GENESYS Diagnostics INC.

PATIENT INFORMATION		SPECIMEN DETAILS		PROVIDER INFORMATION
NAME:	**John Doe**	**SPECIMEN TYPE:**	Buccal Swab	**Dr. Bauer**
ACC #:	BS7	**COLLECTION DATE:**	1/1/1900	**123456789**
DOB:	12/24/1800	**RECEIVED DATE:**	1/1/1900	
SEX:	Male	**REPORT DATE:**	10/12/2021	

Comprehensive Pharmacogenetic Report

Current Patient Medications

Zofran, Prevacid, Lexapro, Citalopram, Xanax

Citalopram
Celexa®

Insufficient Response to Citalopram (CYP2C19: Rapid Metabolizer) — ACTIONABLE

At standard label-recommended dosage, citalopram plasma concentrations levels are expected to be low which may result in a loss of efficacy. Consider an alternative medication. If citalopram is warranted, consider increasing the dose to a maximum of 150% and titrate based on the clinical response and tolerability.

Lexapro
Escitalopram

Insufficient Response to Escitalopram (CYP2C19: Rapid Metabolizer) — ACTIONABLE

At standard label-recommended dosage, escitalopram plasma concentrations levels are expected to be low which may result in a loss of efficacy. Consider an alternative medication. If escitalopram is warranted, consider increasing the dose to a maximum of 150% and titrate based on the clinical response and tolerability.

Prevacid
Lansoprazole

Slightly Decreased to Normal Exposure to Lansoprazole (CYP2C19: Rapid Metabolizer) — ACTIONABLE

The patient's genotype may be associated with a slightly decreased lansoprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing lansoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

Xanax
Alprazolam

Normal Response to Alprazolam — INFORMATIVE

Pharmacogenetic guidance: Alprazolam is primarily eliminated by metabolism via CYP3A4 and CYP3A5. Genetic polymorphisms of these genes are not expected to affect the efficacy or safety profiles of this drug. **Polypharmacy guidance:** The concomitant use of alprazolam with CYP3A4 inhibitors may result in increased alprazolam levels and prolonged sedation. Impairment of motor skills are also observed with some combinations. Monitor patients for exaggerated sedative effects. If possible, alprazolam should be avoided in patients receiving strong inhibitors of CYP3A4 such as ketoconazole, itraconazole and ritonavir. Drugs that induce CYP3A enzymes may decrease alprazolam levels, which results in a loss of efficacy.

Zofran
Ondansetron

Normal Response to Ondansetron (CYP2D6: Intermediate Metabolizer) — INFORMATIVE

Ondansetron can be prescribed at standard label-recommended dosage and administration.

Zofran
Ondansetron

Favorable Response to Standard Ondansetron Dosing (ABCB1: Homozygous Mutant - Variant Allele Present) — INFORMATIVE

The genotype result predicts that the patient has markedly decreased ABCB1 transporter expression. A high response rate in controlling nausea and vomiting has been reported when patients with this genotype are treated with ondansetron. Ondansetron can be prescribed at standard label-recommended dosage and administration.

A medication has potentially reduced efficacy, increased toxicity or the patient has an increased risk for the indicated condition.	**ACTIONABLE** — Recommendations based upon publications by international pharmacogenetic expert groups, consortia or regulatory bodies (CPIC, DPWG, FDA, EMA). Recommendations are suitable for implementation in a clinical setting. Guidelines may change as knowledge arises.
Guidelines exist for adjusting dosage, increased vigilance or the patient has a moderate risk for the indicated condition.	
The medication can be prescribed according to standard regimens or the patient's risk for the indicated condition is not increased.	**INFORMATIVE** — There are insufficient or contradictory findings documenting the impact of a given genetic polymorphism or drug interaction. Recommendations are informative and implementation in a clinical setting is optional.

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Risk Management

Hyperhomocysteinemia - Depression

No Increased Risk of Hyperhomocysteinemia

The patient carries one copy of the MTHFR c.665C>T variant (heterozygous). MTHFR enzyme activity is reduced (60% of normal activity).

Patients diagnosed with depression often have low folate levels and homocysteine is a highly sensitive marker of folate status. Functional folate deficiency is indicated by elevated homocysteine. The patient's small reduction in MTHFR activity is not a risk factor for hyperhomocysteinemia.

Patients diagnosed with depression: as lower folate levels are associated with poorer antidepressant response, and baseline levels of folate within the normal range predict antidepressant response, testing for homocysteine levels and serum folate levels may be informative for this patient before prescribing methylfolate as an antidepressant-augmenting agent.

Hyperhomocysteinemia - Thrombosis

No Increased Risk of Hyperhomocysteinemia

The patient carries one copy of the MTHFR c.665C>T variant (heterozygous). MTHFR enzyme activity is reduced (60% of normal activity).

Based on results for the MTHFR c.665C>T variant, the patient has a small reduction in MTHFR activity, which is not a risk factor for hyperhomocysteinemia. Hyperhomocysteinemia is associated with a risk for venous thromboembolism (VTE). Unless other risk factors are present, the patient is not expected to have an increased risk for VTE.

The patient's MTHFR activity is slightly reduced.

Thrombophilia

Normal Risk of Thrombosis

The patient does not carry the F5 c.1601G>A variant (also known as Factor V Leiden) or the F2 c.*97G>A variant (also known as Factor II 20210G>A).

The patient's risk of thrombosis is not increased (average risk of clotting is about 1 in 1000 for anyone in a year). However, because this test cannot find all of the inherited reasons for abnormal clotting, other factors may affect this risk assessment.

Assess thrombotic risk based on other genetic and/or circumstantial risk factors such as smoking, obesity, malignancy, prolonged immobilization or surgery.

Estrogen-containing contraceptive and hormone replacement therapy: unless other genetic and/or circumstantial risk factors are present, consider standard prescribing and monitoring practices.

Type III Hyperlipoproteinemia

Not Associated with Type III Hyperlipoproteinemia

The patient is negative for the APOE c.388 T>C (Cys130Arg) mutation and positive for the APOE c.526 C>T (Arg176Cys) mutation. The patient's genotype is ε3/ε2 (frequency: 6.7-18%).

The APOE E2 form is associated with a slower conversion of IDL to LDL, lower cholesterol, and higher triglycerides, compared to the normal APOE E3 form. The APOE ε3/ε2 genotype is not associated with increased risk of cardiovascular disease.

Consider dietary adjustments based on lipid profiles. No action is needed when a patient is normolipidemic.

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Potentially Impacted Medications

CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
Anticancer Agents	**Antifolates**		Methotrexate (Trexall®)	
Cardiovascular	**Angiotensin II Receptor Antagonists**	Azilsartan (Edarbi®, Edarbyclor®) Candesartan (Atacand®) Eprosartan (Teveten®) Irbesartan (Avapro®) Olmesartan (Benicar®) Telmisartan (Micardis®) Valsartan (Diovan®, Entresto®)	Losartan (Cozaar®, Hyzaar®)	
	Antianginal Agents	Ranolazine (Ranexa®)		
	Antiarrhythmics	Amiodarone (Nexterone®, Pacerone®) Disopyramide (Norpace®) Quinidine (Quinidine®) Sotalol (Betapace®, Sorine®, Sotylize®)	Flecainide (Tambocor®) Mexiletine (Mexitil®) Propafenone (Rythmol®)	
	Anticoagulants	Apixaban (Eliquis®) Betrixaban (Bevyxxa®) Dabigatran Etexilate (Pradaxa®) Edoxaban (Savaysa®) Fondaparinux (Arixtra®) Rivaroxaban (Xarelto®)	Warfarin (Coumadin®)	
	Antiplatelets	Prasugrel (Effient®) Ticagrelor (Brilinta®) Vorapaxar (Zontivity®)	Clopidogrel (Plavix®)	
	Beta Blockers	Atenolol (Tenormin®) Bisoprolol (Zebeta®) Carvedilol (Coreg®) Labetalol (Normodyne®, Trandate®) Nebivolol (Bystolic®) Propranolol (Inderal®)	Metoprolol (Lopressor®) Timolol (Blocadren®)	
	Diuretics	Torsemide (Demadex®)		
	Statins	Atorvastatin (Lipitor®) Lovastatin (Mevacor®, Altoprev®, Advicor®) Pitavastatin (Livalo®) Pravastatin (Pravachol®) Rosuvastatin (Crestor®) Simvastatin (Zocor®)	Fluvastatin (Lescol®)	
Diabetes	**Meglitinides**	Nateglinide (Starlix®) Repaglinide (Prandin®, Prandimet®)		
	Sulfonylureas	Chlorpropamide (Diabinese®) Glimepiride (Amaryl®) Glipizide (Glucotrol®) Glyburide (Micronase®) Tolbutamide (Orinase®)		

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CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
Gastrointestinal	Antiemetics	Aprepitant (Emend-oral®) Dolasetron (Anzemet®) Fosaprepitant (Emend-IV®) Fosnetupitant / Palonosetron (Akynzeo-IV®) Netupitant / Palonosetron (Akynzeo-oral®) Ondansetron (Zofran®, Zuplenz®) Palonosetron (Aloxi®) Rolapitant (Varubi®)	Dronabinol (Marinol®) Metoclopramide (Reglan®)	
	Proton Pump Inhibitors	Esomeprazole (Nexium®) Rabeprazole (Aciphex®)	Dexlansoprazole (Dexilant®, Kapidex®) Lansoprazole (Prevacid®) Omeprazole (Prilosec®) Pantoprazole (Protonix®)	
Infections	Antifungals	Amphotericin B (AmBisome®, Abelcet®) Anidulafungin (Eraxis®) Caspofungin (Cancidas®) Fluconazole (Diflucan®) Isavuconazonium (Cresemba®) Itraconazole (Sporanox®) Micafungin (Mycamine®) Posaconazole (Noxafil®)		Voriconazole (Vfend®)
	Anti-HIV Agents	Dolutegravir (Tivicay®, Triumeq®) Doravirine (Pifeltro®) Etravirine (Edurant®) Raltegravir (Isentress®, Dutrebis®) Rilpivirine (Intelence®)	Efavirenz (Sustiva®)	
	Antimalarials	Proguanil (Malarone®)		
	Fibromyalgia Agents	Milnacipran (Savella®)		
	Muscle Relaxants	Cyclobenzaprine (Flexeril®, Amrix®) Metaxalone (Skelaxin®) Methocarbamol (Robaxin®) Tizanidine (Zanaflex®)	Carisoprodol (Soma®)	
	NSAIDs	Diclofenac (Voltaren®) Indomethacin (Indocin®) Ketoprofen (Orudis®) Ketorolac (Toradol®) Nabumetone (Relafen®) Naproxen (Aleve®) Sulindac (Clinoril®)	Celecoxib (Celebrex®) Flurbiprofen (Ansaid®) Ibuprofen (Advil®, Motrin®)	Meloxicam (Mobic®) Piroxicam (Feldene®)

CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
Pain	**Opioids**	Alfentanil (Alfenta®) Buprenorphine (Butrans®, Buprenex®) Dihydrocodeine (Synalgos-DC®) Fentanyl (Actiq®) Hydromorphone (Dilaudid®, Exalgo®) Levorphanol (Levo Dromoran®) Meperidine (Demerol®) Morphine (MS Contin®) Oxymorphone (Opana®, Numorphan®) Sufentanil (Sufenta®) Tapentadol (Nucynta®)	Benzhydrocodone (Apadaz®) Codeine (Codeine; Fioricet® with Codeine) Hydrocodone (Vicodin®) Methadone (Dolophine®) Oxycodone (Percocet®, Oxycontin®) Tramadol (Ultram®)	
	Antiaddictives	Lofexidine (Lucemyra®)	Bupropion (Wellbutrin®, Zyban®, Aplenzin®, Contrave®) Naltrexone (Vivitrol®, Contrave®)	
	Anti-ADHD Agents	Amphetamine (Adderall®, Evekeo®) Clonidine (Kapvay®) Dextroamphetamine (Dexedrine®) Guanfacine (Intuniv®) Lisdexamfetamine (Vyvanse®)	Atomoxetine (Strattera®) Dexmethylphenidate (Focalin®) Methylphenidate (Ritalin®, Aptensio XR®, Concerta®, Metadate ER®, Quillivant ER®)	
	Anticonvulsants	Brivaracetam (Briviact®) Cannabidiol (Epidiolex®) Carbamazepine (Tegretol®, Carbatrol®, Epitol®) Eslicarbazepine (Aptiom®) Ethosuximide (Zarontin®) Ezogabine (Potiga®) Felbamate (Felbatol®) Gabapentin (Neurontin®) Lacosamide (Vimpat®) Lamotrigine (Lamictal®) Levetiracetam (Keppra®) Oxcarbazepine (Trileptal®, Oxtellar XR®) Perampanel (Fycompa®) Phenobarbital (Luminal®) Pregabalin (Lyrica®) Primidone (Mysoline®) Rufinamide (Banzel®) Tiagabine (Gabitril®) Topiramate (Topamax®) Valproic Acid (Depakene®) Vigabatrin (Sabril®) Zonisamide (Zonegran®)	Fosphenytoin (Cerebyx®) Phenytoin (Dilantin®)	
	Antidementia Agents	Donepezil (Aricept®) Galantamine (Razadyne®) Memantine (Namenda®)		

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Psychotropic	**Antidepressants**	Desvenlafaxine (Pristiq®) Duloxetine (Cymbalta®) Fluoxetine (Prozac®, Sarafem®) Fluvoxamine (Luvox®) Levomilnacipran (Fetzima®) Mirtazapine (Remeron®) Nefazodone (Serzone®) Paroxetine (Paxil®, Brisdelle®) Trazodone (Oleptro®) Vilazodone (Viibryd®) Vortioxetine (Trintellix®)	Amoxapine (Amoxapine®) Desipramine (Norpramin®) Maprotiline (Ludiomil®) Nortriptyline (Pamelor®) Protriptyline (Vivactil®) Sertraline (Zoloft®)	Amitriptyline (Elavil®) Citalopram (Celexa®) Clomipramine (Anafranil®) Doxepin (Silenor®) Escitalopram (Lexapro®) Imipramine (Tofranil®) Trimipramine (Surmontil®) Venlafaxine (Effexor®)
	Antipsychotics	Aripiprazole (Abilify®, Aristada®) Asenapine (Saphris®) Brexpiprazole (Rexulti®) Cariprazine (Vraylar®) Chlorpromazine (Thorazine®) Clozapine (Clozaril®) Fluphenazine (Prolixin®) Haloperidol (Haldol®) Loxapine (Loxitane®, Adasuve®) Lurasidone (Latuda®) Olanzapine (Zyprexa®) Paliperidone (Invega®) Pimavanserin (Nuplazid®) Pimozide (Orap®) Quetiapine (Seroquel®) Risperidone (Risperdal®) Thiothixene (Navane®) Trifluoperazine (Stelazine®) Ziprasidone (Geodon®)	Iloperidone (Fanapt®) Perphenazine (Trilafon®)	Thioridazine (Mellaril®)
	Benzodiazepines	Alprazolam (Xanax®) Clobazam (Onfi®) Clonazepam (Klonopin®)	Diazepam (Valium®)	
	Other Neurological Agents	Deutetrabenazine (Austedo®) Dextromethorphan / Quinidine (Nuedexta®) Flibanserin (Addyi®) Valbenazine (Ingrezza®)	Tetrabenazine (Xenazine®)	
Rheumatology	**Anti-Hyperuricemics and Anti-Gout Agents**	Colchicine (Mitigare®) Febuxostat (Uloric®)		
	Immunomodulators	Apremilast (Otezla®) Leflunomide (Arava®) Tofacitinib (Xeljanz®)		
Transplantation	**Immunosuppressants**	Tacrolimus (Prograf®)		
	5-Alpha Reductase Inhibitors for Benign Prostatic Hyperplasia	Dutasteride (Avodart®) Finasteride (Proscar®)		

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CATEGORY	DRUG CLASS	STANDARD PRECAUTIONS	USE WITH CAUTION	CONSIDER ALTERNATIVES
Urologicals	**Alpha-Blockers for Benign Prostatic Hyperplasia**	Alfuzosin (UroXatral®) Doxazosin (Cardura®) Silodosin (Rapaflo®) Tamsulosin (Flomax®) Terazosin (Hytrin®)		
	Antispasmodics for Overactive Bladder	Darifenacin (Enablex®) Fesoterodine (Toviaz®) Mirabegron (Myrbetriq®) Oxybutynin (Ditropan®) Solifenacin (Vesicare®) Tolterodine (Detrol®) Trospium (Sanctura®)		
	Phosphodiesterase Inhibitors for Erectile Dysfunction	Avanafil (Stendra®) Sildenafil (Viagra®) Tadalafil (Cialis®) Vardenafil (Levitra®)		

Dosing Guidance

Amitriptyline
Elavil®

Decreased Amitriptyline Exposure (CYP2C19: Rapid Metabolizer) — INFORMATIVE

The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of amitriptyline to nortriptyline and a subsequent decrease in amitriptyline exposure leading to therapy failure or increased side effects.

Psychiatric Conditions: Consider an alternative medication. If amitriptyline is warranted, consider therapeutic drug monitoring to guide dose adjustments.

Neuropathic Pain: Consider an alternative medication. If amitriptyline is warranted titrate dose according to the patient's clinical response and tolerability.

Amoxapine
Amoxapine®

Possible Increased Amoxapine Exposure (CYP2D6: Intermediate Metabolizer) — INFORMATIVE

Like other tricyclic and tetracyclic antidepressants, amoxapine is metabolized by CYP2D6. However, the overall contribution of this enzyme in the metabolism of this drug is not well documented. Decreased CYP2D6 activity may result in higher amoxapine concentrations potentially leading to higher adverse events. There are no established dosing adjustments for patients with decreased CYP2D6 function; therapy must be initiated cautiously and adjusted according to the patient's response.

Atomoxetine
Strattera®

Possible Atomoxetine Underexposure Leading to Decreased Response (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

The genotype result indicates that the patient is likely to have an insufficient response due to inadequate drug exposure following standard dosing. Consider the following dosing strategy:

- Initiate treatment at 40 mg/day, increase to 80 mg/day after 3 days and maintain dose.
- If after 2 weeks, optimal clinical response is not observed and adverse events are not present, consider a dose increase to 100 mg/day.
- If after 2 weeks, optimal clinical response is not observed and adverse events are not present, consider therapeutic drug monitoring 1-2 hours post dose. If the plasma concentration is less than 200 ng/ml consider a dose increase to a target of 400 ng/ml. Doses greater than 100 mg/day may be needed to achieve a targeted therapeutic concentration. (Therapeutic range: 200-1000 ng/ml).

Benzhydrocodone
Apadaz®

Possible Altered Response to Benzhydrocodone (CYP2D6: Intermediate Metabolizer) — INFORMATIVE

Benzhydrocodone is a prodrug of hydrocodone and is converted to active hydrocodone by intestinal enzymes. Decreased conversion of hydrocodone to the more active metabolite hydromorphone is expected in CYP2D6 intermediate metabolizers. However, there is insufficient evidence whether these patients have decreased analgesia when taking benzhydrocodone. Adequate pain relief can be achieved by increasing the dose in response to pain symptoms. Other opioids not metabolized by CYP2D6 may also be considered (i.e., morphine, oxymorphone, buprenorphine, fentanyl, methadone, and hydromorphone).

Bupropion
Wellbutrin®, Zyban®, Aplenzin®, Contrave®

Altered Bupropion Exposure (CYP2B6: Intermediate Metabolizer) — INFORMATIVE

The genotype result indicates that the patient is likely to have increased bupropion exposure, but decreased exposure to the active metabolite (hydroxybupropion). This metabolite contributes to the therapeutic effects of bupropion when used as a smoking cessation agent or as an antidepressant. This decrease in exposure of hydroxybupropion may result in decreased therapeutic efficacy.

Smoking Cessation: There is insufficient data to allow calculation of dose adjustment. Consider standard prescribing and closer monitoring.

Major Depressive Disorder and Prevention of Seasonal Affective Disorder: There is insufficient data to allow calculation of dose adjustment. Therapeutic monitoring of bupropion-hydroxybupropion levels may be considered to guide dosing adjustments.

Carisoprodol

Altered Sensitivity to Carisoprodol (CYP2C19: Rapid Metabolizer) — INFORMATIVE

Soma®

There is insufficient data to allow calculation of dose adjustment. If carisoprodol is prescribed, it is recommended to use a lower dose, and to carefully monitor the patient for side effects.

Celecoxib
Celebrex®

Increased Celecoxib Exposure (CYP2C9: Intermediate Metabolizer) — **ACTIONABLE**

This genotype is associated with a prolongation of celecoxib half-life and increase in plasma concentrations, which may result in higher toxicity especially during long-term therapy. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age.

Osteoarthritis, Rheumatoid Arthritis, Ankylosing Spondylitis, Acute Pain, Primary Dysmenorrhea: Consider initiating celecoxib therapy with the lowest recommended dose. Exercise caution during up-titration until a favorable clinical effect is obtained or the maximum recommended dose is reached. Consider using the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when celecoxib is administered with CYP2C9 inhibitors or inducers.

Acute Migraine: Consider using for the fewest number of days per month, as needed. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when celecoxib is administered with CYP2C9 inhibitors or inducers.

Osteoarthritis and Hypertension (co-formulation with amlodipine): Consider using the lowest effective dosage for the shortest duration consistent with the patient treatment goals. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when celecoxib is administered with CYP2C9 inhibitors or inducers.

Citalopram
Celexa®

Insufficient Response to Citalopram (CYP2C19: Rapid Metabolizer) — **ACTIONABLE**

At standard label-recommended dosage, citalopram plasma concentrations levels are expected to be low which may result in a loss of efficacy. Consider an alternative medication. If citalopram is warranted, consider increasing the dose to a maximum of 150% and titrate based on the clinical response and tolerability.

Clomipramine
Anafranil®

Decreased Clomipramine Exposure (CYP2C19: Rapid Metabolizer) — **INFORMATIVE**

The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of clomipramine to desmethyl clomipramine and a subsequent decrease in clomipramine exposure leading to therapy failure or increased side effects.

