends a therapeutic dose of 3-4 mg/day.		

Drug	Finding	Recommendation	Concern	Evidence
Anticonvulsants				
Brivaracetam (Briviact, Nubriveo, Brivajoy) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Clobazam (Onfi) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Phenytoin (Dilantin) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Antidepressants				
Bupropion (Wellbutrin) <i>FDA drug label: Not established for PGx</i>	 ANKK1: Normal function. Two alleles with normal activity.	Individuals with normal function of this gene are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Antiemetics				
Ondansetron (Zofran) <i>FDA drug label: Informative PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with higher plasma concentrations of the active medication. Monitor the patient's response to guide dosing.	ADR	
Tropisetron (Navoban, Setrovel) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Antiestrogens				
Tamoxifen (Soltamox, Nolvadex) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably lower plasma concentrations of the active medication, thus a significantly increased risk of pharmacotherapy failure. This medication should be avoided.	Efficacy	
Antifungals				
Ketoconazole (Nizoral) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Voriconazole (Vfend) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Antimetabolites				
Methotrexate (Trexall, Rheumatrex, Otrexup) <i>FDA drug label: Not established for PGx</i>	 Multigenic: MTHFR (C677T), MTHFR (A1298C): Normal function. Two normal function alleles.; Decreased function. One normal function allele and one decreased function allele.	Individuals with decreased function of this gene frequently present with increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	
Antiplatelet Agents				
Clopidogrel (Plavix) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Prasugrel (Effient) <i>FDA drug label: Informative PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Typical response expected. No additional therapeutic recommendations.		
Ticagrelor (Brilinta) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Anxiolytics				
Buspirone (Buspar) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Atypical antipsychotics				
Aripiprazole (Abilify) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	
Brexipiprazole (Rexulti) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	
Clozapine (Clozaril, Leponex, Versacloz) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Iloperidone (Fanapt) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	
Olanzapine (Zalasta, Zyprexa) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Typical response expected. No additional therapeutic recommendations.		
Quetiapine (Seroquel) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Risperidone (Risperdal) <i>FDA drug label: Informative PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	
Benzodiazepines				
Alprazolam (Xanax, Niravam) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Clonazepam (Klonopin) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Diazepam (Valium) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Beta-3 Adrenergic Agonists				
Mirabegron (Myrbetriq) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Beta Blockers				
Carvedilol (Coreg) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions.	ADR	
Metoprolol (Lopressor) <i>FDA drug label:</i> <i>Informative PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	
Nebivolol (Bystolic) <i>FDA drug label:</i> <i>Informative PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Typical response expected. No additional therapeutic recommendations.		
Propranolol (Inderal) <i>FDA drug label:</i> <i>Informative PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Typical response expected. No additional therapeutic recommendations.		
Timolol (Blocadren) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Central Monoamine-Depleting Agents				
Tetrabenazine (Xenazine) <i>FDA drug label: Testing required</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Central Nervous System Agents				
Dextromethorphan-Quinidine (Nuedexta) <i>FDA drug label: Testing recommended</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	
Cholinergic Agonists				
Cevimeline (Evoxac) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Cholinesterase Inhibitors				
Donepezil (Aricept) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Galantamine (Razadyne, Razadyne ER, Nivalin, Lycopremine, Reminyl) <i>FDA drug label: Informative PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
CNS Stimulants				
Amphetamine (Adzenys, Evekeo) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Dexmethylphenidate (Focalin) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Dextroamphetamine (Zenzedi, Dexedrine) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Lisdexamfetamine (Vyvanse) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Methylphenidate (COMT) (Concerta, Metadate, Ritalin, Ritalin LA, Quillivant, Daytrana, Methylin) <i>FDA drug label: Not established for PGx</i>	 COMT(Val158Met): Poor function. Two decreased function alleles.	Individuals with poor function of this gene may present with increased risk of pharmacotherapy failure. Be alert to lack of efficacy.	Efficacy	
Contraceptives				
Estrogen-containing oral contraceptives <i>FDA drug label: Not established for PGx</i>	 F5: Two wild-type alleles.	Individuals with wild type alleles are expected to show typical response. No additional therapeutic recommendations.		
Dipeptidyl peptidase-4 (DPP-4) inhibitor				
Saxagliptin (Onglyza) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
EGFR Inhibitors				
Gefitinib (Iressa) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Enzyme Inhibitors				
Eliglustat (Cerdelga) <i>FDA drug label: Testing required</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider alternative medication, or reducing the dose.	ADR	
Hypnotics				
Eszopiclone (Lunesta) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Immunosuppressants				
Azathioprine (Imuran) <i>FDA drug label: Testing recommended</i>	 TPMT: *1 *1	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Cyclosporine (Gengraf, Neoral) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Sirolimus (Rapamune) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Tacrolimus (Prograf, Hecoria) <i>FDA drug label: Not established for PGx</i>	 CYP3A5: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with higher plasma concentrations of the active medication, frequently present with increased medication efficacy. No additional therapeutic recommendations.	Efficacy	
Monoamine Oxidase Inhibitors				
Moclobemide (Manerix, Aurorix, Amira, Clobemix, Depnil) <i>FDA drug label: Not established for PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Muscle Relaxants				
Carisoprodol (Soma) <i>FDA drug label: Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		

