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SAMPLE REPORT

Admera Health, LLC
126 Corporate Blvd · South Plainfield, NJ 07080
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PATIENT INFORMATION

Name: Smith, John
DOB: October 9, 2000
Age: 16
Sex: Male
Address: 126 Corporate Blvd.
South Plainfield, NJ 07080

SAMPLE

Date Collected: February 16, 2017
Date Received: February 16, 2017
Case ID: PGXPL17-000002
Source: Buccal Swabs

REFERRING PHYSICIAN

Name: Jane Doe, MD
Institution: Local Hospital
Phone: 123-456-7890

Comprehensive Drug Information for Smith, John

PGxOne™ Plus

ICD-10: B20 Human immunodeficiency virus [HIV] disease

CONSIDER ALTERNATIVE

Drug Impacted	Recommendation
Folic Acid	CONSIDER ALTERNATIVES

DOSE RECOMMENDATION

Drug Impacted	Recommendation
Erythromycin/ Sulfisoxazole (Pediazole®)	DECREASE DOSE due to a risk of hemolytic anemia

NORMAL RESPONSE EXPECTED

Drug Impacted	Recommendation
Abacavir (Ziagen®)	NORMAL RESPONSE EXPECTED
Dolutegravir (Tivicay®)	
Ibuprofen (Advil®)	
Naproxen (Aleve®)	
Lamivudine (Epivir®)	
Lopinavir/ Ritonavir (Kaletra®)	

PROCEED WITH CAUTION

Drug Impacted	Recommendation
Amphetamine (Adderall®)	USE CAUTION
Dexmethylphenidate (Focalin®)	
Dextroamphetamine (Adderall®)	
Lisdexamfetamine (Vyvanse®)	
Methylphenidate (Ritalin®)	
Atazanavir (Reyataz®)	

Only selected drugs are listed here due to limited space.
Please refer to Patient Specific Genotype Results table for comprehensive illustration of drugs in each action category.

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PGxOne™ Plus

Patient Specific Genotype Results and Comprehensive Drug Information for **Smith, John**

ICD-10: B20 Human immunodeficiency virus [HIV] disease

Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
	Vitamins: Folic Acid	**CONSIDER ALTERNATIVES** (e.g., supplements containing methylfolate) due to significantly reduced folic acid conversion	MTHFR	C677T/C677T	C677T Homozygous Mutation
	Macrolides: Erythromycin/Sulfisoxazole (Pediazole®)	**DECREASE DOSE** due to a risk of hemolytic anemia	G6PD	A-202A_376G/A	G6PD Deficiency
	Antiretroviral Drugs: Atazanavir (Reyataz®)	**USE CAUTION** due to low likelihood of drug discontinuation resulted from jaundice	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier
	Antiretroviral Drugs: Efavirenz (Sustiva®), Nevirapine (Viramune®)	**USE CAUTION** due to higher potential for an increased frequency and severity of drug-associated adverse events	CYP2B6	G516T/G516T/A785G/A785G	G516T Homozygous/A785G Homozygous
	CNS Stimulants (ADHD): Amphetamine (Adderall®), Dexmethylphenidate (Focalin®), Dextroamphetamine (Adderall®), Lisdexamfetamine (Vyvanse®), Methylphenidate (Ritalin®)	**USE CAUTION** due to reduced response	COMT	c.472G>A/c.472G>A	MET Homozygous
	Antiretroviral Drugs: Abacavir (Ziagen®)	**NORMAL RESPONSE EXPECTED**	HLA-B	WT/WT	Wild Type
	Antiretroviral Drugs: Dolutegravir (Tivicay®)	**NORMAL RESPONSE EXPECTED**	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier
	Antiretroviral Drugs: Lamivudine (Epivir®), Lopinavir/Ritonavir (Kaletra®), Zidovudine (Retrovir®)	**NORMAL RESPONSE EXPECTED**	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
	Antiretroviral Drugs: Nelfinavir (Viracept®)	**NORMAL RESPONSE EXPECTED**	CYP2C19	*1/*17	Rapid Metabolizer
	Nonsteroidal Antiinflammatory Drugs (NSAIDs): Ibuprofen (Advil®), Naproxen (Aleve®)	**NORMAL RESPONSE EXPECTED**	CYP2C9	*1/*1	Normal Metabolizer

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Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
	**Systemic Corticosteroids:** Methylprednisolone (Medrol®), Prednisolone (Orapred®), Prednisone (Deltasone®)	**NORMAL RESPONSE EXPECTED**	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype

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Current Medication Information for
Smith, John

PGxOne™ Plus

Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
	Vitamins: Folic Acid	**CONSIDER ALTERNATIVES** (e.g., supplements containing methylfolate) due to significantly reduced folic acid conversion	MTHFR	C677T/C677T	C677T Homozygous Mutation
	Macrolides: Pediazole	**DECREASE DOSE** due to a risk of hemolytic anemia	G6PD	A-202A_376G/A	G6PD Deficiency
	CNS Stimulants (ADHD): Adderall	**USE CAUTION** due to reduced response	COMT	c.472G>A/c.472G>A	MET Homozygous
	Nonsteroidal Antiinflammatory Drugs (NSAIDs): Ibuprofen	**NORMAL RESPONSE EXPECTED**	CYP2C9	*1/*1	Normal Metabolizer
	Systemic Corticosteroids: Prednisone	**NORMAL RESPONSE EXPECTED**	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
NA	**Antibiotics:** Clindamycin	**CLINICAL INTERPRETATION NOT AVAILABLE**	NA	NA	NA
NA	**Vitamins:** Multivitamins	**PHARMACOGENOMICS EVIDENCE NOT AVAILABLE**	NA	NA	NA

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Drug-Drug Interactions for
Smith, John

PGxOne™ Plus

Severity	Drugs	Warning	Documentation	Clinical Management
S	PREDNISONE -- IBUPROFEN	**MAJOR** Concurrent use of CORTICOSTEROIDS and NSAIDS may result in increased risk of gastrointestinal ulcer or bleeding.	FAIR	Concurrent administration of NSAIDs with oral corticosteroids may increase the risk of gastrointestinal ulcer or bleeding. If coadministration is necessary, monitor for signs of bleeding (Prod Info DAYPRO® oral caplets, 2016; Prod Info ANSAID® oral tablets, 2016; Prod Info ARTHROTEC® oral tablets, 2016; Prod Info CELEBREX® oral capsules, 2016).

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Drug-Food Interactions for
Smith, John

PGxOne™ Plus

Severity	Drugs	Warning	Documentation	Clinical Management
!	ASCORBIC ACID/CYANOCOBALAMIN/FOLIC ACID/NIACINAMIDE/PYRIDOXINE/RIBOFLAVIN/THIAMINE/VITAMIN A/VITAMIN D/VITAMIN E -- FOOD	**MODERATE** Concurrent use of PYRIDOXINE and FOOD may result in decreased pyridoxine exposure.	EXCELLENT	Concomitant administration with food delayed and decreased pyridoxine absorption, lowering overall pyridoxine exposure. Administer pyridoxine on an empty stomach with a glass of water (Prod Info DICLEGIS® oral delayed-release tablets, 2013).