Psychiatric Conditions: Consider an alternative medication. If clomipramine is warranted, consider therapeutic drug monitoring to guide dose adjustments.

Clopidogrel
Plavix®

Increased Response to Clopidogrel (CYP2C19: Rapid Metabolizer) — **ACTIONABLE**

Clopidogrel can be prescribed at standard label-recommended dosage. Individuals with the *17 allele may have an increased risk of bleeding while taking clopidogrel.

Codeine
Codeine; Fioricet® with Codeine

Possible Non-Response to Codeine (CYP2D6: Intermediate Metabolizer) — **ACTIONABLE**

Reduced morphine levels are anticipated, and the patient may or may not experience adequate pain relief with codeine. Codeine can be prescribed at standard label-recommended dosage and administration, with monitoring for symptoms of insufficient pain relief. Other opioids not metabolized by CYP2D6 may also be considered (i.e., morphine, oxymorphone, buprenorphine, fentanyl, methadone, and hydromorphone).

Desipramine
Norpramin®

Increased Desipramine Exposure (CYP2D6: Intermediate Metabolizer) — **INFORMATIVE**

The patient is predicted to be a CYP2D6 intermediate metabolizer which is likely to result in decreased metabolism of desipramine to less active compounds and a subsequent increase in desipramine exposure leading to side effects.

Psychiatric Conditions: Consider a 25% reduction of the recommended dose and use therapeutic drug monitoring to guide dose adjustments.

Dexlansoprazole

Dexilant®, Kapidex®

Slightly Decreased to Normal Exposure to Dexlansoprazole (CYP2C19: Rapid Metabolizer) — INFORMATIVE

The patient's genotype may be associated with a slightly decreased dexlansoprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing dexlansoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

Dexmethylphenidate

Focalin®

Decreased Response to Dexmethylphenidate (COMT: Intermediate COMT Activity) — INFORMATIVE

The patient's genotype result predicts a less optimal response to dexmethylphenidate. Dosage should be individualized according to the needs and response of the patient. Therapy should be initiated in small doses, with gradual weekly increments.

Diazepam

Valium®

Possible Altered Sensitivity to Diazepam (CYP2C19: Rapid Metabolizer) — INFORMATIVE

CYP2C19 rapid and ultra-rapid metabolizers metabolize diazepam and nordiazepam more rapidly than normal metabolizers. However, there is insufficient data to allow calculation of dose adjustment when diazepam is prescribed. Monitor the patient's response and adjust the dose accordingly.

Doxepin

Silenor®

Decreased Doxepin Exposure (CYP2C19: Rapid Metabolizer) — INFORMATIVE

The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of doxepin to desmethyl doxepin and a subsequent decrease in doxepin exposure leading to therapy failure or increased side effects.

Psychiatric Conditions: Consider an alternative medication. If doxepin is warranted, consider therapeutic drug monitoring to guide dose adjustments.

Insomnia: Doxepin can be prescribed according to the standard recommended dosage and administration.

Dronabinol

Marinol®

Increased Dronabinol Exposure (CYP2C9: Intermediate Metabolizer) — ACTIONABLE

The patient's genotype predicts a reduced CYP2C9 metabolic activity. Increased drug exposure may occur in this patient leading to prolonged sedation. Consider standard label-recommended dosing and close monitoring for adverse effects.

Efavirenz

Sustiva®

Increased Efavirenz Exposure (CYP2B6: Intermediate Metabolizer) — ACTIONABLE

The genotype result indicates that the patient is likely to have higher dose-adjusted trough concentrations of efavirenz following standard dosing. This may result in increased risk of CNS adverse events. Consider initiating efavirenz with a decreased dose of 400 mg/day. If therapeutic drug monitoring is available and a decreased efavirenz dose is prescribed, consider obtaining steady-state plasma efavirenz concentrations to ensure concentrations are in the suggested therapeutic range (~1 to 4 µg/mL).

Escitalopram

Lexapro®

Insufficient Response to Escitalopram (CYP2C19: Rapid Metabolizer) — ACTIONABLE

At standard label-recommended dosage, escitalopram plasma concentrations levels are expected to be low which may result in a loss of efficacy. Consider an alternative medication. If escitalopram is warranted, consider increasing the dose to a maximum of 150% and titrate based on the clinical response and tolerability.

Flecainide

Tambocor®

Increased Exposure to Flecainide (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

The patient's genotype may be associated with an increased flecainide exposure following standard dosing. Consider prescribing a lower flecainide dose for therapeutic indications. When compared to a CYP2D6 normal metabolizer, an intermediate metabolizer may require a 25% dose reduction. Careful titration with ECG recording and monitoring of flecainide plasma concentrations are recommended until a favorable clinical response is achieved.

Dose adjustments are not required when flecainide is utilized for diagnostic uses.

Flurbiprofen
Ansaid®

Increased Flurbiprofen Exposure (CYP2C9: Intermediate Metabolizer) — ACTIONABLE

Rheumatoid Arthritis and Osteoarthritis: Consider initiating flurbiprofen therapy with the lowest recommended dose. Exercise caution during up-titration until a favorable clinical effect is obtained or the maximum recommended dose is reached. Consider using the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when flurbiprofen is administered with CYP2C9 inhibitors or inducers.

Fluvastatin
Lescol®

Possible Increased Fluvastatin Exposure (CYP2C9: Intermediate Metabolizer) — INFORMATIVE

Increased fluvastatin plasma concentrations due to reduced CYP2C9 activity may occur, resulting in myopathy/hepatotoxicity. Consider monitoring the patient for treatment-related adverse effects, and adjust dose based on tolerability and response. Other adverse events and predisposing factors include advanced age (65 and older), diabetes, hypothyroidism, renal or hepatic impairments, high statin dose, CYP2C9 inhibitors, ABCG2 inhibitors, and female sex.

Fosphenytoin
Cerebyx®

Increased Phenytoin (Fosphenytoin Active Metabolite) Exposure (CYP2C9: Intermediate Metabolizer) — ACTIONABLE

Fosphenytoin is a prodrug of phenytoin. The genotype results indicate that the patient is a CYP2C9 intermediate metabolizer. Plasma concentrations of phenytoin are likely to increase, resulting in an increased risk of mild to moderate neurological toxicity. Consider a standard loading dose and reduce the maintenance dose by 25%. Be alert to neurological concentration-related adverse events. Adjust subsequent maintenance doses based on therapeutic drug monitoring and response.

Hydrocodone
Vicodin®

Possible Altered Response to Hydrocodone (CYP2D6: Intermediate Metabolizer) — INFORMATIVE

Decreased conversion of hydrocodone to the more active metabolite hydromorphone is expected in CYP2D6 intermediate metabolizers. However, there is insufficient evidence whether these patients have decreased analgesia when taking hydrocodone. Adequate pain relief can be achieved by increasing the dose in response to pain symptoms. Other opioids not metabolized by CYP2D6 may also be considered (i.e., morphine, oxymorphone, buprenorphine, fentanyl, methadone, and hydromorphone).

Ibuprofen
Advil®, Motrin®

Increased Ibuprofen Exposure (CYP2C9: Intermediate Metabolizer) — ACTIONABLE

Pain, Dysmenorrhea, Rheumatoid Arthritis, Osteoarthritis, Fever and Other Anti-Inflammatory Uses: Consider initiating ibuprofen therapy with the lowest recommended dose. Exercise caution during up-titration until a favorable clinical effect is obtained or the maximum recommended dose is reached. Consider using the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when ibuprofen is administered with CYP2C9 inhibitors or inducers.

Iloperidone
Fanapt®

Moderate Sensitivity to Iloperidone (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

Because iloperidone is associated with QTc prolongation, caution is warranted when prescribing the drug in patients with reduced CYP2D6 activity. Iloperidone must be titrated slowly from a low starting dose to avoid orthostatic hypotension. If patients taking iloperidone experience symptoms that could indicate the occurrence of cardiac arrhythmias (e.g., dizziness, palpitations, or syncope), the prescriber should initiate further evaluation, including cardiac monitoring.

Imipramine
Tofranil®

Decreased Imipramine Exposure (CYP2C19: Rapid Metabolizer) — INFORMATIVE

The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of imipramine to desipramine and a subsequent decrease in imipramine exposure leading to therapy failure or increased side effects.

Psychiatric Conditions: Consider an alternative medication. If imipramine is warranted, consider therapeutic drug monitoring to guide dose adjustments.

Lansoprazole
Prevacid®

Slightly Decreased to Normal Exposure to Lansoprazole (CYP2C19: Rapid Metabolizer) — ACTIONABLE

The patient's genotype may be associated with a slightly decreased lansoprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing lansoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

Losartan
Cozaar®, Hyzaar®

Possible Decreased Response to Losartan (CYP2C9: Intermediate Metabolizer) — INFORMATIVE

Losartan is metabolized to its active metabolite by CYP2C9 and CYP3A4. The patient's genotype predicts a reduced exposure to losartan's active metabolite and a possible reduced hypotensive effect. Losartan can be prescribed at label-recommended dosage and administration with additional monitoring of the patient's response.

Maprotiline
Ludiomil®

Possible Increased Maprotiline Exposure (CYP2D6: Intermediate Metabolizer) — INFORMATIVE

Like other tricyclic and tetracyclic antidepressants, maprotiline is metabolized by CYP2D6 as well as CYP1A2. Decreased CYP2D6 activity results in higher maprotiline concentrations potentially leading to higher adverse events. There are no established dosing adjustments for patients with decreased CYP2D6 function therefore, therapy must be initiated at a low dosage and gradually adjusted according to the patient's response. The lowest effective dosage should always be considered during maintenance therapy.

Meloxicam
Mobic®

Increased Meloxicam Exposure (CYP2C9: Intermediate Metabolizer) — ACTIONABLE

Pain, Rheumatoid Arthritis, Osteoarthritis: Consider initiating meloxicam therapy with 50% of the lowest recommended dose. Exercise caution during up-titration until a favorable clinical effect is obtained or until the 50% maximum recommended dose is reached. Consider using the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Upward dose titration should not occur until after steady state is reached (at least 7 days). Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when meloxicam is administered with CYP2C9 inhibitors or inducers.
Or
Consider an alternative medication.

Methadone
Dolophine®

Increased Methadone Exposure (CYP2B6: Intermediate Metabolizer) — INFORMATIVE

The patient's genotype may be associated with an increased methadone exposure following standard dosing.

For Addiction Treatment: There is limited evidence indicating that intermediate metabolizers require lower doses, therefore, a dose adjustment cannot be calculated.

For Pain Management: There are no studies documenting the effect of CYP2B6 genetic variations on methadone exposure when this drug is used as an analgesic. Consider standard prescribing and monitoring practices.

Methotrexate
Trexall®

Increased Risk for Methotrexate Toxicity (MTHFR: Reduced MTHFR Activity) — INFORMATIVE

The patient carries one copy of the MTHFR c.665C>T variant resulting in a reduced MTHFR activity. **Malignancy:** Leukemia or lymphoma patients who are treated with methotrexate standard regimens might have an increased likelihood of treatment interruptions due to methotrexate toxicity. Monitor the patient closely for increased side effects and adjust the dose accordingly. Other genetic and clinical factors may also influence the patient's risk for toxicity and response to methotrexate treatment. **Nonmalignant conditions:** a limited number of studies found an association between individuals carrying the MTHFR c.665C>T variant and methotrexate-induced toxicity in rheumatoid arthritis patients. However, there is insufficient data to calculate dose adjustment. Monitor patient closely for increased side effects and adjust the dose accordingly. Other genetic and clinical factors may also influence the patient's risk for toxicity and response to methotrexate treatment.

Methylphenidate
Ritalin®, Aptensio XR®, Concerta®, Metadate ER®, Quillivant ER®

Decreased Response to Methylphenidate (COMT: Intermediate COMT Activity) — INFORMATIVE

The patient's genotype result predicts a less optimal response to methylphenidate. Dosage should be individualized according to the needs and response of the patient. Therapy should be initiated in small doses, with gradual weekly increments.

Metoclopramide
Reglan®

Possible Sensitivity to Metoclopramide (CYP2D6: Intermediate Metabolizer) — INFORMATIVE

There is no data documenting the changes in plasma concentrations of metoclopramide in CYP2D6 intermediate metabolizers. Metoclopramide can be prescribed at standard label-recommended dosage and administration with careful monitoring for possible increase of side effects.

Metoprolol
Lopressor®

Increased Exposure to Metoprolol (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

The patient's genotype may be associated with an increased metoprolol exposure following standard dosing. When compared to a normal metabolizer, an intermediate metabolizer may require a 50% dose reduction. If metoprolol is prescribed, be alert to adverse events (e.g., bradycardia or cold extremities).

Mexiletine
Mexitil®

Increased Sensitivity to Mexiletine (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

Consider prescribing a lower mexiletine dose. A slow titration with ECG recording and monitoring of mexiletine plasma concentrations are recommended until a favorable clinical response is achieved.

Naltrexone
Vivitrol®, Contrave®

Altered Response to Naltrexone (OPRM1: Normal OPRM1 Function) — INFORMATIVE

Treatment of alcohol dependence: the patient has the OPRM1 118AA wild-type genotype that is associated with a poorer outcome with naltrexone therapy. Naltrexone-treated patients not carrying the OPRM1 118A>G G allele are less likely to respond to this drug, and may have higher relapse rates than those who are carriers of this allele. This association has not been reported consistently across studies.

Nortriptyline
Pamelor®

Increased Nortriptyline Exposure (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

The patient is predicted to be a CYP2D6 intermediate metabolizer which is likely to result in decreased metabolism of nortriptyline to less active compounds and a subsequent increase in nortriptyline exposure leading to side effects.

Psychiatric Conditions: Consider a 25% reduction of the recommended dose and use therapeutic drug monitoring to guide dose adjustments.

Omeprazole
Prilosec®

Slightly Decreased to Normal Exposure to Omeprazole (CYP2C19: Rapid Metabolizer) — ACTIONABLE

The patient's genotype may be associated with a slightly decreased omeprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing omeprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

Oxycodone
Percocet®, Oxycontin®

Possible Altered Response to Oxycodone (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

Decreased conversion of oxycodone to the more active metabolite oxymorphone is expected in CYP2D6 intermediate metabolizers. However, there is insufficient evidence whether these patients have decreased analgesia when taking oxycodone. Adequate pain relief can be achieved by increasing the dose in response to pain symptoms. Other opioids not metabolized by CYP2D6 may also be considered (i.e., morphine, oxymorphone, buprenorphine, fentanyl, methadone, and hydromorphone).

Pantoprazole
Protonix®

Slightly Decreased to Normal Exposure to Pantoprazole (CYP2C19: Rapid Metabolizer) — ACTIONABLE

The patient's genotype may be associated with a slightly decreased pantoprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing pantoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

Perphenazine
Trilafon®

Possible Sensitivity to Perphenazine (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

Patients with a decreased CYP2D6 function will eliminate perphenazine more slowly, which can result in higher drug concentrations and possibly more adverse events (extrapyramidal symptoms). Consider close monitoring and dose reduction to avoid toxicity.

Phenytoin
Dilantin®

Increased Phenytoin Exposure (CYP2C9: Intermediate Metabolizer) — ACTIONABLE

The genotype results indicate that the patient is a CYP2C9 intermediate metabolizer. Plasma concentrations of phenytoin are likely to increase, resulting in an increased risk of mild to moderate neurological toxicity. Consider a standard loading dose and reduce the maintenance dose by 25%. Be alert to neurological concentration-related adverse events. Adjust subsequent maintenance doses based on therapeutic drug monitoring and response.

Piroxicam
Feldene®

Increased Piroxicam Exposure (CYP2C9: Intermediate Metabolizer) — ACTIONABLE

Rheumatoid Arthritis and Osteoarthritis: This genotype is associated with a pronounced prolongation of piroxicam half -life and increase in plasma concentrations, which may result in higher toxicity especially during long-term therapy. Consider an alternative medication.

Propafenone
Rythmol®

Increased Exposure to Propafenone (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

The patient's genotype may be associated with an increased propafenone exposure following standard dosing. There is insufficient data to allow calculation of dose adjustment. Titrate carefully and adjust the dose in response to plasma concentration and ECG monitoring. An alternative medication such as sotalol, disopyramide, quinidine or amiodarone may also be considered.

Dose adjustments with co-medications: concurrent use of propafenone along with CYP3A4 inhibitors and CYP2D6 inhibitors may significantly increase the plasma concentration of propafenone increasing the risk of proarrhythmia and other adverse events. Therefore, avoid simultaneous use of propafenone with both a CYP2D6 inhibitor and a CYP3A4 inhibitor.

Protriptyline
Vivactil®

Possible Increased Protriptyline Exposure (CYP2D6: Intermediate Metabolizer) — INFORMATIVE

Like other tricyclic and tetracyclic antidepressants, protriptyline is metabolized by CYP2D6. Decreased CYP2D6 activity results in higher protriptyline concentrations potentially leading to higher adverse events. There are no established dosing adjustments for patients with decreased CYP2D6 function. Therefore, therapy must be initiated at a low dosage and gradually adjusted according to the patient's response. The lowest effective dosage should always be considered during maintenance therapy.

Sertraline
Zoloft®

Possible Reduced Response to Sertraline (CYP2C19: Rapid Metabolizer) — INFORMATIVE

Sertraline can be prescribed at standard label-recommended dosage and administration. If patient does not respond to recommended maintenance dosing, consider an alternative medication.

Tetrabenazine
Xenazine®

Normal Sensitivity to Tetrabenazine (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

For treating chorea associated with Huntington's disease: Individualization of dose with careful weekly titration is required. The first week's starting dose is 12.5 mg daily; second week, 25 mg (12.5 mg twice daily); then slowly titrate at weekly intervals by 12.5 mg to a tolerated dose. **The maximum daily dose in CYP2D6 intermediate metabolizers of CYP2D6 is 100 mg with a maximum single dose of 37.5 mg**. If serious adverse events occur, titration should be stopped and the dose of tetrabenazine should be reduced. If the adverse event(s) do not resolve, consider withdrawal of tetrabenazine.

Thioridazine
Mellaril®

Increased Sensitivity to Thioridazine (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

Reduced cytochrome CYP2D6 activity results in elevated plasma levels of thioridazine, would be expected to augment the prolongation of the QTc interval associated with thioridazine, and may increase the risk of serious, potentially fatal, cardiac arrhythmias, such as Torsades de pointes-type arrhythmias. Such an increased risk may result also from the additive effect of coadministering thioridazine with other agents that prolong the QTc interval. Therefore, thioridazine is contraindicated in patients with reduced levels of CYP2D6 activity.

Timolol
Blocadren®

Possible Sensitivity to Timolol (CYP2D6: Intermediate Metabolizer) — INFORMATIVE

Potentiated systemic beta-blockade (e.g., bradycardia) has been reported during timolol treatment by patients with decreased CYP2D6 activity. Monitor patient for treatment-related adverse effects.

PATIENT INFORMATION

NAME: John Doe
ACC #: BS7
DOB: 12/24/1800
SEX: Male

Tramadol
Ultram®

Decreased Exposure to Tramadol (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

The patient's genotype may be associated with a reduced conversion of tramadol to an active metabolite with higher activity. Consider monitoring for reduced effectiveness and titrate the dose if analgesia is not achieved. If titration fails, choose an alternative not as dependent on CYP2D6 metabolism (fentanyl, morphine, hydromorphone, oxymorphone or tapentadol) or try a non-opioid analgesic such as a NSAID or a COX-2 inhibitor.

Trimipramine
Surmontil®

Decreased Trimipramine Exposure (CYP2C19: Rapid Metabolizer) — INFORMATIVE

The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of trimipramine to desmethyl trimipramine and a subsequent decrease in trimipramine exposure leading to therapy failure or increased side effects.

Psychiatric Conditions: Consider an alternative medication. If trimipramine is warranted, consider therapeutic drug monitoring to guide dose adjustments.

Venlafaxine
Effexor®

Increased Exposure to Venlafaxine (CYP2D6: Intermediate Metabolizer) — ACTIONABLE

The patient has a decreased CYP2D6 activity which may result in elevated plasma concentrations of venlafaxine at standard doses. Consider an alternative medication or consider prescribing venlafaxine at a reduced dose and be extra alert for adverse events; adjust the dose based on tolerability and therapeutic monitoring.

If therapeutic drug monitoring is utilized, the sum of venlafaxine and O-desmethylvenlafaxine (an active metabolite) plasma concentrations should be used for efficacy. While the sum of the parent and the active metabolite are informative for efficacy, a higher parent (venlafaxine) concentration may be associated with higher side effects, including QT prolongation.

Voriconazole
Vfend®

Non-Response to Voriconazole (CYP2C19: Rapid Metabolizer) — ACTIONABLE

Voriconazole plasma concentrations are expected to be low if a standard dose is used, increasing the risk of loss of response and effectiveness and subsequent disease progression. Consider an alternative medication that is not dependent on CYP2C19 metabolism, such as isavuconazole, liposomal amphotericin B or posaconazole.

Warfarin
Coumadin®

Dosing Adjustments are Expected (CYP2C9 *1/*3; VKORC1 -1639G>A G/A) — ACTIONABLE

When initiating warfarin treatment for indications with a target INR of 2-3, consider one of the following methods to estimate dosing requirements:

FDA Label: CYP2C9 and VKORC1 genotype results indicate an expected therapeutic dose of 3-4 mg/day.

Pharmacogenomics algorithms/calculators available at www.warfarindosing.org:

Caucasians and Asians: Use the patient's demographics and other clinical factors along with CYP2C9 and VKORC1 genotypes to calculate the expected therapeutic dose.

Africans and African Americans: Use the patient's demographics and other clinical factors along with CYP2C9 and VKORC1 genotypes to calculate the expected therapeutic dose.

The provided recommendations in Africans and African Americans apply only when all the following CYP2C9 alleles are tested: *5, *6, *8, *11.

GENESYS Diagnostics INC.

