GENETIC REPORT ANALYSIS

PATIENT NAME		PATIENT IDENTIFICATION	
Core Production		NFGUSTEST001P	
Date of Birth:	Jan 1, 1977	**Gender:**	Male

PRE-EXISTING CONDITIONS & MEDICATIONS

Selected Age: Adults, aged 18 to 65

Psychiatric medication: Clozapine, Fluoxetine

Concomitant medication: Hydrocodone

Pre-existing conditions: Diabetes mellitus and risk factors, Mild kidney disease

Lifestyle & diet: Alcohol, Caffeine, Vitamin C, Ascorbic acid, Vitamin D

SAMPLE INFORMATION

Date Collected:	May 29, 2019	**Date Accessioned:**	May 30, 2019
Specimen Type:	NFG Swab	**Sample Code:**	NFGUSTEST001P

CAP ACCREDITED
COLLEGE of AMERICAN PATHOLOGISTS
#8737159

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REQUESTING DOCTOR:

Dr. Dr. Better

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ACCESS TO ONLINE INTERACTIVE REPORT:

http://www.neuropharmagen.com/reports/NFGUSTEST001P

SUMMARY TABLE

An initial interpretation of the results obtained from the patients genetic profile is displayed in the table below. For each drug examined, the result is indicated according to the following code:

- No genetic variants relevant to the treatment have been found. Use as directed.
- Need for drug dose monitoring and/or less likelihood of positive response.
- Increased likelihood of positive response and/or lower risk of adverse drug reactions.
- Increased risk of adverse drug reactions.
- Contraindication
- Combination not advised
- Warning / Information
- Monitor parameters
  - Increase dose
  - Decrease dose

Antidepressants

Agomelatine *(Valdoxan®)*	**Amitriptyline** *(Elavil®)*	**Bupropion** *(Wellbutrin®)*
Citalopram *(Celexa®)*	**Clomipramine** *(Anafranil®)*	**Desipramine** *(Norpramin®)*
Desvenlafaxine *(Pristiq®)*	**Doxepin** *(Sinequan®)*	**Duloxetine** *(Cymbalta®)*
Escitalopram *(Lexapro®)*	**Fluoxetine** *(Prozac®)*	**Fluvoxamine** *(Luvox®)*
Imipramine *(Tofranil®)*	**Mianserin** *(Tolvon®)*	**Mirtazapine** *(Remeron®)*
Nortriptyline *(Pamelor®)*	**Paroxetine** *(Paxil®)*	**Sertraline** *(Zoloft®)*
Trazodone *(Desyrel®)*	**Trimipramine** *(Surmontil®)*	**Venlafaxine** *(Effexor®)*
Vortioxetine *(Trintellix®)*		

Antipsychotics

Aripiprazole *(Abilify®)*	**Clozapine** *(Clozaril®)*	**Haloperidol** *(Haldol®)*
Iloperidone *(Fanapt®)*	**Lurasidone** *(Latuda®)*	**Olanzapine** *(Zyprexa®)*
Paliperidone *(Invega®)*	**Perphenazine** *(Trilafon®)*	**Pimozide** *(Orap®)*
Quetiapine *(Seroquel®)*	**Risperidone** *(Risperdal®)*	**Thioridazine** *(Mellaril®)*
Zuclopenthixol *(Cisordinol®)*		

Stabilizers and anticonvulsants

Carbamazepine *(Tegretol®)*	**Clonazepam** *(Klonopin®)*	**Eslicarbazepine** *(Aptiom®)*
Lamotrigine *(Lamictal®)*	**Levetiracetam** *(Keppra®)*	**Lithium*** *(Eskalith®)*
Oxcarbazepine *(Trileptal®)*	**Phenobarbital** *(Luminal®)*	**Phenytoin** *(Dilantin®)*
Topiramate *(Topamax®)*	**Valproic Acid** *(Depakote®)*	**Vigabatrin** *(Sabril®)*
Zonisamide *(Zonegran®)*		

Anxiolytics / Hypnotics

Alprazolam *(Xanax®)*	**Buspirone** *(BuSpar®)*	**Clobazam** *(Onfi®)*
Eszopiclone *(Lunesta®)*	**Lorazepam** *(Ativan®)*	**Zolpidem** *(Ambien®)*

Others

Atomoxetine *(Strattera®)*	**Methadone** *(Dolophine®)*	**Methylphenidate** *(Ritalin®)*
Naloxone *(Narcan®)*	**Naltrexone** *(Vivitrol®)*	

* According to the ATC code, Lithium is considered an antipsychotic (N05AN01). By request of the physicians, the classification of lithium in the table has been modified and it is shown in the mood stabilizers section.

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RESULTS REPORT

This section contains the detailed list of drugs with the associated genetic results and interpretation. When different genetic results indicated in different colors occur at the same time for a given drug, the resulting color in the summary table will follow this safety priority rule: risk of adverse drug reactions (red) > dose monitoring (amber) > increased likelihood of positive response and/or lower risk of adverse drug reactions (green). The final evaluation of the analysis results is at the physician´s discretion.

DRUG	RESULTS AND INTERPRETATION
Agomelatine *(Valdoxan®)*	***Analysis result:*** No variations related to response and/or metabolism that are different from the population standard were found in the analyzed genes. ***Interpretation:*** Use as directed. ***Information about interactions:*** **[Alcohol]** Warning: The combination of Agomelatine and Alcohol is not recommended. **[Diabetes mellitus and risk factors]** Warning: Use caution when prescribing Agomelatine to diabetic patients; risk of worsening of liver damage. **[Mild kidney disease]** Warning: Agomelatine should be administered with caution in patients with renal insufficiency.
Alprazolam *(Xanax®)*	***Analysis result:*** Reduced metabolism of the drug (*CYP3A4*) ***Interpretation:*** The patient carries a variant that has been associated with reduced metabolism of the drug (CYP3A4). Its effect has not been directly evaluated on Alprazolam, but clinical studies show that inhibition of CYP3A4 results in increased exposure to Alprazolam and increased risk of adverse effects. Thus, it is recommended to increase caution, especially in certain populations (polypharmacy patients, the elderly, adolescents, etc.). ***Information about interactions:*** **[Alcohol]** Monitor: The sedative effect of Alprazolam may be enhanced by Alcohol. Warn the patient of the increased risk of physical and/or psychological dependence and increase supervision. **[Hydrocodone]** Monitor: Risk of vasodilation and severe hypotension, among other adverse effects (additive effects). Consider lowering the dosage of Hydrocodone.

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Amitriptyline
(Elavil®)

Analysis result:

Higher likelihood of positive response to treatment (*ABCB1*)

Poor metabolizer of the drug (*CYP2C19*)

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates there is a higher likelihood of positive response to treatment (ABCB1). Moreover, the analysis indicates that the patient is a CYP2C19 poor and a CYP2D6 intermediate metabolizer of this drug. Consider a 25% reduction of the recommended starting dose.[1] Use therapeutic drug monitoring to guide dose adjustments[2].

Information about interactions:

[Fluoxetine]

Monitor: Risk of increased plasma levels of Amitriptyline (inhibited hepatic metabolism); monitor the plasma levels and reduce the dosage if necessary. Risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects); monitor plasma levels of sodium.

