GENESYS Diagnostics INC.

CAP ACCREDITED
COLLEGE of AMERICAN PATHOLOGISTS

Clinical Laboratory Improvement Amendments

PHARMACOGENOMICS IN PSYCHIATRY

PRECISION PRESCRIBING

ACHIEVE OPTIMAL PRESCRIBING:

Patients with multiple health issues already taking several medications/herbal supplements prior to seeking care can be challenging, especially with limited information about their history. This makes prescribing any additional medications, and deciding other medications which may interact with one of these drugs, difficult. There are over 20 medications with FDA approval for depression, a few of which contain warnings that genetics may alter a patient's response; a patient with multiple conditions makes prescribing more difficult.

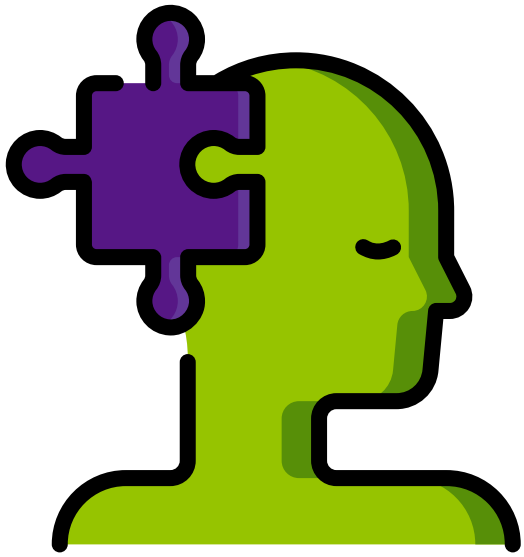
OBTAIN A STRONGER PATIENT PROFILE:

According to the CDC, mental illness is an important public health problem because it is associated with chronic medical diseases such as cardiovascular disease, diabetes, and obesity. About 25% of U.S. adults have a mental illness (1); psychiatric drug treatment, including antidepressants, antipsychotics, and anxiolytics, is characterized by large inter-individual differences in drug response and dosage requirements, lack of efficacy in approximately 30% of patients, and improper drug dosing causing severe adverse effects (2).

PSYCHIATRIC PATIENT PANELS:

Psychiatry Panel:
CYP1A2, CYP2D6, CYP2C19, CYP2C9, CUP3A4, CYP3A5, ADRA2A, COMT, and HTR2A.

Comprehensive Panel:
CYP1A2, CYP2B6, CYP2C19, CYP2D6, CYP2C9, VKORC1, CYP3A4, CYP3A5, ADRA2A, OPRM1, COMT, Factor II, Factor V, NTHFR, APOE, SLCO1B1, and HTR2A.



GENESYS Diagnostics INC.

CYTOCHROME P450:

Most drugs are metabolized by drug metabolizing enzymes (DMEs); the cytochrome P450 (CYP) enzymes are especially important in metabolizing antipsychotics and antidepressants. CYP activity depends on various factors, including genetic constitution. CYP enzyme polymorphisms are an important factor in the individual variability in metabolic capacity. The effect of a psychotropic drug depends on factors that influence pharmacogenetics and pharmacodynamics of the drug. Most of them can be explained by individual variability, making genotyping useful in predicting patient response to specific drug treatment (2). Genetic variants in CYP450 are common and determine the drug efficacy. For example,the CYP450 2D6 enzyme is crucial for some of the most widely used psychiatric medications, and those who are poor metabolizers are vulnerable to adverse and even lethal reactions (3). Genetic factors contribute for about 50% of anti-depressant response; up to 60% of depressed patients don't respond completely, and up to 30% do not respond at all (4). Many patients on antipsychotic medications experience serious side effects and discontinue treatment as a result.

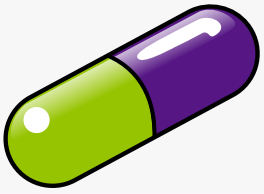
CYP2D6, CYP2C19, CYP3A4, AND CYP3A5:

Almost all medications used in psychiatric care are metabolized by CYP2D6, CYP2C19, or CYP3A4, and genetic variations are extremely common. This genetic variability is often the most important indicator as to how an individual patient will respond to medication. A patient's genes are the main factor in determining the level of these enzymes in their liver: if too much of the enzyme is present, the medication is processed too quickly, whereas too little of the enzyme may cause medication to build up in their bloodstream, potentially causing adverse reactions or side effects. Without knowing a patient's genetic profile, a physician may need to go through months of trial-and-error prescribing to find the optimal drug and dose, potentially causing the patient much anxiety, nervousness, and/or depression. In his book, Psychiatric Pharmacogenetics, Mrazek describes three additional drug-metabolizing enzyme genes: CYP2C19, CYP2C9, and CYP1A2, along with norepinephrine transporter gene, dopamine and serotonin transporter genes, and genes involved in coding for the receptors (5). Developing new methodologies to enhance the safety of prescribing psychotropic medications has become an increasingly high priority (5), with safety concerns being highlighted by a series of FDA black box warnings over the past several years. Many commonly prescribed neuroactive drugs are metabolized by the P450 network of proteins including CYP2D6, CYP2C19, CYP3A4, and CYP3A5. The following drugs are covered by the GENESYS psychiatric panel: diazepam, clonazepam, citalopram, alprazolam, fluvoxamine, haloperidol, ziprasidone, and trazodone. Using the GENESYS pharmacogenetic reports for personalized psychiatric drug therapy helps predict potential variability for a patient's metabolic profile, identifying patients' drug metabolizing phenotypes and giving physicians more information when choosing drug therapy options for psychiatric patients. In turn, this results in decreased adverse effects, increased treatment adherence, reduced drug interactions and improved efficiency.

References;
1. Centers for Disease Control and Prevention. Mental Illness Surveillance Among Adults in the United States. MMWR 2011;60(Suppl): 1-29.
2. Van der Weide, Jan and John W J Hinrichs, The Influence of Cytochrome P450 Pharmacogenetics on Disposition of Common Antidepressant and Antipsychotic Medications. Clinical Biochemistry February 2006; 27-25.
3. http://www.psychiatrictimes.com/articles/psychiatric-pharmacogenomics
4. Crisafulli, Concena, et al, Pharmacogenetics of Antidepressants. Frontiers in Pharmacology Gebruary 2011;2:1-21.
5. Mrazek DA. Psychiatric Pharmacogenomics. New York: Oxford University Press; 2010.

ABOUT US

Genesys Diagnostics provides a range of clinical diagnostic services to physicians, hospitals, and laboratories across the country.



CONTACT US

(860) 574-9172
(860) 574-9264
www.gdilabs.com
info@gdilabs.com
8 Enterprise Ln. Oakdale, CT 06370