PATIENT INFORMATION

NAME: **John Doe**
ACC #: BS7
DOB: 12/24/1800
SEX: Male

Test Details

Gene	Genotype	Phenotype	Clinical Consequences
ADRA2A	C-1291G C/G	**Heterozygous for the G Allele**	Carriers of the G allele of ADRA2A C-1291G variant, show greater reduction of inattentive symptoms when administered Methylphenidate or Dexmethylphenidate.
Apolipoprotein E	ε3/ε2	**Altered APOE function**	Not associated with type III hyperlipoproteinemia - No increased risk of cardiovascular disease
COMT	Val158Met A/G	**Intermediate COMT Activity**	Consistent with a reduced catechol O-methyltransferase (COMT) function.
CYP1A2	*1A/*1V	**Normal Metabolizer- Possible Inducibility**	Consistent with a typical CYP1A2 activity in absence of inducing substances. Rapid metabolism may occur in presence of inducers such as barbiturates, cruciferous vegetables, carbamazepine, rifampin and smoking.
CYP2B6	*1/*6	**Intermediate Metabolizer**	Consistent with a moderate deficiency in CYP2B6 activity. Potential risk for side effects or loss of efficacy with drug substrates.
CYP2C19	*1/*17	**Rapid Metabolizer**	Consistent with a moderate increase in CYP2C19 enzyme activity.
CYP2C9	*1/*3	**Intermediate Metabolizer**	Consistent with a moderate deficiency in CYP2C9 enzyme activity.
CYP2D6	*1/*5	**Intermediate Metabolizer**	Consistent with a moderate deficiency in CYP2D6 enzyme activity.
CYP3A4	*1/*1	**Normal Metabolizer**	Consistent with a typical CYP3A4 activity. Caution is advised when prescribing narrow therapeutic index drugs. Alternative drugs or dose adjustment may be required if CYP3A inhibitors or inducers are co-prescribed.
CYP3A5	*3/*3	**Poor Metabolizer**	Consistent with an absence of CYP3A5 enzyme expression (Non-Expresser). This phenotype is the most common in the general population.
F2 **F5**	rs1799963 GG rs6025 CC	**Normal Risk of Thrombosis**	Unless other genetic or circumstantial risk factors are present, the patient is not expected to have an increased risk for thrombosis.
HTR2A	-1438G>A A/A	**Homozygous for the A allele (rs6311)**	The patient carries two copies of the variant allele at rs6311 which may be associated with greater serotonin 2A receptor gene expression.
HTR2A	rs7997012 G/G	**Homozygous for G allele (rs7997012)**	Reduced response to citalopram and escitalopram
MTHFR	c.665C>T CT	**Reduced MTHFR Activity**	The patient carries one copy of the MTHFR c.665C>T variant (heterozygous) and the patient's MTHFR activity is reduced slightly. This is not associated with an increased risk of hyperhomocysteinemia.
MTHFR	c.1286A>C AA c.665C>T CT	**No Increased Risk of Hyperhomocysteinemia**	The patient is heterozygous for the MTHFR c.665C>T variant. The MTHFR function is reduced slightly, but it is not associated with an increased risk for hyperhomocysteinemia.
OPRM1	A118G A/A	**Normal OPRM1 Function**	Consistent with a normal OPRM1 receptor signaling efficiency induced by exogenous opioids. This is associated with a good analgesia following standard opioid doses and a poor response to naltrexone.
SLCO1B1	521T>C T/T	**Normal Function**	Consistent with a typical SLCO1B1 transporter function.
VKORC1	-1639G>A G/A	**Intermediate Warfarin Sensitivity**	Consistent with a moderately decreased VKORC1 expression. Exercise caution with coumarin anticoagulants.

Alleles Tested: **ADRA2A** 5749G>A, C-1291G; **Apolipoprotein E** ε2, ε4, (ε3 is reference); **COMT** Val158Met; **CYP1A2** *1C, *1D, *1E, *1F, *1J, *1K, *1L, *1V, *1W, *3, *5, *6, *7, *8, *11, *15, *16; **CYP2B6** *4, *5, *6, *7, *9, *16, *18, *22; **CYP2C19** *2, *3, *4A, *4B, *5, *6, *7, *8, *9, *10, *13, *17; **CYP2C9** *2, *3, *4, *5, *6, *8, *11; **CYP2D6** *2, *3, *4, *4M, *6, *7, *8, *9, *10, *11, *12, *15, *17, *29, *35, *41, *5 (gene deletion), XN (gene duplication); **CYP3A4** *3, *6, *8, *11, *12, *13, *15, *16A, *16B, *17, *18A, *18B, *22; **CYP3A5** *2, *3, *6, *7, *8, *9; **Factor II** rs1799963, rs1799963; **Factor V Leiden** rs6025, rs6025; **HTR2A** -1438G>A, rs7997012; **MTHFR** c.665C>T, c.1286A>C; **OPRM1** A118G; **SLCO1B1** 521T>C; **VKORC1** -1639G>A

Limitation: This test will not detect all the known alleles that result in altered or inactive tested genes. This test does not account for all individual variations in the individual tested. Absence of a detectable gene mutation does not rule out the possibility that a patient has different phenotypes due to the presence of an undetected polymorphism or due to other factors such as drug-drug interactions, comorbidities and lifestyle habits. Technical limitations include the possibility of laboratory error and inaccuracy of the test due to unknown rare variants.

Methodology: Bead array and e-sensor based assays detect listed alleles and most rare variants with known clinical significance and analytical sensitivity and specificity >99%.

Lab Disclaimer: Genesys Diagnostics Inc. has validated the Genotype Test. The performance characteristics of this test were determined by Genesys Diagnostics Inc. This test is an FDA modified and Lab Developed Test.

Translational Software Disclaimer: The information presented on this report is provided as general educational health information. The content is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Only a physician, pharmacist or other healthcare professional should advise a patient on the use of the medications prescribed.

The pharmacogenetic assay involves use of reporting software and genotype-phenotype associations performed by Translational Software (www.translationalsoftware.com). The software has not been evaluated by the Food and Drug Administration. The software, and the report generated by the software, is not intended to diagnose, treat, cure, or prevent any disease. A qualified designee within the lab uses Translational Software to generate and subsequently review the report. The pharmacogenetic report is one of multiple pieces of information that clinicians should consider in guiding their therapeutic choice for each patient. It remains the responsibility of the health-care provider to determine the best course of treatment for a patient. Adherence to dose guidelines does not necessarily assure a successful medical outcome.

Report was signed out electronically by on //.

PATIENT INFORMATION

NAME: **John Doe**
ACC #: BS7
DOB: 12/24/1800
SEX: Male

Patient Information Card

This is a summary genetic report for your patient to share with other healthcare providers. The card can be cut out along the dashed line and carried with the patient.

REPORT DETAILS

Name: John Doe
DOB: 12/24/1800
ACC #: BS7

Pharmacogenetic Test Summary

ADRA2A	C-1291G C/G	Heterozygous for the G Allele
Apolipoprotein E	ε3/ε2	Altered APOE function
COMT	Val158Met A/G	Intermediate COMT Activity
CYP1A2	*1A/*1V	Normal Metabolizer- Possible Inducibility
CYP2B6	*1/*6	Intermediate Metabolizer
CYP2C19	*1/*17	Rapid Metabolizer
CYP2C9	*1/*3	Intermediate Metabolizer
CYP2D6	*1/*5	Intermediate Metabolizer
CYP3A4	*1/*1	Normal Metabolizer
CYP3A5	*3/*3	Poor Metabolizer
Factor II	rs1799963 GG	Normal Thrombosis Risk
Factor V Leiden	rs6025 CC	Normal Thrombosis Risk
HTR2A	-1438G>A A/A	Homozygous for the A allele (rs6311)
HTR2A	rs7997012 G/G	Homozygous for G allele (rs7997012)
MTHFR	c.1286A>C AA	Normal MTHFR Activity
MTHFR	c.665C>T CT	Reduced MTHFR Activity
OPRM1	A118G A/A	Normal OPRM1 Function
SLCO1B1	521T>C T/T	Normal Function
VKORC1	-1639G>A G/A	Intermediate Warfarin Sensitivity

For a complete report contact Genesys Diagnostics
www.gdilabs.com

GENESYS Diagnostics INC.

PATIENT INFORMATION		SPECIMEN DETAILS		ORDERED BY
NAME:	John Doe	**SPECIMEN TYPE:**	Buccal Swab	Dr. Bauer
ACC #:	BS7	**COLLECTION DATE:**	1/1/1900	
DOB:	12/24/1800	**RECEIVED DATE:**	1/1/1900	
SEX:	Male	**REPORT DATE:**	10/12/2021	

Comprehensive Pharmacogenetic Report with DDI

Current Patient Medications

Zofran, Prevacid, Lexapro, Citalopram, Xanax

Citalopram
Celexa®

Insufficient Response to Citalopram (CYP2C19: Rapid Metabolizer) — ACTIONABLE

At standard label-recommended dosage, citalopram plasma concentrations levels are expected to be low which may result in a loss of efficacy. Consider an alternative medication. If citalopram is warranted, consider increasing the dose to a maximum of 150% and titrate based on the clinical response and tolerability.

Lexapro
Escitalopram

Insufficient Response to Escitalopram (CYP2C19: Rapid Metabolizer) — ACTIONABLE

At standard label-recommended dosage, escitalopram plasma concentrations levels are expected to be low which may result in a loss of efficacy. Consider an alternative medication. If escitalopram is warranted, consider increasing the dose to a maximum of 150% and titrate based on the clinical response and tolerability.

Prevacid
Lansoprazole

Slightly Decreased to Normal Exposure to Lansoprazole (CYP2C19: Rapid Metabolizer) — ACTIONABLE

The patient's genotype may be associated with a slightly decreased lansoprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing lansoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.

Xanax
Alprazolam

Normal Response to Alprazolam — INFORMATIVE

Pharmacogenetic guidance: Alprazolam is primarily eliminated by metabolism via CYP3A4 and CYP3A5. Genetic polymorphisms of these genes are not expected to affect the efficacy or safety profiles of this drug. **Polypharmacy guidance:** The concomitant use of alprazolam with CYP3A4 inhibitors may result in increased alprazolam levels and prolonged sedation. Impairment of motor skills are also observed with some combinations. Monitor patients for exaggerated sedative effects. If possible, alprazolam should be avoided in patients receiving strong inhibitors of CYP3A4 such as ketoconazole, itraconazole and ritonavir. Drugs that induce CYP3A enzymes may decrease alprazolam levels, which results in a loss of efficacy.

Zofran
Ondansetron

Normal Response to Ondansetron (CYP2D6: Intermediate Metabolizer) — INFORMATIVE

Ondansetron can be prescribed at standard label-recommended dosage and administration.

Zofran
Ondansetron

Favorable Response to Standard Ondansetron Dosing (ABCB1: Homozygous Mutant - Variant Allele Present) — INFORMATIVE

The genotype result predicts that the patient has markedly decreased ABCB1 transporter expression. A high response rate in controlling nausea and vomiting has been reported when patients with this genotype are treated with ondansetron. Ondansetron can be prescribed at standard label-recommended dosage and administration.

Citalopram & Lexapro

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Citalopram

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Lexapro

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

SERIOUS

Unrecognized Medications: *None*

Highly elevated risk for indicated condition or adverse drug reaction. Medication can be prescribed with monitoring; alternative therapy may be needed.

Moderately elevated risk for indicated condition or adverse drug reaction. Medication can be prescribed with monitoring; therapy adjustment may be needed.

Typical risk for indicated condition or adverse drug reaction. Medication can be prescribed according to standard dosing guidelines.

PHARMACOGENETIC RESULTS

DRUG-DRUG INTERACTIONS

ACTIONABLE	Recommendations are suitable for implementation in a clinical setting. Recommendations extracted from evidence based guidelines issued by international pharmacogenetic consortia, professional societies or regulatory bodies (CPIC, DPWG, FDA, EMA, CPNDA, ACMG).
INFORMATIVE	Recommendations are informative and implementation in a clinical setting is optional. The evidence documenting these drug-gene associations may be limited or insufficient and may require further investigation. There are no established evidence based guidelines issued by international pharmacogenetic consortia, professional societies or regulatory bodies.
MODERATE	Drug interactions of moderate severity. The clinician should assess the patient's characteristics and take action as needed.
SERIOUS	Severe drug interaction or contraindicated drug combination which may produces serious consequences in most patients. This drug combination generally should not be dispensed or administered to the same patient. Action is required to reduce risk of severe adverse interaction.

Risk Management

Type III Hyperlipoproteinemia

Not Associated with Type III Hyperlipoproteinemia

The patient is negative for the APOE c.388 T>C (Cys130Arg) mutation and positive for the APOE c.526 C>T (Arg176Cys) mutation. The patient's genotype is ε3/ε2 (frequency: 6.7-18%).

The APOE E2 form is associated with a slower conversion of IDL to LDL, lower cholesterol, and higher triglycerides, compared to the normal APOE E3 form. The APOE ε3/ε2 genotype is not associated with increased risk of cardiovascular disease.

Consider dietary adjustments based on lipid profiles. No action is needed when a patient is normolipidemic.

Hyperhomocysteinemia - Depression

No Increased Risk of Hyperhomocysteinemia

The patient carries one copy of the MTHFR c.665C>T variant (heterozygous). MTHFR enzyme activity is reduced (60% of normal activity).

Patients diagnosed with depression often have low folate levels and homocysteine is a highly sensitive marker of folate status. Functional folate deficiency is indicated by elevated homocysteine. The patient's small reduction in MTHFR activity is not a risk factor for hyperhomocysteinemia.

Patients diagnosed with depression: as lower folate levels are associated with poorer antidepressant response, and baseline levels of folate within the normal range predict antidepressant response, testing for homocysteine levels and serum folate levels may be informative for this patient before prescribing methylfolate as an antidepressant-augmenting agent.

Thrombophilia

Normal Risk of Thrombosis

The patient does not carry the F5 c.1601G>A variant (also known as Factor V Leiden) or the F2 c.*97G>A variant (also known as Factor II 20210G>A).

The patient's risk of thrombosis is not increased (average risk of clotting is about 1 in 1000 for anyone in a year). However, because this test cannot find all of the inherited reasons for abnormal clotting, other factors may affect this risk assessment.

Assess thrombotic risk based on other genetic and/or circumstantial risk factors such as smoking, obesity, malignancy, prolonged immobilization or surgery.

Estrogen-containing contraceptive and hormone replacement therapy: unless other genetic and/or circumstantial risk factors are present, consider standard prescribing and monitoring practices.

Hyperhomocysteinemia - Thrombosis

No Increased Risk of Hyperhomocysteinemia

The patient carries one copy of the MTHFR c.665C>T variant (heterozygous). MTHFR enzyme activity is reduced (60% of normal activity).

Based on results for the MTHFR c.665C>T variant, the patient has a small reduction in MTHFR activity, which is not a risk factor for hyperhomocysteinemia. Hyperhomocysteinemia is associated with a risk for venous thromboembolism (VTE). Unless other risk factors are present, the patient is not expected to have an increased risk for VTE.

The patient's MTHFR activity is slightly reduced.

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Potentially Impacted Medications

CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
5-Alpha Reductase Inhibitors for Benign Prostatic Hyperplasia	*Dutasteride (Avodart®)*	●			
	Finasteride (Proscar®)	●			
Alpha-Blockers for Benign Prostatic Hyperplasia	*Alfuzosin (UroXatral®)*	●			⚠ Citalopram ⚠ Lexapro ⚠ Zofran
	Doxazosin (Cardura®)	●			
	Silodosin (Rapaflo®)	●			
	Tamsulosin (Flomax®)	●			
	Terazosin (Hytrin®)	●			
Angiotensin II Receptor Antagonists	Azilsartan (Edarbi®, Edarbyclor®)	●			
	Candesartan (Atacand®)	●			
	Eprosartan (Teveten®)	●			
	Irbesartan (Avapro®)	●			
	Losartan (Cozaar®, Hyzaar®)		●		
	Olmesartan (Benicar®)	●			
	Telmisartan (Micardis®)	●			
	Valsartan (Diovan®, Entresto®)	●			
Antiaddictives	Bupropion (Wellbutrin®, Zyban®, Aplenzin®, Contrave®)		●		⚠ Citalopram ⚠ Lexapro
	Lofexidine (Lucemyra®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Zofran
	Naltrexone (Vivitrol®, Contrave®)		●		

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Anti-ADHD Agents	Amphetamine (Adderall®, Evekeo®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Prevacid ⚠ Xanax
	Atomoxetine (Strattera®)		●		⚠ Citalopram ⚠ Lexapro ⚠ Zofran
	Clonidine (Kapvay®)	●			
	Dexmethylphenidate (Focalin®)		●		⚠ Xanax
	Dextroamphetamine (Dexedrine®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Prevacid ⚠ Xanax
	Guanfacine (Intuniv®)	●			
	Lisdexamfetamine (Vyvanse®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Xanax
	Methylphenidate (Ritalin®, Aptensio XR®, Concerta®, Metadate ER®, Quillivant ER®)		●		⚠ Xanax
Antianginal Agents	Ranolazine (Ranexa®)	●			⊗ Citalopram ⚠ Lexapro ⚠ Zofran

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Antiarrhythmics	*Amiodarone (Nexterone®, Pacerone®)*	●			⊗ Citalopram ⊗ Lexapro ⚠ Zofran
	Disopyramide (Norpace®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Zofran
	Flecainide (Tambocor®)		●		⊗ Citalopram ⊗ Lexapro ⊗ Zofran
	Mexiletine (Mexitil®)		●		
	Propafenone (Rythmol®)		●		⊗ Citalopram ⚠ Lexapro ⚠ Zofran
	Quinidine (Quinidine®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Zofran
	Sotalol (Betapace®, Sorine®, Sotylize®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Zofran

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Anticoagulants	*Apixaban (Eliquis®)*	●			⚠ Citalopram ⚠ Lexapro
	Betrixaban (Bevyxxa®)	●			⚠ Citalopram ⚠ Lexapro
	Dabigatran Etexilate (Pradaxa®)	●			⚠ Citalopram ⚠ Lexapro
	Edoxaban (Savaysa®)	●			⚠ Citalopram ⚠ Lexapro
	Fondaparinux (Arixtra®)	●			⚠ Citalopram ⚠ Lexapro
	Rivaroxaban (Xarelto®)	●			⚠ Citalopram ⚠ Lexapro
	Warfarin (Coumadin®)		●		⊗ Citalopram ⊗ Lexapro
Anticonvulsants	Brivaracetam (Briviact®)	●			
	Cannabidiol (Epidiolex®)	●			
	Carbamazepine (Tegretol®, Carbatrol®, Epitol®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Xanax
	Eslicarbazepine (Aptiom®)	●			
	Ethosuximide (Zarontin®)	●			
	Ezogabine (Potiga®)	●			⊗ Citalopram ⊗ Lexapro ⚠ Zofran
	Felbamate (Felbatol®)	●			⊗ Citalopram ⚠ Lexapro ⚠ Zofran
	Fosphenytoin (Cerebyx®)		●		⚠ Citalopram ⚠ Lexapro ⚠ Prevacid ⚠ Xanax
	Gabapentin (Neurontin®)	●			⚠ Xanax

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
	Lacosamide (Vimpat®)	●			
	Lamotrigine (Lamictal®)	●			
	Levetiracetam (Keppra®)	●			
	Oxcarbazepine (Trileptal®, Oxtellar XR®)	●			
	Perampanel (Fycompa®)	●			
	Phenobarbital (Luminal®)	●			⚠ Xanax
	Phenytoin (Dilantin®)		●		⚠ Citalopram ⚠ Lexapro ⚠ Prevacid ⚠ Xanax
	Pregabalin (Lyrica®)	●			⚠ Xanax
	Primidone (Mysoline®)	●			⚠ Xanax
	Rufinamide (Banzel®)	●			
	Tiagabine (Gabitril®)	●			
	Topiramate (Topamax®)	●			
	Valproic Acid (Depakene®)	●			
	Vigabatrin (Sabril®)	●			
	Zonisamide (Zonegran®)	●			
Antidementia Agents	Donepezil (Aricept®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Zofran
	Galantamine (Razadyne®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Zofran
	Memantine (Namenda®)	●			

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Antidepressants	Amitriptyline (Elavil®)			●	
	Amoxapine (Amoxapine®)		●		
	Citalopram (Celexa®)			●	⊗ Lexapro ⊗ Zofran
	Clomipramine (Anafranil®)			●	⚠ Citalopram ⚠ Lexapro
	Desipramine (Norpramin®)		●		
	Desvenlafaxine (Pristiq®)	●			
	Doxepin (Silenor®)			●	
	Duloxetine (Cymbalta®)	●			
	Escitalopram (Lexapro®)			●	⊗ Citalopram ⊗ Zofran
	Fluoxetine (Prozac®, Sarafem®)	●			⊗ Citalopram ⚠ Lexapro ⚠ Xanax
	Fluvoxamine (Luvox®)	●			⊗ Citalopram ⚠ Lexapro ⊗ Xanax
	Imipramine (Tofranil®)			●	⚠ Citalopram ⚠ Lexapro
	Levomilnacipran (Fetzima®)	●			
	Maprotiline (Ludiomil®)		●		⚠ Citalopram ⚠ Lexapro ⚠ Zofran
	Mirtazapine (Remeron®)	●			
	Nefazodone (Serzone®)	●			⊗ Xanax
	Nortriptyline (Pamelor®)		●		
	Paroxetine (Paxil®, Brisdelle®)	●			
	Protriptyline (Vivactil®)		●		
	Sertraline (Zoloft®)		●		

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	Trazodone (Oleptro®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Zofran
	Trimipramine (Surmontil®)			●	
	Venlafaxine (Effexor®)			●	⚠ Citalopram ⚠ Lexapro ⚠ Zofran
	Vilazodone (Viibryd®)	●			
	Vortioxetine (Trintellix®)	●			
Antiemetics	*Aprepitant (Emend-oral®)*	●			⚠ Xanax
	Dolasetron (Anzemet®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Zofran
	Dronabinol (Marinol®)		●		
	Fosaprepitant (Emend-IV®)	●			
	Fosnetupitant / Palonosetron (Akynzeo-IV®)	●			⊗ Xanax
	Metoclopramide (Reglan®)		●		⊗ Citalopram ⊗ Lexapro
	Netupitant / Palonosetron (Akynzeo-oral®)	●			⊗ Xanax
	Ondansetron (Zofran®, Zuplenz®)	●			⊗ Citalopram ⊗ Lexapro
	Palonosetron (Aloxi®)	●			
	Rolapitant (Varubi®)	●			
Antifolates	Methotrexate (Trexall®)		●		⚠ Prevacid