[Alcohol]

Warning: Amitriptyline may enhance the sedative effects of alcohol; warn the patient. Furthermore, the inherent danger of any suicide or overdose attempt may be greater in patients with excessive alcohol consumption.

[Diabetes mellitus and risk factors]

Warning: In patients receiving Amitriptyline, increases as well as decreases of blood glucose levels have been reported.

Aripiprazole
(Abilify®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Diabetes mellitus and risk factors]

Monitor: Diabetes mellitus and risk factors for the development of diabetes may predispose patients to severe hyperglycaemic complications associated with treatment with Aripiprazole. Periodically determine baseline glycaemia, and pay particular attention to signs of hyperglycaemia.

[Fluoxetine]

Monitor: Risk of increased plasma levels of Aripiprazole. Reduce the dosage of Aripiprazole.

[Alcohol]

Warning: Although Aripiprazole does not appear to enhance the effects of alcohol on the CNS in healthy subjects, the patient should be advised not to consume alcohol for the duration of treatment.

Atomoxetine
(Strattera®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Fluoxetine]

Monitor: Risk of increased plasma levels of Atomoxetine. Reduce the starting dose of Atomoxetine according to the patient´s body weight.

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Bupropion
(Wellbutrin®)

Analysis result:

No variations related to response and/or metabolism that are different from the population standard were found in the analyzed genes.

Interpretation:

Use as directed.

Information about interactions:

[Alcohol]

Contraindication: Bupropion is contraindicated in patients who excessively consume or abruptly stop consuming alcohol, as the seizure threshold could be affected.

[Clozapine]

Monitor: Risk of increased plasma levels of Clozapine. Consider reducing the dose of Clozapine.

[Fluoxetine]

Monitor: Risk of increased plasma levels of Fluoxetine, increasing the risk of QT prolongation and serotonin syndrome. Assess lowering the dosage of Fluoxetine.

[Mild kidney disease]

Monitor: Risk of accumulation of Bupropion and derived active metabolites. Assess reducing the frequency of administration and/or dose of Bupropion if necessary.

Buspirone
(BuSpar®)

Analysis result:

Reduced metabolism of the drug (*CYP3A4*)

Interpretation:

The patient carries a variant that has been associated with reduced metabolism of the drug (CYP3A4). Its effect has not been directly evaluated on Buspirone, but clinical studies show that inhibition of CYP3A4 results in increased exposure to Buspirone and increased risk of adverse effects. Thus, it is recommended to increase caution and consider a dose reduction of the drug especially in certain populations (polypharmacy patients, the elderly, adolescents, etc.).

Information about interactions:

[Alcohol]

Not recommended: Out of prudence it is recommended to avoid consuming Alcohol in patients treated with Buspirone.

[Hydrocodone]

Monitor: Increased risk of serotonin syndrome (additive effects). Closely monitor the patient, especially during the start of treatment and then at dosage increases.

[Mild kidney disease]

Monitor: Risk of increased exposure to Buspirone in patients with kidney disease. Caution is recommended.

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Carbamazepine
(Tegretol®)

Analysis result:

No variations related to response and/or metabolism that are different from the population standard were found in the analyzed genes.

Interpretation:

Use as directed.

Information about interactions:

[Clozapine]

Not recommended: Risk of reduced plasma levels of Clozapine. Risk of additive toxicity. Avoid this combination, or monitor the response to Clozapine, monitor the plasma levels of sodium and regularly perform a CBC.

[Fluoxetine]

Monitor: Risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects); monitor plasma levels of sodium. Risk of increased plasma levels of Carbamazepine; monitor the plasma levels of Carbamazepine and adjust the dose if necessary.

[Mild kidney disease]

Monitor: Evaluate the risk/benefit analysis prior to administering Carbamazepine to patients with kidney damage.

[Caffeine]

Warning: Risk of reduced plasma levels of Caffeine (induced hepatic metabolism).

Citalopram
(Celexa®)

Analysis result:

Higher likelihood of positive response to treatment (*ABCB1*)

Poor metabolizer of the drug (*CYP2C19*)

Interpretation:

The analysis indicates the presence of factors associated with a higher likelihood of positive response to treatment (ABCB1). Moreover, the analysis indicates that the patient is a CYP2C19 poor metabolizer of this drug. Consider a 50% reduction of the recommended starting dose and titrate to response (do not exceed a daily dose of 20 mg; risk of QTc prolongation) or select an alternative drug not predominantly metabolized by this pathway.

Information about interactions:

[Fluoxetine]

Not recommended: Increased risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects).

[Clozapine]

Monitor: Risk of increased plasma levels of Clozapine. Increased risk of hyponatraemia, serotonin syndrome and other adverse effects (additive effects). Monitor plasma levels of sodium.

[Alcohol]

Warning: Although it has not been proven that Citalopram increases cognitive and motor disorders caused by alcohol, the patient should be advised to avoid consuming alcohol during treatment with Citalopram.

[Mild kidney disease]

Warning: No dosage adjustment of Citalopram is necessary in patients with mild to moderate decreased kidney function.

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Clobazam
(Onfi®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Poor metabolizer of the drug (*CYP2C19*)

Interpretation:

The analysis indicates that the patient is a CYP2C19 poor metabolizer of this drug. Consider a starting dose of 5 mg/day and dose titration should proceed slowly according to weight, but to half the recommended total daily dose, as tolerated. If necessary and based upon clinical response, an additional titration to the maximum dose, depending on the weight group, may be started on day 21.

Information about interactions:

[Fluoxetine]

Monitor: Risk of increased plasma levels of Clobazam. Reduce the dosage of Clobazam if necessary.

[Alcohol]

Warning: Alcohol may result in an increase of approximately 50% of Clobazam levels in the blood. In addition, alcohol may enhance the CNS-depressant effects of clobazam. Furthermore, the risk of Clobazam dependence is higher in patients with a history of alcohol abuse.

[Mild kidney disease]

Warning: There are no differences in the pharmacokinetics of Clobazam between patients with mild to moderate kidney disease and healthy subjects; it is therefore not necessary to adjust the dose of Clobazam.

Clomipramine
(Anafranil®)

Analysis result:

Poor metabolizer of the drug (*CYP2C19*)

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2C19 poor and a CYP2D6 intermediate metabolizer of this drug. Consider a 25% reduction of the recommended starting dose.[1] Use therapeutic drug monitoring to guide dose adjustments[2].

Information about interactions:

[Fluoxetine]

Monitor: Risk of increased plasma levels of Clomipramine (inhibited hepatic metabolism); assess lowering the dosage. Risk of increased serotonin syndrome, hyponatraemia and other adverse effects (additive effects); monitor plasma levels of sodium.

[Alcohol]

Warning: Patients with excessive alcohol consumption are at a greater risk of developing seizures. Furthermore, Clomipramine may enhance the sedative effects of alcohol; advise the patient.

[Mild kidney disease]

Warning: No information is available regarding the administration of Clomipramine to patients with kidney disease. Caution is advised.

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Clonazepam
(Klonopin®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Interpretation:

The analysis indicates that the patient has a lower risk of drug resistance (ABCB1). Use as directed.

Information about interactions:

[Alcohol]

Warning: It is recommended to discourage alcohol consumption for patients receiving Clonazepam.

[Mild kidney disease]

Warning: No information is available regarding the administration of Clonazepam to patients with kidney disease. Caution is advised.

