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PATIENT INFORMATION	SAMPLE	REFERRING PHYSICIAN
Name: **JOHN SMITH**	Date Collected: **12/27/2017**	Name: **Physician, M.D.**
Gender: **Male**	Date Received: **01/02/2016**	Institution: **Any Hospital**
Birthday: **10/09/1973**	Case ID: **PGPLL17-000002**	Address: **21 Any Street Any City, Philippines**
Age: **44**	Source: **Buccal Swabs**	Contact: **+632 123-4567**
Address: **14 Any Street, Any Village Any City, Philippines**		

PGxOne Plus™
50 Genes

Comprehensive Drug Information for Smith, John

ICD-10: G89.4 Chronic pain syndrome; M51.15 Intvrt disc disorders w radiculopathy, thoracolumbar region; M54.12 Radiculopathy, cervical region; M54.16 Radiculopathy, lumbar region

CONSIDER ALTERNATIVE

Drug Impacted	Recommendation
Codeine (Codeine®)	CONSIDER ALTERNATIVES
Codeine/ Acetaminophen (Tylenol #3 & #4®)	
Hydrocodone/ Acetaminophen (Vicodin®)	
Oxycodone (Oxycontin®)	
Tramadol (Ultram®)	
Tramadol Hydrochloride/ Acetaminophen (Ultracet®)	

DOSE RECOMMENDATION

Drug Impacted	Recommendation
Tramadol (Ultram®)	INCREASE DOSE
Tramadol Hydrochloride/ Acetaminophen (Ultracet®)	
Buprenorphine (Subutex®)	DECREASE DOSE
Fentanyl (Duragesic®)	
Methadone (Methadose®)	
Sufentanil (Sufenta®)	

NORMAL RESPONSE EXPECTED

Drug Impacted	Recommendation
Alfentanil (Alfenta®)	NORMAL RESPONSE EXPECTED
Celecoxib (Celebrex®)	
Cyclobenzaprine (Flexeril®)	
Dexamethasone (Decadron®)	
Diclofenac (Voltaren®)	
Hydromorphone (Dilaudid®)	

PROCEED WITH CAUTION

Drug Impacted	Recommendation
Buprenorphine (Subutex®)	USE CAUTION
Dexlansoprazole (Dexilant®)	
Esomeprazole (Nexium®)	
Fentanyl (Duragesic®)	
Lansoprazole (Prevacid®)	
Omeprazole (Prilosec®)	

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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Level of Evidence Legend

●	FDA Actionable PGx – Package insert
◖	PharmGKB, CPIC, EMA, DPWG, PMDA, HCSC
○	Medical Literature

Disclaimer: Recommendations with an evidence level of ○ are derived from medical literature and not the FDA/drug manufacture's package insert, or endorsed by established clinical guidelines. Healthcare providers should use their professional discretion when prescribing these drugs.

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I. ICD-10 Diagnosis Code Driven Result for
Smith, John

ICD-10: G89.4 Chronic pain syndrome;M51.15 Intvrt disc disorders w radiculopathy, thoracolumbar region;M54.12 Radiculopathy, cervical region;M54.16 Radiculopathy, lumbar region

Action	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
✓	**Antiemetics:**				
	Dexamethasone (Decadron®)	◖	NORMAL RESPONSE EXPECTED	ABCB1 WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
!	**Calcium Channel Blockers:**				
	Verapamil (Calan®)	◖	USE CAUTION due to increased risk for QTc prolongation	NOS1AP WT/WT	rs10494366 GG genotype/rs10800397 C Allele Carrier/rs10919035 C Allele Carrier
✓	**Nonsteroidal Antiinflammatory Drugs (NSAIDs):**				
	Celecoxib (Celebrex®)	●	NORMAL RESPONSE EXPECTED	CYP2C9 *1/*1	Normal Metabolizer
	Diclofenac (Voltaren®)	◖			
	Meloxicam (Mobic®)	◖			
✗	**Opioids:**				
	Codeine (Codeine®)	◖	CONSIDER ALTERNATIVES if no response	CYP2D6 *4/*10	Intermediate Metabolizer
	Codeine/Acetaminophen (Tylenol #3 & #4®)	◖			
	Hydrocodone/Acetaminophen (Vicodin®)	◖			
	Oxycodone (Oxycontin®)	◖			
✗	**Opioids:**				
	Tramadol Hydrochloride/Acetaminophen (Ultracet®)	●	CONSIDER ALTERNATIVES (not oxycodone, codeine)	CYP2D6 *4/*10	Intermediate Metabolizer
	Tramadol (Ultram®)	●	OR		
▲			INCREASE DOSE		
▼	**Opioids:**				
	Methadone (Methadose®)	◖	DECREASE DOSE	CYP2B6 G516T/G516T/A785G/A785G	G516T Homozygous/A785G Homozygous
▼	**Opioids:**				
	Buprenorphine (Subutex®)	○	DECREASE DOSE	CYP3A4 *1A/*1B	Intermediate Metabolizer
	Fentanyl (Duragesic®)	○			
	Sufentanil (Sufenta®)	○			
			OR		
!			USE CAUTION due to the risk of increased exposure to the drug leading to adverse events		

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Action	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
✓	**Opioids:**				
	Alfentanil (Alfenta®)	◖	NORMAL RESPONSE EXPECTED	**OPRM1** WT/WT	rs1799971 A Allele Carrier/rs510679 TT genotype
	Hydromorphone (Dilaudid®)	○			
	Morphine (MS Contin®)	◖			
!	**Proton Pump Inhibitors (PPIs):**				
	Dexlansoprazole (Dexilant®)	●	USE CAUTION due to higher drug plasma levels	**CYP2C19** *1/*2	Intermediate Metabolizer
	Esomeprazole (Nexium®)	●			
	Lansoprazole (Prevacid®)	●			
	Omeprazole (Prilosec®)	●			
	Pantoprazole (Protonix®)	●			
	Rabeprazole (Aciphex®)	●			
✓	**Skeletal Muscle Relaxants:**				
	Cyclobenzaprine (Flexeril®)	○	NORMAL RESPONSE EXPECTED	**CYP1A2** *1A/*1F	Normal Metabolizer

Disclaimer: The ICD-10 codes page may be left blank because ICD codes were not provided or not applicable.

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II. Current Medication List for **Smith, John**

Action	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
✓	**Antiemetics:**				
	Dexamethasone	◖	NORMAL RESPONSE EXPECTED	**ABCB1** WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
!	**Calcium Channel Blockers:**				
	Calan	◖	USE CAUTION due to increased risk for QTc prolongation	**NOS1AP** WT/WT	rs10494366 GG genotype/rs10800397 C Allele Carrier/rs10919035 C Allele Carrier
✓	**Nonsteroidal Antiinflammatory Drugs (NSAIDs):**				
	Diclofenac	◖	NORMAL RESPONSE EXPECTED	**CYP2C9** *1/*1	Normal Metabolizer
!	**Proton Pump Inhibitors (PPIs):**				
	Pantoprazole	●	USE CAUTION due to higher drug plasma levels	**CYP2C19** *1/*2	Intermediate Metabolizer
✓	**Skeletal Muscle Relaxants:**				
	Cyclobenzaprine	○	NORMAL RESPONSE EXPECTED	**CYP1A2** *1A/*1F	Normal Metabolizer
?	**Nonsteroidal Anti-Inflammatory Drugs (NSAIDs):**				
	Aspirin	NA	CLINICAL EVIDENCE NOT SUFFICIENT	**CYP2C19** *1/*2	Intermediate Metabolizer
N/A	**Antibiotics:**				
	Clindamycin	NA	CLINICAL INTERPRETATION NOT AVAILABLE	NA	NA
N/A	**Vitamins:**				
	Niacin	NA	PHARMACOGENOMICS EVIDENCE NOT AVAILABLE	NA	NA

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Drug-Drug Interactions for
Smith, John