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Antifungals	*Amphotericin B (AmBisome®, Abelcet®)*	●			
	Anidulafungin (Eraxis®)	●			
	Caspofungin (Cancidas®)	●			
	Fluconazole (Diflucan®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Xanax ⊗ Zofran
	Isavuconazonium (Cresemba®)	●			
	Itraconazole (Sporanox®)	●			⚠ Prevacid ⊗ Xanax
	Micafungin (Mycamine®)	●			
	Posaconazole (Noxafil®)	●			⚠ Citalopram ⚠ Lexapro ⊗ Prevacid ⊗ Xanax ⚠ Zofran
	Voriconazole (Vfend®)			●	⊗ Citalopram ⚠ Lexapro ⊗ Xanax ⚠ Zofran
Anti-HIV Agents	*Dolutegravir (Tivicay®, Triumeq®)*	●			
	Doravirine (Pifeltro®)	●			
	Efavirenz (Sustiva®)		●		⚠ Citalopram ⚠ Lexapro ⚠ Prevacid ⚠ Zofran
	Etravirine (Edurant®)	●			⊗ Citalopram
	Raltegravir (Isentress®, Dutrebis®)	●			
	Rilpivirine (Intelence®)	●			⊗ Prevacid
Anti-Hyperuricemics and Anti-Gout Agents	*Colchicine (Mitigare®)*	●			
	Febuxostat (Uloric®)	●			
Antimalarials	*Proguanil (Malarone®)*	●			

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Antiplatelets	Clopidogrel (Plavix®)		●		⚠ Citalopram ⚠ Lexapro
	Prasugrel (Effient®)	●			⚠ Citalopram ⚠ Lexapro
	Ticagrelor (Brilinta®)	●			⚠ Citalopram ⚠ Lexapro
	Vorapaxar (Zontivity®)	●			⚠ Citalopram ⚠ Lexapro
Antipsychotics	Aripiprazole (Abilify®, Aristada®)	●			
	Asenapine (Saphris®)	●			
	Brexpiprazole (Rexulti®)	●			⚠ Lexapro
	Cariprazine (Vraylar®)	●			
	Chlorpromazine (Thorazine®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Zofran
	Clozapine (Clozaril®)	●			⚠ Citalopram ⚠ Lexapro ⊗ Xanax ⚠ Zofran
	Fluphenazine (Prolixin®)	●			
	Haloperidol (Haldol®)	●			⊗ Citalopram ⚠ Lexapro ⊗ Zofran
	Iloperidone (Fanapt®)		●		⊗ Citalopram ⊗ Lexapro ⚠ Zofran
	Loxapine (Loxitane®, Adasuve®)	●			
	Lurasidone (Latuda®)	●			
	Olanzapine (Zyprexa®)	●			
	Paliperidone (Invega®)	●			⊗ Citalopram ⊗ Lexapro ⚠ Zofran

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	Perphenazine (Trilafon®)		●		
	Pimavanserin (Nuplazid®)	●			
	Pimozide (Orap®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Zofran
	Quetiapine (Seroquel®)	●			⊗ Citalopram ⊗ Lexapro ⚠ Zofran
	Risperidone (Risperdal®)	●			
	Thioridazine (Mellaril®)			●	⊗ Citalopram ⊗ Lexapro ⊗ Zofran
	Thiothixene (Navane®)	●			
	Trifluoperazine (Stelazine®)	●			
	Ziprasidone (Geodon®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Zofran
Antispasmodics for Overactive Bladder	Darifenacin (Enablex®)	●			
	Fesoterodine (Toviaz®)	●			
	Mirabegron (Myrbetriq®)	●			
	Oxybutynin (Ditropan®)	●			
	Solifenacin (Vesicare®)	●			
	Tolterodine (Detrol®)	●			
	Trospium (Sanctura®)	●			
Benzodiazepines	***Alprazolam (Xanax®)***	●			
	Clobazam (Onfi®)	●			
	Clonazepam (Klonopin®)	●			
	Diazepam (Valium®)		●		

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Beta Blockers	*Atenolol (Tenormin®)*	●			
	Bisoprolol (Zebeta®)	●			
	Carvedilol (Coreg®)	●			
	Labetalol (Normodyne®, Trandate®)	●			
	Metoprolol (Lopressor®)		●		⚠ Citalopram ⚠ Lexapro
	Nebivolol (Bystolic®)	●			
	Propranolol (Inderal®)	●			
	Timolol (Blocadren®)		●		
Diuretics	Torsemide (Demadex®)	●			
Fibromyalgia Agents	*Milnacipran (Savella®)*	●			
Immunomodulators	*Apremilast (Otezla®)*	●			
	Leflunomide (Arava®)	●			
	Tofacitinib (Xeljanz®)	●			
Immunosuppressants	Tacrolimus (Prograf®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Prevacid ⚠ Xanax ⚠ Zofran
Meglitinides	Nateglinide (Starlix®)	●			
	Repaglinide (Prandin®, Prandimet®)	●			
Muscle Relaxants	Carisoprodol (Soma®)		●		
	Cyclobenzaprine (Flexeril®, Amrix®)	●			⚠ Citalopram ⚠ Lexapro
	Metaxalone (Skelaxin®)	●			⊗ Citalopram ⊗ Lexapro
	Methocarbamol (Robaxin®)	●			
	Tizanidine (Zanaflex®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Zofran

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
NSAIDs	Celecoxib (Celebrex®)		🟡		⚠ Citalopram ⚠ Lexapro
	Diclofenac (Voltaren®)	🟢			⚠ Citalopram ⚠ Lexapro
	Flurbiprofen (Ansaid®)		🟡		⚠ Citalopram ⚠ Lexapro
	Ibuprofen (Advil®, Motrin®)		🟡		⚠ Citalopram ⚠ Lexapro
	Indomethacin (Indocin®)	🟢			⚠ Citalopram ⚠ Lexapro
	Ketoprofen (Orudis®)	🟢			⚠ Citalopram ⚠ Lexapro
	Ketorolac (Toradol®)	🟢			⚠ Citalopram ⚠ Lexapro
	Meloxicam (Mobic®)			🔴	⚠ Citalopram ⚠ Lexapro
	Nabumetone (Relafen®)	🟢			⚠ Citalopram ⚠ Lexapro
	Naproxen (Aleve®)	🟢			⚠ Citalopram ⚠ Lexapro
	Piroxicam (Feldene®)			🔴	⚠ Citalopram ⚠ Lexapro
	Sulindac (Clinoril®)	🟢			⚠ Citalopram ⚠ Lexapro

GENESYS Diagnostics INC.

PATIENT INFORMATION		SPECIMEN DETAILS		ORDERED BY
NAME:	John Doe	**SPECIMEN TYPE:**	Buccal Swab	Dr. Bauer
ACC #:	BS7	**COLLECTION DATE:**	1/1/1900	
DOB:	12/24/1800	**RECEIVED DATE:**	1/1/1900	
SEX:	Male	**REPORT DATE:**	10/12/2021	

CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Opioids	*Alfentanil (Alfenta®)*	●			⚠ Xanax
	Benzhydrocodone (Apadaz®)		●		
	Buprenorphine (Butrans®, Buprenex®)	●			⚠ Xanax
	Codeine (Codeine; Fioricet® with Codeine)		●		⚠ Xanax
	Dihydrocodeine (Synalgos-DC®)	●			⚠ Xanax
	Fentanyl (Actiq®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Xanax
	Hydrocodone (Vicodin®)		●		⚠ Xanax
	Hydromorphone (Dilaudid®, Exalgo®)	●			⚠ Xanax
	Levorphanol (Levo Dromoran®)	●			⚠ Xanax
	Meperidine (Demerol®)	●			⊗ Citalopram ⊗ Lexapro ⚠ Xanax
	Methadone (Dolophine®)		●		⊗ Citalopram ⊗ Lexapro ⚠ Xanax ⊗ Zofran
	Morphine (MS Contin®)	●			⚠ Xanax
	Oxycodone (Percocet®, Oxycontin®)		●		⚠ Xanax
	Oxymorphone (Opana®, Numorphan®)	●			⚠ Xanax
	Sufentanil (Sufenta®)	●			⚠ Xanax
	Tapentadol (Nucynta®)	●			⚠ Citalopram ⚠ Lexapro ⚠ Xanax
	Tramadol (Ultram®)		●		⚠ Citalopram ⚠ Lexapro ⚠ Xanax ⚠ Zofran

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CLASS	DRUG*	PHARMACOGENETIC RESULTS ✓	⚠	⊗	INTERACTING DRUGS
Other Neurological Agents	Deutetrabenazine (Austedo®)	●			
	Dextromethorphan / Quinidine (Nuedexta®)	●			⊗ Citalopram ⊗ Lexapro ⊗ Zofran
	Flibanserin (Addyi®)	●			
	Tetrabenazine (Xenazine®)		●		
	Valbenazine (Ingrezza®)	●			
Phosphodiesterase Inhibitors for Erectile Dysfunction	*Avanafil (Stendra®)*	●			
	Sildenafil (Viagra®)	●			
	Tadalafil (Cialis®)	●			
	Vardenafil (Levitra®)	●			
Proton Pump Inhibitors	Dexlansoprazole (Dexilant®, Kapidex®)		●		
	Esomeprazole (Nexium®)	●			⊗ Citalopram ⚠ Lexapro
	Lansoprazole (Prevacid®)		●		
	Omeprazole (Prilosec®)		●		⊗ Citalopram ⚠ Lexapro
	Pantoprazole (Protonix®)		●		
	Rabeprazole (Aciphex®)	●			
Statins	Atorvastatin (Lipitor®)	●			
	Fluvastatin (Lescol®)		●		
	Lovastatin (Mevacor®, Altoprev®, Advicor®)	●			
	Pitavastatin (Livalo®)	●			
	Pravastatin (Pravachol®)	●			
	Rosuvastatin (Crestor®)	●			
	Simvastatin (Zocor®)	●			
Sulfonylureas	*Chlorpropamide (Diabinese®)*	●			
	Glimepiride (Amaryl®)	●			
	Glipizide (Glucotrol®)	●			
	Glyburide (Micronase®)	●			
	Tolbutamide (Orinase®)	●			

*Current patient medications are listed in bold whereas italicized drug names indicate drugs with no pharmacogenetic guidance

Dosing Guidance

Amitriptyline (Elavil®)

Decreased Amitriptyline Exposure (CYP2C19: Rapid Metabolizer)

INFORMATIVE

less than p>The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of amitriptyline to nortriptyline and a subsequent decrease in amitriptyline exposure leading to therapy failure or increased side effects.less than /p> less than p>less than strong>Psychiatric Conditions:less than /strong> Consider an alternative medication. If amitriptyline is warranted, consider therapeutic drug monitoring to guide dose adjustments.less than /p> less than p>less than strong>Neuropathic Pain:less than /strong> Consider an alternative medication. If amitriptyline is warranted titrate dose according to the patient's clinical response and tolerability.less than /p>

Amoxapine (Amoxapine®)

Possible Increased Amoxapine Exposure (CYP2D6: Intermediate Metabolizer)

INFORMATIVE

less than p>Like other tricyclic and tetracyclic antidepressants, amoxapine is metabolized by CYP2D6. However, the overall contribution of this enzyme in the metabolism of this drug is not well documented. Decreased CYP2D6 activity may result in higher amoxapine concentrations potentially leading to higher adverse events. There are no established dosing adjustments for patients with decreased CYP2D6 function; therapy must be initiated cautiously and adjusted according to the patient's response.less than /p>

Atomoxetine (Strattera®)

Possible Atomoxetine Underexposure Leading to Decreased Response (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>The genotype result indicates that the patient is likely to have an insufficient response due to inadequate drug exposure following standard dosing. Consider the following dosing strategy:less than /p>less than ul>less than li>Initiate treatment at 40 mg/day, increase to 80 mg/day after 3 days and maintain dose.less than /li>less than li>If after 2 weeks, optimal clinical response is not observed and adverse events are not present, consider a dose increase to 100 mg/day.less than /li>less than li>If after 2 weeks, optimal clinical response is not observed and adverse events are not present, consider therapeutic drug monitoring 1-2 hours post dose. If the plasma concentration is less than 200 ng/ml consider a dose increase to a target of 400 ng/ml. Doses greater than 100 mg/day may be needed to achieve a targeted therapeutic concentration. (Therapeutic range: 200-1000 ng/ml).less than /li>less than /ul>

Benzhydrocodone (Apadaz®)

Possible Altered Response to Benzhydrocodone (CYP2D6: Intermediate Metabolizer)

INFORMATIVE

less than p>Benzhydrocodone is a prodrug of hydrocodone and is converted to active hydrocodone by intestinal enzymes. Decreased conversion of hydrocodone to the more active metabolite hydromorphone is expected in CYP2D6 intermediate metabolizers. However, there is insufficient evidence whether these patients have decreased analgesia when taking benzhydrocodone. Adequate pain relief can be achieved by increasing the dose in response to pain symptoms. Other opioids not metabolized by CYP2D6 may also be considered (i.e., morphine, oxymorphone, buprenorphine, fentanyl, methadone, and hydromorphone).less than /p>

Bupropion (Wellbutrin®, Zyban®, Aplenzin®, Contrave®)

Altered Bupropion Exposure (CYP2B6: Intermediate Metabolizer)

INFORMATIVE

less than p>The genotype result indicates that the patient is likely to have increased bupropion exposure, but decreased exposure to the active metabolite (hydroxybupropion). This metabolite contributes to the therapeutic effects of bupropion when used as a smoking cessation agent or as an antidepressant. This decrease in exposure of hydroxybupropion may result in decreased therapeutic efficacy.less than /p>less than p>less than strong>Smoking Cessationless than /strong>: There is insufficient data to allow calculation of dose adjustment. Consider standard prescribing and closer monitoring.less than /p>less than p>less than strong>Major Depressive Disorder and Prevention of Seasonal Affective Disorderless than /strong>: There is insufficient data to allow calculation of dose adjustment. Therapeutic monitoring of bupropion-hydroxybupropion levels may be considered to guide dosing adjustments.less than /p>

Carisoprodol (Soma®)

Altered Sensitivity to Carisoprodol (CYP2C19: Rapid Metabolizer)

INFORMATIVE

less than p>There is insufficient data to allow calculation of dose adjustment. If carisoprodol is prescribed, it is recommended to use a lower dose, and to carefully monitor the patient for side effects.less than /p>

Celecoxib (Celebrex®)

Increased Celecoxib Exposure (CYP2C9: Intermediate Metabolizer)

ACTIONABLE

less than p>This genotype is associated with a prolongation of celecoxib half-life and increase in plasma concentrations, which may result in higher toxicity especially during long-term therapy. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age.less than /p>less than p>less than strong>Osteoarthritis, Rheumatoid Arthritis, Ankylosing Spondylitis, Acute Pain, Primary Dysmenorrhealess than /strong>: Consider initiating celecoxib therapy with the lowest recommended dose. Exercise caution during up-titration until a favorable clinical effect is obtained or the maximum recommended dose is reached. Consider using the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when celecoxib is administered with CYP2C9 inhibitors or inducers.less than /p>less than p>less than strong>Acute Migraineless than /strong>: Consider using for the fewest number of days per month, as needed. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when celecoxib is administered with CYP2C9 inhibitors or inducers.less than /p>less than p>less than strong>Osteoarthritis and Hypertension (co-formulation with amlodipine)less than /strong>: Consider using the lowest effective dosage for the shortest duration consistent with the patient treatment goals. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when celecoxib is administered with CYP2C9 inhibitors or inducers.less than /p>

Citalopram (Celexa®)

Citalopram & Alfuzosin

MODERATE

Concurrent use with agents known to prolong the QT interval is not recommended. The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Amiodarone

SERIOUS

The US manufacturer of amiodarone states that the concurrent use of QT prolonging agents should be avoided and that the need to co-administer amiodarone with any other drug known to prolong the QTc interval must be based on a careful assessment of the potential risks and benefits of doing so for each patient.The Australian and UK manufacturers of amiodarone states that concurrent use of agents known to cause torsades de pointes is contraindicated.

Citalopram & Amphetamine

MODERATE

The concurrent use of amphetamines with SSRIs or SNRIs should be approached with appropriate monitoring.Instruct patients receiving concurrent therapy to report any signs or symptoms of serotonin syndrome immediately.Monitor blood pressure during concurrent therapy and adjust dosage or change medication for persistent increases in blood pressure.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Apixaban

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Atomoxetine

MODERATE

Concurrent use with agents known to prolong the QT interval is not recommended. The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Betrixaban

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Bupropion

MODERATE

The concurrent use of bupropion and SSRIs or SNRIs should be undertaken only with extreme caution and with low initial bupropion dosing and small gradual dosage increases. Single doses should not exceed 150 mg. The maximum daily dose of bupropion should not exceed 300 mg for smoking cessation or 450 mg for depression.

Citalopram & Carbamazepine

MODERATE

When used concomitantly with dual CYP2C19 and CYP3A4 inducers, monitoring of concentrations or dosage adjustment of citalopram and escitalopram may be necessary.

Citalopram & Celecoxib

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Chlorpromazine

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Clomipramine

MODERATE

Patients receiving concurrent therapy should be observed for signs of increased serotonergic side effects.Counsel patients to report new or worsening muscle twitching, tremors, shivering or stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, decreased coordination, or severe diarrhea.

Citalopram & Clopidogrel

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue antiplatelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Clozapine

MODERATE

Clozapine levels should be monitored in patients receiving concurrent therapy with clozapine and either citalopram or escitalopram and patients should be monitored for signs of clozapine toxicity. The dosage of either clozapine or citalopram or escitalopram may need to be adjusted or one or both agents may need to be discontinued. Clozapine levels should also be monitored following the discontinuation of citalopram or escitalopram from concurrent therapy.If concurrent therapy is warranted in patients receiving clozapine and either citalopram or escitalopram, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Cyclobenzaprine

MODERATE

The US manufacturer of cyclobenzaprine recommends limiting use to short term duration, no more than two to three weeks. Use alternative therapy whenever possible, particularly in patients with hepatic impairment.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome, and seizure activity. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Dabigatran Etexilate

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Dextroamphetamine

MODERATE

The concurrent use of amphetamines with SSRIs or SNRIs should be approached with appropriate monitoring.Instruct patients receiving concurrent therapy to report any signs or symptoms of serotonin syndrome immediately.Monitor blood pressure during concurrent therapy and adjust dosage or change medication for persistent increases in blood pressure.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Dextromethorphan / Quinidine

SERIOUS

If possible, avoid the use of hydroquinidine or quinidine with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Diclofenac

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Disopyramide

SEVERE

The Australian manufacturer of disopyramide states that concurrent use with agents liable to produce torsades de pointes, including tricyclic or tetracyclic antidepressants, erythromycin, vincamine, and sultopride, is contraindicated.If alternatives are not available and concurrent therapy is deemed medically necessary, obtain serum calcium, magnesium, and potassium levels and monitor ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Dolasetron

MODERATE

Concurrent use with agents known to prolong the QT interval is not recommended. The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Donepezil

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Edoxaban

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Efavirenz

MODERATE

When used concomitantly with CYP2C19 and CYP3A4 inducers, monitoring of concentrations or dosage adjustment of citalopram may be necessary.Concurrent use of citalopram with agents known to prolong the QT interval is not recommended. The manufacturer recommends EKG monitoring in patients who are at risk for developing a prolonged QTc interval, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Escitalopram

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Esomeprazole

MODERATE

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, hypocalcemia, hypomagnesemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Esomeprazole

SERIOUS

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Etravirine

MODERATE

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, hypocalcemia, hypomagnesemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Etravirine

SERIOUS

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Ezogabine

SERIOUS

The concurrent use of ezogabine with agents known to prolong the QT interval should be approached with caution. Patients receiving concurrent therapy with other QT prolongers, an electrocardiogram (ECG) should be performed prior to ezogabine initiation. In those patients with a corrected QT interval greater than 440 msec at baseline, a repeat ECG should be performed after reaching the maintenance dose of ezogabine.Consider obtaining serum calcium, magnesium, and potassium levels at baseline and regular intervals. Correct any electrolyte abnormalities.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Felbamate

MODERATE

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, hypocalcemia, hypomagnesemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Felbamate

SERIOUS

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Fentanyl

MODERATE

Most patients tolerate the combination of fentanyl with serotonin-increasing agents. Serotonin syndrome constitutes a range of toxicities from mild to life threatening. Monitor patients on multiple serotonergic agents for symptoms of serotonin toxicity.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.Patients in whom serotonin syndrome is suspected should receive immediate medical attention.

Citalopram & Flecainide

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Fluconazole

MODERATE

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, hypocalcemia, hypomagnesemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Fluconazole

SERIOUS

If possible, avoid the use of fluconazole with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Fluconazole

SERIOUS

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Fluoxetine

MODERATE

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, hypocalcemia, hypomagnesemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Fluoxetine

SERIOUS

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Flurbiprofen

MODERATE

Selective serotonin reuptake inhibitors or vilazodone and flurbiprofen should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Fluvoxamine

MODERATE

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, hypocalcemia, hypomagnesemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Fluvoxamine

SERIOUS

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Fondaparinux

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Fosphenytoin

MODERATE

When used concomitantly with dual CYP2C19 and CYP3A4 inducers, monitoring of concentrations or dosage adjustment of citalopram and escitalopram may be necessary.

