

You Should Actually Know What 'Pharmacogenetics' Is

Here's a new approach that could help doctors prescribe smarter, and reduce waste of what's prescribed.

By Jennifer Fuhrmann-Berger | June 06, 2018

In 510 B.C.E., Pythagoras unwittingly made one of the first contributions to pharmacogenetics when he observed that ingesting fava beans could cause lethal toxicity in select individuals. Today, this increasingly important field of scientific study offers an opportunity to rein in wasteful prescription spending.

Benefits professionals are well-served to learn as much as they can about this fast-growing science and its role in prescribing. Complex and high-cost specialty drugs dominate the drug pipeline in the United States, and are expected to account for 50% of drug spend by 2020. Many such drugs require testing for certain genetic and metabolic markers.

Thanks to the completion of the Human Genome Project and related research, scientists have gained greater insight into how the body responds to various substances. This research supports the use of pharmacogenetics to ensure safe and effective prescribing in an era of medicine where 70% of Americans take prescription drugs.

A Prescription for Wasteful Spending

America spends roughly \$200 billion annually on unnecessary and inappropriate prescription drug utilization, and up to \$1 trillion as a whole on wasteful healthcare expenses. With medical errors and adverse drug reactions considered the third and fourth leading causes of death in the nation respectively, the importance of smart prescribing cannot be ignored.

Today's prescription drug marketplace has seen the approval of therapies that can cost hundreds of thousands of dollars for a single treatment. Meanwhile, research shows that many important classes of drugs, ranging from mental health to cancer treatments, are effective in only 25-60% of the patient population. Benefit professionals must seek creative solutions to ensure that their clients provide access to the right care. Pharmacogenetics can be one those solutions.

Wasteful prescription spending goes beyond the purchase of medications that a member does not truly need. It encompasses spending on medications that might actually harm the member, or that may have no therapeutic effect for the member despite being used as recommended. It also includes spending on complications, additional medications to reduce side effects, and disease progression that could have been avoided if the right medication had been prescribed at the right dose the first time.

Using Metabolic Fingerprints to Target Medication Therapy

Each individual is unique. Just as no two people have the same fingerprints, no two individuals have the exact same metabolism. These variations affect how the body breaks down medications, and can be identified by testing for certain metabolic factors. Having access to pharmacogenetic data can help support a patient-centric benefit plan, reduce adverse drug reactions, and help reduce medical expenses.

The impact of metabolic variation is well known in a number of drugs, and that number is growing. Warfarin, a common blood-thinner, provides an excellent example. Differences in metabolism can affect how well the drug is processed in the liver, and what effect the drug will have on the body's production of vitamin K. The drug's FDA-approved label recommends using pharmacogenetic information when available to adjust dosage appropriately based on these factors.

It is vital to find the proper dosage for warfarin and similar drugs. After all, it is better to prevent serious complications than to attempt to deal with them after the fact. Patients who metabolize warfarin too quickly might receive no therapeutic benefit, leaving them at risk for heart attack, stroke, and other life-threatening cardiovascular events. If they metabolize it too slowly, they may experience elevated levels of the drug in their body, raising the risk of a major or even fatal bleeding event.

Real World Impact of Pharmacogenetics Testing

Studies show that pharmacogenetic testing does work. It not only allows tailored prescribing that improves health outcomes, it also cuts down on costs. In one study published in the *Journal of Medical Economics*, the use of pharmacogenetic testing lowered the frequency of hospital visits by roughly one third for senior patients taking more than one medication. It also reduced the frequency of emergency room visits by more than two thirds. Of the providers whose patients participated in the study, 95% found the testing to be helpful.

Another study, available through the National Institutes of Health, found that pharmacogenetic testing could save \$3,962 per year, per patient, when used to guide medication management for individuals diagnosed with depression. Pharmacogenetic testing may also improve adherence to prescribed medication for patients with difficult-to-treat psychiatric disorders.

Annual medical costs for certain patient populations may run as much as \$5,188 more per year in the absence of pharmacogenetic testing to determine optimal treatments compared to situations when pharmacogenetic data was applied. Research suggests that as much as 65% of some patient populations could be exposed to medications with known pharmacogenetic factors tied to adverse drug events. These adverse events, with properly implemented pharmacogenetic testing, can in many cases be avoided.

Pharmacogenetics continues to develop rapidly, and every secret researchers unlock puts more power in our hands to prevent adverse drug reactions, reduce wasted time and expense on trial-and-error prescribing, and avoid unnecessary hospital stays and emergency room visits. Ultimately, pharmacogenetics did not help Pythagoras in his own time. Today, it has the potential to save lives, and reduce the \$200 billion America wastes each year on inappropriate and unnecessary prescribing.