Drug		Finding	Recommendation	Concern	Evidence
Non-drug					
ABCG2		ABCG2: Normal function. Two normal function alleles.	Typical response is expected; no additional therapeutic recommendations.		
ANKK1		ANKK1: Normal function. Two alleles with normal activity.	Normal function. Two alleles with normal activity.		
ApoE		ApoE: Often associated with normal lipid metabolism.	Typical cardiovascular disease risk expected.		
COMT(Val158Met)		COMT(Val158Met): Poor function. Two decreased function alleles.	No additional therapeutic recommendations.		
CYP1A2		CYP1A2: Normal metabolizer. Two normal function alleles.; Intermediate metabolizer. One normal function allele and one decreased function allele.; Intermediate metabolizer. Two decreased function alleles.; Indeterminate metabolizer. One decreased function allele and one uncertain function allele.	No additional therapeutic recommendations.		
CYP2B6		CYP2B6: Normal metabolizer. Two normal function alleles.	Typical response is expected; no additional therapeutic recommendations.		
DPYD		DPYD: Normal metabolizer. Two alleles showing normal activity.	Typical response is expected; no additional therapeutic recommendations.		
F2		F2: Not Tested	No recommendation for F2 is available due to absent laboratory assay results.		
F2		F2: Not Tested	No recommendation for F2 is available due to absent laboratory assay results.		
HTR2A		HTR2A(rs7997012): One wild type allele and one variant allele.	No additional therapeutic recommendations.		
HTR2C(-759C>T)		HTR2C(-759C>T): One wild type allele and one variant allele.	No additional therapeutic recommendations.		
HTR2C(2565G>C)		HTR2C(2565G>C): Two variant alleles detected.	No additional therapeutic recommendations.		

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The information contained in this report is intended to be interpreted by a licensed physician or other licensed healthcare professional. This report is not intended to take the place of professional medical advice. Decisions regarding use of prescribed medications must be made only after consulting with a licensed physician or other licensed healthcare professional, and should consider each patient's medical history and current treatment regimen. Portions © 2014-2023 Coriell Life Sciences, Inc.

Drug	Finding	Recommendation	Concern	Evidence
MTHFR (A1298C)	 MTHFR (A1298C): Decreased function. One normal function allele and one decreased function allele.	No additional therapeutic recommendations.		
MTHFR (C677T)	 MTHFR (C677T): Normal function. Two normal function alleles.	Typical response is expected; no additional therapeutic recommendations.		
OPRM1(A118G)	 OPRM1(A118G): Normal function. Two alleles with normal activity.	Normal function. Two alleles with normal activity.		
Non-nucleoside reverse transcriptase inhibitors				
Efavirenz (Sustiva) <i>FDA drug label: Actionable PGx</i>	 CYP2B6: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Nevirapine (Viramune) <i>FDA drug label: Not established for PGx</i>	 CYP2B6: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Nonsteroidal Anti-Inflammatory Drugs (NSAIDs)				
Celecoxib (Celebrex) <i>FDA drug label: Actionable PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Diclofenac (Cataflam) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Flurbiprofen (Ocufen) <i>FDA drug label: Actionable PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication frequently present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Ibuprofen (Motrin, Advil) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication frequently present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Lornoxicam (Xefo) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication frequently present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Meloxicam (Mobic) <i>FDA drug label: Actionable PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	
Piroxicam (Feldene) <i>FDA drug label: Actionable PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication frequently present with higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	
Platinum-containing compounds				
Cisplatin (Platinol) <i>FDA drug label: Not established for PGx</i>	 TPMT: *1 *1	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Prokinetic agents				
Metoclopramide (Primperan, Reglan) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Proton Pump Inhibitors (PPIs)				
Dexlansoprazole (Dexilant, Kapidex) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication may present with lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Monitor the patient's response to guide dosing; consider increasing the dose.	Efficacy	
Esomeprazole (Nexium) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Lansoprazole (Prevacid) <i>FDA drug label:</i> <i>Informative PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication may present with lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Monitor the patient's response to guide dosing; consider increasing the dose.	Efficacy	
Omeprazole (Prilosec, Zegerid) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication may present with lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Monitor the patient's response to guide dosing; consider increasing the dose.	Efficacy	
Pantoprazole (Protonix) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication may present with lower plasma concentrations of the active medication, thus an increased risk of pharmacotherapy failure. Monitor the patient's response to guide dosing; consider increasing the dose.	Efficacy	