Clozapine
(Clozaril®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Caffeine]

Not recommended: Risk of increased plasma levels of Clozapine (inhibited hepatic metabolism). Avoid or reduce caffeine consumption.

[Diabetes mellitus and risk factors]

Monitor: Diabetes mellitus and risk factors for the development of diabetes may predispose patients to severe hyperglycaemic complications associated with treatment with Clozapine. Periodically monitor glucose levels and watch for signs of hyperglycaemia.

[Fluoxetine]

Monitor: Risk of increased plasma levels of Clozapine. Increased risk of hyponatraemia, serotonin syndrome and other adverse effects (additive effects). Monitor the patient closely and reduce the dose of Clozapine if necessary. Monitor plasma levels of sodium.

[Alcohol]

Warning: It is recommended to discourage alcohol consumption for patients receiving Clozapine.

[Mild kidney disease]

Warning: Information limited. It is recommended to exercise extra caution with patients with kidney disease.

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Desipramine
(Norpramin®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Consider a 25% reduction of the recommended starting dose.[1] Use therapeutic drug monitoring to guide dose adjustments[2].

Information about interactions:

[Fluoxetine]

Monitor: Risk of increased plasma levels of Desipramine (inhibited hepatic metabolism). Monitor plasma levels of Desipramine and reduce the dose if necessary. Risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects). Monitor plasma levels of sodium.

[Alcohol]

Warning: Moderate alcohol consumption may reduce the plasma levels of Desipramine (induced hepatic metabolism). Furthermore, the inherent danger of any suicide or overdose attempt may be greater in patients with excessive alcohol consumption. In addition, Desipramine may enhance the sedative effects of alcohol; advise the patient.

[Diabetes mellitus and risk factors]

Warning: In patients receiving tricyclic antidepressants, increases as well as decreases of blood glucose levels have been reported.

[Mild kidney disease]

Warning: Risk of toxic reactions is higher in patients with decreased kidney function. Caution is advised when selecting the dose of Desipramine.

Desvenlafaxine
(Pristiq®)

Analysis result:

Higher likelihood of positive response to treatment (*ABCB1*)

Interpretation:

The analysis indicates there is a higher likelihood of positive response to treatment (ABCB1), and therefore, if applicable, use of this drug is recommended in preference to other similar alternatives.

Information about interactions:

[Fluoxetine]

Not recommended: Increased risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects).

[Clozapine]

Monitor: Risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects). Monitor plasma levels of sodium.

[Alcohol]

Warning: Although it has not been proven that Desvenlafaxine enhances cognitive and motor impairment caused by alcohol, the patient should be advised to avoid consuming alcohol during treatment with Desvenlafaxine.

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Doxepin
(Sinequan®)

Analysis result:

Poor metabolizer of the drug (*CYP2C19*)

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2C19 poor and a CYP2D6 intermediate metabolizer of this drug. Consider a 25% reduction of the recommended starting dose.[1] Use therapeutic drug monitoring to guide dose adjustments[2].

Information about interactions:

[Fluoxetine]

Monitor: Risk of increased plasma levels of Doxepin (inhibited hepatic metabolism). Monitor plasma levels of Doxepin and reduce the dose if necessary. Risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects). Monitor plasma levels of sodium.

[Alcohol]

Warning: Doxepin may enhance the sedative effects of alcohol; warn the patient. Furthermore, the inherent danger of any suicide or overdose attempt may be greater in patients with excessive alcohol consumption.

[Diabetes mellitus and risk factors]

Warning: In patients receiving Doxepin, increases as well as decreases of blood glucose levels have been reported.

Duloxetine
(Cymbalta®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Alcohol]

Not recommended: Although Duloxetine does not increase cognitive and motor disorders caused by alcohol, the concomitant use of Duloxetine with excessive alcohol consumption has been associated with severe liver damage.

[Caffeine]

Not recommended: Risk of increased plasma levels of Duloxetine (inhibited hepatic metabolism).

[Fluoxetine]

Not recommended: Risk of increased plasma levels of both drugs. Risk of QT prolongation. Increased risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects).

[Clozapine]

Monitor: Risk of increased plasma levels of Clozapine. Increased risk of hyponatraemia, serotonin syndrome and other adverse effects (additive effects). Monitor plasma levels of sodium.

[Diabetes mellitus and risk factors]

Warning: Glycaemic control in some patients with diabetes deteriorates with Duloxetine.

[Mild kidney disease]

Warning: No dosage adjustment of Duloxetine is necessary in patients with mild or moderate kidney disease.

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Escitalopram
(Lexapro®)

Analysis result:

Higher likelihood of positive response to treatment (*ABCB1*)

Poor metabolizer of the drug (*CYP2C19*)

Interpretation:

The analysis indicates the presence of factors associated with a higher likelihood of positive response to treatment (ABCB1). Moreover, the analysis indicates that the patient is a CYP2C19 poor metabolizer of this drug. Consider a 50% reduction of the recommended starting dose and titrate to response or select an alternative drug not predominantly metabolized by this pathway.

Information about interactions:

[Fluoxetine]

Not recommended: Increased risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects).

[Clozapine]

Monitor: Risk of increased plasma levels of Clozapine. Increased risk of hyponatraemia, serotonin syndrome and other adverse effects (additive effects). Monitor plasma levels of sodium.

[Alcohol]

Warning: Although Escitalopram does not appear to enhance the effects of alcohol on the CNS, alcohol consumption is not advised for patients being treated with Escitalopram.

[Mild kidney disease]

Warning: The dose of Escitalopram does not need to be adjusted in patients with mild to moderate kidney disease.

Eslicarbazepine
(Aptiom®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Interpretation:

The analysis indicates that the patient has a lower risk of drug resistance (ABCB1). Use as directed.

Information about interactions:

[Clozapine]

Monitor: Risk of CNS depression and hyponatraemia, among other adverse additive effects. Control sodium plasma levels.

[Fluoxetine]

Monitor: Risk of hyponatraemia, among other adverse additive effects. Control sodium plasma levels.

[Alcohol]

Warning: Risk of CNS depression, among other adverse effects .

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Eszopiclone
(Lunesta®)

Analysis result:

Reduced metabolism of the drug (*CYP3A4*)

Interpretation:

The patient carries a variant that has been associated with reduced metabolism of the drug (CYP3A4). Its effect has not been directly evaluated on Eszopiclone, but clinical studies show that inhibition of CYP3A4 results in increased exposure to Eszopiclone and increased risk of adverse effects. Thus, it is recommended to increase caution and warn the patient about the possible increase in sedative effects, especially in certain populations (polypharmacy patients, the elderly, adolescents, etc.).

Information about interactions:

[Alcohol]

Not recommended: Increased risk of developing dependence. Increased risk of CNS depression, as well as other adverse cognitive and/or neuropsychiatric reactions. Consuming Alcohol during treatment with Eszopiclone is not recommended. Warn the patient and monitor closely.

[Hydrocodone]

Monitor: Increased risk of CNS depression (additive effects). Consider lowering the dosage of one of the drugs.

Fluoxetine
(Prozac®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Clozapine]

Monitor: Risk of increased plasma levels of Clozapine. Increased risk of hyponatraemia, serotonin syndrome and other adverse effects (additive effects). Monitor the patient closely and reduce the dose of Clozapine if necessary. Monitor plasma levels of sodium.