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Portable Patient PGxOne™ Plus Genotype Results and Drug Information by Specialty for

Smith, John

PGxOne™ Plus

Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Anesthesiology		**Local Anesthetics:** Lidocaine/Prilocaine (Emla®)	**CONSIDER ALTERNATIVES** due to high susceptibility to drug-induced methemoglobinemia	G6PD	A-202A_376G/A	G6PD Deficiency
Anesthesiology		**General Anesthetics:** Ketamine (Ketalar®), Propofol (Diprivan®)	**DECREASE DOSE** due to decreased drug clearance	CYP2B6	G516T/G516T /A785G/A785G	G516T Homozygous/A785G Homozygous
Anesthesiology		**Local Anesthetics:** Lidocaine (Lidoderm®), Ropivacaine (Naropin®)	**NORMAL RESPONSE EXPECTED**	CYP1A2	*1A/*1F	Normal Metabolizer
Anesthesiology		**Sedatives:** Dexmedetomidine (Precedex®)	**NORMAL RESPONSE EXPECTED**	ADRA2A	WT/c.-1252G>C	rs1800544 GC genotype/rs1800545 GG genotype
Cardiology		**Anticoagulants:** Phenprocoumon (Marcoumar®)	**INCREASE DOSE**	CYP4F2	*3/*3	Poor Metabolizer
Cardiology		**ACE Inhibitors:** Captopril (Capoten®), Perindopril (Aceon®)	**USE CAUTION** due to increased major cardiovascular events rate	AGTR1	WT/c.*86A>C	rs5186 AC genotype
Cardiology		**ACE Inhibitors:** Quinapril (Accupril®)	**USE CAUTION** due to reduced response	ACE	WT/WT	ACE Deletion
Cardiology		**Angiotensin II Receptor Blockers:** Candesartan (Atacand®)	**USE CAUTION** due to reduced response	AGTR1	WT/c.*86A>C	rs5186 AC genotype
Cardiology		**Angiotensin II Receptor Blockers:** Irbesartan (Avapro®)	**USE CAUTION** due to reduced response	ACE	WT/WT	ACE Deletion
Cardiology		**Antiarrhythmic Drugs:** Amiodarone (Cordarone®)	**USE CAUTION** due to increased risk of drug-induced ventricular arrhythmia and QT prolongation	NOS1AP	c.106-38510G>T/c.178-20044C>T/c.178-20044C>T	rs10494366 GT genotype/rs10800397 T Allele Carrier/rs10919035 C Allele Carrier
Cardiology		**Antiarrhythmic Drugs:** Digoxin (Lanoxin®)	**USE CAUTION** due to increased risk of drug toxicity leading to adverse events	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Cardiology		**Antilipemic Agents (Statins):** Atorvastatin (Lipitor®)	**USE CAUTION** due to higher risk of developing myalgia	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype

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Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Cardiology	!	**Calcium Channel Blockers:** Amlodipine (Norvasc®), Nifedipine (Adalat®)	**USE CAUTION** due to increased risk for QTc prolongation	NOS1AP	c.106-38510G>T/c.178-20044C>T/c.178-20044C>T	rs10494366 GT genotype/rs10800397 T Allele Carrier/rs10919035 C Allele Carrier
Cardiology	!	**Calcium Channel Blockers:** Nitrendipine (Nitrepin®)	**USE CAUTION** due to reduced response	AGTR1	WT/c.*86A>C	rs5186 AC genotype
Cardiology	!	**Phosphodiesterase Inhibitors:** Cilostazol (Pletal®)	**USE CAUTION** due to significant decrease in drug clearance	CYP3A5	*3A/*3A	Non Expresser
Cardiology	✓	**ACE Inhibitors:** Benazepril (Lotensin®)	**NORMAL RESPONSE EXPECTED**	ACE	WT/WT	ACE Deletion
Cardiology	✓	**Angiotensin II Receptor Blockers:** Losartan (Cozaar®)	**NORMAL RESPONSE EXPECTED**	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Cardiology	✓	**Angiotensin II Receptor Blockers:** Losartan (Cozaar®)	**NORMAL RESPONSE EXPECTED**	AGTR1	WT/c.*86A>C	rs5186 AC genotype
Cardiology	✓	**Antianginal Drugs:** Ranolazine (Ranexa®)	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer
Cardiology	✓	**Antiarrhythmic Drugs:** Dronedarone (Multaq®)	**NORMAL RESPONSE EXPECTED**	CYP3A4	*1A/*1A	Normal Metabolizer
Cardiology	✓	**Antiarrhythmic Drugs:** Flecainide (Tambocor®)	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer
Cardiology	✓	**Antiarrhythmic Drugs:** Propafenone (Rythmol®)	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer
Cardiology	✓	**Anticoagulants:** Rivaroxaban (Xarelto®)	**NORMAL RESPONSE EXPECTED**	CYP3A4	*1A/*1A	Normal Metabolizer
Cardiology	✓	**Anticoagulants:** Warfarin (Coumadin®)	**NORMAL DOSE** Warfarin daily dose 5-7mg	CYP2C9	*1/*1	Normal Metabolizer
Cardiology	✓	**Anticoagulants:** Warfarin (Coumadin®)	**NORMAL DOSE** Warfarin daily dose 5-7mg	VKORC1	WT/-1639G>A	rs9923231 A Allele Carrier

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Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Cardiology	✓	**Antilipemic Agents:** Fenofibrate (Tricor®)	NORMAL RESPONSE EXPECTED	APOE	WT/WT	Non E2 Carrier
Cardiology	✓	**Antilipemic Agents (Statins):** Fluvastatin (Lescol®)	NORMAL RESPONSE EXPECTED	ACE	WT/WT	ACE Deletion
Cardiology	✓	**Antilipemic Agents (Statins):** Lovastatin (Mevacor®), Rosuvastatin (Crestor®)	NORMAL RESPONSE EXPECTED	CYP3A5	*3A/*3A	Non Expresser
Cardiology	✓	**Antilipemic Agents (Statins):** Pitavastatin (Livalo®), Pravastatin (Pravachol®), Rosuvastatin (Crestor®)	NORMAL RESPONSE EXPECTED	SLCO1B1	*1/*1	Normal Activity
Cardiology	✓	**Antilipemic Agents (Statins):** Pravastatin (Pravachol®)	NORMAL RESPONSE EXPECTED	KIF6	WT/c.2155T>C	rs20455 non-AA genotype
Cardiology	✓	**Antilipemic Agents (Statins):** Simvastatin (Zocor®)	NORMAL RESPONSE EXPECTED	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Cardiology	✓	**Antilipemic Agents (Statins):** Simvastatin (Zocor®)	NORMAL RESPONSE EXPECTED	SLCO1B1	*1/*1	Normal Activity
Cardiology	✓	**Antiplatelets:** Clopidogrel (Plavix®)	NORMAL RESPONSE EXPECTED	CYP2C19	*1/*17	Rapid Metabolizer
Cardiology	✓	**Antiplatelets:** Ticagrelor (Brilinta®)	NORMAL RESPONSE EXPECTED	CYP2C19	*1/*17	Rapid Metabolizer
Cardiology	✓	**Beta Blockers:** Atenolol (Tenormin®)	NORMAL RESPONSE EXPECTED	ADRA2A	WT/c.-1252G>C	rs1800544 GC genotype/rs1800545 GG genotype
Cardiology	✓	**Beta Blockers:** Carvedilol (Coreg®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Cardiology	✓	**Beta Blockers:** Metoprolol (Lopressor®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Cardiology	✓	**Beta Blockers:** Nebivolol (Bystolic®), Propranolol (Inderal LA®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer

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Cardiology	✓	**Calcium Channel Blockers:** Diltiazem (Cardizem®), Felodipine (Plendil®), Lercanidipine (Zanidip®), Nisoldipine (Sular®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Cardiology	✓	**Calcium Channel Blockers:** Verapamil (Calan®)	NORMAL RESPONSE EXPECTED	NOS1AP	c.106-38510G>T/c.178-20044C>T/c.178-20044C>T	rs10494366 GT genotype/rs10800397 T Allele Carrier/rs10919035 C Allele Carrier
Cardiology	✓	**Diuretics:** Bumetanide (Bumex®), Furosemide (Lasix®), Hydrochlorothiazide (Microzide®), Torsemide (Demadex®)	NORMAL RESPONSE EXPECTED	ACE	WT/WT	ACE Deletion
Cardiology	✓	**Diuretics:** Hydrochlorothiazide (Microzide®)	NORMAL RESPONSE EXPECTED	AGTR1	WT/c.*86A>C	rs5186 AC genotype
Cardiology	✓	**Diuretics:** Spironolactone (Aldactone®)	NORMAL RESPONSE EXPECTED	ACE	WT/WT	ACE Deletion
Cardiology	✓	**Miscellaneous Cardiovascular Agents:** Ivabradine (Corlanor®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Cardiology	✓	**Vasodilators:** Hydralazine	NORMAL RESPONSE EXPECTED	NAT2	*5/*5/*12/*12	Slow Acetylator
Cardiology	✓	**Vasodilators:** Nitroprusside (Nitropress®)	NORMAL RESPONSE EXPECTED	ACE	WT/WT	ACE Deletion
Dentistry	✓	**Cholinergic Agonists:** Cevimeline (Evoxac®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Endocrinology	✗	**Sulfonylureas:** Chlorpropamide (Diabinese®), Glimepiride (Amaryl®), Glipizide (Glucotrol®), Glyburide (Glynase®), Tolbutamide	CONSIDER ALTERNATIVES	G6PD	A-202A_376G/A	G6PD Deficiency
Endocrinology	!	**Biguanides:** Metformin (Glucophage®)	USE CAUTION due to decreased drug response	ATM	WT/c.175-5285G>T	rs11212617 AC genotype
Endocrinology	✓	**Endocrine Enzyme Inhibitors:** Eliglustat (Cerdelga®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer

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Endocrinology		**Thiazolidinediones:** Pioglitazone (Actos®)	**NORMAL RESPONSE EXPECTED**	CYP2C8	*1/*1	Wild Type
Endocrinology		**Thiazolidinediones:** Rosiglitazone (Avandia®)	**NORMAL RESPONSE EXPECTED**	CYP2C8	*1/*1	Wild Type
Gastroenterology		**Proton Pump Inhibitors (PPIs):** Dexlansoprazole (Dexilant®), Esomeprazole (Nexium®), Lansoprazole (Prevacid®), Omeprazole (Prilosec®), Pantoprazole (Protonix®), Rabeprazole (Aciphex®)	**INCREASE DOSE** by 50-200% and then adjusted to achieve a favorable clinical response due to decreased efficacy	CYP2C19	*1/*17	Rapid Metabolizer
Gastroenterology		**Osmotic Laxatives:** Ascorbic Acid (MoviPrep®)	**USE CAUTION** due to a risk of hemolytic anemia	G6PD	A-202A_376G/A	G6PD Deficiency
Gastroenterology		**Histamine H2 Antagonists:** Famotidine (Pepcid®)	**NORMAL DOSE**	CYP2C19	*1/*17	Rapid Metabolizer
Gynecology		**Hormonal Contraceptives:** Ethinyl Estradiol/Norelgestromin (Ortho Evra®)	**NORMAL RESPONSE EXPECTED**	F5	WT/WT	Non Factor V Leiden Carrier
Gynecology		**Hormones:** Oral-Contraceptive	**NORMAL RESPONSE EXPECTED**	F2	WT/WT	Wild Type
Gynecology		**Mixed 5-HT1A Agonist/5-HT2A Antagonist:** Flibanserin (Addyi®)	**NORMAL RESPONSE EXPECTED**	CYP2C19	*1/*17	Rapid Metabolizer
Hematology		**Colony Stimulating Factors:** Eltrombopag (Promacta®)	**NORMAL RESPONSE EXPECTED**	F5	WT/WT	Non Factor V Leiden Carrier
Immunology		**Immunosuppressant Agents:** Cyclosporine (Gengraf®), Sirolimus (Rapamune®)	**DECREASE DOSE**	CYP3A5	*3A/*3A	Non Expresser
Immunology		**5-Aminosalicylic Acid Derivatives:** Sulfasalazine (Azulfidine®)	**USE CAUTION** due to a risk of hemolytic anemia	G6PD	A-202A_376G/A	G6PD Deficiency
Immunology		**Urate-Oxidase (Recombinent):** Pegloticase (Krystexxa®)	**USE CAUTION** due to the risk of hemolysis and methemoglobinemia	G6PD	A-202A_376G/A	G6PD Deficiency

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Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Immunology		**Uricosuric Agents:** Probenecid	**USE CAUTION** due to the risk of hemolysis and methemoglobinemia	G6PD	A-202A_376G/A	G6PD Deficiency
Immunology		**Antirheumatic Immunosuppressants:** Methotrexate (Trexall®)	**NORMAL RESPONSE EXPECTED**	ITPA	WT/WT	Non-protective Wild Type
Immunology		**Immunosuppressant Agents:** Tacrolimus (Prograf®)	**NORMAL RESPONSE EXPECTED**	CYP3A5	*3A/*3A	Non Expresser
Immunology		**Immunosuppressive Drugs:** Azathioprine (Imuran®)	**NORMAL RESPONSE EXPECTED**	TPMT	*1/*1	Normal Metabolizer
Immunology		**Systemic Corticosteroids:** Methylprednisolone (Medrol®), Prednisolone (Orapred®), Prednisone (Deltasone®)	**NORMAL RESPONSE EXPECTED**	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Immunology		**Xanthine Oxidase Inhibitors:** Allopurinol (Zyloprim®)	**NORMAL RESPONSE EXPECTED**	HLA-B	WT/WT	Wild Type
Infectious Diseases		**Antifungal Drugs:** Voriconazole (Vfend®)	**CONSIDER ALTERNATIVES** (e.g., isavuconazole, liposomal amphotericin B, posaconazole)	CYP2C19	*1/*17	Rapid Metabolizer
Infectious Diseases		**Topical Antibiotics:** Mafenide (Sulfamylon®)	**CONSIDER ALTERNATIVES** due to reported fatal ADR cases	G6PD	A-202A_376G/A	G6PD Deficiency
Infectious Diseases		**Macrolides:** Erythromycin/Sulfisoxazole (Pediazole®)	**DECREASE DOSE** due to a risk of hemolytic anemia	G6PD	A-202A_376G/A	G6PD Deficiency
Infectious Diseases		**Antihepaciviral Drugs:** Boceprevir (Victrelis®), Peginterferon alfa-2b (PegIntron®), Ribavirin (Copegus®), Telaprevir (Incivo®)	**USE CAUTION** due to increased risk of ribavirin-induced hemolytic anemia	ITPA	WT/WT	Non-protective Wild Type
Infectious Diseases		**Antimalarial Drugs:** Chloroquine (Aralen®), Primaquine Phosphate (Primaquine®), Quinine (Qualaquin®)	**USE CAUTION** due to high risk for hemolysis	G6PD	A-202A_376G/A	G6PD Deficiency
Infectious Diseases		**Antiretroviral Drugs:** Atazanavir (Reyataz®)	**USE CAUTION** due to low likelihood of drug discontinuation resulted from jaundice	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier

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Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Infectious Diseases	!	**Antiretroviral Drugs:** Efavirenz (Sustiva®), Nevirapine (Viramune®)	USE CAUTION due to higher potential for an increased frequency and severity of drug-associated adverse events	CYP2B6	G516T/G516T /A785G/A785 G	G516T Homozygous/A 785G Homozygous
Infectious Diseases	!	**Antitubercular Agents:** Ethambutol (Myambutol®), Isoniazid, Pyrazinamide (Rifater®), Rifampin (Rifadin®)	USE CAUTION due to increased risk of hepatotoxicity caused by decreased drug clearance	NAT2	*5/*5/*12/*12	Slow Acetylator
Infectious Diseases	!	**Miscellaneous Antibiotics:** Dapsone, Sulfamethoxazole/Trimet hoprim (Bactrim®)	USE CAUTION due to an increased risk of hemolytic adverse reactions	G6PD	A-202A_376G/A	G6PD Deficiency
Infectious Diseases	!	**Miscellaneous Antibiotics:** Nalidixic Acid (Neggram®), Nitrofurantoin (Macrobid®)	USE CAUTION due to an association with hemolytic anemia	G6PD	A-202A_376G/A	G6PD Deficiency
Infectious Diseases	✓	**Antihepaciviral Drugs:** Ledipasvir/Sofosbuvir (Harvoni®)	NORMAL RESPONSE EXPECTED	IFNL3	WT/WT	Favorable Response Genotype
Infectious Diseases	✓	**Antiretroviral Drugs:** Abacavir (Ziagen®)	NORMAL RESPONSE EXPECTED	HLA-B	WT/WT	Wild Type
Infectious Diseases	✓	**Antiretroviral Drugs:** Dolutegravir (Tivicay®)	NORMAL RESPONSE EXPECTED	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier
Infectious Diseases	✓	**Antiretroviral Drugs:** Lamivudine (Epivir®), Lopinavir/Ritonavir (Kaletra®), Zidovudine (Retrovir®)	NORMAL RESPONSE EXPECTED	ABCB1	WT/WT	rs2032582 AA genotype/rs104 5642 AA genotype
Infectious Diseases	✓	**Antiretroviral Drugs:** Nelfinavir (Viracept®)	NORMAL RESPONSE EXPECTED	CYP2C19	*1/*17	Rapid Metabolizer
Infectious Diseases	✓	**Lipopeptides:** Daptomycin (Cubicin®)	NORMAL RESPONSE EXPECTED	ABCB1	WT/WT	rs2032582 AA genotype/rs104 5642 AA genotype
Neurology	!	**COMT Inhibitors:** Entacapone (Comtan®)	USE CAUTION due to decreased response	COMT	c.472G>A/c.4 72G>A	MET Homozygous
Neurology	✓	**Acetylcholinesterase Inhibitors:** Donepezil (Aricept®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer

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Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Neurology	✓	**Acetylcholinesterase Inhibitors:** Galantamine (Razadyne®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Neurology	✓	**Alpha-2 Antagonist:** Mirtazapine (Remeron®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Neurology	✓	**Anticonvulsant Drugs:** Brivaracetam (Briviact®)	NORMAL RESPONSE EXPECTED	CYP2C19	*1/*17	Rapid Metabolizer
Neurology	✓	**Anticonvulsant Drugs:** Carbamazepine (Tegretol®), Lamotrigine (Lamictal®), Oxcarbazepine (Trileptal®), Phenytoin (Dilantin®), Topiramate (Topamax®)	NORMAL RESPONSE EXPECTED	SCN2A	WT/WT	rs2304016 non-GG genotype
Neurology	✓	**Anticonvulsant Drugs:** Carbamazepine (Tegretol®), Phenytoin (Dilantin®)	NORMAL RESPONSE EXPECTED	HLA-B	WT/WT	Wild Type
Neurology	✓	**Anticonvulsant Drugs:** Clobazam (Onfi®)	NORMAL RESPONSE EXPECTED	CYP2C19	*1/*17	Rapid Metabolizer
Neurology	✓	**Anticonvulsant Drugs:** Phenobarbital	NORMAL RESPONSE EXPECTED	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Neurology	✓	**Antimigraine Agents:** Eletriptan (Relpax®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Neurology	✓	**Antimigraine Agents:** Zolmitriptan (Zomig®)	NORMAL RESPONSE EXPECTED	CYP1A2	*1A/*1F	Normal Metabolizer
Neurology	✓	**Central Monoamine-Depleting Agents:** Tetrabenazine (Xenazine®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Neurology	✓	**NMDA Receptor Antagonists:** Dextromethorphan/Quinidine(Nuedexta®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Oncology	✗	**Urate-Oxidases (Recombinant):** Rasburicase (Elitek®)	CONSIDER ALTERNATIVES include allopurinol	G6PD	A-202A_376G/A	G6PD Deficiency
Oncology	!	**Alkylating Agents:** Cyclophosphamide (Cytoxan®)	USE CAUTION due to poorer response and increased risk of toxicity	MTHFR	C677T/C677T	C677T Homozygous Mutation

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Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Oncology	⚠	**Antiemetics (Selective 5 -HT3 Receptor Antagonist):** Dolasetron (Anzemet®), Granisetron (Sancuso®)	**USE CAUTION** due to increased risk for QTc interval prolongation	NOS1AP	c.106-38510G>T/c.178-20044C>T/c.178-20044C>T	rs10494366 GT genotype/rs10800397 T Allele Carrier/rs10919035 C Allele Carrier
Oncology	⚠	**Antimetabolites (Pyrimidine Analog):** Fluorouracil (Carac®)	**USE CAUTION** due to increased risk of diarrhea	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Oncology	⚠	**Antimetabolites (Pyrimidine Analog):** Fluorouracil (Carac®)	**USE CAUTION** due to a highly increased risk of toxicity and poorer treatment outcome	GSTP1	WT/WT	rs1695 AA genotype
Oncology	⚠	**Antimetabolites (Pyrimidine Analog):** Fluorouracil (Carac®)	**USE CAUTION** due to poorer response and increased risk of toxicity	MTHFR	C677T/C677T	C677T Homozygous Mutation
Oncology	⚠	**Antimetabolites (Pyrimidine Analog):** Fluorouracil (Carac®)	**USE CAUTION** due to increased risk of severe neutropenia	XRCC1	c.1196A>G/c.1196A>G	rs25487 C Allele Carrier
Oncology	⚠	**BRAF Kinase Inhibitors:** Dabrafenib (Tafinlar®)	**USE CAUTION** by closely observing patients with G6PD deficiency for signs of hemolytic anemia	G6PD	A-202A_376G/A	G6PD Deficiency
Oncology	⚠	**Chemotherapy Modulating Agents:** Leucovorin (Wellcovorin®)	**USE CAUTION** due to a highly increased risk of toxicity and poorer treatment outcome	GSTP1	WT/WT	rs1695 AA genotype
Oncology	⚠	**Chemotherapy Modulating Agents:** Leucovorin (Wellcovorin®)	**USE CAUTION** due to poorer response and increased risk of toxicity	MTHFR	C677T/C677T	C677T Homozygous Mutation
Oncology	⚠	**Chemotherapy Modulating Agents:** Leucovorin (Wellcovorin®)	**USE CAUTION** due to increased risk of severe neutropenia	XRCC1	c.1196A>G/c.1196A>G	rs25487 C Allele Carrier
Oncology	⚠	**Folate Antimetabolites:** Methotrexate (Trexall®)	**USE CAUTION** due to increased risk of toxicity caused by increased drug concentration	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Oncology	⚠	**Folate Antimetabolites:** Methotrexate (Trexall®)	**USE CAUTION** due to poorer response and increased risk of toxicity	MTHFR	C677T/C677T	C677T Homozygous Mutation
Oncology	⚠	**Folate Antimetabolites:** Pemetrexed (Alimta®)	**USE CAUTION** due to poorer response and increased risk of toxicity	MTHFR	C677T/C677T	C677T Homozygous Mutation