Drug	Finding	Recommendation	Concern	Evidence
Rabeprazole (Aciphex) <i>FDA drug label: Actionable PGx</i>	✓ CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		●
Purine analogs				
Thioguanine (6-TG, Tabloid, Lanvis) <i>FDA drug label: Testing recommended</i>	✓ TPMT: *1/*1	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		●
Purine antagonists				
Mercaptopurine (Purinethol) <i>FDA drug label: Testing recommended</i>	✓ TPMT: *1/*1	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		●

Drug	Finding	Recommendation	Concern	Evidence
Selective Serotonin Reuptake Inhibitors (SSRIs)				
Citalopram (Celexa) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Escitalopram (Lexapro) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Fluoxetine (Prozac) <i>FDA drug label:</i> <i>Informative PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Typical response expected. No additional therapeutic recommendations.		
Fluvoxamine (Luvox) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	
Paroxetine (Paxil) <i>FDA drug label:</i> <i>Informative PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	
Sertraline (Zoloft) <i>FDA drug label:</i> Not established for PGx	 CYP2C19: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Vortioxetine (Trintellix) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Serotonin and Norepinephrine Reuptake Inhibitors (SSNRI)				
Atomoxetine (Strattera) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose; monitor the patient's response to guide dosing.	ADR	
Duloxetine (Cymbalta) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Venlafaxine (Effexor) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with lower plasma concentrations of the active medication/medication ratio, thus an increased risk of side effects and/or pharmacotherapy failure. This medication should be avoided.	ADR & Efficacy	
Serotonin Receptor Antagonists and Reuptake Inhibitors (SARIs)				
Trazodone (Oleptro, Desyrel) <i>FDA drug label:</i> Not established for PGx	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Statins				
Atorvastatin (Lipitor, Caduet) <i>FDA drug label: Not established for PGx</i>	 CYP3A4: Normal metabolizer. Two normal function alleles.	Normal metabolizers of this medication are expected to show typical response. No additional therapeutic recommendations.		
Simvastatin (Zocor) <i>FDA drug label: Informative PGx</i>	 SLCO1B1: Decreased function. One normal function allele and one decreased function allele.	Individuals with decreased function of this gene frequently present with significantly increased risk of side effects. This medication should be avoided.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Sulfonylurea				
Gliclazide (Diamicon, Diaprel, Azukon) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, frequently present with increased medication efficacy. No additional therapeutic recommendations.	Efficacy	
Glimepiride (Amaryl) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, frequently present with increased medication efficacy. No additional therapeutic recommendations.	Efficacy	
Glyburide (Glibenclamide) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Tolbutamide (Orinase) <i>FDA drug label: Not established for PGx</i>	 CYP2C9: Intermediate metabolizer. One normal function allele and one decreased function allele.	Intermediate metabolizers of this medication may present with higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Tetracyclic antidepressants				
Mirtazapine (Remeron) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Typical response expected. No additional therapeutic recommendations.		