Citalopram & Galantamine

MODERATE

The UK manufacturer of galantamine states that it should be used with caution in patients treated with drugs that affect the QTc interval.If concurrent therapy is warranted, monitor ECG more frequently and consider obtaining serum calcium, magnesium, and potassium levels at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Haloperidol

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Ibuprofen

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Iloperidone

SERIOUS

The US manufacturer of iloperidone states that the concurrent administration of other drugs that are known to prolong the QTc interval should be avoided. Disopyramide and procainamide should not be used to treat iloperidone-overdose-induced arrhythmias.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Imipramine

MODERATE

Patients receiving concurrent therapy should be observed for signs of increased serotonergic side effects.Counsel patients to report new or worsening muscle twitching, tremors, shivering or stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, decreased coordination, or severe diarrhea.

Citalopram & Indomethacin

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Ketoprofen

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Ketorolac

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Lexapro

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Lisdexamfetamine

MODERATE

The concurrent use of amphetamines with SSRIs or SNRIs should be approached with appropriate monitoring.Instruct patients receiving concurrent therapy to report any signs or symptoms of serotonin syndrome immediately.Monitor blood pressure during concurrent therapy and adjust dosage or change medication for persistent increases in blood pressure.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Lofexidine

SERIOUS

The UK manufacturer of lofexidine states that concurrent use of lofexidine and QT prolonging agents should be avoided. The US manufacturer states that ECGs should be monitored in patients receiving concurrent therapy with lofexidine and agents that are known to prolong the QT interval.Consider obtaining serum calcium, magnesium, and potassium levels at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Maprotiline

MODERATE

Concurrent use with agents known to prolong the QT interval is not recommended. The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Meloxicam

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Meperidine

SERIOUS

Use an alternative analgesic whenever possible, particularly in patients with renal impairment.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome, seizure activity. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Metaxalone

SEVERE

The manufacturers of the selective serotonin reuptake inhibitors, the selective serotonin and norepinephrine reuptake inhibitors, nefazodone, and venlafaxine state that concurrent use with MAOIs is contraindicated.A minimum 5 week washout period should separate the switch of fluoxetine to a MAOI.A washout period of at least 21 days is recommended for the switch from vortioxetine to a MAOI.A washout period of at least 2 weeks is recommended for the switch of citalopram, escitalopram, fluvoxamine, paroxetine, sertraline, or vilazodone to a MAOI.A washout period of 7 days is recommended for the switch of dapoxetine, levomilnacipran, nefazodone, desvenlafaxine, and venlafaxine to a MAOI.A washout period of 5 days is recommended for the switch of duloxetine or milnacipran to a MAOI.Prior to starting any selective serotonin reuptake inhibitor, non-selective serotonin reuptake inhibitor, or duloxetine, allow a 2 week washout period after stopping MAOI therapy.These washout recommendations apply to the selective MAO-B inhibitors rasagiline and selegiline as well.If rasagiline is used in combination with fluvoxamine, patients should receive no more than 0.5mg of rasagiline daily.In emergency situations in patients maintained on SSRIs or SNRIs, weigh the availability and safety of alternatives to linezolid and methylene blue against the risk of serotonin syndrome. If linezolid or methylene blue therapy is required, the patient's SSRI or SNRI should be immediately discontinued. Patients should be monitored for serotonin syndrome for 2 weeks or until 24 hours after the last dose of linezolid or methylene blue, whichever comes first.In non-emergency situations in patients maintained on SSRIs or SNRIs when linezolid or methylene blue therapy is planned, discontinue the patient's SSRI or SNRI at least 2 weeks in advance of linezolid or methylene blue therapy. The patient's SSRI or SNRI therapy may be resumed 24 hours after the last dose of linezolid or methylene blue.Do not initiate SSRI or SNRI therapy in patients receiving linezolid or methylene blue until 24 hours after the last dose of these agents.

Citalopram & Methadone

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Metoclopramide

SERIOUS

If possible, consider alternatives to metoclopramide in patients receiving SSRI or SNRI therapy. If concurrent therapy is warranted, monitor patients for signs of extrapyramidal side effects (acute dystonic reaction, Parkinsonian symptoms, akathisia, tardive dyskinesia) and neuroleptic malignant syndrome. Symptoms unique to serotonin syndrome may include diaphoresis, hyperreflexia, and clonus. The manufacturer of metoclopramide says to avoid treatment with metoclopramide for longer than 12 weeks, and to use the lowest possible dose.For gastroesophageal reflux, the manufacturer recommends reduction in the dosage of metoclopramide to 5 mg four times daily (thirty minutes before each meal and at bedtime) or 10 mg taken three times daily for a maximum daily dosage of 30 mg in patients taking fluoxetine or paroxetine.For acute and recurrent diabetic gastroparesis, reduce the dosage of metoclopramide to 5 mg four times daily for a maximum daily dosage of 20 mg in patients taking fluoxetine or paroxetine.

Citalopram & Metoprolol

MODERATE

Monitor patients receiving concurrent therapy with metoprolol and inhibitors of CYP2D6. The dosage of metoprolol may need to be adjusted.Rolapitant, a moderate CYP2D6 inhibitor, effects on CYP2D6 are expected to last at least 28 days after administration.

Citalopram & Nabumetone

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Naproxen

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Omeprazole

MODERATE

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, hypocalcemia, hypomagnesemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Omeprazole

SERIOUS

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Ondansetron

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Paliperidone

SERIOUS

The US manufacturer of paliperidone states that the use of paliperidone should be avoided with other drugs that are known to prolong the QTc interval, including Class IA and Class III antiarrhythmics, antipsychotics, antibiotics such as gatifloxacin and moxifloxacin, or any other class of medications known to prolong the QTc interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Phenytoin

MODERATE

When used concomitantly with dual CYP2C19 and CYP3A4 inducers, monitoring of concentrations or dosage adjustment of citalopram and escitalopram may be necessary.

Citalopram & Pimozide

SEVERE

The concurrent use of pimozide with citalopram, escitalopram,fluvoxamine, nefazodone, or sertraline is contraindicated.If concurrent therapy is deemed medically necessary, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Piroxicam

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Posaconazole

MODERATE

The UK manufacturer of posaconazole states that posaconazole should be used with caution when given with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Prasugrel

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Propafenone

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Quetiapine

SERIOUS

The US manufacturer of quetiapine states that concurrent use with agents known to prolong the QT interval should be avoided.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Quinidine

SERIOUS

If possible, avoid the use of hydroquinidine or quinidine with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Ranolazine

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Rivaroxaban

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Sotalol

SERIOUS

Concurrent use with agents known to prolong the QT interval is not recommended.The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms. Consider obtaining serum calcium, magnesium, and potassium levels at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Sulindac

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Tacrolimus

MODERATE

Concurrent use with agents known to prolong the QT interval is not recommended. The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Tapentadol

MODERATE

If concurrent therapy of tapentadol with a SSRI or SNRI is warranted, patients should be closely monitored for signs and symptoms of serotonin syndrome or increased seizure frequency. Tapentadol may need to be discontinued.

Citalopram & Thioridazine

SERIOUS

The manufacturer of thioridazine states under contraindications that the use of thioridazine should be avoided in combination with other drugs that are known to prolong the QTc interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Ticagrelor

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Tizanidine

MODERATE

Concurrent use with agents known to prolong the QT interval is not recommended. The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Tramadol

MODERATE

If concurrent therapy of tramadol with a SSRI or SNRI is warranted, patients should be closely monitored for signs and symptoms of serotonin syndrome and increased seizure activity.

Citalopram & Trazodone

MODERATE

Concurrent use with agents known to prolong the QT interval is not recommended. The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Venlafaxine

MODERATE

Concurrent use with agents known to prolong the QT interval is not recommended. The manufacturer recommends ECG monitoring in patients for whom citalopram is not recommended, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Citalopram & Vorapaxar

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Citalopram & Voriconazole

MODERATE

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, hypocalcemia, hypomagnesemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Voriconazole

SERIOUS

The dose of citalopram should be limited to 20 mg in patients receiving concurrent therapy with an inhibitor of CYP2C19. Evaluate the patient for other drugs, diseases and conditions which increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. Weigh the specific benefits versus risks for each patient. The US manufacturer recommends ECG monitoring for citalopram patients with congestive heart failure, bradyarrhythmias, taking concomitant QT prolonging medications or receiving concurrent therapy. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Citalopram & Warfarin

SERIOUS

For the combination of fluvoxamine and warfarin: when possible change to a SSRI which does not inhibit warfarin metabolism (e.g. citalopram or paroxetine). For patients who require this combination, monitor for an increase in INR when fluvoxamine is started or the dose is increased. The warfarin dose may need to be reduced.For all anticoagulant/SSRI or SNRI combinations, if concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin and/or hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.The time of highest risk for a coumarin-type drug interaction is when the precipitant drug is initiated or discontinued. Contact the prescriber before initiating, altering the dose or discontinuing either drug.

Citalopram & Ziprasidone

SEVERE

The manufacturer of ziprasidone states under contraindications that ziprasidone should not be used with other drugs that prolong the QT interval such as dofetilide, sotalol, quinidine, other Class Ia and III anti-arrhythmics, mesoridazine, thioridazine, chlorpromazine, droperidol, pimozide, sparfloxacin, gatifloxacin, moxifloxacin, halofantrine, mefloquine, pentamidine, arsenic trioxide, levomethadyl acetate, dolasetron mesylate, probucol or tacrolimus.If concurrent therapy is deemed medically necessary, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Insufficient Response to Citalopram (CYP2C19: Rapid Metabolizer)

ACTIONABLE

less than p>At standard label-recommended dosage, citalopram plasma concentrations levels are expected to be low which may result in a loss of efficacy. Consider an alternative medication. If citalopram is warranted, consider increasing the dose to a maximum of 150% and titrate based on the clinical response and tolerability.less than /p>

Clomipramine (Anafranil®)

Decreased Clomipramine Exposure (CYP2C19: Rapid Metabolizer)

INFORMATIVE

less than p>The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of clomipramine to desmethyl clomipramine and a subsequent decrease in clomipramine exposure leading to therapy failure or increased side effects.less than /p> less than p>less than strong>Psychiatric Conditions:less than /strong> Consider an alternative medication. If clomipramine is warranted, consider therapeutic drug monitoring to guide dose adjustments.less than /p>

Clopidogrel (Plavix®)

Increased Response to Clopidogrel (CYP2C19: Rapid Metabolizer)

ACTIONABLE

less than p>Clopidogrel can be prescribed at standard label-recommended dosage. Individuals with the *17 allele may have an increased risk of bleeding while taking clopidogrel.less than /p>

Codeine (Codeine; Fioricet® with Codeine)

Possible Non-Response to Codeine (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>Reduced morphine levels are anticipated, and the patient may or may not experience adequate pain relief with codeine. Codeine can be prescribed at standard label-recommended dosage and administration, with monitoring for symptoms of insufficient pain relief. Other opioids not metabolized by CYP2D6 may also be considered (i.e., morphine, oxymorphone, buprenorphine, fentanyl, methadone, and hydromorphone).less than /p>

Desipramine (Norpramin®)

Increased Desipramine Exposure (CYP2D6: Intermediate Metabolizer)

INFORMATIVE

less than p>The patient is predicted to be a CYP2D6 intermediate metabolizer which is likely to result in decreased metabolism of desipramine to less active compounds and a subsequent increase in desipramine exposure leading to side effects.less than /p> less than p>less than strong>Psychiatric Conditions:less than /strong> Consider a 25% reduction of the recommended dose and use therapeutic drug monitoring to guide dose adjustments.less than /p>

Dexlansoprazole (Dexilant®, Kapidex®)

Slightly Decreased to Normal Exposure to Dexlansoprazole (CYP2C19: Rapid Metabolizer)

INFORMATIVE

less than p>The patient's genotype may be associated with a slightly decreased dexlansoprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing dexlansoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.less than /p>

Dexmethylphenidate (Focalin®)

Decreased Response to Dexmethylphenidate (COMT: Intermediate COMT Activity)

INFORMATIVE

less than p>The patient's genotype result predicts a less optimal response to dexmethylphenidate. Dosage should be individualized according to the needs and response of the patient. Therapy should be initiated in small doses, with gradual weekly increments.less than /p>

Diazepam (Valium®)

⚠ Possible Altered Sensitivity to Diazepam (CYP2C19: Rapid Metabolizer)

INFORMATIVE

less than p>CYP2C19 rapid and ultra-rapid metabolizers metabolize diazepam and nordiazepam more rapidly than normal metabolizers. However, there is insufficient data to allow calculation of dose adjustment when diazepam is prescribed. Monitor the patient's response and adjust the dose accordingly.less than /p>

Doxepin (Silenor®)

⊗ Decreased Doxepin Exposure (CYP2C19: Rapid Metabolizer)

INFORMATIVE

less than p>The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of doxepin to desmethyl doxepin and a subsequent decrease in doxepin exposure leading to therapy failure or increased side effects.less than /p> less than p>less than strong>Psychiatric Conditions:less than /strong> Consider an alternative medication. If doxepin is warranted, consider therapeutic drug monitoring to guide dose adjustments.less than /p> less than p>less than strong>Insomnia:less than /strong> Doxepin can be prescribed according to the standard recommended dosage and administration.less than /p>

Dronabinol (Marinol®)

⚠ Increased Dronabinol Exposure (CYP2C9: Intermediate Metabolizer)

ACTIONABLE

less than p>The patient's genotype predicts a reduced CYP2C9 metabolic activity. Increased drug exposure may occur in this patient leading to prolonged sedation. Consider standard label-recommended dosing and close monitoring for adverse effects.less than /p>

Efavirenz (Sustiva®)

⚠ Increased Efavirenz Exposure (CYP2B6: Intermediate Metabolizer)

ACTIONABLE

less than p>The genotype result indicates that the patient is likely to have higher dose-adjusted trough concentrations of efavirenz following standard dosing. This may result in increased risk of CNS adverse events. Consider initiating efavirenz with a decreased dose of 400 mg/day. If therapeutic drug monitoring is available and a decreased efavirenz dose is prescribed, consider obtaining steady-state plasma efavirenz concentrations to ensure concentrations are in the suggested therapeutic range (~1 to 4 µg/mL).less than /p>

Flecainide (Tambocor®)

⚠ Increased Exposure to Flecainide (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>The patient's genotype may be associated with an increased flecainide exposure following standard dosing. Consider prescribing a lower flecainide dose for therapeutic indications. When compared to a CYP2D6 normal metabolizer, an intermediate metabolizer may require a 25% dose reduction. Careful titration with ECG recording and monitoring of flecainide plasma concentrations are recommended until a favorable clinical response is achieved.less than /p>less than p>Dose adjustments are not required when flecainide is utilized for diagnostic uses.less than /p>

Flurbiprofen (Ansaid®)

⚠ Increased Flurbiprofen Exposure (CYP2C9: Intermediate Metabolizer)

ACTIONABLE

less than p>less than strong>Rheumatoid Arthritis and Osteoarthritisless than /strong>: Consider initiating flurbiprofen therapy with the lowest recommended dose. Exercise caution during up-titration until a favorable clinical effect is obtained or the maximum recommended dose is reached. Consider using the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when flurbiprofen is administered with CYP2C9 inhibitors or inducers.less than /p>

Fluvastatin (Lescol®)

Possible Increased Fluvastatin Exposure (CYP2C9: Intermediate Metabolizer)

INFORMATIVE

less than p>Increased fluvastatin plasma concentrations due to reduced CYP2C9 activity may occur, resulting in myopathy/hepatotoxicity. Consider monitoring the patient for treatment-related adverse effects, and adjust dose based on tolerability and response. Other adverse events and predisposing factors include advanced age (65 and older), diabetes, hypothyroidism, renal or hepatic impairments, high statin dose, CYP2C9 inhibitors, ABCG2 inhibitors, and female sex.less than /p>

Fosphenytoin (Cerebyx®)

Increased Phenytoin (Fosphenytoin Active Metabolite) Exposure (CYP2C9: Intermediate Metabolizer)

ACTIONABLE

less than p>Fosphenytoin is a prodrug of phenytoin. The genotype results indicate that the patient is a CYP2C9 intermediate metabolizer. Plasma concentrations of phenytoin are likely to increase, resulting in an increased risk of mild to moderate neurological toxicity. Consider a standard loading dose and reduce the maintenance dose by 25%. Be alert to neurological concentration-related adverse events. Adjust subsequent maintenance doses based on therapeutic drug monitoring and response.less than /p>

Hydrocodone (Vicodin®)

Possible Altered Response to Hydrocodone (CYP2D6: Intermediate Metabolizer)

INFORMATIVE

less than p>Decreased conversion of hydrocodone to the more active metabolite hydromorphone is expected in CYP2D6 intermediate metabolizers. However, there is insufficient evidence whether these patients have decreased analgesia when taking hydrocodone. Adequate pain relief can be achieved by increasing the dose in response to pain symptoms. Other opioids not metabolized by CYP2D6 may also be considered (i.e., morphine, oxymorphone, buprenorphine, fentanyl, methadone, and hydromorphone).less than /p>

Ibuprofen (Advil®, Motrin®)

Increased Ibuprofen Exposure (CYP2C9: Intermediate Metabolizer)

ACTIONABLE

less than p>less than strong>Pain, Dysmenorrhea, Rheumatoid Arthritis, Osteoarthritis, Fever and Other Anti-Inflammatory Usesless than /strong>: Consider initiating ibuprofen therapy with the lowest recommended dose. Exercise caution during up-titration until a favorable clinical effect is obtained or the maximum recommended dose is reached. Consider using the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when ibuprofen is administered with CYP2C9 inhibitors or inducers.less than /p>

Iloperidone (Fanapt®)

Moderate Sensitivity to Iloperidone (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>Because iloperidone is associated with QTc prolongation, caution is warranted when prescribing the drug in patients with reduced CYP2D6 activity. Iloperidone must be titrated slowly from a low starting dose to avoid orthostatic hypotension. If patients taking iloperidone experience symptoms that could indicate the occurrence of cardiac arrhythmias (e.g., dizziness, palpitations, or syncope), the prescriber should initiate further evaluation, including cardiac monitoring.less than /p>

Imipramine (Tofranil®)

Decreased Imipramine Exposure (CYP2C19: Rapid Metabolizer)

INFORMATIVE

less than p>The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of imipramine to desipramine and a subsequent decrease in imipramine exposure leading to therapy failure or increased side effects.less than /p> less than p>less than strong>Psychiatric Conditions:less than /strong> Consider an alternative medication. If imipramine is warranted, consider therapeutic drug monitoring to guide dose adjustments.less than /p>

Lexapro

Insufficient Response to Escitalopram (CYP2C19: Rapid Metabolizer)

ACTIONABLE

less than p>At standard label-recommended dosage, escitalopram plasma concentrations levels are expected to be low which may result in a loss of efficacy. Consider an alternative medication. If escitalopram is warranted, consider increasing the dose to a maximum of 150% and titrate based on the clinical response and tolerability.less than /p>

Lexapro & Alfuzosin

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Amiodarone

SERIOUS

The US manufacturer of amiodarone states that the concurrent use of QT prolonging agents should be avoided and that the need to co-administer amiodarone with any other drug known to prolong the QTc interval must be based on a careful assessment of the potential risks and benefits of doing so for each patient.The Australian and UK manufacturers of amiodarone states that concurrent use of agents known to cause torsades de pointes is contraindicated.

Lexapro & Amphetamine

MODERATE

The concurrent use of amphetamines with SSRIs or SNRIs should be approached with appropriate monitoring.Instruct patients receiving concurrent therapy to report any signs or symptoms of serotonin syndrome immediately.Monitor blood pressure during concurrent therapy and adjust dosage or change medication for persistent increases in blood pressure.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Apixaban

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Atomoxetine

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Betrixaban

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Brexpiprazole

MODERATE

The US manufacturer of brexpiprazole recommends the following dose adjustments for patients who are receiving a moderate CYP2D6 inhibitor:- in patients with schizophrenia or major depressive disorder who are taking a moderate CYP2D6 inhibitor AND who are receiving a strong or moderate inhibitor of CYP3A4, decrease the dose to one-fourth the usual dose.- no empiric dosage adjustment is recommended for patients receiving moderate CYP2D6 inhibitors without a strong or moderate inhibitor of CYP3A4.The dose of brexpiprazole should be adjusted to its original level if the CYP2D6 inhibitor is discontinued.Rolapitant, a moderate CYP2D6 inhibitor, effects on CYP2D6 are expected to last at least 28 days after administration.

Lexapro & Bupropion

MODERATE

The concurrent use of bupropion and SSRIs or SNRIs should be undertaken only with extreme caution and with low initial bupropion dosing and small gradual dosage increases. Single doses should not exceed 150 mg. The maximum daily dose of bupropion should not exceed 300 mg for smoking cessation or 450 mg for depression.

Lexapro & Carbamazepine

MODERATE

When used concomitantly with dual CYP2C19 and CYP3A4 inducers, monitoring of concentrations or dosage adjustment of citalopram and escitalopram may be necessary.

Lexapro & Celecoxib

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Chlorpromazine

SERIOUS

If possible, avoid the use of chlorpromazine with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Clomipramine

MODERATE

Patients receiving concurrent therapy should be observed for signs of increased serotonergic side effects.Counsel patients to report new or worsening muscle twitching, tremors, shivering or stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, decreased coordination, or severe diarrhea.