[Diabetes mellitus and risk factors]

Monitor: Fluoxetine may affect glycaemic control in diabetic patients. Assess adjusting the dose of insulin and/or oral antidiabetics when initiating or discontinuing treatment with Fluoxetine, if necessary.

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Fluvoxamine
(Luvox®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Clozapine]

Not recommended: Risk of increased plasma levels of Clozapine. Increased risk of hyponatraemia, serotonin syndrome and other adverse effects. Avoid this combination, or closely monitor the patient and consider reducing the dose of Clozapine. In addition, monitor the plasma levels of sodium.

[Fluoxetine]

Not recommended: Risk of increased plasma levels of Fluvoxamine (inhibited hepatic metabolism). Increased risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects).

[Caffeine]

Monitor: Risk of increased plasma levels of Caffeine. Decrease the caffeine dosage, or restrict its consumption.

[Mild kidney disease]

Monitor: Closely monitor patients with kidney disease and start treatment with a low dose of Fluvoxamine.

[Alcohol]

Warning: Although no significant effects of alcohol on the pharmacokinetics and pharmacodynamics of Fluvoxamine, or conversely, have been reported, it is recommended to advise the patient not to consume alcohol.

Haloperidol
(Haldol®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

High risk of developing extrapyramidal symptoms (*AKT1-DDIT4-FCHSD1-RPTOR*)

Interpretation:

The analysis indicates that the patient has a high risk of developing extrapyramidal symptoms (AKT1-DDIT4-FCHSD1-RPTOR), therefore treatment with a low EPS-risk second generation antipsychotic is recommended. If this drug is warranted, consider the additional use of an anticholinergic. In addition, the analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Clozapine]

Not recommended: Risk of increased levels of Clozapine, risk of additive adverse effects.

[Fluoxetine]

Not recommended: Risk of increased plasma levels of Haloperidol and Fluoxetine, increased risk of QT prolongation, serotonin syndrome, hyponatraemia and other adverse effects.

[Alcohol]

Warning: Patients undergoing treatment with Haloperidol should avoid alcohol consumption given the possible additive effects and the risk of hypotension.

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Iloperidone
(Fanapt®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Hydrocodone]

Not recommended: Increased risk of CNS depression and other adverse effects. Avoid the combination or use an alternative when extended-release Hydrocodone is used at dosages higher than 160 mg/day.

[Clozapine]

Monitor: Risk of CNS depression hypotension, QTc prolongation, and other adverse effects (additive effects). Increase medical surveillance, and monitor blood pressure.

[Diabetes mellitus and risk factors]

Monitor: Diabetes mellitus and risk factors for diabetes may predispose the patient to severe hyperglycemic complications associated with treatment with Iloperidone. Periodically monitor glucose levels, and be alert to signs of hyperglycemia.

[Fluoxetine]

Monitor: Risk of increased plasma levels of Iloperidone, with the consequential risk of QT prolongation (inhibited hepatic metabolism). Risk of serotonin syndrome and neuroleptic malignant syndrome (additive effects). For extensive (normal) metabolizers of CYP2D6, reduce the dosage of Iloperidone by 50%, at the end of the combination treatment with Fluoxetine, return to the previous dosage of Iloperidone.

Imipramine
(Tofranil®)

Analysis result:

Poor metabolizer of the drug (*CYP2C19*)

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2C19 poor and a CYP2D6 intermediate metabolizer of this drug. Consider a 25% reduction of the recommended starting dose.[1] Use therapeutic drug monitoring to guide dose adjustments[2].

Information about interactions:

[Fluoxetine]

Monitor: Risk of increased plasma levels of Imipramine (inhibited hepatic metabolism); assess reducing the dose of Imipramine. Risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects); monitor plasma levels of sodium.

[Mild kidney disease]

Monitor: Exercise caution in patients with significant reduced kidney function.

[Alcohol]

Warning: Imipramine may enhance the sedative effects of alcohol; warn the patient. Furthermore, the inherent danger of any suicide or overdose attempt may be greater in patients with excessive alcohol consumption.

[Diabetes mellitus and risk factors]

Warning: In patients receiving Imipramine, increases as well as decreases of blood glucose levels have been reported.

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Lamotrigine
(Lamictal®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Interpretation:

The analysis indicates that the patient has a lower risk of drug resistance (ABCB1). Use as directed.

Information about interactions:

[Mild kidney disease]

⚠ Monitor: The half-life of Lamotrigine is significantly higher in patients with decreased kidney function. In these patients, lower maintenance doses of Lamotrigine could be effective.

Levetiracetam
(Keppra®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Interpretation:

The analysis indicates that the patient has a lower risk of drug resistance (ABCB1). Use as directed.

Information about interactions:

[Mild kidney disease]

⚠ Monitor: Levetiracetam elimination is lower in patients with kidney damage. In patients with a slight decrease in glomerular filtration, the recommended dose of Levetiracetam is 500-1000 mg every 12 hours.

Lithium
(Eskalith®)

Analysis result:

No variations related to response and/or metabolism that are different from the population standard were found in the analyzed genes.

Interpretation:

Use as directed.

Information about interactions:

[Mild kidney disease]

⛔ Contraindication: Lithium is generally contraindicated in patients with significant kidney disease. Furthermore, progressive or sudden changes in kidney function, even if within normal range, suggest the need for treatment reassessment.

[Caffeine]

⚠ Monitor: Risk of reduced plasma levels of Lithium. Monitor plasma levels of Lithium if consumption of Caffeine changes significantly

[Clozapine]

⚠ Monitor: Risk of encephalopathy syndrome; monitor for signs of neurological toxicity.

[Fluoxetine]

⚠ Monitor: Risk of alteration of plasma levels of Lithium. Risk of additive serotonergic effects. Control the plasma levels of Lithium.

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Lorazepam
(Ativan®)

Analysis result:

No variations related to response and/or metabolism that are different from the population standard were found in the analyzed genes.

Interpretation:

Use as directed.

Information about interactions:

[Alcohol]

Warning: The sedative effect of Lorazepam may be enhanced by alcohol. Furthermore, the risk of Lorazepam dependence is higher in patients with a history of alcohol and drug abuse.

Lurasidone
(Latuda®)

Analysis result:

Reduced metabolism of the drug (*CYP3A4*)

Interpretation:

The patient carries a variant that has been associated with reduced metabolism of the drug (CYP3A4). Its effect has not been directly evaluated on Lurasidone. However, coadministration of Lurasidone with strong CYP3A4 inhibitors is contraindicated, so it is recommended to increase caution, especially in certain populations (polypharmacy patients, the elderly, adolescents, etc.).

Information about interactions:

[Diabetes mellitus and risk factors]

Monitor: Diabetes mellitus and risk factors for diabetes may predispose the patient to severe hyperglycemic complications associated with treatment with Lurasidone. Periodically monitor glucose levels, and be alert to signs of hyperglycemia.

[Hydrocodone]

Monitor: Increased risk of CNS depression and other adverse effects. Consider lowering the dosage of Hydrocodone.

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Methadone
(Dolophine®)

Analysis result:

No variations related to response and/or metabolism that are different from the population standard were found in the analyzed genes.

Interpretation:

Use as directed.

Information about interactions:

[Alcohol]

Not recommended: The combination of Methadone and other central nervous system depressants, such as alcohol, may increase the risk of respiratory depression, hypotension, deep sedation and coma. Avoid alcohol consumption, as well as products containing alcohol, whether prescribed or not.

