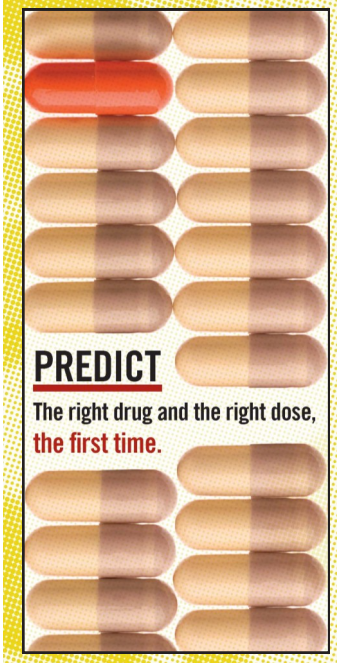
# PREDICT




VANDERBILT UNIVERSITY
MEDICAL CENTER

**Each person responds differently to medicines.**

One part of personalized medicine means making sure your patients receive the right medicine. With Vanderbilt University Medical Center's advanced PREDICT Program, we can now use your patients' genetic information to predict and help prevent adverse drug events.

## What is PREDICT?

*What if you could tell which drugs were most likely to work for your patients, and which you should avoid, even before you prescribe them?*

Gene variations alter drug metabolism and can profoundly affect a person's drug response.

PREDICT stands for Pharmacogenomic Resource for Enhanced Decisions in Care and Treatment and is part of Vanderbilt's Personalized Medicine program.

Personalized medicine involves tailoring treatments to a patient's genetic profile. PREDICT aims to prospectively identify and genetically test patients who are more likely to require target medications (e.g., Clopidogrel, Warfarin, and Simvastatin) within the next 3 years. This way, genetic results will guide therapeutic decisions from initial diagnoses to drug order.

## Program Goals:

1. To prospectively identify patients who are likely to receive target medications in the next 3 years;
2. To genetically test these patients;
3. To tailor their drug therapy according to the results

Using the results patients are more likely to receive the right drug, the right dose, the first time.

### Quick Facts about PREDICT:

- Currently no cost to the patient
- No consent required for test
- Simple blood test with a turnaround time of about 3-4 days
- Results are available for simvastatin and clopidogrel; no need to retest when other drugs are added in the future.
- PREDICT is also called PDX or Pharmacogenomic Panel.

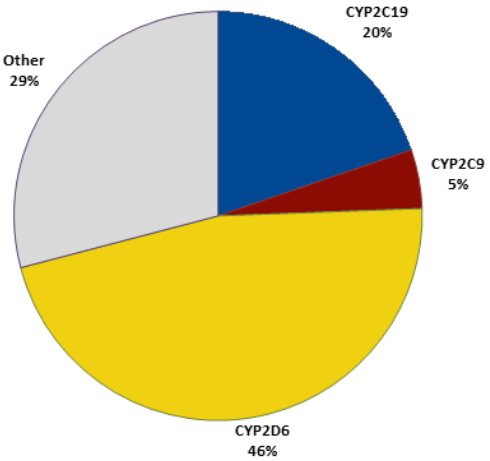
## FDA Labels with Pharmacogenomic Biomarkers

| Class | Sample Drugs | Enzyme |
|---|---|---|
| **Cytochrome P450** | Quinidine | CYP2D6 |
| | Carvedilol | CYP2D6 |
| | **Clopidogrel*** | **CYP2C19** |
| | Metoprolol | CYP2D6 |
| | Prasugrel | CYP2C19 |
| | Propafenone | CYP2D6 |
| | Propranolol | CYP2D6 |
| | Ticagrelor | CYP2C19 |
| | **Warfarin*** | **CYP2C9** |
| | Atomoxetine | CYP2D6 |
| | Fluoxetine | CYP2D6 |
| | Fluvoxamine | CYP2C9 |
| | Risperidone | CYP2D6 |
| | Tiotropium | CYP2D6 |
| | **Tamoxifen*** | **CYP2D6** |
| **Other** | **Simvastatin*** | **SLCO1B1** |
| | **Azathioprine*** | **TPMT** |
| | **Abacavir*** | **HLA-B** |
| | **Warfarin*** | **VKORC1** |

**Denotes drug-genome testing in the development pipeline for PREDICT.*

PREDICT testing is available now. One test has a lifetime of therapeutic uses. There is no need to retest as other drug-genome interactions are released.