Lexapro & Clopidogrel

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue antiplatelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Clozapine

MODERATE

Clozapine levels should be monitored in patients receiving concurrent therapy with clozapine and either citalopram or escitalopram and patients should be monitored for signs of clozapine toxicity. The dosage of either clozapine or citalopram or escitalopram may need to be adjusted or one or both agents may need to be discontinued. Clozapine levels should also be monitored following the discontinuation of citalopram or escitalopram from concurrent therapy.If concurrent therapy is warranted in patients receiving clozapine and either citalopram or escitalopram, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Cyclobenzaprine

MODERATE

The US manufacturer of cyclobenzaprine recommends limiting use to short term duration, no more than two to three weeks. Use alternative therapy whenever possible, particularly in patients with hepatic impairment.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome, and seizure activity. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Dabigatran Etexilate

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Dextroamphetamine

MODERATE

The concurrent use of amphetamines with SSRIs or SNRIs should be approached with appropriate monitoring.Instruct patients receiving concurrent therapy to report any signs or symptoms of serotonin syndrome immediately.Monitor blood pressure during concurrent therapy and adjust dosage or change medication for persistent increases in blood pressure.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Dextromethorphan / Quinidine

SERIOUS

If possible, avoid the use of hydroquinidine or quinidine with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Diclofenac

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Disopyramide

SEVERE

The Australian manufacturer of disopyramide states that concurrent use with agents liable to produce torsades de pointes, including tricyclic or tetracyclic antidepressants, erythromycin, vincamine, and sultopride, is contraindicated.If alternatives are not available and concurrent therapy is deemed medically necessary, obtain serum calcium, magnesium, and potassium levels and monitor ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Dolasetron

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Donepezil

SERIOUS

If possible, avoid the use of donepezil with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Edoxaban

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Efavirenz

MODERATE

When used concomitantly with CYP2C19 and CYP3A4 inducers, monitoring of concentrations or dosage adjustment of citalopram may be necessary.Concurrent use of citalopram with agents known to prolong the QT interval is not recommended. The manufacturer recommends EKG monitoring in patients who are at risk for developing a prolonged QTc interval, including those receiving concurrent therapy with agents known to prolong the QT interval. Citalopram should be discontinued in patients with persistent QTc measurements greater than 500 ms.While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Esomeprazole

MODERATE

Evaluate patient for other drugs, diseases and conditions which may further increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. It would be prudent to limit the escitalopram dose to 10 mg daily in patients with QT prolonging risk factors who also receive concurrent therapy with selected CYP2C19 inhibitors. Weigh the specific benefits versus risks for each patient.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Ezogabine

SERIOUS

The concurrent use of ezogabine with agents known to prolong the QT interval should be approached with caution. Patients receiving concurrent therapy with other QT prolongers, an electrocardiogram (ECG) should be performed prior to ezogabine initiation. In those patients with a corrected QT interval greater than 440 msec at baseline, a repeat ECG should be performed after reaching the maintenance dose of ezogabine.Consider obtaining serum calcium, magnesium, and potassium levels at baseline and regular intervals. Correct any electrolyte abnormalities.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Felbamate

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Fentanyl

MODERATE

Most patients tolerate the combination of fentanyl with serotonin-increasing agents. Serotonin syndrome constitutes a range of toxicities from mild to life threatening. Monitor patients on multiple serotonergic agents for symptoms of serotonin toxicity.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.Patients in whom serotonin syndrome is suspected should receive immediate medical attention.

Lexapro & Flecainide

SERIOUS

If possible, avoid the use of flecainide with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Fluconazole

SERIOUS

If possible, avoid the use of fluconazole with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Fluoxetine

MODERATE

Evaluate patient for other drugs, diseases and conditions which may further increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. It would be prudent to limit the escitalopram dose to 10 mg daily in patients with QT prolonging risk factors who also receive concurrent therapy with selected CYP2C19 inhibitors. Weigh the specific benefits versus risks for each patient.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Flurbiprofen

MODERATE

Selective serotonin reuptake inhibitors or vilazodone and flurbiprofen should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Fluvoxamine

MODERATE

Evaluate patient for other drugs, diseases and conditions which may further increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. It would be prudent to limit the escitalopram dose to 10 mg daily in patients with QT prolonging risk factors who also receive concurrent therapy with selected CYP2C19 inhibitors. Weigh the specific benefits versus risks for each patient.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Fondaparinux

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Fosphenytoin

MODERATE

When used concomitantly with dual CYP2C19 and CYP3A4 inducers, monitoring of concentrations or dosage adjustment of citalopram and escitalopram may be necessary.

Lexapro & Galantamine

MODERATE

The UK manufacturer of galantamine states that it should be used with caution in patients treated with drugs that affect the QTc interval.If concurrent therapy is warranted, monitor ECG more frequently and consider obtaining serum calcium, magnesium, and potassium levels at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Haloperidol

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Ibuprofen

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Iloperidone

SERIOUS

The US manufacturer of iloperidone states that the concurrent administration of other drugs that are known to prolong the QTc interval should be avoided. Disopyramide and procainamide should not be used to treat iloperidone-overdose-induced arrhythmias.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Imipramine

MODERATE

Patients receiving concurrent therapy should be observed for signs of increased serotonergic side effects.Counsel patients to report new or worsening muscle twitching, tremors, shivering or stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, decreased coordination, or severe diarrhea.

Lexapro & Indomethacin

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Ketoprofen

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Ketorolac

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Lisdexamfetamine

MODERATE

The concurrent use of amphetamines with SSRIs or SNRIs should be approached with appropriate monitoring.Instruct patients receiving concurrent therapy to report any signs or symptoms of serotonin syndrome immediately.Monitor blood pressure during concurrent therapy and adjust dosage or change medication for persistent increases in blood pressure.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Lofexidine

SERIOUS

The UK manufacturer of lofexidine states that concurrent use of lofexidine and QT prolonging agents should be avoided. The US manufacturer states that ECGs should be monitored in patients receiving concurrent therapy with lofexidine and agents that are known to prolong the QT interval.Consider obtaining serum calcium, magnesium, and potassium levels at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Maprotiline

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Meloxicam

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Meperidine

SERIOUS

Use an alternative analgesic whenever possible, particularly in patients with renal impairment.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome, seizure activity. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Metaxalone

SEVERE

The manufacturers of the selective serotonin reuptake inhibitors, the selective serotonin and norepinephrine reuptake inhibitors, nefazodone, and venlafaxine state that concurrent use with MAOIs is contraindicated.A minimum 5 week washout period should separate the switch of fluoxetine to a MAOI.A washout period of at least 21 days is recommended for the switch from vortioxetine to a MAOI.A washout period of at least 2 weeks is recommended for the switch of citalopram, escitalopram, fluvoxamine, paroxetine, sertraline, or vilazodone to a MAOI.A washout period of 7 days is recommended for the switch of dapoxetine, levomilnacipran, nefazodone, desvenlafaxine, and venlafaxine to a MAOI.A washout period of 5 days is recommended for the switch of duloxetine or milnacipran to a MAOI.Prior to starting any selective serotonin reuptake inhibitor, non-selective serotonin reuptake inhibitor, or duloxetine, allow a 2 week washout period after stopping MAOI therapy.These washout recommendations apply to the selective MAO-B inhibitors rasagiline and selegiline as well.If rasagiline is used in combination with fluvoxamine, patients should receive no more than 0.5mg of rasagiline daily.In emergency situations in patients maintained on SSRIs or SNRIs, weigh the availability and safety of alternatives to linezolid and methylene blue against the risk of serotonin syndrome. If linezolid or methylene blue therapy is required, the patient's SSRI or SNRI should be immediately discontinued. Patients should be monitored for serotonin syndrome for 2 weeks or until 24 hours after the last dose of linezolid or methylene blue, whichever comes first.In non-emergency situations in patients maintained on SSRIs or SNRIs when linezolid or methylene blue therapy is planned, discontinue the patient's SSRI or SNRI at least 2 weeks in advance of linezolid or methylene blue therapy. The patient's SSRI or SNRI therapy may be resumed 24 hours after the last dose of linezolid or methylene blue.Do not initiate SSRI or SNRI therapy in patients receiving linezolid or methylene blue until 24 hours after the last dose of these agents.

Lexapro & Methadone

SERIOUS

Concurrent use of levomethadone or methadone with other agents known to prolong the QT interval should be approached with extreme caution.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Metoclopramide

SERIOUS

If possible, consider alternatives to metoclopramide in patients receiving SSRI or SNRI therapy. If concurrent therapy is warranted, monitor patients for signs of extrapyramidal side effects (acute dystonic reaction, Parkinsonian symptoms, akathisia, tardive dyskinesia) and neuroleptic malignant syndrome. Symptoms unique to serotonin syndrome may include diaphoresis, hyperreflexia, and clonus. The manufacturer of metoclopramide says to avoid treatment with metoclopramide for longer than 12 weeks, and to use the lowest possible dose.For gastroesophageal reflux, the manufacturer recommends reduction in the dosage of metoclopramide to 5 mg four times daily (thirty minutes before each meal and at bedtime) or 10 mg taken three times daily for a maximum daily dosage of 30 mg in patients taking fluoxetine or paroxetine.For acute and recurrent diabetic gastroparesis, reduce the dosage of metoclopramide to 5 mg four times daily for a maximum daily dosage of 20 mg in patients taking fluoxetine or paroxetine.

Lexapro & Metoprolol

MODERATE

Monitor patients receiving concurrent therapy with metoprolol and inhibitors of CYP2D6. The dosage of metoprolol may need to be adjusted.Rolapitant, a moderate CYP2D6 inhibitor, effects on CYP2D6 are expected to last at least 28 days after administration.

Lexapro & Nabumetone

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Naproxen

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Omeprazole

MODERATE

Evaluate patient for other drugs, diseases and conditions which may further increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. It would be prudent to limit the escitalopram dose to 10 mg daily in patients with QT prolonging risk factors who also receive concurrent therapy with selected CYP2C19 inhibitors. Weigh the specific benefits versus risks for each patient.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Ondansetron

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Paliperidone

SERIOUS

The US manufacturer of paliperidone states that the use of paliperidone should be avoided with other drugs that are known to prolong the QTc interval, including Class IA and Class III antiarrhythmics, antipsychotics, antibiotics such as gatifloxacin and moxifloxacin, or any other class of medications known to prolong the QTc interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Phenytoin

MODERATE

When used concomitantly with dual CYP2C19 and CYP3A4 inducers, monitoring of concentrations or dosage adjustment of citalopram and escitalopram may be necessary.

Lexapro & Pimozide

SEVERE

The concurrent use of pimozide with citalopram, escitalopram,fluvoxamine, nefazodone, or sertraline is contraindicated.If concurrent therapy is deemed medically necessary, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Piroxicam

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Posaconazole

MODERATE

The UK manufacturer of posaconazole states that posaconazole should be used with caution when given with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Prasugrel

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Propafenone

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Quetiapine

SERIOUS

The US manufacturer of quetiapine states that concurrent use with agents known to prolong the QT interval should be avoided.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Quinidine

SERIOUS

If possible, avoid the use of hydroquinidine or quinidine with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Ranolazine

MODERATE

The UK manufacturer of ranolazine states that concurrent use with agents known to prolong the QT interval should be approached with caution.Patients should be instructed to inform their physician if they are receiving any drugs that prolong the QTc interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Rivaroxaban

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Sotalol

SERIOUS

The manufacturer of sotalol states that concurrent use with other agents known to prolong the QT interval is not recommended.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Sulindac

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and NSAIDs should be used concurrently with caution. Patients should be warned about the increased risk of bleeding and be educated about signs and symptoms of bleeding.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.Discontinue anti-platelet agents in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Tacrolimus

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Tapentadol

MODERATE

If concurrent therapy of tapentadol with a SSRI or SNRI is warranted, patients should be closely monitored for signs and symptoms of serotonin syndrome or increased seizure frequency. Tapentadol may need to be discontinued.

Lexapro & Thioridazine

SEVERE

The concurrent use of thioridazine and strong or moderate CYP2D6 inhibitors such as dronedarone, escitalopram, or quinidine is contraindicated. Consider the use of alternative antipsychotics with less QT prolongation potential, or an alternative to dronedarone, escitalopram, or quinidine containing products.If concurrent use is deemed medically necessary, consider obtaining serum calcium, magnesium, and potassium levels at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.The manufacturer of Nuedexta states that if concurrent use with QT prolonging agents cannot be avoided, ECG monitoring should be done at initiation of concurrent therapy and at 3-4 hours after the first dose.

Lexapro & Ticagrelor

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Tizanidine

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Tramadol

MODERATE

If a CYP2D6 inhibitor is started in a patient stabilized on long term tramadol therapy, monitor for loss of analgesic efficacy. When initiating tramadol in a patient stabilized on a moderate or strong CYP2D6 inhibitor, anticipate lower analgesic efficacy. Hospitalized patients may need added doses of rescue analgesics to achieve adequate pain control.To decrease risk for serotonin syndrome, consider change to an alternative analgesic for patients taking other serotonin increasing drugs in addition to concomitant tramadol and a CYP2D6 inhibitor.If a CYP2D6 inhibitor is discontinued, consider lowering the dose of tramadol until patient achieves stable drug effects.The effects of rolapitant, a moderate CYP2D6 inhibitor, on CYP2D6 are expected to last at least 28 days after administration.

Lexapro & Trazodone

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Venlafaxine

MODERATE

While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Vorapaxar

MODERATE

Selective serotonin reuptake inhibitors or serotonin-norepinephrine reuptake inhibitors and agents that affect coagulation should be used concurrently with caution.If concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin, hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.

Lexapro & Voriconazole

MODERATE

The manufacturers of asenapine, ivabradine, mesoridazine, moxifloxacin, paliperidone, propafenone, quetiapine, quinine, sevoflurane, tetrabenazine, vandetanib, and zuclopenthixol state that concurrent use of agents known to prolong the QT interval should be avoided.The manufacturers of apomorphine, ciprofloxacin, clozapine, dolasetron, domperidone, formoterol, gatifloxacin, gemifloxacin, haloperidol, levofloxacin, nalidixic acid, norfloxacin, posaconazole, rilpivirine, risperidone, state that the concurrent use of agents known to prolong the QT interval should be approached with caution.The manufacturers of dofetilide and sotalol state that concurrent use of agents known to prolong the QT interval is not recommended.The US manufacturer of eribulin states that patients receiving concurrent therapy with eribulin and other agents known to prolong the QT interval should receive ECG monitoring.While the US FDA and manufacturer recommend no special precautions when escitalopram is used with QT prolonging agents, Health Canada and the Canadian manufacturer of escitalopram discourage the concurrent use of agents known to prolong the QT interval and the UK manufacturer states that concurrent use is contraindicated.The concurrent use of ezogabine with agents known to prolong the QT interval should be approached with caution. Patients receiving concurrent therapy with other QT prolongers, an electrocardiogram (ECG) should be performed prior to ezogabine initiation. In those patients with a corrected QT interval greater than 440 msec at baseline, a repeat ECG should be performed after reaching the maintenance dose of ezogabine.In patients maintained on agents known to prolong the QT interval, consider a baseline ECG prior to administration of gadofosveset to asses the risk/benefit of gadofosveset. If gadofosveset is used, consider ECG monitoring for 72 hours until the majority of gadofosveset is eliminated.The Australian and UK manufacturers of gadoxetate state that gadoxetate should be used with caution in patients receiving other agents agents known to prolong the QT interval. Gadoxetate's affects on the QTc interval may last at least 28 hours after injection.Pasireotide should be used with caution in patients receiving therapy with agents that prolong the QT interval. Patients should receive a baseline electrocardiogram (ECG) and hypokalemia and hypomagnesemia should be corrected before therapy is initiated. Monitor ECG and potassium and magnesium levels during therapy.Patients receiving concurrent therapy with agents known to prolong the QTc interval should be monitored with electrocardiograms during treatment with sorafenib. Electrolytes (calcium, magnesium, and potassium) should also be monitored.The US manufacturer of telavancin recommends against the use of telavancin with other drugs known to cause QT prolongation.Vemurafenib should not be initiated in patients taking medications known to prolong the QT interval or with a baseline QTc greater than 500 msec is not recommended. All patients receiving vemurafenib should undergo ECG testing at baseline, after 15 days of treatment, monthly during the first 3 months of treatment, and then every 3 months. If a patient's QTc exceeds 500 msec during treatment, vemurafenib should be discontinued and cardiac risk factors for QT prolongation should be controlled. Consider discontinuing other medications known to prolong the QT interval at this time. If the patient's QTc decreases below 500 msec, vemurafenib may be introduced at a lower dosage according to the current labeling recommendations.Consider obtaining serum calcium, magnesium, and potassium levels at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Lexapro & Voriconazole

MODERATE

Evaluate patient for other drugs, diseases and conditions which may further increase risk for QT prolongation and correct risk factors (e.g. correct hypokalemia, discontinue other QT prolonging drugs) when possible. It would be prudent to limit the escitalopram dose to 10 mg daily in patients with QT prolonging risk factors who also receive concurrent therapy with selected CYP2C19 inhibitors. Weigh the specific benefits versus risks for each patient.If concurrent therapy is warranted, patients should be monitored for signs and symptoms of serotonin syndrome. Instruct patients to report muscle twitching, tremors, shivering and stiffness, fever, heavy sweating, heart palpitations, restlessness, confusion, agitation, trouble with coordination, or severe diarrhea.

Lexapro & Warfarin

SERIOUS

For the combination of fluvoxamine and warfarin: when possible change to a SSRI which does not inhibit warfarin metabolism (e.g. citalopram or paroxetine). For patients who require this combination, monitor for an increase in INR when fluvoxamine is started or the dose is increased. The warfarin dose may need to be reduced.For all anticoagulant/SSRI or SNRI combinations, if concurrent therapy is warranted, monitor patients receiving concurrent therapy for signs of blood loss, including decreased hemoglobin and/or hematocrit, fecal occult blood, and/or decreased blood pressure and promptly evaluate patients with any symptoms.When applicable, perform agent-specific laboratory test (e.g. INR, aPTT) to monitor efficacy and safety of anticoagulation. Discontinue anticoagulation in patients with active pathologic bleeding.Instruct patients to report any signs and symptoms of bleeding, such as unusual bleeding from the gums or nose; unusual bruising; red or black, tarry stools; red, pink or dark brown urine; acute abdominal or joint pain and/or swelling.The time of highest risk for a coumarin-type drug interaction is when the precipitant drug is initiated or discontinued. Contact the prescriber before initiating, altering the dose or discontinuing either drug.

Lexapro & Ziprasidone

SEVERE

The manufacturer of ziprasidone states under contraindications that ziprasidone should not be used with other drugs that prolong the QT interval such as dofetilide, sotalol, quinidine, other Class Ia and III anti-arrhythmics, mesoridazine, thioridazine, chlorpromazine, droperidol, pimozide, sparfloxacin, gatifloxacin, moxifloxacin, halofantrine, mefloquine, pentamidine, arsenic trioxide, levomethadyl acetate, dolasetron mesylate, probucol or tacrolimus.If concurrent therapy is deemed medically necessary, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Losartan (Cozaar®, Hyzaar®)

⚠ Possible Decreased Response to Losartan (CYP2C9: Intermediate Metabolizer)

INFORMATIVE

less than p>Losartan is metabolized to its active metabolite by CYP2C9 and CYP3A4. The patient's genotype predicts a reduced exposure to losartan's active metabolite and a possible reduced hypotensive effect. Losartan can be prescribed at label-recommended dosage and administration with additional monitoring of the patient's response.less than /p>

Maprotiline (Ludiomil®)

⚠ Possible Increased Maprotiline Exposure (CYP2D6: Intermediate Metabolizer)

INFORMATIVE

less than p>Like other tricyclic and tetracyclic antidepressants, maprotiline is metabolized by CYP2D6 as well as CYP1A2. Decreased CYP2D6 activity results in higher maprotiline concentrations potentially leading to higher adverse events. There are no established dosing adjustments for patients with decreased CYP2D6 function therefore, therapy must be initiated at a low dosage and gradually adjusted according to the patient's response. The lowest effective dosage should always be considered during maintenance therapy.less than /p>

Meloxicam (Mobic®)

⊗ Increased Meloxicam Exposure (CYP2C9: Intermediate Metabolizer)

ACTIONABLE

less than p>less than strong>Pain, Rheumatoid Arthritis, Osteoarthritisless than /strong>: Consider initiating meloxicam therapy with 50% of the lowest recommended dose. Exercise caution during up-titration until a favorable clinical effect is obtained or until the 50% maximum recommended dose is reached. Consider using the lowest effective dosage for shortest duration consistent with individual patient treatment goals. Upward dose titration should not occur until after steady state is reached (at least 7 days). Carefully monitor for toxicity especially patients with additional risk factors such as hepatic impairment or advanced age. A dosage adjustment may be warranted when meloxicam is administered with CYP2C9 inhibitors or inducers.less than br />Orless than br />Consider an alternative medication.less than /p>

Methadone (Dolophine®)

⚠ Increased Methadone Exposure (CYP2B6: Intermediate Metabolizer)

INFORMATIVE

less than p>The patient's genotype may be associated with an increased methadone exposure following standard dosing.less than /p>less than p>less than strong>For Addiction Treatmentless than /strong>: There is limited evidence indicating that intermediate metabolizers require lower doses, therefore, a dose adjustment cannot be calculated.less than /p>less than p>less than strong>For Pain Managementless than /strong>: There are no studies documenting the effect of CYP2B6 genetic variations on methadone exposure when this drug is used as an analgesic. Consider standard prescribing and monitoring practices.less than /p>

Methotrexate (Trexall®)

⚠ Increased Risk for Methotrexate Toxicity (MTHFR: Reduced MTHFR Activity)

INFORMATIVE

less than p>The patient carries one copy of the MTHFR c.665C>T variant resulting in a reduced MTHFR activity. less than strong>Malignancy:less than /strong> Leukemia or lymphoma patients who are treated with methotrexate standard regimens might have an increased likelihood of treatment interruptions due to methotrexate toxicity. Monitor the patient closely for increased side effects and adjust the dose accordingly. Other genetic and clinical factors may also influence the patient's risk for toxicity and response to methotrexate treatment. less than strong>Nonmalignant conditions:less than /strong> a limited number of studies found an association between individuals carrying the MTHFR c.665C>T variant and methotrexate-induced toxicity in rheumatoid arthritis patients. However, there is insufficient data to calculate dose adjustment. Monitor patient closely for increased side effects and adjust the dose accordingly. Other genetic and clinical factors may also influence the patient's risk for toxicity and response to methotrexate treatment.less than /p>

Methylphenidate (Ritalin®, Aptensio XR®, Concerta®, Metadate ER®, Quillivant ER®)

Decreased Response to Methylphenidate (COMT: Intermediate COMT Activity)

INFORMATIVE

less than p>The patient's genotype result predicts a less optimal response to methylphenidate. Dosage should be individualized according to the needs and response of the patient. Therapy should be initiated in small doses, with gradual weekly increments.less than /p>