Severity	Drugs	Warning	Documentation	Clinical Management
S	CYCLOBENZAPRINE HYDROCHLORIDE -- VERAPAMIL HYDROCHLORIDE	**MAJOR** Concurrent use of CYCLOBENZAPRINE and VERAPAMIL may result in increased cyclobenzaprine exposure and increased risk of serotonin syndrome.	FAIR	Coadministration of cyclobenzaprine and verapamil may result in a life-threatening condition called serotonin syndrome. If concurrent use is necessary, monitor patients closely for serotonin syndrome, especially during treatment initiation and dose increases. Symptoms of serotonin syndrome include neuromuscular abnormalities (eg, hyperreflexia, tremor, and ataxia), autonomic instability (eg, tachycardia, diaphoresis, and hyperthermia), gastrointestinal symptoms (eg, nausea, vomiting, diarrhea), or mental status changes (eg, agitation and confusion). Discontinue both drugs immediately if these symptoms occur and initiate supportive therapy (Prod Info AMRIX® oral extended-release capsules, 2013; Prod Info FLEXERIL® oral tablets, 2013).
S	DICLOFENAC SODIUM -- ASPIRIN	**MAJOR** Concurrent use of ASPIRIN and NSAIDS may result in increased risk of bleeding.	FAIR	Analgesic-dose aspirin is generally not recommended with an NSAID due to an increased risk of bleeding and gastrointestinal (GI) adverse events (Prod Info CAMBIA® oral solution, 2016; Prod Info ZORVOLEX® oral capsules, 2016). When using low-dose aspirin for prophylaxis of cardiovascular adverse events, consider monitoring more closely for GI bleeding (Prod Info TIVORBEX® oral capsules, 2016) and giving aspirin at least 2 hours prior to an interacting NSAID (Hohlfeld et al, 2013).
S	DICLOFENAC SODIUM -- DEXAMETHASONE	**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).
!	ASPIRIN -- DEXAMETHASONE	**MODERATE** Concurrent use of ASPIRIN and DEXAMETHASONE may result in an increased risk of gastrointestinal ulceration and subtherapeutic aspirin serum concentrations.	GOOD	Monitor patients for excessive gastrointestinal side effects (GI distress, GI bleeding, gastric ulceration) and for decreased effectiveness of aspirin.

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Drug-Food Interactions for
Smith, John

Severity	Drugs	Warning	Documentation	Clinical Management
!	ASPIRIN -- CELERY	**MODERATE** Concurrent use of ANTIPLATELET AGENTS and CELERY may result in increased risk of bleeding.	FAIR	Avoid concomitant use of celery with antiplatelet agents. If both are taken together monitor the patient closely for signs and symptoms of bleeding.
!	PANTOPRAZOLE SODIUM -- CRANBERRY	**MODERATE** Concurrent use of PROTON PUMP INHIBITORS and CRANBERRY may result in reduced effectiveness of proton pump inhibitors.	GOOD	Advise patients to avoid regular use of cranberry juice while taking a proton pump inhibitor. Occasional use of cranberry juice is not likely to have a clinical effect on proton pump inhibitor effectiveness. The effect of cranberry extract supplements on gastric acid is not known, caution is advised.
!	VERAPAMIL HYDROCHLORIDE -- CAFFEINE	**MODERATE** Concurrent use of CAFFEINE and VERAPAMIL may result in increased caffeine serum concentrations and enhanced CNS stimulation.	FAIR	Monitor blood pressure and for signs of caffeine toxicity.
!	VERAPAMIL HYDROCHLORIDE -- GRAPEFRUIT JUICE	**MODERATE** Concurrent use of VERAPAMIL and GRAPEFRUIT JUICE may result in an increased risk of verapamil adverse effects (flushing, edema, hypotension, myocardial ischemia).	EXCELLENT	Counsel patients to avoid grapefruit juice while taking verapamil. Orange juice may be substituted in place of grapefruit juice (Ho et al, 2000).

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Drug-Alcohol Interactions for
Smith, John

Severity	Drugs	Warning	Documentation	Clinical Management
	ASPIRIN -- ETHANOL	**MODERATE** Concurrent use of ETHANOL and ASPIRIN may result in increased risk of gastrointestinal bleeding.	GOOD	Concomitant use of alcohol and aspirin may increase the risk of gastrointestinal injury and bleeding and should be undertaken with caution. Chronic or heavy alcohol consumption may increase this risk (Prod Info DuoCover oral film coated tablets, 2016).
	NIACIN -- ETHANOL	**MODERATE** Concurrent use of NIACIN and ETHANOL may result in increase in side effects of flushing and pruritus.	GOOD	Alcohol may potentiate the adverse effects of niacin. Concomitant alcohol may increase the side effects of flushing and pruritus and should be avoided around the time of niacin ingestion.
	VERAPAMIL HYDROCHLORIDE -- ETHANOL	**MODERATE** Concurrent use of VERAPAMIL and ETHANOL may result in enhanced ethanol intoxication (impaired psychomotor functioning).	EXCELLENT	Patients receiving verapamil therapy should not ingest ethanol, or at least cautiously limit their intake of ethanol. Patients should also be warned that verapamil may enhance the sedative and depressive effects of ethanol, and extra caution is needed when doing activities which require mental alertness.

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Drug-Lab Interactions for
Smith, John

Severity	Drugs	Warning	Documentation	Clinical Management
S	DEXAMETHASONE -- INTERFERON GAMMA RELEASE ASSAY FOR TUBERCULOSIS SCREENING	**MAJOR** DEXAMETHASONE may result in false negative readings in interferon-gamma release assays due to unknown.	FAIR	Dexamethasone may lead to false-negative readings in interferon-gamma release assays for tuberculosis screening (Edwards et al, 2017).
!	CYCLOBENZAPRINE HYDROCHLORIDE -- TRICYCLIC ANTIDEPRESSANT MEASUREMENT	**MODERATE** CYCLOBENZAPRINE may result in false positive tricyclic antidepressants assay results due to structurally similarity of cyclobenzaprine to the tricyclic antidepressant class.	EXCELLENT	Cyclobenzaprine is often falsely identified as a tricyclic antidepressant on toxicology assays. Chromatographic techniques such as thin-layer chromatography (TLC), gas chromatography (GC), and high-pressure liquid chromatography (HPLC) have poor sensitivity for differentiating structurally similar molecules like cyclobenzaprine and tricyclic antidepressants. When an assay is positive for tricyclic antidepressants and there is no history of their use, techniques such as ultraviolet (UV) spectroscopy, UV absorbance ratio, or mass spectroscopy should be considered as these methods can identify individual molecules with higher specificity (VanHoey, 2005).
!	NIACIN -- CATECHOLAMINE MEASUREMENT	**MODERATE** NIACIN may result in falsely elevated plasma or urinary catecholamine levels due to interference with the fluorescence test.	FAIR	Niacin may interfere with the fluorescence test for plasma or urinary catecholamines leading to falsely elevated levels (Prod Info NIASPAN® extended-release oral tablets, 2005). Interpret such assay results with caution in patients receiving niacin.
!	NIACIN -- URINALYSIS, GLUCOSE, QUALITATIVE	**MODERATE** NIACIN may result in false-positive urine glucose measurements with cupric sulfate solution (Benedict's solution) due to mechanism unknown.	FAIR	Niacin therapy may result in false-positive urine glucose measurements when assayed using cupric sulfate solution (Benedicts's reagent) (Prod Info NIASPAN® extended-release oral tablets, 2005). Interpret results of such tests with caution in patients receiving niacin.
!	PANTOPRAZOLE SODIUM -- URINE DRUG SCREENING	**MODERATE** PROTON PUMP INHIBITORS may result in false-positive urine screening tests for tetrahydrocannabinol (THC) due to unknown.	GOOD	Proton pump inhibitors may cause false positive urine screening tests for tetrahydrocannabinol (THC). Use an alternative method to confirm positive screening tests for THC (Prod Info DEXILANT(TM) oral delayed-release capsules, 2016; Prod Info PRILOSEC® oral delayed-release capsules, 2016; Prod Info PROTONIX® I.V. intravenous injection, 2014).

Disclaimer: The Current Medication section may be left blank if no medication list provided. The Drug Interactions section may be left blank if no drug interactions were found for drugs on the current medication list or no medication list was provided.