[Clozapine]

Not recommended: Risk of severe constipation, CNS depression, hypotension, QT prolongation and other adverse effects (additive effects).

[Fluoxetine]

Not recommended: Risk of increased plasma levels of Methadone. Risk of serotonin syndrome, neuroleptic malignant syndrome and QT prolongation (additive effects).

[Hydrocodone]

Monitor: Increased risk of CNS depression and other adverse effects. Reduce the dosage of Methadone or of both drugs if necessary. Monitor signs of sedation and respiratory depression.

[Mild kidney disease]

Monitor: The pharmacokinetics of Methadone in patients with kidney failure has not been widely evaluated. However, adjusting the dose and closely monitoring the patient is recommended.

Methylphenidate
(Ritalin®, Concerta®, Metadate®, Daytrana®)

Analysis result:

Higher likelihood of positive response to treatment (*LPHN3*)

Interpretation:

The analysis indicates there is a higher likelihood of positive response to treatment (LPHN3), and therefore, if applicable, use of this drug is recommended in preference to other similar alternatives.

Information about interactions:

[Caffeine]

Not recommended: The stimulating effects of caffeine may be additives with those of other substances which stimulate the CNS.

[Fluoxetine]

Monitor: Risk of increased plasma levels of Fluoxetine. Monitor plasma concentrations of Fluoxetine and reduce the dose if necessary.

[Alcohol]

Warning: Methylphenidate should be used with caution in patients with known drug or alcohol dependency, due to the potential risk of abuse, misuse or trafficking.

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Mianserin
(Tolvon®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Diabetes mellitus and risk factors]

Not recommended: When treating diabetic patients with Mianserin, normal precautions should be taken and the doses of all concomitant medications should be kept under review.

[Alcohol]

Warning: Mianserin may enhance the depressive effect of alcohol on the central nervous system; patients should therefore be advised not to consume alcohol for the duration of treatment.

[Mild kidney disease]

Warning: Take the usual precautions in patients with kidney failure.

Mirtazapine
(Remeron®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Alcohol]

Warning: Mirtazapine may increase the depressive action of alcohol on the CNS; alcohol should therefore not be consumed for the duration of treatment with Mirtazapine.

[Caffeine]

Warning: Risk of increased plasma levels of Mirtazapine (inhibited hepatic metabolism).

[Mild kidney disease]

Warning: Mirtazapine elimination is correlated with creatinine clearance. Caution is advised when administering Mirtazapine to patients with compromised kidney function.

Naloxone
(Narcan®)

Analysis result:

No variations related to response and/or metabolism that are different from the population standard were found in the analyzed genes.

Interpretation:

Use as directed.

Information about interactions:

[Mild kidney disease]

Warning: No information is available regarding the administration of Naloxone to patients with kidney failure. Caution.

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Naltrexone
(Vivitrol®, Revia®)

Analysis result:

No variations related to response and/or metabolism that are different from the population standard were found in the analyzed genes.

Interpretation:

Use as directed.

Information about interactions:

[Mild kidney disease]

Warning: Suitable studies regarding the administration of Naltrexone to patients with kidney disease have not been conducted. Given its renal secretion, caution is advised.

Nortriptyline
(Pamelor®)

Analysis result:

Higher likelihood of positive response to treatment (*ABCB1*)

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates there is a higher likelihood of positive response to treatment (ABCB1). Moreover, the analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Consider a 25% reduction of the recommended starting dose.[1] Use therapeutic drug monitoring to guide dose adjustments[2].

Information about interactions:

[Fluoxetine]

Monitor: Risk of increased plasma levels of Nortriptyline (inhibited hepatic metabolism). Assess reducing the dose of Nortriptyline. Risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects). Monitor plasma levels of sodium.

[Alcohol]

Warning: Nortriptyline may enhance the sedative effects of alcohol; warn the patient. Furthermore, the inherent danger of any suicide or overdose attempt may be greater in patients with excessive alcohol consumption.

[Diabetes mellitus and risk factors]

Warning: In patients receiving Nortriptyline, increases as well as decreases of blood glucose levels have been reported.

Olanzapine
(Zyprexa®)

Analysis result:

No variations related to response and/or metabolism that are different from the population standard were found in the analyzed genes.

Interpretation:

Use as directed.

Information about interactions:

[Diabetes mellitus and risk factors]

Monitor: Diabetes mellitus and risk factors for diabetes may predispose the patient to severe hyperglycemic complications associated with treatment with Olanzapine. Assess the risk-benefit ratio of the administration of Olanzapine in these patients. In all patients, periodically check glucose levels, and be alert to signs of hyperglycemia.

[Hydrocodone]

Monitor: Risk of severe constipation, CNS depression, hypotension and other adverse effects (additive effects). Consider reducing the dose of Hydrocodone.

[Alcohol]

Warning: Alcohol could enhance orthostatic hypotension associated with Olanzapine. Furthermore, in view of the primary effects of Olanzapine on the CNS, the consumption of alcohol during treatment with Olanzapine is not recommended.

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Oxcarbazepine
(Trileptal®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Interpretation:

The analysis indicates that the patient has a lower risk of drug resistance (ABCB1). Use as directed.

Information about interactions:

[Clozapine]

Not recommended: Risk of reduced plasma levels of Clozapine (induced hepatic metabolism). Increased risk of CNS depression (additive effects).

[Fluoxetine]

Monitor: Risk of increased plasma levels of Fluoxetine. Risk of serotonin syndrome, hyponatraemia and other adverse effects. Monitor plasma levels of sodium.

Paliperidone
(Invega®)

Analysis result:

High risk of developing extrapyramidal symptoms (*AKT1-DDIT4-FCHSD1-RPTOR*)

Interpretation:

The analysis indicates that the patient has a high risk of developing extrapyramidal symptoms (AKT1-DDIT4-FCHSD1-RPTOR), therefore treatment with a low EPS-risk second generation antipsychotic is recommended. If this drug is warranted, consider the additional use of an anticholinergic.

Information about interactions:

[Clozapine]

Not recommended: Risk of QT prolongation, CNS depression, and other adverse effects (additive effects).

[Diabetes mellitus and risk factors]

Monitor: Diabetes mellitus and risk factors for diabetes may predispose the patient to severe hyperglycemic complications associated with treatment with Paliperidone. Periodically monitor glucose levels, and be alert to signs of hyperglycemia.

[Mild kidney disease]

Monitor: The dose of Paliperidone should be personalised depending on the patient´s state of kidney function. In patients with mild kidney failure, the recommended starting dose is 3 mg/day.

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Paroxetine
(Paxil®)

Analysis result:

Higher likelihood of positive response to treatment (*ABCB1*)

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates the presence of factors associated with a higher likelihood of positive response to treatment (ABCB1). Moreover, the analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Fluoxetine]

Not recommended: Risk of increased plasma levels of both drugs (inhibited hepatic metabolism). Risk of QT prolongation. Increased risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects). Avoid this combination, or assess reducing the dose of Paroxetine and/or Fluoxetine.

[Clozapine]

Monitor: Risk of increased plasma levels of Clozapine. Increased risk of hyponatraemia, serotonin syndrome and other adverse effects (additive effects). Monitor the patient closely and reduce the dose of Clozapine if necessary. Monitor plasma levels of sodium.