Metoclopramide (Reglan®)

Possible Sensitivity to Metoclopramide (CYP2D6: Intermediate Metabolizer)

INFORMATIVE

less than p>There is no data documenting the changes in plasma concentrations of metoclopramide in CYP2D6 intermediate metabolizers. Metoclopramide can be prescribed at standard label-recommended dosage and administration with careful monitoring for possible increase of side effects.less than /p>

Metoprolol (Lopressor®)

Increased Exposure to Metoprolol (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>The patient's genotype may be associated with an increased metoprolol exposure following standard dosing. When compared to a normal metabolizer, an intermediate metabolizer may require a 50% dose reduction. If metoprolol is prescribed, be alert to adverse events (e.g., bradycardia or cold extremities).less than /p>

Mexiletine (Mexitil®)

Increased Sensitivity to Mexiletine (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>Consider prescribing a lower mexiletine dose. A slow titration with ECG recording and monitoring of mexiletine plasma concentrations are recommended until a favorable clinical response is achieved.less than /p>

Naltrexone (Vivitrol®, Contrave®)

Altered Response to Naltrexone (OPRM1: Normal OPRM1 Function)

INFORMATIVE

less than p>less than span style="text-decoration: underline;">Treatment of alcohol dependence:less than /span> the patient has the OPRM1 118AA wild-type genotype that is associated with a poorer outcome with naltrexone therapy. Naltrexone-treated patients not carrying the OPRM1 118A>G G allele are less likely to respond to this drug, and may have higher relapse rates than those who are carriers of this allele. This association has not been reported consistently across studies.less than /p>

Nortriptyline (Pamelor®)

Increased Nortriptyline Exposure (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>The patient is predicted to be a CYP2D6 intermediate metabolizer which is likely to result in decreased metabolism of nortriptyline to less active compounds and a subsequent increase in nortriptyline exposure leading to side effects.less than /p> less than p>less than strong>Psychiatric Conditions:less than /strong> Consider a 25% reduction of the recommended dose and use therapeutic drug monitoring to guide dose adjustments.less than /p>

Omeprazole (Prilosec®)

Slightly Decreased to Normal Exposure to Omeprazole (CYP2C19: Rapid Metabolizer)

ACTIONABLE

less than p>The patient's genotype may be associated with a slightly decreased omeprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing omeprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.less than /p>

Oxycodone (Percocet®, Oxycontin®)

Possible Altered Response to Oxycodone (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>Decreased conversion of oxycodone to the more active metabolite oxymorphone is expected in CYP2D6 intermediate metabolizers. However, there is insufficient evidence whether these patients have decreased analgesia when taking oxycodone. Adequate pain relief can be achieved by increasing the dose in response to pain symptoms. Other opioids not metabolized by CYP2D6 may also be considered (i.e., morphine, oxymorphone, buprenorphine, fentanyl, methadone, and hydromorphone).less than /p>

Pantoprazole (Protonix®)

Slightly Decreased to Normal Exposure to Pantoprazole (CYP2C19: Rapid Metabolizer)

ACTIONABLE

less than p>The patient's genotype may be associated with a slightly decreased pantoprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing pantoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.less than /p>

Perphenazine (Trilafon®)

Possible Sensitivity to Perphenazine (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>Patients with a decreased CYP2D6 function will eliminate perphenazine more slowly, which can result in higher drug concentrations and possibly more adverse events (extrapyramidal symptoms). Consider close monitoring and dose reduction to avoid toxicity.less than /p>

Phenytoin (Dilantin®)

Increased Phenytoin Exposure (CYP2C9: Intermediate Metabolizer)

ACTIONABLE

less than p>The genotype results indicate that the patient is a CYP2C9 intermediate metabolizer. Plasma concentrations of phenytoin are likely to increase, resulting in an increased risk of mild to moderate neurological toxicity. Consider a standard loading dose and reduce the maintenance dose by 25%. Be alert to neurological concentration-related adverse events. Adjust subsequent maintenance doses based on therapeutic drug monitoring and response.less than /p>

Piroxicam (Feldene®)

Increased Piroxicam Exposure (CYP2C9: Intermediate Metabolizer)

ACTIONABLE

less than p>less than strong>Rheumatoid Arthritis and Osteoarthritisless than /strong>: This genotype is associated with a pronounced prolongation of piroxicam half-life and increase in plasma concentrations, which may result in higher toxicity especially during long-term therapy. Consider an alternative medication.less than /p>

Prevacid

Prevacid & Amphetamine

MODERATE

Monitor patients receiving concurrent therapy for changes in amphetamine effectiveness and side effects. Separate the administration times of amphetamines and antacids.The US manufacturer states that coadministration of antacids with amphetamines should be avoided. The Canadian manufacturer states that antacids should not be administered at the same time as amphetamines.The Canadian manufacturer states that concurrent use of proton pump inhibitors and amphetamines should be avoided. The US manufacturer states that patients receiving concurrent therapy should be monitored for changes in clinical effects.Some vitamin preparations may contain sufficient quantities of calcium and/or magnesium salts with antacid properties to interact as well.

Prevacid & Dextroamphetamine — MODERATE

Monitor patients receiving concurrent therapy for changes in amphetamine effectiveness and side effects. Separate the administration times of amphetamines and antacids.The US manufacturer states that coadministration of antacids with amphetamines should be avoided. The Canadian manufacturer states that antacids should not be administered at the same time as amphetamines.The Canadian manufacturer states that concurrent use of proton pump inhibitors and amphetamines should be avoided. The US manufacturer states that patients receiving concurrent therapy should be monitored for changes in clinical effects.Some vitamin preparations may contain sufficient quantities of calcium and/or magnesium salts with antacid properties to interact as well.

Prevacid & Efavirenz — MODERATE

Approach concurrent use of lansoprazole and CYP2C19 and CYP3A4 inducers with caution.The manufacturer of lansoprazole recommends avoiding concurrent use of lansoprazole and St. John's Wort or rifampin. If concurrent therapy is warranted, monitor closely for loss of efficacy.

Prevacid & Fosphenytoin — MODERATE

Approach concurrent use of lansoprazole and CYP2C19 and CYP3A4 inducers with caution.The manufacturer of lansoprazole recommends avoiding concurrent use of lansoprazole and St. John's Wort or rifampin. If concurrent therapy is warranted, monitor closely for loss of efficacy.

Prevacid & Itraconazole — MODERATE

If the concurrent administration of these two agents cannot be avoided, consider administering two capsules of glutamic acid hydrochloride 15 minutes before administering the antifungal and separate the administration times of the antifungal and the agent affecting gastric pH by at least two hours.

Prevacid & Methotrexate — MODERATE

Patients receiving concurrent use of methotrexate and proton pump inhibitors should be monitored closely for elevated methotrexate levels and methotrexate toxicity. The US manufacturer of omeprazole states that secretory ability returns gradually over three to five days following discontinuation. This interaction has best described in patients receiving high dose methotrexate for cancer treatment. Therefore, it would seem prudent to discontinue proton pump inhibitors several days prior to high dose methotrexate therapy. The magnitude and frequency of this interaction in patients receiving less than or equal to 15 mg weekly is less clear. While a small study suggested lansoprazole was safe in rheumatoid arthritis patients taking 7.5 - 15 mg weekly, at least one case report of PPI associated methotrexate toxicity at a low dose has been described.

Prevacid & Phenytoin — MODERATE

Approach concurrent use of lansoprazole and CYP2C19 and CYP3A4 inducers with caution.The manufacturer of lansoprazole recommends avoiding concurrent use of lansoprazole and St. John's Wort or rifampin. If concurrent therapy is warranted, monitor closely for loss of efficacy.

Prevacid & Posaconazole — SERIOUS

Avoid the concurrent use of posaconazole suspension with cimetidine or proton pump inhibitors. If cimetidine or proton pump inhibitor therapy is required, use the tablet formulation of posaconazole, or consider the use of other H2 blockers in patients receiving posaconazole suspension.The US manufacturer of cimetidine recommends that the azole antifungal be given at least 2 hours before cimetidine.

Prevacid & Rilpivirine — SEVERE

The US manufacturer of rilpivirine states that concurrent use of proton pump inhibitors is contraindicated.When substituting antacids for proton pump inhibitors in patients maintained on rilpivirine, administer the antacid at least 2 hours before or 4 hours after rilpivirine.When substituting H2 antagonists for proton pump inhibitors in patients maintained on rilpivirine, administer the H2 antagonist at least 12 hours before or 4 hours after rilpivirine.

Prevacid & Tacrolimus

MODERATE

Consider monitoring tacrolimus levels when initiating or discontinuing a PPI other than pantoprazole in patients who are poor metabolizers of CYP2C19 or whose genotype is unknown. The dosage of tacrolimus may need to be adjusted. Pantoprazole may be an alternative to other PPIs in patients maintained on tacrolimus.When concurrent therapy of selected proton pump inhibitors and tacrolimus is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Slightly Decreased to Normal Exposure to Lansoprazole (CYP2C19: Rapid Metabolizer)

ACTIONABLE

less than p>The patient's genotype may be associated with a slightly decreased lansoprazole exposure following standard dosing. Be alert for insufficient response, consider prescribing lansoprazole at standard label-recommended dosage and administration. May consider increasing the recommended dose for certain indications by 50-100% to optimize therapeutic efficacy.less than /p>

Propafenone (Rythmol®)

Increased Exposure to Propafenone (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>The patient's genotype may be associated with an increased propafenone exposure following standard dosing. There is insufficient data to allow calculation of dose adjustment. Titrate carefully and adjust the dose in response to plasma concentration and ECG monitoring. An alternative medication such as sotalol, disopyramide, quinidine or amiodarone may also be considered.less than /p>less than p>less than strong>Dose adjustments with co-medicationsless than /strong>: concurrent use of propafenone along with CYP3A4 inhibitors and CYP2D6 inhibitors may significantly increase the plasma concentration of propafenone increasing the risk of proarrhythmia and other adverse events. Therefore, avoid simultaneous use of propafenone with both a CYP2D6 inhibitor and a CYP3A4 inhibitor.less than /p>

Protriptyline (Vivactil®)

Possible Increased Protriptyline Exposure (CYP2D6: Intermediate Metabolizer)

INFORMATIVE

less than p>Like other tricyclic and tetracyclic antidepressants, protriptyline is metabolized by CYP2D6. Decreased CYP2D6 activity results in higher protriptyline concentrations potentially leading to higher adverse events. There are no established dosing adjustments for patients with decreased CYP2D6 function. Therefore, therapy must be initiated at a low dosage and gradually adjusted according to the patient's response. The lowest effective dosage should always be considered during maintenance therapy.less than /p>

Sertraline (Zoloft®)

Possible Reduced Response to Sertraline (CYP2C19: Rapid Metabolizer)

INFORMATIVE

less than p>Sertraline can be prescribed at standard label-recommended dosage and administration. If patient does not respond to recommended maintenance dosing, consider an alternative medication.less than /p>

Tetrabenazine (Xenazine®)

Normal Sensitivity to Tetrabenazine (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>less than strong>For treating chorea associated with Huntington's disease:less than /strong> Individualization of dose with careful weekly titration is required. The first week's starting dose is 12.5 mg daily; second week, 25 mg (12.5 mg twice daily); then slowly titrate at weekly intervals by 12.5 mg to a tolerated dose. less than strong>The maximum daily dose in CYP2D6 intermediate metabolizers of CYP2D6 is 100 mg with a maximum single dose of 37.5 mgless than /strong>. If serious adverse events occur, titration should be stopped and the dose of tetrabenazine should be reduced. If the adverse event(s) do not resolve, consider withdrawal of tetrabenazine.less than /p>

Thioridazine (Mellaril®)

Increased Sensitivity to Thioridazine (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>Reduced cytochrome CYP2D6 activity results in elevated plasma levels of thioridazine, would be expected to augment the prolongation of the QTc interval associated with thioridazine, and may increase the risk of serious, potentially fatal, cardiac arrhythmias, such as Torsades de pointes-type arrhythmias. Such an increased risk may result also from the additive effect of coadministering thioridazine with other agents that prolong the QTc interval. Therefore, thioridazine is contraindicated in patients with reduced levels of CYP2D6 activity.less than /p>

Timolol (Blocadren®)

Possible Sensitivity to Timolol (CYP2D6: Intermediate Metabolizer)

INFORMATIVE

less than p>Potentiated systemic beta-blockade (e.g., bradycardia) has been reported during timolol treatment by patients with decreased CYP2D6 activity. Monitor patient for treatment-related adverse effects.less than /p>

Tramadol (Ultram®)

Decreased Exposure to Tramadol (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>The patient's genotype may be associated with a reduced conversion of tramadol to an active metabolite with higher activity. Consider monitoring for reduced effectiveness and titrate the dose if analgesia is not achieved. If titration fails, choose an alternative not as dependent on CYP2D6 metabolism (fentanyl, morphine, hydromorphone, oxymorphone or tapentadol) or try a non-opioid analgesic such as a NSAID or a COX-2 inhibitor. less than /p>

Trimipramine (Surmontil®)

Decreased Trimipramine Exposure (CYP2C19: Rapid Metabolizer)

INFORMATIVE

less than p>The patient's high CYP2C19 activity is likely to result in a significantly increased metabolism of trimipramine to desmethyl trimipramine and a subsequent decrease in trimipramine exposure leading to therapy failure or increased side effects.less than /p> less than p>less than strong>Psychiatric Conditions:less than /strong> Consider an alternative medication. If trimipramine is warranted, consider therapeutic drug monitoring to guide dose adjustments.less than /p>

Venlafaxine (Effexor®)

Increased Exposure to Venlafaxine (CYP2D6: Intermediate Metabolizer)

ACTIONABLE

less than p>The patient has a decreased CYP2D6 activity which may result in elevated plasma concentrations of venlafaxine at standard doses. Consider an alternative medication or consider prescribing venlafaxine at a reduced dose and be extra alert for adverse events; adjust the dose based on tolerability and therapeutic monitoring.less than /p>less than p>If therapeutic drug monitoring is utilized, the sum of venlafaxine and O-desmethylvenlafaxine (an active metabolite) plasma concentrations should be used for efficacy. While the sum of the parent and the active metabolite are informative for efficacy, a higher parent (venlafaxine) concentration may be associated with higher side effects, including QT prolongation.less than /p>

Voriconazole (Vfend®)

Non-Response to Voriconazole (CYP2C19: Rapid Metabolizer)

ACTIONABLE

less than p>Voriconazole plasma concentrations are expected to be low if a standard dose is used, increasing the risk of loss of response and effectiveness and subsequent disease progression. Consider an alternative medication that is not dependent on CYP2C19 metabolism, such as isavuconazole, liposomal amphotericin B or posaconazole.less than /p>

Warfarin (Coumadin®)

Dosing Adjustments are Expected (CYP2C9 *1/*3; VKORC1 -1639G>A G/A)

ACTIONABLE

less than p>When initiating warfarin treatment for indications with a target INR of 2-3, consider one of the following methods to estimate dosing requirements:less than /p> less than p>less than strong>FDA Label:less than /strong> CYP2C9 and VKORC1 genotype results indicate an expected therapeutic dose of 3-4 mg/day.less than /p> less than p>less than strong>Pharmacogenomics algorithms/calculators available at www.warfarindosing.org:less than /strong>less than /p> less than p>less than strong>Caucasians and Asians:less than /strong> Use the patient's demographics and other clinical factors along with CYP2C9 and VKORC1 genotypes to calculate the expected therapeutic dose.less than /p> less than p>less than strong>Africans and African Americans:less than /strong> Use the patient's demographics and other clinical factors along with CYP2C9 and VKORC1 genotypes to calculate the expected therapeutic dose.less than /p> less than p>The provided recommendations in Africans and African Americans apply only when all the following CYP2C9 alleles are tested: *5, *6, *8, *11.less than /p>

Xanax

Xanax & Alfentanil

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Amphetamine

MODERATE

Limit prescribing benzodiazepines with CNS stimulants such as amphetamines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect.Monitor patients receiving concurrent therapy for signs of substance abuse.

Xanax & Aprepitant

SERIOUS

Avoid concomitant use with moderate CYP3A4 inhibitors. Consider reducing the dose of alprazolam when coadministered with a moderate CYP3A4 inhibitor.If concurrent use is necessary, monitor patients for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.

Xanax & Aprepitant

MODERATE

Depending on patient tolerance, the benzodiazepine dosage may need to be reduced or an alternative agent not metabolized by CYP3A4 (e.g. lorazepam, temazepam) may be used.Patients receiving concurrent therapy with aprepitant and alprazolam, midazolam, or triazolam should be closely monitored and counseled regarding possible adverse effects due to increased benzodiazepine exposure. Due to its long half-life, the effects of a single dose of netupitant persist for 4 or more days.

Xanax & Buprenorphine

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.For buprenorphine patients newly starting a benzodiazepine, consider beginning the benzodiazepine at a lower than usual dose, especially if predisposing factors (e.g. COPD, sleep apnea, debilitation, elderly) are present. High doses of benzodiazepines are associated with a greater risk for respiratory depression. Use the lowest effective dose and monitor for excessive sedation or respiratory depression, particularly in patients with predisposing risk factors for respiratory compromise.Buprenorphine-naloxone combination products are used for maintenance treatment of opioid dependence. Patients with comorbid benzodiazepine dependence, on high doses of benzodiazepines, or a history of benzodiazepine abuse may require benzodiazepine detoxification prior to initiation of office-based buprenorphine treatment. For patients receiving opioid maintenance treatment, it would be prudent to assure all controlled substance prescriptions are approved or written by the buprenorphine-naloxone provider.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Carbamazepine

MODERATE

Monitor patients receiving CYP3A4 inducers or who have received these agents in the previous 2 weeks for decreased benzodiazepine effectiveness. The dose of the benzodiazepine may need to be adjusted or an alternative agent used.If the CYP3A4 inducer is discontinued, benzodiazepine levels will gradually rise as induction effects diminish. Monitor for increased benzodiazepine effects and adjust the dose accordingly.

Xanax & Clozapine

SERIOUS

The concurrent use of clozapine with benzodiazepines should be approached with caution, especially in patients who have recently started or restarted clozapine therapy.Monitor patients for excessive sedation, decreased respiratory rate, and ataxia.

Xanax & Codeine

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Dexmethylphenidate

MODERATE

Limit prescribing benzodiazepines with CNS stimulants such as amphetamines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect.Monitor patients receiving concurrent therapy for signs of substance abuse.

Xanax & Dextroamphetamine

MODERATE

Limit prescribing benzodiazepines with CNS stimulants such as amphetamines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect.Monitor patients receiving concurrent therapy for signs of substance abuse.

Xanax & Dihydrocodeine

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Fentanyl

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Fluconazole

SERIOUS

Avoid concomitant use with moderate CYP3A4 inhibitors. Consider reducing the dose of alprazolam when coadministered with a moderate CYP3A4 inhibitor.If concurrent use is necessary, monitor patients for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.

Xanax & Fluoxetine

MODERATE

If fluoxetine is started in a patient already receiving alprazolam, the alprazolam dose may need to be decreased. With continued (i.e. chronic) fluoxetine therapy the interaction may wane due to the counteracting effect of weak CYP3A4 induction by fluoxetine. Monitor and adjust the alprazolam dose as needed.If clinically appropriate, a benzodiazepine which does not undergo extensive Phase I metabolism (lorazepam, oxazepam), or clonazepam may be an alternative to alprazolam in patients receiving fluoxetine.Counsel patient to report excess drowsiness, confusion, memory problems including sleep-driving behaviors, loss of coordination, slowed or difficult breathing, or unresponsiveness.

Xanax & Fluvoxamine

SERIOUS

Benzodiazepines that do not undergo extensive Phase I metabolism (lorazepam, oxazepam) may be an alternative in patients receiving fluvoxamine.The US manufacturer of fluvoxamine recommends that fluvoxamine and diazepam not be concurrently administered.If fluvoxamine is concurrently administered with alprazolam, the manufacturer of fluvoxamine recommends that the initial dose of alprazolam be reduced by 50%, followed by titration to the lowest effective dose.If fluvoxamine is started in a patient already receiving a benzodiazepine, monitor closely and anticipate the need to reduce the benzodiazepine dose.Counsel patient to report excess drowsiness, confusion, memory problems including sleep-driving behaviors, loss of coordination, unusual dizziness of lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.

Xanax & Fosnetupitant / Palonosetron

SERIOUS

Avoid concomitant use with moderate CYP3A4 inhibitors. Consider reducing the dose of alprazolam when coadministered with a moderate CYP3A4 inhibitor.If concurrent use is necessary, monitor patients for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.

Xanax & Fosphenytoin

MODERATE

Monitor patients receiving CYP3A4 inducers or who have received these agents in the previous 2 weeks for decreased benzodiazepine effectiveness. The dose of the benzodiazepine may need to be adjusted or an alternative agent used.If the CYP3A4 inducer is discontinued, benzodiazepine levels will gradually rise as induction effects diminish. Monitor for increased benzodiazepine effects and adjust the dose accordingly.

Xanax & Gabapentin

MODERATE

Limit prescribing benzodiazepines and gabapentinoids to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a gabapentinoid with an benzodiazepine, prescribe a lower initial dose of the gabapentinoid than indicated in the absence of an opioid and titrate based upon clinical response. If a benzodiazepine is indicated (other than an indication of epilepsy) in a patient already taking a gabapentinoid, prescribe a lower dose of the benzodiazepine and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.

Xanax & Hydrocodone

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Hydromorphone

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Itraconazole

SEVERE

The concurrent use of alprazolam, estazolam, or triazolam with itraconazole or ketoconazole is contraindicated.The concurrent use of oral midazolam with itraconazole or ketoconazole is contraindicated by the manufacturer of the azole antifungals. The manufacturer of oral midazolam states that the agents should only be used concurrently if absolutely necessary and if appropriate equipment and personnel are available to respond to respiratory insufficiency. The concurrent use of injectable midazolam and itraconazole or ketoconazole should be approached with special precaution and patient monitoring.The US manufacturer of itraconazole states that concomitant administration with triazolam or oral midazolam is contraindicated during and two weeks after itraconazole treatment.