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Oncology	!	**Platinum Analog:** Carboplatin (Paraplatin®), Cisplatin (Platinol®), Oxaliplatin (Eloxatin®)	USE CAUTION due to a highly increased risk of toxicity and poorer treatment outcome	GSTP1	WT/WT	rs1695 AA genotype
Oncology	!	**Platinum Analog:** Carboplatin (Paraplatin®), Cisplatin (Platinol®), Oxaliplatin (Eloxatin®)	USE CAUTION due to increased risk of severe neutropenia	XRCC1	c.1196A>G/c.1196A>G	rs25487 C Allele Carrier
Oncology	!	**Platinum Analog:** Carboplatin (Paraplatin®), Oxaliplatin (Eloxatin®)	USE CAUTION due to poorer response and increased risk of toxicity	MTHFR	C677T/C677T	C677T Homozygous Mutation
Oncology	!	**Platinum Analog:** Cisplatin (Platinol®)	USE CAUTION due to increased risk for nephrotoxicity	ERCC1	c.*197G>T/c.354T>C/c.354T>C/c.*931T>G	rs3212986 C Allele Carrier/rs11615 non-AA genotype/rs735482 non-AA genotype
Oncology	!	**Taxane Derivatives:** Docetaxel (Taxotere®)	USE CAUTION due to increased risk for nephrotoxicity	ERCC1	c.*197G>T/c.354T>C/c.354T>C/c.*931T>G	rs3212986 C Allele Carrier/rs11615 non-AA genotype/rs735482 non-AA genotype
Oncology	!	**Taxane Derivatives:** Paclitaxel (Abraxane®)	USE CAUTION due to increased risk for nephrotoxicity	ERCC1	c.*197G>T/c.354T>C/c.354T>C/c.*931T>G	rs3212986 C Allele Carrier/rs11615 non-AA genotype/rs735482 non-AA genotype
Oncology	!	**VEGF Tyrosine Kinase Inhibitors:** Sorafenib (NexAvar®)	USE CAUTION due to increased risk of hyperbilirubinemia and treatment interruption	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier
Oncology	✓	**Anthracyclines:** Doxorubicin (Doxil®)	NORMAL RESPONSE EXPECTED	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Oncology	✓	**Anthracyclines:** Doxorubicin (Doxil®)	NORMAL RESPONSE EXPECTED	NQO1	WT/WT	rs1800566 non-AA genotype
Oncology	✓	**Anthracyclines:** Epirubicin (Ellence®)	NORMAL RESPONSE EXPECTED	GSTP1	WT/WT	rs1695 AA genotype
Oncology	✓	**Anthracyclines:** Epirubicin (Ellence®)	NORMAL RESPONSE EXPECTED	NQO1	WT/WT	rs1800566 non-AA genotype
Oncology	✓	**Antiemetics:** Dexamethasone (Decadron®)	NORMAL RESPONSE EXPECTED	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype

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Oncology	✓	**Antiemetics:** Dronabinol (Marinol®)	NORMAL RESPONSE EXPECTED	CYP2C9	*1/*1	Normal Metabolizer
Oncology	✓	**Antiemetics (Selective 5 -HT3 Receptor Antagonist):** Ondansetron (Zofran®)	NORMAL RESPONSE EXPECTED	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Oncology	✓	**Antiemetics (Selective 5 -HT3 Receptor Antagonist):** Ondansetron (Zofran®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Oncology	✓	**Antiemetics (Selective 5 -HT3 Receptor Antagonist):** Palonosetron (Aloxi®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Oncology	✓	**Antimetabolites (Purine Analog):** Mercaptopurine (Purinethol®), Thioguanine (Tabloid®)	NORMAL RESPONSE EXPECTED	TPMT	*1/*1	Normal Metabolizer
Oncology	✓	**Antimetabolites (Pyrimidine Analog):** Capecitabine (Xeloda®), Pyrimidinedione (Tegafur-Uracil®)	NORMAL RESPONSE EXPECTED	DPYD	*4/*5	Normal Metabolizer
Oncology	✓	**Antimetabolites (Pyrimidine Analog):** Cytarabine (Depocyt®)	NORMAL RESPONSE EXPECTED	CDA	WT/WT	rs532545 C Allele
Oncology	✓	**BCR-ABL Tyrosine Kinase Inhibitors:** Nilotinib (Tasigna®), Pazopanib (Votrient®)	NORMAL RESPONSE EXPECTED	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier
Oncology	✓	**EGFR Tyrosine Kinase Inhibitors:** Erlotinib (Tarceva®)	NORMAL RESPONSE EXPECTED	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier
Oncology	✓	**EGFR Tyrosine Kinase Inhibitors:** Gefitinib (Iressa®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Oncology	✓	**EGFR Tyrosine Kinase Inhibitors:** Ruxolitinib (Jakavi®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Oncology	✓	**Histone Deacetylase (HDAC) Inhibitors:** Belinostat (Beleodaq®)	NORMAL RESPONSE EXPECTED	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier

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Oncology	✓	**Immunomodulators:** Thalidomide (Thalomid®)	NORMAL RESPONSE EXPECTED	ERCC1	c.*197G>T/c.354T>C/c.354T>C/c.*931T>G	rs3212986 C Allele Carrier/rs11615 non-AA genotype/rs735482 non-AA genotype
Oncology	✓	**Selective Estrogen Receptor Modulators (SERM):** Tamoxifen (Soltamox®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Oncology	✓	**Selective Estrogen Receptor Modulators (SERM):** Tamoxifen (Soltamox®)	NORMAL RESPONSE EXPECTED	F2	WT/WT	Wild Type
Oncology	✓	**Taxane Derivatives:** Cabazitaxel (Jevtana®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Oncology	✓	**Topoisomerase I Inhibitors:** Irinotecan (Camptosar®)	NORMAL RESPONSE EXPECTED	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier
Oncology	✓	**Topoisomerase II Inhibitor:** Idarubicin (Idamycin®)	NORMAL RESPONSE EXPECTED	SLCO1B1	*1/*1	Normal Activity
Oncology	✓	**VEGF Tyrosine Kinase Inhibitors:** Sunitinib (Sutent®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Oncology	✓	**Vinca Alkaloids:** Vincristine (Marqibo®)	NORMAL RESPONSE EXPECTED	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Pain Management	▼	**Opioids:** Methadone (Methadose®)	DECREASE DOSE	CYP2B6	G516T/G516T/A785G/A785G	G516T Homozygous/A785G Homozygous
Pain Management	✓	**Alpha-2 Adrenergic Agonists:** Tizanidine (Zanaflex®)	NORMAL RESPONSE EXPECTED	CYP1A2	*1A/*1F	Normal Metabolizer
Pain Management	✓	**Nonsteroidal Antiinflammatory Drugs (NSAIDs):** Celecoxib (Celebrex®), Diclofenac (Voltaren®), Meloxicam (Mobic®)	NORMAL RESPONSE EXPECTED	CYP2C9	*1/*1	Normal Metabolizer
Pain Management	✓	**Nonsteroidal Antiinflammatory Drugs (NSAIDs):** Ibuprofen (Advil®), Naproxen (Aleve®)	NORMAL RESPONSE EXPECTED	CYP2C9	*1/*1	Normal Metabolizer