## Why Pharmacogenomics?




Route of elimination of drugs with FDA pharmacogenomic labels

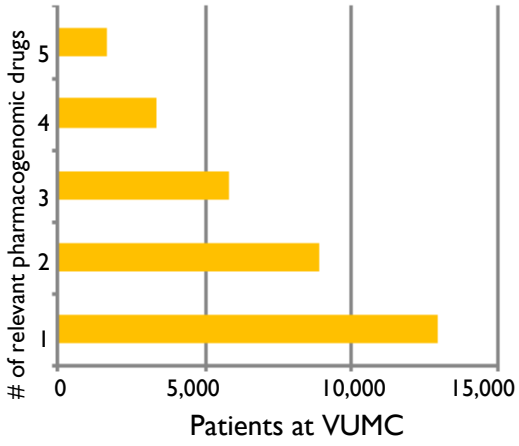
~75% of all drugs with FDA pharmacogenomic labels are metabolized by three enzymes.

# PREDICT

## Vanderbilt's Approach to Personalized Medicine

| Drug | Estimated Adverse Events Prevented Over 5 Years |
|---|---|
| Abacavir | 3 |
| Azathioprine | 17 |
| Clopidogrel | 79 |
| Simvastatin | 19 |
| Tamoxifen | 15 |
| Warfarin | 265 |
| **Total** | **398** |

Essentially all enzymes for drug metabolism exhibit **common polymorphisms** at the genetic level.




## Who should be tested?

Patients are selected based on demographic variables such as age, gender, race, and weight and on their relevant past medical history (e.g., hypertension, diabetes, coronary artery disease, dialysis, atrial fibrillation, atherosclerosis, congestive heart failure, and other conditions).

## What is being tested?

DNA extracted from the patient's blood specimen will be genotyped for 184 common polymorphisms within 34 genes associated with drug absorption, distribution, metabolism, and excretion using the Illumina Vera Code ADME Core Panel Assay.

Genes analyzed using this technology include:

ABCB1; ABCC2; ABCG2; CYP1A1, CYP1A2; CYP2A6; CYP2B6; CYP2C19; CYP2C8; CYP2C9; CYP2D6; CYP2E1; CYP3A4; CYP3A5; DPYD; GSTM1; GSTP1; CSTT1; NAT1; NAT2; SLC15A2; SLC22A1; SLC22A2; SLC22A6; SLC01B1; SLC01B3; SLC02B1; SULT1A1; TPMT; UGT1A1; UGT2B15; UGT2B17; UGT2B7; VKORC1

PREDICT is a platform-based approach with significant opportunities for meaningful intervention.

## How will I review the results?

While 34 genes are analyzed using this technology, only genes which have been approved as actionable by the Vanderbilt Pharmacy & Therapeutics (P&T) committee will be made available for clinical decision support. The remaining genetic results will be stored but inaccessible within StarPanel.

Depending on the results of the test, dosage adjustments for specific drugs prescribed to the patient or alternative medications may be indicated.

For management decisions regarding the clinical care of a patient, see the "Drug-Genome Interactions" section of the "Patient Summary" or the "Labs" in StarPanel. Clinical decision support may also be provided in medication prescribing tools (e.g., HEO/Wiz, RxStar, and VOOM).

## Questions?

To learn more about the PREDICT program, visit www.mc.vanderbilt.edu/predictpdx.

## Call 5-GENE

If you have a specific question about PREDICT, call **615-875-GENE** (xt. 5-4363), or email a team member at predict@vanderbilt.edu.

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