Xanax & Levorphanol

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Lisdexamfetamine

MODERATE

Limit prescribing benzodiazepines with CNS stimulants such as amphetamines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect.Monitor patients receiving concurrent therapy for signs of substance abuse.

Xanax & Meperidine

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Methadone

MODERATE

Medication assisted treatment (MAT) with methadone is not contraindicated in patients taking benzodiazepines or other CNS depressants; however, discontinuation of benzodiazepines and other CNS depressants is preferred in most cases. In some cases, monitoring at a higher level of care for tapering may be appropriate. In others, gradual tapering or decreasing to the lowest effective dose of the benzodiazapine or CNS depressant is appropriate. Consider other medications and nonpharmacologic treatments to address anxiety or insomnia. Ensure that other health care providers prescribing benzodiazepines or other CNS depressants are aware of the patient's methadone treatment.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness. Educate patients about the risks of concurrent use and monitor for use of prescribed and illicit benzodiazepines or other CNS depressants.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Methadone

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Methylphenidate

MODERATE

Limit prescribing benzodiazepines with CNS stimulants such as amphetamines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect.Monitor patients receiving concurrent therapy for signs of substance abuse.

Xanax & Morphine

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Nefazodone

SERIOUS

Benzodiazepines that do not undergo extensive CYP hepatic metabolism (e.g. lorazepam, oxazepam) may be an alternative in nefazodone patients.If nefazodone is administered in combination with triazolam, the manufacturer of nefazodone recommends that the initial dose triazolam be reduced by 75%. In interaction studies nefazodone 200 mg twice daily increased triazolam exposure (area-under-curve, AUC) 4-fold. However, because not all commercially available triazolam dosage forms permit a sufficient dosage adjustment, the manufacturer of nefazodone recommends that the combination of nefazodone and triazolam be avoided in most patients, especially the elderly.When nefazodone is coadministered with alprazolam, AUC and half-life increased approximately 2-fold. The US manufacturers of nefazodone recommend a 50% reduction in the initial dose of alprazolam.The US manufacturer of estazolam recommends caution and consideration of an appropriate dose reduction when concomitant therapy is considered. Two other strong CYP3A4 inhibitors, itraconazole and oral ketoconazole, are contraindicated with estazolam use. It would be prudent to avoid the combination of nefazodone and estazolam.If nefazodone is started in a patient already receiving a benzodiazepine primarily metabolized by CYP3A4, then monitor closely and anticipate the need to reduce the benzodiazepine dose.Counsel patient to report excess drowsiness, confusion, memory problems including sleep-driving behaviors, loss of coordination, slowed or difficult breathing, or unresponsiveness.

Xanax & Netupitant / Palonosetron

SERIOUS

Avoid concomitant use with moderate CYP3A4 inhibitors. Consider reducing the dose of alprazolam when coadministered with a moderate CYP3A4 inhibitor.If concurrent use is necessary, monitor patients for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.

Xanax & Oxycodone

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Oxymorphone

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Phenobarbital

MODERATE

Monitor patients receiving phenobarbital or who have received doses in the previous 2 weeks for decreased benzodiazepine effectiveness. The dose of the benzodiazepine may need to be adjusted or an alternative agent used.Patients on chronic benzodiazepine therapy who are started on phenobarbital should be initially monitored for additive CNS sedation or respiratory depression, particularly when predisposing factors (e.g. COPD, sleep apnea, debilitation, elderly) are present. Continued use of phenobarbital leads to induction of benzodiazepine metabolism. The onset is gradual and may not peak for several weeks.If phenobarbital is discontinued, benzodiazepine levels will gradually rise as induction effects diminish. Monitor for increased benzodiazepine effects and adjust the dose accordingly.

Xanax & Phenytoin

MODERATE

Monitor patients receiving CYP3A4 inducers or who have received these agents in the previous 2 weeks for decreased benzodiazepine effectiveness. The dose of the benzodiazepine may need to be adjusted or an alternative agent used.If the CYP3A4 inducer is discontinued, benzodiazepine levels will gradually rise as induction effects diminish. Monitor for increased benzodiazepine effects and adjust the dose accordingly.

Xanax & Posaconazole

SEVERE

The US manufacturers of alprazolam and triazolam state that concurrent use with strong CYP3A4 inhibitors is contraindicated.

Xanax & Pregabalin

MODERATE

Limit prescribing benzodiazepines and gabapentinoids to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a gabapentinoid with an benzodiazepine, prescribe a lower initial dose of the gabapentinoid than indicated in the absence of an opioid and titrate based upon clinical response. If a benzodiazepine is indicated (other than an indication of epilepsy) in a patient already taking a gabapentinoid, prescribe a lower dose of the benzodiazepine and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.

Xanax & Primidone

MODERATE

Monitor patients receiving phenobarbital or who have received doses in the previous 2 weeks for decreased benzodiazepine effectiveness. The dose of the benzodiazepine may need to be adjusted or an alternative agent used.Patients on chronic benzodiazepine therapy who are started on phenobarbital should be initially monitored for additive CNS sedation or respiratory depression, particularly when predisposing factors (e.g. COPD, sleep apnea, debilitation, elderly) are present. Continued use of phenobarbital leads to induction of benzodiazepine metabolism. The onset is gradual and may not peak for several weeks.If phenobarbital is discontinued, benzodiazepine levels will gradually rise as induction effects diminish. Monitor for increased benzodiazepine effects and adjust the dose accordingly.

Xanax & Sufentanil

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Tacrolimus

MODERATE

The US manufacturer of tacrolimus recommends monitoring tacrolimus whole blood trough concentrations and reducing tacrolimus dose if needed.Consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Xanax & Tapentadol

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Tramadol

MODERATE

Limit prescribing opioid analgesics with CNS depressants such as benzodiazepines to patients for whom alternatives are inadequate.If concurrent use is necessary, limit the dosages and duration of each drug to the minimum possible while achieving the desired clinical effect. If starting a CNS depressant (for an indication other than epilepsy) with an opioid analgesic, prescribe a lower initial dose of the CNS depressant than indicated in the absence of an opioid and titrate based upon clinical response. If an opioid analgesic is indicated in a patient already taking a CNS depressant, prescribe a lower dose of the opioid and titrate based upon clinical response.Monitor patients receiving concurrent therapy for unusual dizziness or lightheadedness, extreme sleepiness, slowed or difficult breathing, or unresponsiveness.Discuss naloxone with all patients when prescribing or renewing an opioid analgesic or medicine to treat opioid use disorder (OUD). Consider prescribing naloxone to patients prescribed medicines to treat OUD or opioid analgesics (such as those taking CNS depressants) who are at increased risk of opioid overdose and when a patient has household members/close contacts at risk for accidental overdose.

Xanax & Voriconazole

SEVERE

The US manufacturers of alprazolam and triazolam state that concurrent use with strong CYP3A4 inhibitors is contraindicated.

Zofran

Zofran & Alfuzosin

MODERATE

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Amiodarone

MODERATE

The Australian and UK manufacturers of amiodarone states that concurrent use of agents known to cause torsades de pointes is contraindicated.The US manufacturer of amiodarone states that the concurrent use of QT prolonging drugs should be avoided and that need to co-administer amiodarone with any other drug known to prolong the QTc interval must be based on a careful assessment of the potential risks and benefits of doing so for each patient.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Atomoxetine

MODERATE

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Chlorpromazine

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Citalopram

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Clozapine

MODERATE

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Dextromethorphan / Quinidine

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Disopyramide

SERIOUS

The Australian manufacturer of disopyramide states that concurrent use with agents liable to produce torsades de pointes, including tricyclic or tetracyclic antidepressants, erythromycin, vincamine, and sultopride, is contraindicated.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Dolasetron

MODERATE

The manufacturer of dolasetron states that dolasetron should be used with caution when given with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Donepezil

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Efavirenz

MODERATE

The US manufacturer of efavirenz states alternatives should be considered when concurrent administration with a drug with a known risk of Torsade de Pointes or when administered to patients at higher risk of Torsade de Pointes. Limited information is available on the potential pharmacodynamic interaction between efavirenz and drugs that prolong the QT interval; however, QT prolongation has been observed with efavirenz.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Escitalopram

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Ezogabine

MODERATE

The concurrent use of ezogabine with agents known to prolong the QT interval should be approached with caution. Patients receiving concurrent therapy with other QT prolongers, an electrocardiogram (ECG) should be performed prior to ezogabine initiation. In those patients with a corrected QT interval greater than 440 msec at baseline, a repeat ECG should be performed after reaching the maintenance dose of ezogabine.Consider obtaining serum calcium, magnesium, and potassium levels at baseline and regular intervals. Correct any electrolyte abnormalities.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Felbamate

MODERATE

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Flecainide

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Fluconazole

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Galantamine

MODERATE

The UK manufacturer of galantamine states that it should be used with caution in patients treated with drugs that affect the QTc interval.If concurrent therapy is warranted, monitor ECG more frequently and consider obtaining serum calcium, magnesium, and potassium levels at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Haloperidol

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Iloperidone

MODERATE

The US manufacturer of iloperidone states that the concurrent administration of other drugs that are known to prolong the QTc interval should be avoided.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Lexapro

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Lofexidine

SERIOUS

The UK manufacturer of lofexidine states that concurrent use of lofexidine and QT prolonging agents should be avoided. The US manufacturer states that ECGs should be monitored in patients receiving concurrent therapy with lofexidine and agents that are known to prolong the QT interval.Consider obtaining serum calcium, magnesium, and potassium levels at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Maprotiline

MODERATE

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Methadone

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Paliperidone

MODERATE

The US manufacturer of paliperidone states that the use of paliperidone should be avoided with other drugs that are known to prolong the QTc interval, including Class IA and Class III antiarrhythmics, antipsychotics, antibiotics such as gatifloxacin and moxifloxacin, or any other class of medications known to prolong the QTc interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Pimozide

SERIOUS

The manufacturer of pimozide states that under contraindications that the use of pimozide is contraindicated in patients taking other drugs which prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Posaconazole

MODERATE

The UK manufacturer of posaconazole states that posaconazole should be used with caution when given with other agents known to prolong the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Propafenone

MODERATE

The manufacturer of propafenone states that the use of propafenone with other agents known to prolong the QT interval should be avoided.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Quetiapine

MODERATE

The US manufacturer of quetiapine states that concurrent use with agents known to prolong the QT interval should be avoided.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Quinidine

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Ranolazine

MODERATE

The UK manufacturer of ranolazine states that concurrent use with agents known to prolong the QT interval should be approached with caution.Patients should be instructed to inform their physician if they are receiving any drugs that prolong the QTc interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Sotalol

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Tacrolimus

MODERATE

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Thioridazine

SERIOUS

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Tizanidine

MODERATE

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Tramadol

MODERATE

Consider the use of alternative anti-emetics in patients receiving tramadol, or the use of other opioids in patients receiving 5-HT3 antagonists.

Zofran & Trazodone

MODERATE

The US manufacturer of trazodone states that concurrent use with agents known to prolong the QT interval should be avoided.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Venlafaxine

MODERATE

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Voriconazole

MODERATE

The risk for QT prolongation due to ondansetron is dose and route related. Intravenous (IV) doses lead to higher peak concentrations and systemic exposure and so have a greater risk for QT prolongation compared with the same dose given orally. Faster rates of IV infusion are also associated with a greater risk for QT prolongation. If concomitant therapy is needed, correct electrolyte abnormalities prior to starting therapy. Monitor closely, particularly in patients with predisposing risk factors for QT prolongation (e.g. cardiac disease, female, elderly). Electrocardiogram (ECG) monitoring should be performed in patients receiving concurrent therapy.The Canadian manufacturer of Zofran injection has specific recommendations for use of IV ondansetron in oncology patients greater than or equal to 75 years of age :- all IV doses must be diluted in 50 - 100 mL of compatible fluid and infused over at least 15 minutes- initial and repeat IV doses must not exceed 8 mg.Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Zofran & Ziprasidone

SERIOUS

The manufacturer of ziprasidone states under contraindications that ziprasidone should not be used with other drugs that prolong the QT interval such as dofetilide, sotalol, quinidine, other Class Ia and III anti-arrhythmics, mesoridazine, thioridazine, chlorpromazine, droperidol, pimozide, sparfloxacin, gatifloxacin, moxifloxacin, halofantrine, mefloquine, pentamidine, arsenic trioxide, levomethadyl acetate, dolasetron mesylate, probucol or tacrolimus. It would be prudent to avoid the use of ziprasidone with medicines suspected of prolonging the QT interval.If concurrent therapy is warranted, consider obtaining serum calcium, magnesium, and potassium levels and monitoring ECG at baseline and at regular intervals. Correct any electrolyte abnormalities. Instruct patients to report any irregular heartbeat, dizziness, or fainting.

Test Details

Gene	Genotype	Phenotype	Clinical Consequences
ADRA2A	C-1291G C/G	**Heterozygous for the G Allele**	Carriers of the G allele of ADRA2A C-1291G variant, show greater reduction of inattentive symptoms when administered Methylphenidate or Dexmethylphenidate.
Apolipoprotein E	ε3/ε2	**Altered APOE function**	Not associated with type III hyperlipoproteinemia - No increased risk of cardiovascular disease
COMT	Val158Met A/G	**Intermediate COMT Activity**	Consistent with a reduced catechol O-methyltransferase (COMT) function.
CYP1A2	*1A/*1V	**Normal Metabolizer- Possible Inducibility**	Consistent with a typical CYP1A2 activity in absence of inducing substances. Rapid metabolism may occur in presence of inducers such as barbiturates, cruciferous vegetables, carbamazepine, rifampin and smoking.
CYP2B6	*1/*6	**Intermediate Metabolizer**	Consistent with a moderate deficiency in CYP2B6 activity. Potential risk for side effects or loss of efficacy with drug substrates.
CYP2C19	*1/*17	**Rapid Metabolizer**	Consistent with a moderate increase in CYP2C19 enzyme activity.
CYP2C9	*1/*3	**Intermediate Metabolizer**	Consistent with a moderate deficiency in CYP2C9 enzyme activity.

CYP2D6	*1/*5	**Intermediate Metabolizer**	Consistent with a moderate deficiency in CYP2D6 enzyme activity.
CYP3A4	*1/*1	**Normal Metabolizer**	Consistent with a typical CYP3A4 activity. Caution is advised when prescribing narrow therapeutic index drugs. Alternative drugs or dose adjustment may be required if CYP3A inhibitors or inducers are co-prescribed.
CYP3A5	*3/*3	**Poor Metabolizer**	Consistent with an absence of CYP3A5 enzyme expression (Non-Expresser). This phenotype is the most common in the general population.
F2 **F5**	rs1799963 GG rs6025 CC	**Normal Risk of Thrombosis**	Unless other genetic or circumstantial risk factors are present, the patient is not expected to have an increased risk for thrombosis.
HTR2A	-1438G>A A/A	**Homozygous for the A allele (rs6311)**	The patient carries two copies of the variant allele at rs6311 which may be associated with greater serotonin 2A receptor gene expression.
HTR2A	rs7997012 G/G	**Homozygous for G allele (rs7997012)**	Reduced response to citalopram and escitalopram
MTHFR	c.665C>T CT	**Reduced MTHFR Activity**	The patient carries one copy of the MTHFR c.665C>T variant (heterozygous) and the patient's MTHFR activity is reduced slightly. This is not associated with an increased risk of hyperhomocysteinemia.
MTHFR	c.1286A>C AA c.665C>T CT	**No Increased Risk of Hyperhomocysteinemia**	The patient is heterozygous for the MTHFR c.665C>T variant. The MTHFR function is reduced slightly, but it is not associated with an increased risk for hyperhomocysteinemia.
OPRM1	A118G A/A	**Normal OPRM1 Function**	Consistent with a normal OPRM1 receptor signaling efficiency induced by exogenous opioids. This is associated with a good analgesia following standard opioid doses and a poor response to naltrexone.
SLCO1B1	521T>C T/T	**Normal Function**	Consistent with a typical SLCO1B1 transporter function.
VKORC1	-1639G>A G/A	**Intermediate Warfarin Sensitivity**	Consistent with a moderately decreased VKORC1 expression. Exercise caution with coumarin anticoagulants.

Alleles Tested: ADRA2A 5749G>A, C-1291G; **Apolipoprotein E** ε2, ε4, (ε3 is reference); **COMT** Val158Met; **CYP1A2** *1C, *1D, *1E, *1F, *1J, *1K, *1L, *1V, *1W, *3, *5, *6, *7, *8, *11, *15, *16; **CYP2B6** *4, *5, *6, *7, *9, *16, *18, *22; **CYP2C19** *2, *3, *4A, *4B, *5, *6, *7, *8, *9, *10, *13, *17; **CYP2C9** *2, *3, *4, *5, *6, *8, *11; **CYP2D6** *2, *3, *4, *4M, *6, *7, *8, *9, *10, *11, *12, *15, *17, *29, *35, *41, *5 (gene deletion), XN (gene duplication); **CYP3A4** *3, *6, *8, *11, *12, *13, *15, *16A, *16B, *17, *18A, *18B, *22; **CYP3A5** *2, *3, *6, *7, *8, *9; **Factor II** rs1799963, rs1799963; **Factor V Leiden** rs6025, rs6025; **HTR2A** -1438G>A, rs7997012; **MTHFR** c.665C>T, c.1286A>C; **OPRM1** A118G; **SLCO1B1** 521T>C; **VKORC1** -1639G>A

PATIENT INFORMATION		SPECIMEN DETAILS		ORDERED BY
NAME:	John Doe	**SPECIMEN TYPE:**	Buccal Swab	**Dr. Bauer**
ACC #:	BS7	**COLLECTION DATE:**	1/1/1900	
DOB:	12/24/1800	**RECEIVED DATE:**	1/1/1900	
SEX:	Male	**REPORT DATE:**	10/12/2021	

Limitation: This test will not detect all the known alleles that result in altered or inactive tested genes. This test does not account for all individual variations in the individual tested. Absence of a detectable gene mutation does not rule out the possibility that a patient has different phenotypes due to the presence of an undetected polymorphism or due to other factors such as drug-drug interactions, comorbidities and lifestyle habits. Technical limitations include the possibility of laboratory error and inaccuracy of the test due to unknown rare variants.

Methodology: Bead array and e-sensor based assays detect listed alleles and most rare variants with known clinical significance and analytical sensitivity and specificity >99%.

Lab Disclaimer: Genesys Diagnostics Inc. has validated the Genotype Test. The performance characteristics of this test were determined by Genesys Diagnostics Inc. This test is an FDA modified and Lab Developed Test.

Translational Software Disclaimer: The information presented on this report is provided as general educational health information. The content is not intended to be a substitute for professional medical advice, diagnosis, or treatment. Only a physician, pharmacist or other healthcare professional should advise a patient on the use of the medications prescribed.

The pharmacogenetic assay involves use of reporting software and genotype-phenotype associations performed by Translational Software (www.translationalsoftware.com). The software has not been evaluated by the Food and Drug Administration. The software, and the report generated by the software, is not intended to diagnose, treat, cure, or prevent any disease. A qualified designee within the lab uses Translational Software to generate and subsequently review the report. The pharmacogenetic report is one of multiple pieces of information that clinicians should consider in guiding their therapeutic choice for each patient. It remains the responsibility of the health-care provider to determine the best course of treatment for a patient. Adherence to dose guidelines does not necessarily assure a successful medical outcome.

Drug interaction data is provided by First Databank (FDB) and FDB is entirely responsible for its accuracy. The drug interaction report is solely intended to be used by a medical professional. The drug interaction report is based on patient-reported medications and does not account for other factors, such as smoking history, tobacco use, diet and other underlying chronic conditions such as diabetes or heart disease. Unreported medications, herbal medications, over-the-counter supplements and other non-FDA-approved medications are not considered in the drug interaction report, but may cause drug interactions. The treating medical professional bears the ultimate responsibility for all treatment decisions made in regards to the patient, including any decisions based on the drug interaction report.

Report was signed out electronically by on //.

PATIENT INFORMATION		SPECIMEN DETAILS		ORDERED BY
NAME:	John Doe	**SPECIMEN TYPE:**	Buccal Swab	Dr. Bauer
ACC #:	BS7	**COLLECTION DATE:**	1/1/1900	
DOB:	12/24/1800	**RECEIVED DATE:**	1/1/1900	
SEX:	Male	**REPORT DATE:**	10/12/2021	

Patient Information Card

This is a summary genetic report for your patient to share with other healthcare providers. The card can be cut out along the dashed line and carried with the patient.

REPORT DETAILS

Name: John Doe
DOB: 12/24/1800
ACC #: BS7

Pharmacogenetic Test Summary

ADRA2A	C-1291G C/G	Heterozygous for the G Allele
Apolipoprotein E	ε3/ε2	Altered APOE function
COMT	Val158Met A/G	Intermediate COMT Activity
CYP1A2	*1A/*1V	Normal Metabolizer- Possible Inducibility
CYP2B6	*1/*6	Intermediate Metabolizer
CYP2C19	*1/*17	Rapid Metabolizer
CYP2C9	*1/*3	Intermediate Metabolizer
CYP2D6	*1/*5	Intermediate Metabolizer
CYP3A4	*1/*1	Normal Metabolizer
CYP3A5	*3/*3	Poor Metabolizer
Factor II	rs1799963 GG	Normal Thrombosis Risk
Factor V Leiden	rs6025 CC	Normal Thrombosis Risk
HTR2A	-1438G>A A/A	Homozygous for the A allele (rs6311)
HTR2A	rs7997012 G/G	Homozygous for G allele (rs7997012)
MTHFR	c.1286A>C AA	Normal MTHFR Activity
MTHFR	c.665C>T CT	Reduced MTHFR Activity
OPRM1	A118G A/A	Normal OPRM1 Function
SLCO1B1	521T>C T/T	Normal Function
VKORC1	-1639G>A G/A	Intermediate Warfarin Sensitivity

For a complete report contact Genesys Diagnostics
www.gdilabs.com