Drug	Finding	Recommendation	Concern	Evidence
Tricyclic antidepressants				
Amitriptyline (CYP2C19, CYP2D6) (Elavil) <i>FDA drug label: Not established for PGx</i>	 Multigenic: CYP2D6, CYP2C19: Poor metabolizer. Two little or no function alleles.; Normal metabolizer. Two normal function alleles.	Individuals with this combination of alleles frequently present with significantly increased risk of side effects. This medication should be avoided.	ADR	
Amoxapine (Asenden) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	
Clomipramine (CYP2C19, CYP2D6) (Anafranil, Clomicalm) <i>FDA drug label: Not established for PGx</i>	 Multigenic: CYP2D6, CYP2C19: Poor metabolizer. Two little or no function alleles.; Normal metabolizer. Two normal function alleles.	Individuals with this combination of alleles frequently present with significantly increased risk of side effects. This medication should be avoided.	ADR	
Desipramine (Norpramin) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	
Doxepin (CYP2C19, CYP2D6) (Quitaxon, Aponal, Sinequan) <i>FDA drug label: Actionable PGx</i>	 Multigenic: CYP2D6, CYP2C19: Poor metabolizer. Two little or no function alleles.; Normal metabolizer. Two normal function alleles.	Individuals with this combination of alleles frequently present with significantly increased risk of side effects. This medication should be avoided.	ADR	
Imipramine (CYP2C19, CYP2D6) (Tofranil-PM, Tofranil) <i>FDA drug label: Actionable PGx</i>	 Multigenic: CYP2D6, CYP2C19: Poor metabolizer. Two little or no function alleles.; Normal metabolizer. Two normal function alleles.	Individuals with this combination of alleles frequently present with significantly increased risk of side effects. This medication should be avoided.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Nortriptyline (Pamelor) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	
Protriptyline (Vivactil) <i>FDA drug label:</i> <i>Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	
Trimipramine (CYP2C19, CYP2D6) (Surmontil) <i>FDA drug label: Not established for PGx</i>	 Multigenic: CYP2D6, CYP2C19: Poor metabolizer. Two little or no function alleles.; Normal metabolizer. Two normal function alleles.	Individuals with this combination of alleles frequently present with significantly increased risk of side effects. This medication should be avoided.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Typical antipsychotics				
Flupenthixol (Depixol, Fluanxol) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Typical response expected. No additional therapeutic recommendations.		
Haloperidol (Haldol) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	
Perphenazine (Trilafon) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Be alert to adverse reactions; monitor the patient's response to guide dosing.	ADR	
Pimozide (Orap) <i>FDA drug label: Testing required</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	
Thioridazine (Mellaril, Melleril) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus a significantly increased risk of side effects. This medication should be avoided.	ADR	

Drug	Finding	Recommendation	Concern	Evidence
Zuclopenthixol (Cisordinol, Clopixol) <i>FDA drug label: Not established for PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose, or using an alternative medication.	ADR	
Vesicular monoamine transporter 2 inhibitor				
Deutetrabenazine (Austedo) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication may present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	
Valbenazine (Ingrezza) <i>FDA drug label: Actionable PGx</i>	 CYP2D6: Poor metabolizer. Two little or no function alleles.	Poor metabolizers of this medication frequently present with notably higher plasma concentrations of the active medication, thus an increased risk of side effects. Consider reducing the dose.	ADR	
Xanthine Oxidase Inhibitor				
Allopurinol (Zyloprim) <i>FDA drug label: Not established for PGx</i>	 ABCG2: Normal function. Two normal function alleles.	Individuals with normal function of this gene are expected to show typical response. No additional therapeutic recommendations.		

Clinical Evidence Levels

Strong

- Includes gene-drug pairs approved by the Coriell Institute for Medical Research Pharmacogenomics Advisory Group.
- Includes gene-drug pairs supported by multiple studies documenting consistent effects of specific genetic variant(s) on clinical outcomes.
- Includes gene-drug pairs approved by the Dutch Pharmacogenetics Working Group (DPWG) and/or guidelines published in Clinical Pharmacology and Therapeutics by the Clinical Pharmacogenetics Implementation Consortium (CPIC).

Moderate

- Includes gene-drug pairs supported by pharmacokinetic, pharmacodynamic, or molecular/cellular functional studies showing consistent effects of genetic variant(s).
- Includes Drug product information (e.g. This interpretation is based on guidance available in the FDA (Food and Drug Administration) drug label for ABILIFY® (10/2013).
- Includes gene-drug pairs for which potential clinical outcomes are inferred from similar gene-drug interactions approved by the Dutch Pharmacogenetics Working Group (DPWG), and/or guidelines published in Clinical Pharmacology and Therapeutics by the Clinical Pharmacogenetics Implementation Consortium (CPIC), and/or pharmacogenomic reports and submission from the Coriell Institute for Medical Research.

Emerging

- Includes gene-drug pairs supported by published studies of the drug, related drug, or a probing compound of interest involving limited data and/or inconsistent findings.