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III. Comprehensive Drug List for
Smith, John

Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
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	**Local Anesthetics:**				
	Lidocaine/Prilocaine (Emla®)	●	NORMAL RESPONSE EXPECTED	**G6PD** WT/WT	Normal G6PD Efficiency
Anesthesiology	**Sedatives:**				
	Dexmedetomidine (Precedex®)	◖	NORMAL RESPONSE EXPECTED	**ADRA2A** WT/c.-217G>A	rs1800544 GG genotype/rs1800545 GA genotype
Cardiology	**ACE Inhibitors:**				
	Captopril (Capoten®) Quinapril (Accupril®)	◖ ◖	USE CAUTION due to reduced response	**ACE** WT/WT	ACE Deletion
Cardiology	**ACE Inhibitors:**				
	Benazepril (Lotensin®) Perindopril (Aceon®)	◖ ◖	NORMAL RESPONSE EXPECTED	**ACE** WT/WT	ACE Deletion
Cardiology	**ACE Inhibitors:**				
	Perindopril (Aceon®)	◖	NORMAL RESPONSE EXPECTED	**AGTR1** WT/WT	rs5186 AA genotype
Cardiology	**Angiotensin II Receptor Blockers:**				
	Irbesartan (Avapro®)	◖	USE CAUTION due to reduced response	**ACE** WT/WT	ACE Deletion

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Cardiology	**Angiotensin II Receptor Blockers:**				
	Losartan (Cozaar®)		USE CAUTION due to reduced response	AGTR1 WT/WT	rs5186 AA genotype
Cardiology	**Angiotensin II Receptor Blockers:**				
	Candesartan (Atacand®)		NORMAL RESPONSE EXPECTED	AGTR1 WT/WT	rs5186 AA genotype
Cardiology	**Antianginal Drugs:**				
	Ranolazine (Ranexa®)		NORMAL RESPONSE EXPECTED	CYP2D6 *4/*10	Intermediate Metabolizer
Cardiology	**Antiarrhythmic Drugs:**				
	Propafenone (Rythmol®)		CONSIDER ALTERNATIVES (e.g., sotalol, disopyramide, quinidine, amiodarone)	CYP2D6 *4/*10	Intermediate Metabolizer
Cardiology	**Antiarrhythmic Drugs:**				
	Flecainide (Tambocor®)		DECREASE DOSE by 25%	CYP2D6 *4/*10	Intermediate Metabolizer
Cardiology	**Antiarrhythmic Drugs:**				
	Digoxin (Lanoxin®)		USE CAUTION due to decreased metabolism	ABCB1 WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Cardiology	**Antiarrhythmic Drugs:**				
	Amiodarone (Cordarone®)		NORMAL RESPONSE EXPECTED	NOS1AP WT/WT	rs10494366 GG genotype/rs10800397 C Allele Carrier/rs10919035 C Allele Carrier
Cardiology	**Antiarrhythmic Drugs:**				
	Dronedarone (Multaq®)		NORMAL RESPONSE EXPECTED	CYP3A4 *1A/*1B	Intermediate Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Cardiology	**Anticoagulants:**				
	Phenprocoumon (Marcoumar®)	◖	✓ NORMAL RESPONSE EXPECTED	CYP4F2 *1/*1	Normal Metabolizer
Cardiology	**Anticoagulants:**				
	Rivaroxaban (Xarelto®)	○	✓ NORMAL RESPONSE EXPECTED	CYP3A4 *1A/*1B	Intermediate 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
Cardiology	**Antilipemic Agents:**				
	Fenofibrate (Tricor®)	○	◆ USE CAUTION due to decreased response	APOB WT/WT	rs676210 GG Genotype
Cardiology	**Antilipemic Agents (Statins):**				
	Simvastatin (Zocor®)	◖	✖ CONSIDER ALTERNATIVES OR ▼ DECREASE DOSE to 20mg daily	SLCO1B1 *1/*5	Intermediate Activity
Cardiology	**Antilipemic Agents (Statins):**				
	Atorvastatin (Lipitor®) Pravastatin (Pravachol®)	◖ ◖	◆ USE CAUTION due to poorer response to statin treatment with decreased risk for adverse cardiovascular events	KIF6 WT/WT	rs20455 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	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Cardiology	**Antilipemic Agents (Statins):**				
	Lovastatin (Mevacor®)	○	USE CAUTION due to decreased response	**LDLR** WT/c.1773C>T	rs688 CT Genotype
Cardiology	**Antilipemic Agents (Statins):**				
	Rosuvastatin (Crestor®)	◖	NORMAL RESPONSE EXPECTED	**CYP3A5** *1A/*3A	Expresser
Cardiology	**Antilipemic Agents (Statins):**				
	Pitavastatin (Livalo®) Rosuvastatin (Crestor®)	◖ ◖	NORMAL RESPONSE EXPECTED	**SLCO1B1** *1/*5	Intermediate Activity
Cardiology	**Antilipemic Agents (Statins):**				
	Fluvastatin (Lescol®)	◖	NORMAL RESPONSE EXPECTED	**ACE** WT/WT	ACE Deletion
Cardiology	**Antiplatelets:**				
	Clopidogrel (Plavix®)	●	CONSIDER ALTERNATIVES (if no contraindication e.g., prasugrel, ticagrelor)	**CYP2C19** *1/*2	Intermediate Metabolizer
Cardiology	**Antiplatelets:**				
	Ticagrelor (Brilinta®)	●	NORMAL DOSE	**CYP2C19** *1/*2	Intermediate Metabolizer
Cardiology	**Beta Blockers:**				
	Metoprolol (Lopressor®)	●	CONSIDER ALTERNATIVES (e.g., bisoprolol, carvedilol) OR DECREASE DOSE by 50% due to heart failure caused by the decreased drug cardioselectivity	**CYP2D6** *4/*10	Intermediate Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Cardiology	**Beta Blockers:**				
	Atenolol (Tenormin®)	◖	USE CAUTION due to decreased drug response	**ADRA2A** WT/c.-217G>A	rs1800544 GG genotype/rs1800545 GA genotype
Cardiology	**Beta Blockers:**				
	Carvedilol (Coreg®)	●	NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Cardiology	**Beta Blockers:**				
	Nebivolol (Bystolic®) Propranolol (Inderal LA®)	● ●	NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Cardiology	**Calcium Channel Blockers:**				
	Amlodipine (Norvasc®) Nifedipine (Adalat®)	◖ ○	USE CAUTION due to increased risk for QTc prolongation	**NOS1AP** WT/WT	rs10494366 GG genotype/rs10800397 C Allele Carrier/rs10919035 C Allele Carrier
Cardiology	**Calcium Channel Blockers:**				
	Verapamil (Calan®)	◖	USE CAUTION due to increased risk for QTc prolongation	**NOS1AP** WT/WT	rs10494366 GG genotype/rs10800397 C Allele Carrier/rs10919035 C Allele Carrier
Cardiology	**Calcium Channel Blockers:**				
	Diltiazem (Cardizem®) Felodipine (Plendil®) Lercanidipine (Zanidip®) Nisoldipine (Sular®)	○ ○ ○ ○	NORMAL RESPONSE EXPECTED	**CYP3A4** *1A/*1B	Intermediate Metabolizer
Cardiology	**Calcium Channel Blockers:**				
	Nitrendipine (Nitrepin®)	◖	NORMAL RESPONSE EXPECTED	**AGTR1** WT/WT	rs5186 AA genotype
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/WT	rs5186 AA genotype

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Cardiology	**Diuretics:**				
	Spironolactone (Aldactone®)	◐	✓ NORMAL RESPONSE EXPECTED	**ACE** WT/WT	ACE Deletion
Cardiology	**Miscellaneous Cardiovascular Agents:**				
	Ivabradine (Corlanor®)	◐	✓ NORMAL RESPONSE EXPECTED	**CYP3A4** *1A/*1B	Intermediate Metabolizer
Cardiology	**Phosphodiesterase Inhibitors:**				
	Cilostazol (Pletal®)	◐	✓ NORMAL RESPONSE EXPECTED	**CYP3A5** *1A/*3A	Expresser
Cardiology	**Vasodilators:**				
	Hydralazine	●	⚠ USE CAUTION due to decreased drug response	**NAT2** *4/*12	Rapid Acetylator
Cardiology	**Vasodilators:**				
	Nitroprusside (Nitropress®)	◐	✓ NORMAL RESPONSE EXPECTED	**ACE** WT/WT	ACE Deletion
Dentistry	**Cholinergic Agonists:**				
	Cevimeline (Evoxac®)	●	✓ NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Endocrinology	**Biguanides:**				
	Metformin (Glucophage®)	◐	✓ NORMAL RESPONSE EXPECTED	**ATM** WT/WT	rs11212617 CC genotype
Endocrinology	**Endocrine Enzyme Inhibitors:**				
	Eliglustat (Cerdelga®)	●	✓ NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Endocrinology	**Sulfonylureas:**				
	Chlorpropamide (Diabinese®)	●	✓ NORMAL RESPONSE EXPECTED	**G6PD** WT/WT	Normal G6PD Efficiency
	Glimepiride (Amaryl®)	●			
	Glipizide (Glucotrol®)	●			
	Glyburide (Glynase®)	●			
	Tolbutamide	○			