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Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Pain Management	✓	**Opioids:** Alfentanil (Alfenta®), Fentanyl (Duragesic®), Hydromorphone (Dilaudid®), Morphine (MS Contin®)	**NORMAL RESPONSE EXPECTED**	OPRM1	WT/WT	rs1799971 A Allele Carrier/rs51067 9 TT genotype
Pain Management	✓	**Opioids:** Buprenorphine (Subutex®), Fentanyl (Duragesic®), Hydrocodone/Acetamino phen (Vicodin®), Oxycodone (Oxycontin®), Sufentanil (Sufenta®)	**NORMAL RESPONSE EXPECTED**	CYP3A4	*1A/*1A	Normal Metabolizer
Pain Management	✓	**Opioids:** Codeine (Codeine®), Codeine/Acetaminophen (Tylenol #3 & #4®), Hydrocodone/Acetamino phen (Vicodin®), Oxycodone (Oxycontin®)	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer
Pain Management	✓	**Opioids:** Hydrocodone/Acetamino phen (Vicodin®)	**NORMAL RESPONSE EXPECTED**	OPRM1	WT/WT	rs1799971 A Allele Carrier/rs51067 9 TT genotype
Pain Management	✓	**Opioids:** Tramadol Hydrochloride/Acetamino phen (Ultracet®), Tramadol (Ultram®)	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer
Pain Management	✓	**Skeletal Muscle Relaxants:** Carisoprodol (Soma®)	**NORMAL RESPONSE EXPECTED**	CYP2C19	*1/*17	Rapid Metabolizer
Pain Management	✓	**Skeletal Muscle Relaxants:** Cyclobenzaprine (Flexeril®)	**NORMAL RESPONSE EXPECTED**	CYP1A2	*1A/*1F	Normal Metabolizer
Psychiatry	✗	**Selective Serotonin Reuptake Inhibitors (SSRIs):** Sertraline (Zoloft®)	**CONSIDER ALTERNATIVES** for non-responders	CYP2C19	*1/*17	Rapid Metabolizer
Psychiatry	✗	**Tricyclic Antidepressants:** Amitriptyline (Elavil®), Clomipramine (Anafranil®), Desipramine (Norpramin®), Doxepin (Silenor®), Imipramine (Tofranil®), Nortriptyline (Pamelor®), Protriptyline (Vivactil®), Trimipramine (Surmontil®)	**CONSIDER ALTERNATIVES**	CYP2C19	*1/*17	Rapid Metabolizer

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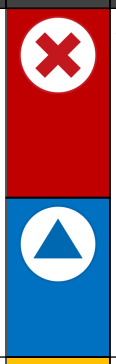
Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Psychiatry		**Selective Serotonin Reuptake Inhibitors (SSRIs):** Citalopram (Celexa®), Escitalopram (Lexapro®)	**CONSIDER ALTERNATIVES** OR **INCREASE DOSE** by 150% in response to efficacy and adverse drug event	CYP2C19	*1/*17	Rapid Metabolizer
Psychiatry		**Antimanic Agents:** Lithium (Lithobid®)	**USE CAUTION** due to increased risk of suicidal ideation	ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Psychiatry		**Antipsychotics:** Chlorpromazine, Fluphenazine	**USE CAUTION** due to possible increased QT interval	CYP1A2	*1A/*1F	Normal Metabolizer
Psychiatry		**Antipsychotics:** Clozapine (Clozaril®)	**USE CAUTION** due to increased risk of developing metabolic syndrome	HTR2C	c.-759C>T/c.-759C>T/c.551-3008C>G/c.551-3008C>G	rs1414334 C Allele Carrier
Psychiatry		**Antipsychotics:** Olanzapine (Zyprexa®)	**USE CAUTION** due to increased risk of developing metabolic syndrome	HTR2C	c.-759C>T/c.-759C>T/c.551-3008C>G/c.551-3008C>G	rs1414334 C Allele Carrier
Psychiatry		**Antipsychotics:** Olanzapine (Zyprexa®), Quetiapine (Seroquel®)	**USE CAUTION** due to increased risk of side effects	SLC6A4	LA/LG	HTTLPR Long Form
Psychiatry		**Antipsychotics:** Risperidone (Risperdal®)	**USE CAUTION** due to increased risk of developing metabolic syndrome	HTR2C	c.-759C>T/c.-759C>T/c.551-3008C>G/c.551-3008C>G	rs1414334 C Allele Carrier
Psychiatry		**Antipsychotics:** Risperidone (Risperdal®)	**USE CAUTION** due to increased risk of side effects	SLC6A4	LA/LG	HTTLPR Long Form
Psychiatry		**Benzodiazepines:** Diazepam (Valium®)	**USE CAUTION** due to decreased drug response	CYP2C19	*1/*17	Rapid Metabolizer
Psychiatry		**Benzodiazepines:** Midazolam (Versed®)	**USE CAUTION** due to increased risk of side effects caused by decreased clearance of drug	CYP3A5	*3A/*3A	Non Expresser
Psychiatry		**CNS Stimulants (ADHD):** Amphetamine (Adderall®), Dexmethylphenidate (Focalin®), Dextroamphetamine (Adderall®), Lisdexamfetamine (Vyvanse®), Methylphenidate (Ritalin®)	**USE CAUTION** due to reduced response	COMT	c.472G>A/c.472G>A	MET Homozygous

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Psychiatry	⚠	**Dopamine/Norepinephrine-Reuptake Inhibitors:** Bupropion (Wellbutrin®)	USE CAUTION due to reduced response and increased risk of side effects	CYP2B6	G516T/G516T /A785G/A785G	G516T Homozygous/A785G Homozygous
Psychiatry	⚠	**Other Stimulants:** Cannabinoids	USE CAUTION due to increased risk of tetrahydrocannabinol (THC) dependence	FAAH	WT/WT	rs324420 CC genotype
Psychiatry	⚠	**Other Stimulants:** Cocaine	USE CAUTION due to increased risk of cocaine dependence	CNR1	WT/WT	rs806368 TT genotype
Psychiatry	✓	**Aldehyde Dehydrogenase Inhibitors:** Disulfiram (Antabuse®)	NORMAL RESPONSE EXPECTED	ANKK1	WT/WT	Non A1 Carrier
Psychiatry	✓	**Anti-Anxiety Agents:** Buspirone (Buspar®)	NORMAL RESPONSE EXPECTED	HTR1A	WT/c.-1019G>C	rs6295 non-CC genotype/rs1800044 C Allele Carrier
Psychiatry	✓	**Antipsychotics:** Aripiprazole (Abilify®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Psychiatry	✓	**Antipsychotics:** Aripiprazole (Abilify®), Brexpiprazole (Rexulti®), Iloperidone (Fanapt®), Pimozide (Orap®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Antipsychotics:** Haloperidol (Haldol®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Antipsychotics:** Perphenazine	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Antipsychotics:** Thioridazine (Mellaril®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Antipsychotics:** Valproic acid (Depakote®)	NORMAL RESPONSE EXPECTED	ANKK1	WT/WT	Non A1 Carrier
Psychiatry	✓	**Benzodiazepines:** Alprazolam (Xanax®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Psychiatry	✓	**Benzodiazepines:** Lorazepam (Ativan®), Oxazepam (Serax®)	NORMAL RESPONSE EXPECTED	UGT2B15	*1/*2	rs1902023 non-AA genotype