[Alcohol]

Warning: Although Paroxetine does not increase cognitive and motor impairment caused by alcohol, the patient should be advised to avoid consuming alcohol during treatment with Paroxetine.

[Mild kidney disease]

Warning: Patients with kidney disease have higher plasma concentrations of Paroxetine.

Perphenazine
(Trilafon®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Alcohol]

Not recommended: Patients undergoing treatment with Perphenazine should avoid alcohol consumption given the possible additive effects and the risk of hypotension. Furthermore, the inherent danger of any suicide or overdose attempt may be greater in patients with excessive alcohol consumption. In addition, Perphenazine may lower the seizure threshold in susceptible individuals, such as patients with alcohol withdrawal.

[Clozapine]

Not recommended: Increased risk of severe constipation, CNS depression, QT prolongation and other adverse effects (additive effects).

[Fluoxetine]

Monitor: Risk of hyponatraemia, QT prolongation, serotonin syndrome and other adverse effects (additive effects). Monitor plasma levels of sodium. Risk of increased plasma levels of Perphenazine. Assess using a lower dose of Perphenazine or Fluoxetine.

[Hydrocodone]

Monitor: Risk of reduced efficacy of Hydrocodone (inhibited hepatic metabolism). Risk of severe constipation, CNS depression, hypotension and other adverse effects (additive effects). Consider reducing the dose of Hydrocodone.

[Mild kidney disease]

Warning: Caution should be exercised in the administration of phenothiazine derivatives in patients with decreased kidney function.

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Phenobarbital
(Luminal®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Interpretation:

The analysis indicates that the patient has a lower risk of drug resistance (ABCB1). Use as directed.

Information about interactions:

[Clozapine]

Monitor: Increased risk of CNS depression (additive effects). Risk of reduced plasma levels of Clozapine; monitor the response to Clozapine.

[Alcohol]

Warning: Risk of additive depressant effects; warn the patient.

Phenytoin
(Dilantin®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Intermediate metabolizer of the drug (*CYP2C9*)

Interpretation:

The analysis indicates that the patient is a CYP2C9 intermediate metabolizer of this drug. Consider using a standard loading dose. Reduce maintenance dose by 25%. Evaluate response and serum concentration after 7-10 days. Be alert to adverse drug events such as ataxia, nystagmus, dysarthria or sedation.

Information about interactions:

[Clozapine]

Monitor: Risk of reduced plasma levels of Clozapine, control the response to Clozapine. Increased risk of CNS depression (additive effects).

[Fluoxetine]

Monitor: Risk of increased plasma levels of Phenytoin. Control the plasma levels of Phenytoin, and adjust the dosage if necessary.

[Mild kidney disease]

Monitor: The free fraction of Phenytoin in plasma is higher in patients with kidney disease, which means evaluating the concentration of free Phenytoin in plasma could be extremely beneficial. Furthermore, do not use an oral loading dose regimen for Phenytoin in these patients.

[Alcohol]

Warning: Acute alcohol intake may increase plasma levels of Phenytoin, while chronic abuse may reduce them.

[Caffeine]

Warning: Risk of reduced plasma levels of Caffeine (induced hepatic metabolism).

[Diabetes mellitus and risk factors]

Warning: Phenytoin may increase glucose plasma levels in diabetic patients.

[Vitamin D]

Warning: Risk of inefficacy of vitamin D.

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Pimozide
(Orap®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Fluoxetine]

Contraindication: Risk of bradycardia, risk of increased plasma levels of Pimozide (risk of QT prolongation).

[Clozapine]

Not recommended: Risk of CNS depression QT prolongation, seizures, and adverse anticholinergic effects, among others (additive effects).

[Mild kidney disease]

Warning: Pimozide is excreted by the kidneys, and so caution should be used in patients with altered renal function.

Quetiapine
(Seroquel®)

Analysis result:

Reduced metabolism of the drug (*CYP3A4*)

Interpretation:

The patient carries a variant that has been associated with reduced metabolism of the drug (CYP3A4). Consider an alternative drug.

Information about interactions:

[Diabetes mellitus and risk factors]

Monitor: Diabetes mellitus and risk factors for diabetes may predispose the patient to severe hyperglycemic complications associated with treatment with Quetiapine. Periodically monitor glucose levels, and be alert to signs of hyperglycemia.

[Alcohol]

Warning: Because Quetiapine enhances motor and cognitive abnormalities caused by alcohol, alcohol consumption should be limited during treatment with Quetiapine.

[Mild kidney disease]

Warning: No dosage adjustment of Quetiapine is necessary in patients with kidney failure.

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Risperidone
(Risperdal®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

High risk of developing extrapyramidal symptoms (*AKT1-DDIT4-FCHSD1-RPTOR*)

Interpretation:

The analysis indicates that the patient has a high risk of developing extrapyramidal symptoms (AKT1-DDIT4-FCHSD1-RPTOR), therefore treatment with a low EPS-risk second generation antipsychotic is recommended. If this drug is warranted, consider the additional use of an anticholinergic. In addition, the analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Select an alternative drug or be extra alert to adverse drug events and adjust dose to clinical response.

Information about interactions:

[Diabetes mellitus and risk factors]

Monitor: Diabetes mellitus and risk factors for diabetes may predispose the patient to severe hyperglycemic complications associated with treatment with Risperidone. Periodically monitor glucose levels, and be alert to signs of hyperglycemia.

[Fluoxetine]

Monitor: Risk of increased plasma levels of Risperidone, lower the dosage (induced hepatic metabolism). Risk of serotonin syndrome (additive effects).

[Hydrocodone]

Monitor: Risk of CNS depression, hypotension and other adverse effects (additive effects). Consider reducing the dose of Hydrocodone.

[Mild kidney disease]

Monitor: Reduction of Risperidone and its active metabolite in patients with moderate and severe kidney disease. Lower the initial dosage of Risperidone, and proceed with slow scaling.

[Alcohol]

Warning: Given the main effect of Risperidone on the central nervous system, the patient should be advised not to consume alcohol for the duration of treatment with Risperidone.

Sertraline
(Zoloft®)

Analysis result:

Poor metabolizer of the drug (*CYP2C19*)

Interpretation:

The analysis indicates that the patient is a CYP2C19 poor metabolizer of this drug. Consider a 50% reduction of the recommended starting dose and titrate to response or select an alternative drug not predominantly metabolized by this pathway.

Information about interactions:

[Fluoxetine]

Not recommended: Increased risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects).

[Clozapine]

Monitor: Risk of increased plasma levels of Clozapine. Increased risk of hyponatraemia, serotonin syndrome and other adverse effects (additive effects). Monitor the patient closely and reduce the dose of Clozapine if necessary. Monitor plasma levels of sodium.

[Alcohol]

Warning: Although it has not been proven that Sertraline enhances cognitive and motor impairment caused by alcohol, the patient should be advised to avoid consuming alcohol during treatment with Sertraline.

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Thioridazine
(Mellaril®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Fluoxetine]

Contraindication: Risk of increased plasma levels of Thioridazine, thus increasing the risk of ventricular arrhythmias and sudden death (hepatic metabolism inhibited); risk of hyponatraemia, serotonin syndrome and other adverse effects (additive effects).

[Clozapine]

Not recommended: Increased risk of severe constipation, CNS depression, QT prolongation and other adverse effects (additive effects).