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
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	**Histamine H2 Antagonists:**				
	Famotidine (Pepcid®)	○	✓ NORMAL DOSE	CYP2C19 *1/*2	Intermediate Metabolizer
Gastroenterology	**Monoclonal Antibody:**				
	Adalimumab (Humira®)	○	✓ NORMAL RESPONSE EXPECTED	HFE WT/c.340+4T>C	rs2071303 C Allele Carrier
Gastroenterology	**Osmotic Laxatives:**				
	Ascorbic Acid (MoviPrep®)	●	✓ NORMAL RESPONSE EXPECTED	G6PD WT/WT	Normal G6PD Efficiency
Gastroenterology	**Proton Pump Inhibitors (PPIs):**				
	Dexlansoprazole (Dexilant®) Esomeprazole (Nexium®) Lansoprazole (Prevacid®) Omeprazole (Prilosec®) Pantoprazole (Protonix®) Rabeprazole (Aciphex®)	● ● ● ● ● ●	◆ USE CAUTION due to higher drug plasma levels	CYP2C19 *1/*2	Intermediate 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

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Gynecology	**Mixed 5-HT1A Agonist/5-HT2A Antagonist:**				
	Flibanserin (Addyi®)	●	✓ NORMAL RESPONSE EXPECTED	CYP2C19 *1/*2	Intermediate Metabolizer
Hematology	**Colony Stimulating Factors:**				
	Eltrombopag (Promacta®)	●	✓ NORMAL RESPONSE EXPECTED	F5 WT/WT	Non Factor V Leiden Carrier
Immunology	**5-Aminosalicylic Acid Derivatives:**				
	Sulfasalazine (Azulfidine®)	●	✓ NORMAL RESPONSE EXPECTED	G6PD WT/WT	Normal G6PD Efficiency
Immunology	**Antigout Agents:**				
	Lesinurad (Zurampic®)	●	✓ NORMAL RESPONSE EXPECTED	CYP2C9 *1/*1	Normal Metabolizer
Immunology	**Antirheumatic Immunosuppressants:**				
	Methotrexate (Trexall®)	◖	✓ NORMAL RESPONSE EXPECTED	ITPA WT/WT	Non-protective Wild Type
Immunology	**Immunosuppressant Agents:**				
	Cyclosporine (Gengraf®) Sirolimus (Rapamune®)	◖ ◖	▲ INCREASE DOSE	CYP3A5 *1A/*3A	Expresser
Immunology	**Immunosuppressant Agents:**				
	Tacrolimus (Prograf®)	◖	▲ INCREASE DOSE	CYP3A4 *1A/*1B	Intermediate Metabolizer
Immunology	**Immunosuppressant Agents:**				
	Tacrolimus (Prograf®)	◖	▲ INCREASE DOSE with 1.5 to 2 times recommended starting dose not exceed 0.3mg per kg per day	CYP3A5 *1A/*3A	Expresser
Immunology	**Immunosuppressive Drugs:**				
	Azathioprine (Imuran®)	●	✓ NORMAL RESPONSE EXPECTED	TPMT *1/*1	Normal Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Immunology	**Systemic Corticosteroids:**				
	Methylprednisolone (Medrol®) Prednisolone (Orapred®) Prednisone (Deltasone®)	◖	✓ NORMAL RESPONSE EXPECTED	**ABCB1** WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Immunology	**Urate-Oxidase (Recombinent):**				
	Pegloticase (Krystexxa®)	●	✓ NORMAL RESPONSE EXPECTED	**G6PD** WT/WT	Normal G6PD Efficiency
Immunology	**Uricosuric Agents:**				
	Probenecid	●	✓ NORMAL RESPONSE EXPECTED	**G6PD** WT/WT	Normal G6PD Efficiency
Immunology	**Xanthine Oxidase Inhibitors:**				
	Allopurinol (Zyloprim®)	●	✓ NORMAL RESPONSE EXPECTED	**HLA-B** WT/WT	Wild Type
Infectious Diseases	**Antifungal Drugs:**				
	Voriconazole (Vfend®)	●	✓ NORMAL RESPONSE EXPECTED	**CYP2C19** *1/*2	Intermediate Metabolizer
Infectious Diseases	**Antihepaciviral Drugs:**				
	Boceprevir (Victrelis®) Ledipasvir/Sofosbuvir (Harvoni®) Peginterferon alfa-2b (PegIntron®) Ribavirin (Copegus®) Telaprevir (Incivo®)	●	◆ USE CAUTION due to decreased response and increased likelihood of relapse	**IFNL3** 39738787C>T/39743165T>G	Unfavorable Response Genotype
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®)	●	✓ NORMAL RESPONSE EXPECTED	**G6PD** WT/WT	Normal G6PD Efficiency

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Therapeutic	Drug Impacted	Evidence Level	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/A785G	G516T Homozygous/A785G Homozygous
Infectious Diseases	**Antiretroviral Drugs:**				
	Abacavir (Ziagen®)	●	NORMAL RESPONSE EXPECTED	**HLA-B** WT/WT	Wild Type
Infectious Diseases	**Antiretroviral Drugs:**				
	Atazanavir (Reyataz®)	◖	NORMAL RESPONSE EXPECTED	**UGT1A1** *1/*28	Heterozygous *28 Allele Carrier
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/rs1045642 AA genotype
Infectious Diseases	**Antiretroviral Drugs:**				
	Nelfinavir (Viracept®)	●	NORMAL RESPONSE EXPECTED	**CYP2C19** *1/*2	Intermediate Metabolizer
Infectious Diseases	**Antitubercular Agents:**				
	Ethambutol (Myambutol®) Isoniazid Pyrazinamide (Rifater®) Rifampin (Rifadin®)	◖ ● ● ●	NORMAL RESPONSE EXPECTED	**NAT2** *4/*12	Rapid Acetylator
Infectious Diseases	**Lipopeptides:**				
	Daptomycin (Cubicin®)	◖	NORMAL RESPONSE EXPECTED	**ABCB1** WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Infectious Diseases	**Macrolides:**				
	Erythromycin/Sulfisoxazole (Pediazole®)	●	NORMAL RESPONSE EXPECTED	**G6PD** WT/WT	Normal G6PD Efficiency

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Infectious Diseases	**Miscellaneous Antibiotics:**				
	Dapsone Sulfamethoxazole/Trimethoprim (Bactrim®)	● ●	✓ NORMAL RESPONSE EXPECTED	G6PD WT/WT	Normal G6PD Efficiency
Infectious Diseases	**Miscellaneous Antibiotics:**				
	Nalidixic Acid (Neggram®) Nitrofurantoin (Macrobid®)	● ●	✓ NORMAL RESPONSE EXPECTED	G6PD WT/WT	Normal G6PD Efficiency
Infectious Diseases	**Topical Antibiotics:**				
	Mafenide (Sulfamylon®)	●	✓ NORMAL RESPONSE EXPECTED	G6PD WT/WT	Normal G6PD Efficiency
Neurology	**Acetylcholinesterase Inhibitors:**				
	Donepezil (Aricept®)	●	◆ USE CAUTION due to possible increased ADRs caused by decreased drug metabolism	CYP2D6 *4/*10	Intermediate Metabolizer
Neurology	**Acetylcholinesterase Inhibitors:**				
	Galantamine (Razadyne®)	●	✓ NORMAL RESPONSE EXPECTED	CYP2D6 *4/*10	Intermediate Metabolizer
Neurology	**Alpha-2 Antagonist:**				
	Mirtazapine (Remeron®)	◖	◆ USE CAUTION due to possible increased ADRs	CYP2D6 *4/*10	Intermediate Metabolizer
Neurology	**Anticonvulsant Drugs:**				
	Brivaracetam (Briviact®)	●	◆ USE CAUTION due to possible increased ADRs	CYP2C19 *1/*2	Intermediate Metabolizer
Neurology	**Anticonvulsant Drugs:**				
	Carbamazepine (Tegretol®) Lamotrigine (Lamictal®) Oxcarbazepine (Trileptal®) Phenytoin (Dilantin®) Topiramate (Topamax®)	◖ ◖ ◖ ◖ ◖	✓ NORMAL RESPONSE EXPECTED	SCN2A WT/WT	rs2304016 non-GG genotype