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Psychiatry	✓	**CNS Stimulants (ADHD):** Methamphetamine (Desoxyn®)	NORMAL RESPONSE EXPECTED	FAAH	WT/WT	rs324420 CC genotype
Psychiatry	✓	**Opioids Antagonists:** Naloxone (Evzio®), Naltrexone (Revia®)	NORMAL RESPONSE EXPECTED	OPRM1	WT/WT	rs1799971 A Allele Carrier/rs510679 TT genotype
Psychiatry	✓	**Selective Serotonin Reuptake Inhibitors (SSRIs):** Fluoxetine (Prozac®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Selective Serotonin Reuptake Inhibitors (SSRIs):** Fluvoxamine (Luvox®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Selective Serotonin Reuptake Inhibitors (SSRIs):** Fluvoxamine (Luvox®), Paroxetine (Paxil®)	NORMAL RESPONSE EXPECTED	HTR1A	WT/c.-1019G>C	rs6295 non-CC genotype/rs1800044 C Allele Carrier
Psychiatry	✓	**Selective Serotonin Reuptake Inhibitors (SSRIs):** Paroxetine (Paxil®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Selective Serotonin Reuptake Inhibitors (SSRIs):** Vilazodone (Viibryd®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer
Psychiatry	✓	**Selective Serotonin Reuptake Inhibitors (SSRIs):** Vortioxetine (Trintellix®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):** Atomoxetine (Strattera®)	NORMAL RESPONSE EXPECTED	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):** Duloxetine (Cymbalta®)	NORMAL RESPONSE EXPECTED	CYP1A2	*1A/*1F	Normal Metabolizer
Psychiatry	✓	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):** Levomilnacipran (Fetzima®)	NORMAL RESPONSE EXPECTED	CYP3A4	*1A/*1A	Normal Metabolizer

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Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Psychiatry	✓	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):** Milnacipran (Savella®)	**NORMAL RESPONSE EXPECTED**	ADRA2A	WT/c.-1252G>C	rs1800544 GC genotype/rs1800545 GG genotype
Psychiatry	✓	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):** Milnacipran (Savella®)	**NORMAL RESPONSE EXPECTED**	HTR1A	WT/c.-1019G>C	rs6295 non-CC genotype/rs1800044 C Allele Carrier
Psychiatry	✓	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):** Reboxetine (Edronax®), Trazodone (Desyrel®)	**NORMAL RESPONSE EXPECTED**	CYP3A4	*1A/*1A	Normal Metabolizer
Psychiatry	✓	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):** Venlafaxine (Effexor®)	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer
Psychiatry	✓	**Tetracyclic Antidepressants:** Maprotiline	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer
Rheumatology	!	**Selective Estrogen Receptor Modulators (SERMs):** Raloxifene (Evista®)	**USE CAUTION** due to decreased hip bone mineral density	UGT1A1	*1/*28	Heterozygous *28 Allele Carrier
Rheumatology	✓	**Antigout Agents:** Lesinurad (Zurampic®)	**NORMAL RESPONSE EXPECTED**	CYP2C9	*1/*1	Normal Metabolizer
Rheumatology	✓	**Nonsteroidal Antiinflammatory Drugs (NSAIDs):** Flurbiprofen (Ansaid®)	**NORMAL RESPONSE EXPECTED**	CYP2C9	*1/*1	Normal Metabolizer
Rheumatology	✓	**Nonsteroidal Anti-inflammatory Drugs (NSAIDs):** Piroxicam (Feldene®)	**NORMAL RESPONSE EXPECTED**	CYP2C9	*1/*1	Normal Metabolizer
Smoking Cessation	✓	**Smoking Cessation Aids:** Bupropion (Zyban®)	**NORMAL RESPONSE EXPECTED**	ANKK1	WT/WT	Non A1 Carrier
Smoking Cessation	✓	**Smoking Cessation Aids:** Nicotine (Nicoderm®)	**NORMAL DOSE** may have an increased likelihood of smoking cessation and decreased risk of relapse	COMT	c.472G>A/c.472G>A	MET Homozygous
Supplements	✗	**Vitamins:** Folic Acid	**CONSIDER ALTERNATIVES** (e.g., supplements containing methylfolate) due to significantly reduced folic acid conversion	MTHFR	C677T/C677T	C677T Homozygous Mutation

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Therapeutic	Action	Drug Impacted	Clinical Interpretation	Gene	Genotype	Phenotype
Toxicology		**Antidotes:** Sodium Nitrite	**CONSIDER ALTERNATIVES**	G6PD	A-202A_376G/A	G6PD Deficiency
Toxicology		**Antidotes:** Methylene Blue (Provayblue®)	**USE CAUTION** due to risk of hemolytic anemia	G6PD	A-202A_376G/A	G6PD Deficiency
Toxicology		**Antidotes:** Ethanol	**NORMAL RESPONSE EXPECTED**	ANKK1	WT/WT	Non A1 Carrier
Toxicology		**Antidotes:** Ethanol	**NORMAL RESPONSE EXPECTED**	OPRM1	WT/WT	rs1799971 A Allele Carrier/rs510679 TT genotype
Urology		**Alpha 1 Blockers:** Dutasteride/Tamsulosin (Jalyn®), Tamsulosin (Flomax®)	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer
Urology		**Alpha 1 Blockers:** Silodosin (Rapaflo®)	**NORMAL RESPONSE EXPECTED**	CYP3A4	*1A/*1A	Normal Metabolizer
Urology		**Anticholinergic Agents:** Darifenacin (Enablex®), Fesoterodine (Toviaz®)	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer
Urology		**Anticholinergic Agents:** Tolterodine (Detrol®)	**NORMAL RESPONSE EXPECTED**	CYP2D6	*1/*9	Normal Metabolizer

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Patient PGxOne™ Plus Genotype and Phenotype Results for Smith, John

PGxOne™ Plus

Gene	Genotype	Phenotype
ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
ACE	WT/WT	ACE Deletion
ADRA2A	WT/c.-1252G>C	rs1800544 GC genotype/rs1800545 GG genotype
AGTR1	WT/c.*86A>C	rs5186 AC genotype
ANKK1	WT/WT	Non A1 Carrier
APOE	WT/WT	Non E2 Carrier
ATM	WT/c.175-5285G>T	rs11212617 AC genotype
CDA	WT/WT	rs532545 C Allele
CES1	WT/WT	rs71647871 C Allele
CNR1	WT/WT	rs806368 TT genotype
COMT	c.472G>A/c.472G>A	MET Homozygous
CYP1A2	*1A/*1F	Normal Metabolizer
CYP2B6	G516T/G516T/A785G/A785G	G516T Homozygous/A785G Homozygous
CYP2C19	*1/*17	Rapid Metabolizer
CYP2C8	*1/*1	Wild Type
CYP2C9	*1/*1	Normal Metabolizer
CYP2D6	*1/*9	Normal Metabolizer
CYP3A4	*1A/*1A	Normal Metabolizer
CYP3A5	*3A/*3A	Non Expresser
CYP4F2	*3/*3	Poor Metabolizer
DPYD	*4/*5	Normal Metabolizer
DRD1	WT/c.-48G>A	rs4532 non-CC genotype
DRD2	WT/WT	rs1799978 TT genotype
ERCC1	c.*197G>T/c.354T>C/c.354T>C /c.*931T>G	rs3212986 C Allele Carrier/rs11615 non-AA genotype/rs735482 non-AA genotype
F2	WT/WT	Wild Type