[Hydrocodone]

Monitor: Risk of reduced efficacy of Hydrocodone (inhibited hepatic metabolism). Risk of severe constipation, CNS depression, hypotension and other adverse effects (additive effects). Consider reducing the dose of Hydrocodone.

[Alcohol]

Warning: Thioridazine may enhance the depressive effects of alcohol on the CNS.

Topiramate
(Topamax®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Interpretation:

The analysis indicates that the patient has a lower risk of drug resistance (ABCB1). Use as directed.

Information about interactions:

[Mild kidney disease]

Monitor: Risk of reduced Topiramate elimination in patients with kidney disease; reduce the dose of Topiramate. Increased risk of hyperchloraemic metabolic acidosis; monitor serum bicarbonate.

[Alcohol]

Warning: Given Topiramate´s potential to cause central nervous system depression, as well as other adverse cognitive and/or neuropsychiatric reactions, the consumption of alcohol during treatment with Topiramate is not advised.

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Trazodone
(Desyrel®)

Analysis result:

Reduced metabolism of the drug (*CYP3A4*)

Interpretation:

The patient carries a variant that has been associated with reduced metabolism of the drug (CYP3A4). Its effect has not been directly evaluated on Trazodone, but clinical studies show that inhibition of CYP3A4 results in increased exposure to Trazodone and increased risk of adverse effects. Thus, it is recommended to increase caution and pay attention to the onset of nausea, hypotension and syncope. Consider reducing the dose of the drug especially in certain populations (polypharmacy patients, the elderly, adolescents, etc.).

Information about interactions:

[Clozapine]

Monitor: Risk of hyponatremia, seizures, CNS depression, and other adverse effects (additive effects). Control sodium plasma levels.

[Fluoxetine]

Monitor: Risk of serotonin syndrome and hyponatremia, among others (additive effects). Control sodium plasma levels.

[Hydrocodone]

Monitor: Risk of severe constipation, serotonin syndrome, CNS depression, hypotension and other adverse effects (additive effects). Consider lowering the dose of Hydrocodone. Closely monitor the patient, especially during the start of treatment and then at dosage increases.

[Alcohol]

Warning: The response to alcohol may be exaggerated during treatment with Trazodone, warn the patient and advise against consuming alcohol during treatment with Trazodone.

[Mild kidney disease]

Warning: The safety and efficacy of the use of Trazodone in patients with kidney failure have not been established. Trazodone should be used with caution in patients with renal insufficiency.

Trimipramine
(Surmontil®)

Analysis result:

Poor metabolizer of the drug (*CYP2C19*)

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2C19 poor and a CYP2D6 intermediate metabolizer of this drug. Consider a 25% reduction of the recommended starting dose.[1] Use therapeutic drug monitoring to guide dose adjustments[2].

Information about interactions:

[Fluoxetine]

Monitor: Risk of increased plasma levels of Trimipramine (inhibited hepatic metabolism). Assess reducing the dose of Trimipramine. Risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects). Monitor plasma levels of sodium.

[Alcohol]

Warning: Alcohol response may be exaggerated during treatment with Trimipramine; advise the patient.

[Diabetes mellitus and risk factors]

Warning: In patients receiving tricyclic antidepressants, increases as well as decreases of blood glucose levels have been reported.

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Valproic Acid
(Depakote®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Interpretation:

The analysis indicates that the patient has a lower risk of drug resistance (ABCB1). Use as directed.

Information about interactions:

[Fluoxetine]

Monitor: Increased risk of hyponatraemia and other adverse effects (additive effects). Control sodium plasma levels.

Venlafaxine
(Effexor®)

Analysis result:

Higher likelihood of positive response to treatment (*ABCB1*)

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates there is a higher likelihood of positive response to treatment (ABCB1). Moreover, the analysis indicates the patient is a CYP2D6 intermediate metabolizer of this drug. Select an alternative drug or adjust dose to clinical response.

Information about interactions:

[Fluoxetine]

Not recommended: Risk of increased plasma levels of Venlafaxine, risk of QT prolongation and other adverse effects (inhibited hepatic metabolism). Increased risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects).

[Clozapine]

Monitor: Risk of QT prolongation, serotonin syndrome, hyponatremia, and other adverse effects (additive effects). Control sodium plasma levels.

[Mild kidney disease]

Monitor: Patients with varying degrees of kidney disease show a reduction in Venlafaxine elimination. Reduce the dosage of Venlafaxine.

[Alcohol]

Warning: Although it has not been proven that Venlafaxine enhances cognitive and motor impairment caused by alcohol, the patient should be advised to avoid consuming alcohol during treatment with Venlafaxine.

Vigabatrin
(Sabril®)

Analysis result:

The patient does NOT carry a variant associated with drug resistance in adult polymedicated patients (*ABCB1*)

Interpretation:

The analysis indicates that the patient has a lower risk of drug resistance (ABCB1). Use as directed.

Information about interactions:

[Mild kidney disease]

Monitor: Patients with varying degrees of kidney disease show a reduction in Vigabatrin elimination. Reduce the dosage of Vigabatrin.

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Vortioxetine
(Trintellix®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

Interpretation:

The analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Use as directed and titrate dose in response to efficacy and adverse drug events, paying special attention to drug-drug interactions.

Information about interactions:

[Fluoxetine]

Not recommended: Risk of increased plasma levels of Vortioxetine and adverse effects (inhibited hepatic metabolism). Increased risk of serotonin syndrome, hyponatraemia and other adverse effects (additive effects).

[Clozapine]

Monitor: Increased risk of SIADH, hyponatraemia and other adverse effects.

[Alcohol]

Warning: Although it has not been show that Vortioxetine increases the cognitive and motor disorders caused by alcohol, avoid the concomitant use of Vortioxetine and alcohol.

[Mild kidney disease]

Warning: The presence of renal insufficiency (mild, moderate, severe and end-stage kidney disease) does not affect the clearance of Vortioxetine and so dose adjustments are not required.

Zolpidem
(Ambien®)

Analysis result:

Reduced metabolism of the drug (*CYP3A4*)

Interpretation:

The patient carries a variant that has been associated with reduced metabolism of the drug (CYP3A4). Its effect has not been directly evaluated on Zolpidem, but clinical studies show that inhibition of CYP3A4 results in increased exposure to Zolpidem and increased risk of adverse effects. Thus, it is recommended to increase caution and warn the patient about the possible increase in sedative effects, especially in certain populations (polypharmacy patients, the elderly, adolescents, etc.).

Information about interactions:

[Alcohol]

Not recommended: Increased risk of developing dependence. Increased risk of CNS depression, as well as other adverse cognitive and/or neuropsychiatric reactions. Consuming Alcohol during treatment with Zolpidem is not recommended. Warn the patient and monitor closely.

[Hydrocodone]

Monitor: Increased risk of CNS depression (additive effects). Consider lowering the dosage of one of the drugs.

Zonisamide
(Zonegran®)

Analysis result:

Poor metabolizer of the drug (*CYP2C19*)

Interpretation:

The analysis indicates that the patient is a CYP2C19 poor metabolizer of this drug. A 30% decrease in drug clearance associated with this phenotype has been described, although the effect on its efficacy may not be relevant. However, it may be important in certain cases, such as polypharmacy or pediatric population.