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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/*2	Intermediate 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/*1B	Intermediate 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** *4/*10	Intermediate Metabolizer
Neurology	**COMT Inhibitors:**				
	Entacapone (Comtan®)	◖	✓ NORMAL RESPONSE EXPECTED	**COMT** WT/WT	Non MET Homozygous
Neurology	**NMDA Receptor Antagonists:**				
	Dextromethorphan/Quinidine (Nuedexta®)	●	✓ NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Oncology	**Alkylating Agents:**				
	Cyclophosphamide (Cytoxan®)	◖	◆ USE CAUTION due to poorer response and increased risk of toxicity	**MTHFR** C677T/A1298C	C677T Heterozygous Mutation/A1298C Heterozygous Mutation

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Oncology	**Alkylating Agents:**				
	Cyclophosphamide (Cytoxan®)	◖	USE CAUTION due to worse outcome including overall survival and progression-free survival	**NQO1** c.559C>T/c.559C>T	rs1800566 AA genotype
Oncology	**Anthracyclines:**				
	Doxorubicin (Doxil®)	◖	USE CAUTION due to worse outcome including overall survival and progression-free survival	**NQO1** c.559C>T/c.559C>T	rs1800566 AA genotype
Oncology	**Anthracyclines:**				
	Epirubicin (Ellence®)	◖	USE CAUTION due to worse outcome including overall survival and progression-free survival	**NQO1** c.559C>T/c.559C>T	rs1800566 AA genotype
Oncology	**Antiemetics:**				
	Dexamethasone (Decadron®)	◖	NORMAL RESPONSE EXPECTED	**ABCB1** WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Oncology	**Antiemetics:**				
	Dronabinol (Marinol®)	●	NORMAL RESPONSE EXPECTED	**CYP2C9** *1/*1	Normal Metabolizer
Oncology	**Antiemetics (Selective 5-HT3 Receptor Antagonist):**				
	Dolasetron (Anzemet®) Granisetron (Sancuso®)	◖ ◖	NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Oncology	**Antiemetics (Selective 5-HT3 Receptor Antagonist):**				
	Dolasetron (Anzemet®) Granisetron (Sancuso®)	◖ ◖	NORMAL RESPONSE EXPECTED	**NOS1AP** WT/WT	rs10494366 GG genotype/rs10800397 C Allele Carrier/rs10919035 C Allele Carrier
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** *4/*10	Intermediate Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Oncology	**Antiemetics (Selective 5-HT3 Receptor Antagonist):**				
	Palonosetron (Aloxi®)	●	✓ NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Oncology	**Antimetabolites (Purine Analog):**				
	Mercaptopurine (Purinethol®) Thioguanine (Tabloid®)	● ●	✓ NORMAL RESPONSE EXPECTED	**TPMT** *1/*1	Normal Metabolizer
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 an increased risk for nephrotoxicity, decreased survival and a poorer response	**ERCC1** WT/WT	rs3212986 C Allele Carrier/rs11615 AA genotype/rs735482 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/A1298C	C677T Heterozygous Mutation/A1298C Heterozygous Mutation
Oncology	**Antimetabolites (Pyrimidine Analog):**				
	Fluorouracil (Carac®)	◖	◆ USE CAUTION due to worse outcome including overall survival and progression-free survival	**NQO1** c.559C>T/c.559C>T	rs1800566 AA genotype
Oncology	**Antimetabolites (Pyrimidine Analog):**				
	Fluorouracil (Carac®)	◖	◆ USE CAUTION due to decreased survival and response	**XRCC1** WT/WT	rs25487 T Allele Carrier
Oncology	**Antimetabolites (Pyrimidine Analog):**				
	Capecitabine (Xeloda®) Pyrimidinedione (Tegafur-Uracil®)	● ◖	✓ NORMAL RESPONSE EXPECTED	**DPYD** *5/*9A/c.496A>G/IVS10-15T>C	Normal Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
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	**BRAF Kinase Inhibitors:**				
	Dabrafenib (Tafinlar®)	●	✓ NORMAL RESPONSE EXPECTED	**G6PD** WT/WT	Normal G6PD Efficiency
Oncology	**Chemotherapy Modulating Agents:**				
	Leucovorin (Wellcovorin®)	◖	◆ USE CAUTION due to an increased risk for nephrotoxicity, decreased survival and a poorer response	**ERCC1** WT/WT	rs3212986 C Allele Carrier/rs11615 AA genotype/rs735482 AA genotype
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/A1298C	C677T Heterozygous Mutation/A1298C Heterozygous Mutation
Oncology	**Chemotherapy Modulating Agents:**				
	Leucovorin (Wellcovorin®)	○	◆ USE CAUTION due to decreased survival and response	**XRCC1** WT/WT	rs25487 T 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/*1B	Intermediate Metabolizer

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Oncology	**EGFR Tyrosine Kinase Inhibitors:**				
	Ruxolitinib (Jakavi®)	◖	✓ NORMAL RESPONSE EXPECTED	**CYP3A4** *1A/*1B	Intermediate Metabolizer
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/A1298C	C677T Heterozygous Mutation/A1298C Heterozygous Mutation
Oncology	**Folate Antimetabolites:**				
	Pemetrexed (Alimta®)	◖	USE CAUTION due to poorer response and increased risk of toxicity	**MTHFR** C677T/A1298C	C677T Heterozygous Mutation/A1298C Heterozygous Mutation
Oncology	**Histone Deacetylase (HDAC) Inhibitors:**				
	Belinostat (Beleodaq®)	●	✓ NORMAL RESPONSE EXPECTED	**UGT1A1** *1/*28	Heterozygous *28 Allele Carrier
Oncology	**Immunomodulators:**				
	Thalidomide (Thalomid®)	◖	USE CAUTION due to decreased overall survival	**ERCC1** WT/WT	rs3212986 C Allele Carrier/rs11615 AA genotype/rs735482 AA genotype
Oncology	**Platinum Analog:**				
	Carboplatin (Paraplatin®) Cisplatin (Platinol®) Oxaliplatin (Eloxatin®)	◖ ◖ ◖	USE CAUTION due to an increased risk for nephrotoxicity, decreased survival and a poorer response	**ERCC1** WT/WT	rs3212986 C Allele Carrier/rs11615 AA genotype/rs735482 AA genotype
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 decreased survival and response	**XRCC1** WT/WT	rs25487 T Allele Carrier

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Oncology	**Platinum Analog:**				
	Carboplatin (Paraplatin®) Oxaliplatin (Eloxatin®)	◖ ◖	USE CAUTION due to poorer response and increased risk of toxicity	**MTHFR** C677T/A1298C	C677T Heterozygous Mutation/A1298C Heterozygous Mutation
Oncology	**Platinum Analog:**				
	Cisplatin (Platinol®) Oxaliplatin (Eloxatin®)	◖ ◖	USE CAUTION due to worse outcome including overall survival and progression-free survival	**NQO1** c.559C>T/c.559C>T	rs1800566 AA genotype
Oncology	**Platinum Analog:**				
	Cisplatin (Platinol®)	◖	USE CAUTION due to increased risk for nephrotoxicity	**ERCC1** WT/WT	rs3212986 C Allele Carrier/rs11615 AA genotype/rs735482 AA genotype
Oncology	**Selective Estrogen Receptor Modulators (SERMs):**				
	Tamoxifen (Soltamox®)	◖	CONSIDER ALTERNATIVES like aromatase inhibitor for postmenopausal women due to increased risk for relapse of breast cancer	**CYP2D6** *4/*10	Intermediate Metabolizer
Oncology	**Taxane Derivatives:**				
	Docetaxel (Taxotere®)	◖	USE CAUTION due to increased risk for nephrotoxicity	**ERCC1** WT/WT	rs3212986 C Allele Carrier/rs11615 AA genotype/rs735482 AA genotype
Oncology	**Taxane Derivatives:**				
	Paclitaxel (Abraxane®)	◖	USE CAUTION due to increased risk for nephrotoxicity	**ERCC1** WT/WT	rs3212986 C Allele Carrier/rs11615 AA genotype/rs735482 AA genotype
Oncology	**Taxane Derivatives:**				
	Cabazitaxel (Jevtana®)	◖	NORMAL RESPONSE EXPECTED	**CYP3A4** *1A/*1B	Intermediate Metabolizer
Oncology	**Topoisomerase I Inhibitors:**				
	Irinotecan (Camptosar®)	●	NORMAL RESPONSE EXPECTED	**UGT1A1** *1/*28	Heterozygous *28 Allele Carrier