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Gene	Genotype	Phenotype
F5	WT/WT	Non Factor V Leiden Carrier
FAAH	WT/WT	rs324420 CC genotype
G6PD	A-202A_376G/A	G6PD Deficiency
GRIK4	WT/c.83-10039T>C	rs1954787 T Allele Carrier
GSTP1	WT/WT	rs1695 AA genotype
HLA-B	WT/WT	Wild Type
HTR1A	WT/c.-1019G>C	rs6295 non-CC genotype/rs1800044 C Allele Carrier
HTR2A	WT/c.614-2211T>C	rs7997012 non-GG genotype
HTR2C	c.-759C>T/c.-759C>T/c.551-3008C>G/c.551-3008C>G	rs1414334 C Allele Carrier
IFNL3	WT/WT	Favorable Response Genotype
ITPA	WT/WT	Non-protective Wild Type
KIF6	WT/c.2155T>C	rs20455 non-AA genotype
MTHFR	C677T/C677T	C677T Homozygous Mutation
NAT2	*5/*5/*12/*12	Slow Acetylator
NOS1AP	c.106-38510G>T/c.178-20044C>T/c.178-20044C>T	rs10494366 GT genotype/rs10800397 T Allele Carrier/rs10919035 C Allele Carrier
NQO1	WT/WT	rs1800566 non-AA genotype
OPRM1	WT/WT	rs1799971 A Allele Carrier/rs510679 TT genotype
SCN2A	WT/WT	rs2304016 non-GG genotype
SLC6A4	LA/LG	HTTLPR Long Form
SLCO1B1	*1/*1	Normal Activity
TPMT	*1/*1	Normal Metabolizer
UGT1A1	*1/*28	Heterozygous *28 Allele Carrier
UGT2B15	*1/*2	rs1902023 non-AA genotype
VKORC1	WT/-1639G>A	rs9923231 A Allele Carrier
XRCC1	c.1196A>G/c.1196A>G	rs25487 C Allele Carrier

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PGxOne™ Plus Panel Genes and Variants:

This test only detects those genes and variants listed below. A normal (wild type) genotype signifies the absence of the targeted alleles and does not indicate the absence of other mutations not covered by the assay. The possibility cannot be ruled out that the indicated genotypes may be present but below the limits of detection for this assay. The panel includes 50 genes and 211 variants based on the recommendations of the Clinical Pharmacogenetics Implementation Consortium (CPIC) and Dutch Pharmacogenetics Working Group (DPWG) and the FDA's work group guidance.

Gene	Allele Type	Alleles
ABCB1	Decreased Activity	rs1045642, rs2032582
ACE	Decreased Activity	rs1799752
ADRA2A	Decreased Activity	rs1800544, rs1800545
AGTR1	Decreased Activity	rs5186
ANKK1	Decreased Activity	rs1800497
APOE	Decreased Activity	rs7412
ATM	Decreased Metformin Response	rs11212617
CDA	Decreased Activity	rs532545
CES1	Decreased Activity	rs71647871
CNR1	Decreased Activity	rs806368
COMT	Decreased Activity	rs4680
CYP1A2	Active	*1A
	Increased Activity	*1F
	Decreased Activity	*1C, *1K, *3, *4, *7
	Inactive	*6
CYP2B6	Decreased Activity	*6, *18
CYP2C19	Active	*1
	Increased Activity	*17
	Decreased Activity	*9, *10
	Inactive	*2, *3, *4, *5, *6, *7, *8, *12
CYP2C8	Decreased Activity	*3
CYP2C9	Active	*1
	Decreased Activity	*2, *3, *4, *5, *8, *9, *11, *12, *13, *14, *16
	Inactive	*6, *15
CYP2D6	Active	*1, *2, *35
	Decreased Activity	*9, *10, *17, *29, *41
	Inactive	*3, *4, *6, *7, *8, *11, *12, *14, *19, *20, *21, *38, *40, *44
	Deletion	*5
	Amplification	*1XN, *2XN, *4XN, *10XN, *17XN, *29xN, *35xN, *41XN
CYP3A4	Active	*1A
	Decreased Activity	*1B, *2, *3, *12, *17
CYP3A5	Active	*1A
	Decreased Activity	*2, *7, *8, *9
	Inactive	*3A, *3B, *6

CYP4F2	Active	*1
	Decreased Activity	*3
DPYD	Active	*1, *4, *5, *6, *9A
	Decreased Activity	*9B, *10
	Inactive	*2A, *3, *7, *8, *11, *12, *13, 496A>G, IVS10-15T>C, 1845G>T, 2846A>T
DRD1	Decreased Activity	rs4532
DRD2	Decreased Activity	rs1799978
ERCC1	Decreased Activity	rs3212986, rs11615, rs735482
F2	Prothrombin Mutation	G20210A
F5	Increased Activity	rs6025
FAAH	Decreased Activity	rs324420
G6PD	Decreased Activity	A, A-202A_376G, A-376G_968C, Alhambra, Andalus, Beverly Hills, Canton, Cassano, Chatham, Chinese-3, Chinese-4, Coimbra, Cosenza, Fushan, Guadalajara, Ilesha, Iowa, Kaiping, Kalyan, Lagosanto, Mahidol, Mediterranean, Metaponto, Minnesota, Mt. Sinai, Nara, Nashville, Olomouc, Pawnee, Plymouth, Praba, Puetro Limon, Santamaria, Santiago, Santiago de Cuba, Sao Boria, Shinshu, Sibari, Telti, Tomah, Ube, Union, Viangchan, West Virginia
GRIK4	Decreased Activity	rs1954787
GSTP1	Decreased Activity	rs1695
HLA-B	Carbamazepine ADR	*1502
	Abacavir Hypersensitivity	*5701
	Allopurinol ADR	*5801
HTR1A	Decreased Activity	rs1800044, rs6295
HTR2A	Decreased Activity	rs7997012
HTR2C	Decreased Activity	rs1414334, rs3813929
IFNL3	Decreased Activity	rs12979860, rs8099917
ITPA	Decreased Activity	rs1127354, rs7270101
KIF6	Decreased Activity	rs20455
MTHFR	Decreased Activity	C677T, A1298C
NAT2	Active	*4, *12, *13
	Inactive	*5, *6, *7
NOS1AP	Decreased Activity	rs10494366, rs10800397, rs10919035
NQO1	Decreased Activity	rs1800566
OPRM1	Decreased Activity	rs1799971, rs510769
SCN2A	Decreased Activity	rs2304016
SLC6A4	Decreased Activity	5-HTTLPR L_A, 5-HTTLPR L_G, 5-HTTLPR S
SLCO1B1	Decreased Activity	*5
TPMT	Active	*1
	Inactive	*2, *3A, *3B, *3C, *4
UGT1A1	Decreased Activity	*28
UGT2B15	Decreased Activity	rs1902023
VKORC1	Increased Warfarin Sensitivity	-1639G>A
XRCC1	Decreased Activity	rs25487

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Assay Methodology and Limitations for PGxOne™ Plus Panel:

Pharmacogenomics testing to assess how a patient may respond to prescribed drugs was performed by massively parallel Next Generation Sequencing (NGS). PGxOne™ Plus was developed, and assessed for accuracy and precision by Admera Health, South Plainfield NJ. The sensitivity and specificity of this test is 100% and 100% respectively. PGxOne™ Plus has not been cleared or approved by the U.S. Food and Drug Administration (FDA) but the FDA has determined that such clearance or approval is not necessary. The PGxOne™ Plus test is used for clinical purposes. It should not be regarded as investigational or for research. Drug interaction information is based upon data available in scientific literature and prescribing information for the most commonly prescribed drugs. This laboratory is certified under the Clinical Laboratory Improvement Amendments (CLIA) as qualified to perform high complexity clinical laboratory testing. The DNA testing is not a substitute for clinical monitoring.

General Pharmacogenomics References:

1. Drug labels with pharmacogenomics information:
   https://www.pharmgkb.org/view/drug-labels.do

2. Pharmacogenomics drug dosing guidelines:
   https://www.pharmgkb.org/view/dosing-guidelines.do

3. FDA Orange Book Search Engine:
   http://www.accessdata.fda.gov/scripts/cder/ob/default.cfm

4. Warfarin dosing guideline:
   Clinical Pharmacogenetics Implementation Consortium Guidelines
   for CYP2C9 and VKORC1 Genotypes and Warfarin Dosing

Electronic Signature

Laboratory Director
ABMG Certified, Clinical Molecular Genetics