Caution: It is important to note that the combination of genetic metabolizer and non-genetic factors, such as, but not limited to: body size, age, inhibition caused by interference of drugs or food, liver function, and kidney function produce the overall response to a given drug dose.

Methods: This specimen was analyzed for gene mutations by real-time PCR (TaqMan SNP Genotyping, Thermo Fisher) developed by Phi Life Sciences, LLC. These assays were validated following the 1988 CLIA standards. Performance characteristics were validated by Phi Life Sciences Laboratory with analytical specificity and sensitivity of >99% for detection of the variants above.

Lab Disclaimer: The FDA has neither cleared nor approved these assays, nor is FDA pre-market review required. These tests are used for clinical purposes and should not be regarded as investigational or for research only. Diagnosis and treatment decisions are the sole responsibility of the practitioner and does not replace the need for clinical and therapeutic drug monitoring. Hence, the interpretation and commentary are provided to the practitioner for educational purposes only and should not be taken as diagnostic or treatment recommendations. For further assistance with interpretation of these results or referral for genetic counseling, please contact Phi Life Sciences' Clinical Support at 888-576-5445.

Patient Information Card

This card contains an abbreviated genetic summary.
It is not intended as a replacement for the complete GeneDose™ report.

 Phi Life Sciences Precision Health Innovations Phi Life Sciences, LLC Patient: Oh, Two DOB: 1945-01-23 Sample ID: 2023PGXA-02 GeneDose Key: AGX664R6F This card shows information about your genetics that relate to drug metabolism. Show to your doctors before being prescribed new medications. For additional support and guidance, physicians may visit checkdru.gs/ Pharmacogenomic Summary <table><tr><td>ABCG2</td><td>G G</td><td>Normal function</td></tr><tr><td>ANKK1</td><td>G G</td><td>Normal function</td></tr><tr><td>ApoE</td><td>ε3 ε3</td><td>See full GeneDose report</td></tr><tr><td>COMT(Val158Met)</td><td>A A</td><td>Poor function</td></tr><tr><td>CYP1A2</td><td>Unspecified Allele; Likely IM; or *1A *1K; or *1C *1F; or *1C *1N or *1A *1L; or *1C *1K; or *1C *1W or *1E *1L; or *1C *1L; or *1A *1F; or *1C *1J; or *1D *1K</td><td>Unknown Metabolizer</td></tr><tr><td>CYP2B6</td><td>*1 *1</td><td>Normal metabolizer</td></tr><tr><td>CYP2C19</td><td>*1 *1</td><td>Normal metabolizer</td></tr><tr><td>CYP2C9</td><td>*1 *2</td><td>Intermediate metabolizer</td></tr></table>			ABCG2	G G	Normal function	ANKK1	G G	Normal function	ApoE	ε3 ε3	See full GeneDose report	COMT(Val158Met)	A A	Poor function	CYP1A2	Unspecified Allele; Likely IM; or *1A *1K; or *1C *1F; or *1C *1N or *1A *1L; or *1C *1K; or *1C *1W or *1E *1L; or *1C *1L; or *1A *1F; or *1C *1J; or *1D *1K	Unknown Metabolizer	CYP2B6	*1 *1	Normal metabolizer	CYP2C19	*1 *1	Normal metabolizer	CYP2C9	*1 *2	Intermediate metabolizer
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CYP2D6	*4A *5	Poor metabolizer																								
CYP3A4	*1A *1A	Normal metabolizer																								
CYP3A5	*3B *3B; or *3 *3; or *3 *3B; or *3 *3.010; or Unspecified Allele; Likely PM; or *3.010 *3.010; or *3B *3.010	Poor metabolizer																								
DPYD	*1 *1	Normal metabolizer																								
F2	Not Tested	n/a																								
F5	C C	Negative																								
Factor V Leiden	Normal	See full GeneDose report																								
HTR2A(rs7997012)	rs7997012 A/G	Positive																								
HTR2C(2565G>C)	G/G	Positive																								
HTR2C(-759C>T)	C T	Positive																								
MTHFR (A1298C)	T G	Decreased function																								
MTHFR (C677T)	G G	Normal function																								
OPRM1(A118G)	A A	Normal function																								
Prothrombin (F2)	Normal	See full GeneDose report																								
SLCO1B1	*1 *5	Decreased function																								
TPMT	*1 *1	Normal metabolizer																								
VKORC1	*1 *2	Medium sensitivity to warfarin																								
Powered by Coriell Life Sciences																										

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