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Oncology	**Topoisomerase II Inhibitor:**				
	Idarubicin (Idamycin®)	◖	USE CAUTION due to increased likelihood of toxic liver disease	SLCO1B1 *1/*5	Intermediate Activity
Oncology	**Urate-Oxidases (Recombinant):**				
	Rasburicase (Elitek®)	●	NORMAL RESPONSE EXPECTED	G6PD WT/WT	Normal G6PD Efficiency
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	**VEGF Tyrosine Kinase Inhibitors:**				
	Sunitinib (Sutent®)	◖	NORMAL RESPONSE EXPECTED	CYP3A4 *1A/*1B	Intermediate Metabolizer
Oncology	**Vinca Alkaloids:**				
	Vincristine (Marqibo®)	◖	NORMAL RESPONSE EXPECTED	ABCB1 WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Osteoporosis	**Selective Estrogen Receptor Modulators (SERMs):**				
	Raloxifene (Evista®)	◖	USE CAUTION due to decreased hip bone mineral density	UGT1A1 *1/*28	Heterozygous *28 Allele Carrier
Pain Management	**Alpha-2 Adrenergic Agonists:**				
	Tizanidine (Zanaflex®)	○	NORMAL RESPONSE EXPECTED	CYP1A2 *1A/*1F	Normal Metabolizer
Pain Management	**Nonsteroidal Antiinflammatory Drugs (NSAIDs):**				
	Celecoxib (Celebrex®)	●	NORMAL RESPONSE EXPECTED	CYP2C9 *1/*1	Normal Metabolizer
	Diclofenac (Voltaren®)	◖			
	Meloxicam (Mobic®)	◖			
Pain Management	**Nonsteroidal Antiinflammatory Drugs (NSAIDs):**				
	Ibuprofen (Advil®)	○	NORMAL RESPONSE EXPECTED	CYP2C9 *1/*1	Normal Metabolizer
	Naproxen (Aleve®)	○			

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Pain Management	**Nonsteroidal Antiinflammatory Drugs (NSAIDs):**				
	Piroxicam (Feldene®)	●	✓ NORMAL RESPONSE EXPECTED	CYP2C9 *1/*1	Normal Metabolizer
Pain Management	**Opioids:**				
	Codeine (Codeine®) Codeine/Acetaminophen (Tylenol #3 & #4®) Hydrocodone/Acetaminophen (Vicodin®) Oxycodone (Oxycontin®)	◖ ◖ ◖ ◖	✖ CONSIDER ALTERNATIVES if no response	CYP2D6 *4/*10	Intermediate Metabolizer
Pain Management	**Opioids:**				
	Tramadol Hydrochloride/Acetaminophen (Ultracet®) Tramadol (Ultram®)	● ●	✖ CONSIDER ALTERNATIVES (not oxycodone, codeine) OR ▲ INCREASE DOSE	CYP2D6 *4/*10	Intermediate Metabolizer
Pain Management	**Opioids:**				
	Methadone (Methadose®)	◖	▼ DECREASE DOSE	CYP2B6 G516T/G516T/A785G/A785G	G516T Homozygous/A785G Homozygous
Pain Management	**Opioids:**				
	Buprenorphine (Subutex®) Fentanyl (Duragesic®) Sufentanil (Sufenta®)	○ ○ ○	▼ DECREASE DOSE OR ◆ USE CAUTION due to the risk of increased exposure to the drug leading to adverse events	CYP3A4 *1A/*1B	Intermediate Metabolizer
Pain Management	**Opioids:**				
	Alfentanil (Alfenta®) Hydromorphone (Dilaudid®) Morphine (MS Contin®)	◖ ○ ◖	✓ NORMAL RESPONSE EXPECTED	OPRM1 WT/WT	rs1799971 A Allele Carrier/rs510679 TT genotype

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Pain Management	**Skeletal Muscle Relaxants:**				
	Carisoprodol (Soma®)	◖	✓ NORMAL RESPONSE EXPECTED	CYP2C19 *1/*2	Intermediate Metabolizer
Pain Management	**Skeletal Muscle Relaxants:**				
	Cyclobenzaprine (Flexeril®)	○	✓ NORMAL RESPONSE EXPECTED	CYP1A2 *1A/*1F	Normal Metabolizer
Psychiatry	**Aldehyde Dehydrogenase Inhibitors:**				
	Disulfiram (Antabuse®)	◖	✓ NORMAL DOSE may have an increased likelihood of response	ANKK1 WT/c.2137G>A	A1 Heterozygous
Psychiatry	**Anti-Anxiety Agents:**				
	Buspirone (Buspar®)	○	✓ NORMAL RESPONSE EXPECTED	HTR1A WT/WT	rs6295 CC genotype/rs1800044 C Allele Carrier
Psychiatry	**Antimanic Agents:**				
	Lithium (Lithobid®)	◖	◆ USE CAUTION due to possible less drug response	ABCB1 WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
Psychiatry	**Antipsychotics:**				
	Risperidone (Risperdal®)	●	✖ CONSIDER ALTERNATIVES (e.g., quetiapine, olanzapine, clozapine)	CYP2D6 *4/*10	Intermediate Metabolizer
Psychiatry	**Antipsychotics:**				
	Thioridazine (Mellaril®)	●	✖ CONSIDER ALTERNATIVES	CYP2D6 *4/*10	Intermediate Metabolizer
Psychiatry	**Antipsychotics:**				
	Chlorpromazine Fluphenazine	◖ ◖	◆ USE CAUTION due to possible increased QT interval	CYP1A2 *1A/*1F	Normal Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Psychiatry	**Antipsychotics:**				
	Clozapine (Clozaril®)	◖	USE CAUTION due to increased risk of side effects including hyperprolactinemia and weight gain	**ANKK1** WT/c.2137G>A	A1 Heterozygous
Psychiatry	**Antipsychotics:**				
	Clozapine (Clozaril®)	◖	USE CAUTION due to increased risk of developing metabolic syndrome	**HTR2C** WT/WT	rs1414334 C Allele Carrier
Psychiatry	**Antipsychotics:**				
	Olanzapine (Zyprexa®) Quetiapine (Seroquel®)	◖ ◖	USE CAUTION due to increased risk of side effects	**SLC6A4** LA/LA	HTTLPR Long Form
Psychiatry	**Antipsychotics:**				
	Olanzapine (Zyprexa®)	◖	USE CAUTION due to increased risk of side effects including hyperprolactinemia and weight gain	**ANKK1** WT/c.2137G>A	A1 Heterozygous
Psychiatry	**Antipsychotics:**				
	Olanzapine (Zyprexa®)	◖	USE CAUTION due to increased risk of developing metabolic syndrome	**HTR2C** WT/WT	rs1414334 C Allele Carrier
Psychiatry	**Antipsychotics:**				
	Aripiprazole (Abilify®) Brexpiprazole (Rexulti®) Iloperidone (Fanapt®) Pimozide (Orap®)	● ● ● ●	NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Psychiatry	**Antipsychotics:**				
	Aripiprazole (Abilify®)	◖	NORMAL RESPONSE EXPECTED	**CYP3A4** *1A/*1B	Intermediate Metabolizer
Psychiatry	**Antipsychotics:**				
	Haloperidol (Haldol®)	◖	NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Psychiatry	**Antipsychotics:**				
	Perphenazine	●	NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Psychiatry	**Antipsychotics:**				
	Valproic Acid (Depakote®)	◖	✓ NORMAL RESPONSE EXPECTED	**ANKK1** WT/c.2137G>A	A1 Heterozygous
Psychiatry	**Benzodiazepines:**				
	Diazepam (Valium®)	●	◆ USE CAUTION due to possible increased ADRs	**CYP2C19** *1/*2	Intermediate Metabolizer
Psychiatry	**Benzodiazepines:**				
	Alprazolam (Xanax®)	○	✓ NORMAL RESPONSE EXPECTED	**CYP3A4** *1A/*1B	Intermediate Metabolizer
Psychiatry	**Benzodiazepines:**				
	Lorazepam (Ativan®) Oxazepam (Serax®)	◖ ◖	✓ NORMAL RESPONSE EXPECTED	**UGT2B15** *1/*2	rs1902023 non-AA genotype
Psychiatry	**Benzodiazepines:**				
	Midazolam (Versed®)	◖	✓ NORMAL RESPONSE EXPECTED	**CYP3A5** *1A/*3A	Expresser
Psychiatry	**CNS Stimulants (ADHD):**				
	Dextroamphetamine (Adderall®) Methylphenidate (Ritalin®)	◖ ◖	◆ USE CAUTION due to increased severity of social withdrawal	**DRD1** WT/WT	rs4532 CC genotype
Psychiatry	**CNS Stimulants (ADHD):**				
	Amphetamine (Adderall®) Dexmethylphenidate (Focalin®) Lisdexamfetamine (Vyvanse®)	◖ ◖ ○	✓ NORMAL RESPONSE EXPECTED	**COMT** WT/WT	Non MET Homozygous
Psychiatry	**CNS Stimulants (ADHD):**				
	Amphetamine (Adderall®)	◖	✓ NORMAL RESPONSE EXPECTED	**OPRM1** WT/WT	rs1799971 A Allele Carrier/rs510679 TT genotype
Psychiatry	**CNS Stimulants (ADHD):**				
	Methamphetamine (Desoxyn®)	◖	✓ NORMAL RESPONSE EXPECTED	**FAAH** WT/WT	rs324420 CC genotype