Information about interactions:

[Alcohol]

Warning: Given the potential presented by Zonisamide to cause central nervous system depression, as well as other adverse cognitive and/or neuropsychiatric reactions, drinking alcohol during treatment with Zonisamide is not recommended.

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Zuclopenthixol
(Cisordinol®, Clopixol®, Acuphase®)

Analysis result:

Intermediate metabolizer of the drug (*CYP2D6*)

High risk of developing extrapyramidal symptoms (*AKT1-DDIT4-FCHSD1-RPTOR*)

Interpretation:

The analysis indicates that the patient has a high risk of developing extrapyramidal symptoms (AKT1-DDIT4-FCHSD1-RPTOR), therefore treatment with a low EPS-risk second generation antipsychotic is recommended. If this drug is warranted, consider the additional use of an anticholinergic. In addition, the analysis indicates that the patient is a CYP2D6 intermediate metabolizer of this drug. Reduce dose by 25% or select alternative drug.

Information about interactions:

[Diabetes mellitus and risk factors]

⚠ Monitor: Zuclopenthixol may modify the response to insulin and glucose, resulting in the necessity to adjust the antidiabetic therapy in diabetic patients.

[Alcohol]

ⓘ Warning: Zuclopenthixol may enhance the sedative effect of alcohol.

The following clarifications apply only to tricyclic antidepressants, provided that they are referenced in the text of the recommendation:
(1) Patients may receive a low TCA starting dose, which will be increased over a number of days until the recommended steady-state dose has been reached. The starting dose in these guidelines refers to the recommended steady-state dose.
(2) Dosage recommendations apply to high starting doses, used in the treatment of conditions such as depression. For conditions in which this drug is used in lower doses, like neuropathic pain, dose modifications are not recommended for slow/intermediate metabolizers, but these patients should be closely monitored for adverse effects.

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GENETIC SUMMARY

Gene	Variant	Genotype
ABCB1	rs11983225	C/C
ABCB1	rs2235048	A/A
AL157359	rs75222709	T/T
AL157359	rs78015114	T/T
BDNF	p.Val66Met	C/C
CES1	p.Gly143Glu	C/C
COMT	p.Val158Met	A/A
DDIT4	rs1053639	A/T
EPHX1	p.Tyr113His	T/T
FCHSD1	rs456998	G/G
GRIK2	rs2518224	A/A
GRIK4	rs1954787	C/T
HLA-A	rs1061235	NOAMP*
HTR2A	c.-1438G>A	T/T
HTR2A	rs9316233	C/G
HTR2C	rs1414334	G/G
LPHN3	rs6551665	A/G
OPRM1	c.118A>G	A/A
RPTOR	rs7211818	A/A
SLC6A4	5HTTLPR	L/S
UGT2B15	D85Y	C/C

** The value of the genotype could not be determined.*

PATIENT´S METABOLIZING PROFILE

Gene	Diplotype	Predicted Phenotype
CYP1A2	*1/*1F	Normal metabolizer
CYP2B6	*1/*6	Normal metabolizer
CYP2C9	*1/*2	Intermediate metabolizer
CYP2C19	*2/*2	Poor metabolizer
CYP2D6	*4/*10	Intermediate metabolizer
CYP3A4	*1/*22	Deficient metabolizer

Test Information

Genotyping of single nucleotide polymorphisms (SNPs) included in the Firefly™ NFG genetic analysis was performed by OpenArray® Technology (Thermo Fisher Scientific). Analysis of *SLC6A4* was performed by polymerase chain reaction (PCR) followed by capillary electrophoresis of PCR products. *CYP2D6* copy number analysis was performed using real-time PCR. The following genetic variants may be detected in this assay: *ABCB1* NG_011513.1:g.186045A>G, NG_011513.1:g.209054C>T, *AL157359* NC_000021.9:g.18955109T>G, NC_000021.8:g.20312612T>C, *BDNF* p.Val66Met (NM_170735.5:c.196G>A), *CES1* p.Gly143Glu (NM_001025194.1:c.428G>A), *COMT* p.Val158Met (NM_000754.3:c.472G>A), *CYP1A2* -163C>A (NG_008431.2:g.32035C>A), *CYP2B6* *1, *6 (NG_007929.1:g.20638G>T), *CYP2C19* *1, *2 (NM_000769.3:c.681G>A), *3 (NM_000769.3:c.636G>A), *4 (NM_000769.3:c.1A>G), *5 (NM_000769.3:c.1297C>T), *6 (NM_000769.3:c.395G>A), *7 (NM_000769.1:c.819+2T>A), *8 (NM_000769.3:c.358T>C), *9 (NM_000769.3:c.431G>A), *10 (NM_000769.3:c.680C>T), *17 (NM_000769.2:c.-806C>A), *27 (NM_000769.2:c.-1041A>G); *CYP2C9* *1, *2 (NM_000771.3:c.430C>T), *3 (NM_000771.3:c.1075A>C), *5 (NM_000771.3:c.1080C>G), *6 (NM_000771.3:c.818delA), *8 (NM_000771.3:c.449G>A), *11 (NM_000771.3:c.1003C>T), *27 (NM_000771.3:c.449G>T), *CYP2D6* *1, *2 (NM_000106.5:c.886C>T; c.1457G>C), *3 (NM_000106.5:c.775delA), *4 (NM_000106.5:c.506-1G>A; c.100C>T; c.1457G>C), *5 (gene deletion), *6 (NM_000106.5:c.454delT), *7 (NM_000106.5:c.971A>C), *8 (NM_000106.5:c.505G>T), *9 (NM_000106.5:c.841_843delAAG), *10 (NM_000106.5: c.100C>T; c.1457G>C), *11 (NM_000106.5:c.181-1G>C), *12 (NM_000106.5:c.124G>A), *14 (NM_000106.5:c.505G>A), *15 (NM_000106.5:c.137dup), *17 (NM_000106.5:c.320C>T), *19 (NM_000106.5:c.765_768delAACT), *29 (NM_000106.5:c.1012G>A), *34, *35 (NM_000106.5:c.31G>A; c.886C>T; c.1457G>C; NG_008376.3:g.2617C>G), *36, *36-*10, *39, *40, *41 (NM_000106.5:c.985+39G>A; c.886C>T; c.1457G>C), *69 (NM_000106.5: c.100C>T; c.985+39G>A; c.886C>T; c.1457G>C), gene duplication and multiplication, *CYP3A4* *1, *22 (NM_017460.5:c.522-191C>T), *DDIT4* (NM_019058.3:c.*95T>A), EPHX1 p.Tyr113His (NM_000120.3:c.337T>C), *FCHSD1* (NM_033449.2:c.1311+176C>A), *GRIK2* (NG_009224.2:g.64748A>C), *GRIK4* (NG_042194.1:g.285909T>C), *HLA-A* (NG_029217.2:g.8057A>T), *HTR2A* c.-1438G>A (NM_000621.4:c.-998G>A), NG_013011.1:g.42815G>C, *HTR2C* NG_012082.2:g.324497C>G), *LPHN3/ADGRL3* (NG_033950.2:g.677568G>A), *OPRM1* p.Asn40Asp (NM_001008504.3:c.118A>G), *RPTOR* (NG_013034.1:g.175279A>G), *SLC6A4* 5HTTLPR, *UGT2B15* *1, *2 (NM_001076.3:c.253T>G).

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Test run by Precision Genetics

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