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
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	**Dopamine/Norepinephrine-Reuptake Inhibitors:**				
	Bupropion (Wellbutrin®)	◖	USE CAUTION due to reduced response and increased risk of side effects	**CYP2C19** *1/*2	Intermediate Metabolizer
Psychiatry	**Opioids Antagonists:**				
	Naloxone (Evzio®) Naltrexone (Revia®)	◖ ◖	✓ NORMAL RESPONSE EXPECTED	**OPRM1** WT/WT	rs1799971 A Allele Carrier/rs510679 TT genotype
Psychiatry	**Other Stimulants:**				
	Cannabinoids	◖	USE CAUTION due to increased risk of tetrahydrocannabinol (THC) dependence	**FAAH** WT/WT	rs324420 CC genotype
Psychiatry	**Other Stimulants:**				
	Cocaine	◖	✓ NORMAL RESPONSE EXPECTED	**CNR1** c.*3475A>G/c.*3475A>G	rs806368 non-TT genotype
Psychiatry	**Selective Serotonin Reuptake Inhibitors (SSRIs):**				
	Citalopram (Celexa®)	◖	USE CAUTION due to reduced response	**GRIK4** WT/WT	rs1954787 T Allele Carrier
Psychiatry	**Selective Serotonin Reuptake Inhibitors (SSRIs):**				
	Fluoxetine (Prozac®)	●	USE CAUTION due to elevated risk for drug overdose resulting in adverse events and drug interaction	**CYP2D6** *4/*10	Intermediate Metabolizer
Psychiatry	**Selective Serotonin Reuptake Inhibitors (SSRIs):**				
	Fluvoxamine (Luvox®) Paroxetine (Paxil®) Sertraline (Zoloft®)	◖ ◖ ◖	USE CAUTION due to reduced response	**HTR1A** WT/WT	rs6295 CC genotype/rs1800044 C Allele Carrier
Psychiatry	**Selective Serotonin Reuptake Inhibitors (SSRIs):**				
	Sertraline (Zoloft®)	◖	USE CAUTION with high alert to adverse drug events	**CYP2C19** *1/*2	Intermediate Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Psychiatry	**Selective Serotonin Reuptake Inhibitors (SSRIs):**				
	Escitalopram (Lexapro®)	●	✓ NORMAL RESPONSE EXPECTED	**CYP2C19** *1/*2	Intermediate Metabolizer
Psychiatry	**Selective Serotonin Reuptake Inhibitors (SSRIs):**				
	Escitalopram (Lexapro®)	◖	✓ NORMAL RESPONSE EXPECTED	**SLC6A4** LA/LA	HTTLPR Long Form
Psychiatry	**Selective Serotonin Reuptake Inhibitors (SSRIs):**				
	Vilazodone (Viibryd®)	○	✓ NORMAL RESPONSE EXPECTED	**CYP3A4** *1A/*1B	Intermediate Metabolizer
Psychiatry	**Selective Serotonin Reuptake Inhibitors (SSRIs):**				
	Vortioxetine (Trintellix®)	●	✓ NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Psychiatry	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):**				
	Venlafaxine (Effexor®)	●	✖ CONSIDER ALTERNATIVES (e.g., citalopram, sertraline)	**CYP2D6** *4/*10	Intermediate Metabolizer
Psychiatry	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):**				
	Milnacipran (Savella®)	◖	◆ USE CAUTION due to reduced response	**ADRA2A** WT/c.-217G>A	rs1800544 GG genotype/rs1800545 GA genotype
Psychiatry	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):**				
	Milnacipran (Savella®)	◖	◆ USE CAUTION due to reduced response	**HTR1A** WT/WT	rs6295 CC genotype/rs1800044 C Allele Carrier
Psychiatry	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):**				
	Atomoxetine (Strattera®)	●	✓ NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
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/*1B	Intermediate Metabolizer
Psychiatry	**Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs):**				
	Reboxetine (Edronax®) Trazodone (Desyrel®)	○ ○	✔ NORMAL RESPONSE EXPECTED	CYP3A4 *1A/*1B	Intermediate Metabolizer
Psychiatry	**Tetracyclic Antidepressants:**				
	Maprotiline	●	▼ DECREASE DOSE	CYP2D6 *4/*10	Intermediate Metabolizer
Psychiatry	**Tricyclic Antidepressants:**				
	Amitriptyline (Elavil®) Clomipramine (Anafranil®) Doxepin (Silenor®) Imipramine (Tofranil®) Protriptyline (Vivactil®) Trimipramine (Surmontil®)	● ● ● ● ● ●	▼ DECREASE DOSE by 25%	CYP2D6 *4/*10	Intermediate Metabolizer
Psychiatry	**Tricyclic Antidepressants:**				
	Desipramine (Norpramin®) Nortriptyline (Pamelor®)	● ●	▼ DECREASE DOSE by 25%	CYP2D6 *4/*10	Intermediate Metabolizer
Rheumatology	**Nonsteroidal Antiinflammatory Drugs (NSAIDs):**				
	Flurbiprofen (Ansaid®)	●	✔ NORMAL RESPONSE EXPECTED	CYP2C9 *1/*1	Normal Metabolizer
Smoking Cessation	**Smoking Cessation Aids:**				
	Bupropion (Zyban®)	●	◆ USE CAUTION due to reduced effectiveness	ANKK1 WT/c.2137G>A	A1 Heterozygous

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Smoking Cessation	**Smoking Cessation Aids:**				
	Nicotine (Nicoderm®)	◖	✓ NORMAL RESPONSE EXPECTED	**COMT** WT/WT	Non MET Homozygous
Supplements	**Vitamins:**				
	Folic Acid	◖	✗ CONSIDER ALTERNATIVES (e.g., supplements containing methylfolate) due to reduced folic acid conversion	**MTHFR** C677T/A1298C	C677T Heterozygous Mutation/A1298C Heterozygous Mutation
Toxicology	**Antidotes:**				
	Ethanol	◖	◆ USE CAUTION due to increased risk for alcoholism	**ANKK1** WT/c.2137G>A	A1 Heterozygous
Toxicology	**Antidotes:**				
	Methylene Blue (Provayblue®)	●	✓ NORMAL RESPONSE EXPECTED	**G6PD** WT/WT	Normal G6PD Efficiency
Toxicology	**Antidotes:**				
	Sodium Nitrite	●	✓ NORMAL RESPONSE EXPECTED	**G6PD** WT/WT	Normal G6PD Efficiency
Urology	**Alpha 1 Blockers:**				
	Dutasteride/Tamsulosin (Jalyn®) Tamsulosin (Flomax®)	● ●	✓ NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer
Urology	**Alpha 1 Blockers:**				
	Silodosin (Rapaflo®)	○	✓ NORMAL RESPONSE EXPECTED	**CYP3A4** *1A/*1B	Intermediate Metabolizer
Urology	**Anticholinergic Agents:**				
	Darifenacin (Enablex®) Fesoterodine (Toviaz®)	● ●	✓ NORMAL RESPONSE EXPECTED	**CYP2D6** *4/*10	Intermediate Metabolizer

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Therapeutic	Drug Impacted	Evidence Level	Clinical Interpretation	Gene/Genotype	Phenotype
Urology	**Anticholinergic Agents:**				
	Tolterodine (Detrol®)	●	✔ NORMAL RESPONSE EXPECTED	CYP2D6 *4/*10	Intermediate Metabolizer

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

Gene	Genotype	Phenotype
ABCB1	WT/WT	rs2032582 AA genotype/rs1045642 AA genotype
ACE	WT/WT	ACE Deletion
ADRA2A	WT/c.-217G>A	rs1800544 GG genotype/rs1800545 GA genotype
AGTR1	WT/WT	rs5186 AA genotype
ANKK1	WT/c.2137G>A	A1 Heterozygous
APOB	WT/WT	rs676210 GG Genotype
APOE	WT/WT	Non E2 Carrier
ATM	WT/WT	rs11212617 CC genotype
CDA	WT/WT	rs532545 C Allele
CES1	WT/WT	rs71647871 C Allele
CNR1	c.*3475A>G/c.*3475A>G	rs806368 non-TT genotype
COMT	WT/WT	Non MET Homozygous
CYP1A2	*1A/*1F	Normal Metabolizer
CYP2B6	G516T/G516T/A785G/A785G	G516T Homozygous/A785G Homozygous
CYP2C19	*1/*2	Intermediate Metabolizer
CYP2C8	*1/*1	Wild Type
CYP2C9	*1/*1	Normal Metabolizer
CYP2D6	*4/*10	Intermediate Metabolizer
CYP3A4	*1A/*1B	Intermediate Metabolizer
CYP3A5	*1A/*3A	Expresser
CYP4F2	*1/*1	Normal Metabolizer
DPYD	*5/*9A/c.496A>G/IVS10-15T>C	Normal Metabolizer
DRD1	WT/WT	rs4532 CC genotype
DRD2	WT/WT	rs1799978 TT genotype
ERCC1	WT/WT	rs3212986 C Allele Carrier/rs11615 AA genotype/rs735482 AA genotype

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Gene	Genotype	Phenotype
F2	WT/WT	Wild Type
F5	WT/WT	Non Factor V Leiden Carrier
FAAH	WT/WT	rs324420 CC genotype
G6PD	WT/WT	Normal G6PD Efficiency
GRIK4	WT/WT	rs1954787 T Allele Carrier
GSTP1	WT/WT	rs1695 AA genotype
HFE	WT/c.340+4T>C	rs2071303 C Allele Carrier
HLA-B	WT/WT	Wild Type
HTR1A	WT/WT	rs6295 CC genotype/rs1800044 C Allele Carrier
HTR2A	WT/WT	rs7997012 non-GG genotype
HTR2C	WT/WT	rs1414334 C Allele Carrier
IFNL3	39738787C>T/39743165T>G	Unfavorable Response Genotype
ITPA	WT/WT	Non-protective Wild Type
KIF6	WT/WT	rs20455 AA genotype
LDLR	WT/c.1773C>T	rs688 CT Genotype
MTHFR	C677T/A1298C	C677T Heterozygous Mutation/A1298C Heterozygous Mutation
NAT2	*4/*12	Rapid Acetylator
NOS1AP	WT/WT	rs10494366 GG genotype/rs10800397 C Allele Carrier/rs10919035 C Allele Carrier
NQO1	c.559C>T/c.559C>T	rs1800566 AA genotype
OPRM1	WT/WT	rs1799971 A Allele Carrier/rs510679 TT genotype
SCN2A	WT/WT	rs2304016 non-GG genotype
SLC6A4	LA/LA	HTTLPR Long Form
SLCO1B1	*1/*5	Intermediate 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

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Gene	Genotype	Phenotype
XRCC1	WT/WT	rs25487 T Allele Carrier

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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.

*The panel includes 53 genes and 214 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. The following genetic variants may be detected in the assay: ABCB1 c.3435T>C, c.2677T>A(G); ACE ACE Insertion; ADRA2A c.1252G>C, c.-217G>A; AGTR1 c.*86A>C; ANKK1 A1; APOB c.6210C>T; APOE Apoε2; ATM c.175-5285G>T; CDA c.-451C>T; CES1 c.428G>A; CNR1 c.*3475A>G; COMT c.472G>A; CYP1A2 *1A, *1C, *1F, *1K, *3, *4, *5, *6, *7; CYP2B6 A785G, G516T, T983C; CYP2C19 *1, *2, *3, *4, *5, *6, *7, *8, *9, *10, *12, *17; CYP2C8 *3; CYP2C9 *1, *2, *3, *4, *5, *6, *8, *9, *11, *12, *13, *14, *15, *16; CYP2D6 *1, *2, *3, *4, *5, *6, *7, *8, *9, *10, *11, *12, *14, *17, *19, *20, *21, *29, *35, *38, *40, *41, *44, *1XN, *2XN, *4XN, *10XN, *17XN, *29xN, *35xN, *41XN; CYP3A4 *1A, *1B, *2, *3, *12, *17; CYP3A5 *1A, *2, *3A, *3B, *6, *7, *8, *9; CYP4F2 *1, *3; DPYD *1, *2A, *3, *4, *5, *6, *7, *8, *9A, *9B, *10, *11, *12, *13, c.496A>G, IVS10-15T>C, c.1645G>T, c.2846A>T; DRD1 c.-48G>A; DRD2 c.-585A>G; ERCC1 c.*197G>T, c.354T>C, c.*931T>G; F2 G20210A; F5 c.1601G>A; FAAH c.385C>A; G6PD 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, Mediterran ean, Metaponto, Minnesota, Mt. Sinai, Nara, Nashville, Olomouc, Pawnee, Plymouth, Praba, Puerto Limon, Santamaria, Santiago, Santiago de Cuba, Sao Borja, Shinshu, Sibari, Telti, Toman, Ube, Union, Viangchan, West Virginia; GRIK4 c.83-10039T>C; GSTP1 c.313A>G; HFE c.340+4T>C; HLA-B *1502, *5701, *5801; HTR1A c.-1019G>C, c.659G>T; HTR2A c.614 -2211T>C; HTR2C c.-759C>T, c.551-3008C>G; IFNL3 g.39738787C>T, g.39743165T>G; ITPA c.94C>A, c.124+21A>C; KIF6 c.2155T>C; LDLR c.1773C>T; MTHFR C677T, A1298C; NAT2 *4, *5, *6, *7, *12, *13; NOS1AP c.105-38510G>T, c.178-20044C>T, c.178-13122C>T; NQO1 c.559C>T; OPRM1 c.118A>G, c.200+1050C>T; SCN2A c.971-32A>G; SLC6A4 5-HTTLPR LA, 5-HTTLPR LG, 5-HTTLPR S; SLCO1B1 *5; TPMT *1, *2, *3A, *3B, *3C, *4; UGT1A1 *28; UGT2B15 *2; VKORC1 c.-1639G>A; XRCC1 c.1196A>G. 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.*

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. Clinical Pharmacogenetics Implementation Consortium (CPIC) drug dosing guidelines:
   https://cpicpgx.org/guidelines
4. FDA drug labels
5. Warfarin dosing guideline:
   CPIC Guidelines for CYP2C9 and VKORC1 Genotypes and Warfarin Dosing

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Laboratory Director
ABMG Certified, Clinical Molecular Genetics

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