GTMRx Institute™

Get the medications right

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Pharmacogenomics: Improving outcomes, lowering costs by making precision medicine personal

About TRS: By the numbers

The Teachers' Retirement System of Kentucky is a defined benefit pension plan. It has 55,000 retired teachers receiving a pension annuity and more than 70,000 active teachers who are contributing into the pension system.

59 Average service retirement age

$36,000 Average pension (in lieu of Social Security)

36,000+ Number of Medicare-eligible retirees

6,377 Number of retirees over 80 as of 12/2018

$226 2019 monthly premium—down from $342 in 2010

A simple blood test can reveal how an individual will respond to their medication. When this information is applied at the level of populations, outcomes improve, complications reduce and savings accrue. That's the power of pharmacogenomics. When this information is integrated with a medication therapy management program, its impact is exponential. A teacher's retirement insurance fund in Kentucky shows how it can be done.

We've all heard the stat by now: **$528.4 billion** a year—16% of the total U.S. health care spend—is wasted on non-optimized medication use. Even worse are the 275,000 avoidable deaths associated with it.[1,2]

Precision medicine—specifically, pharmacogenomics—provides a powerful tool with which to chip away at these numbers.

Pharmacogenomics (PGx) is the study of genes and genetic variation that influences variability in an individual's response to medication. Several genes are responsible for differences in drug metabolism and response. PGx allows pharmacists and clinicians to better match the medication to the patient, improving the likelihood of therapeutic success while reducing the potential of toxicity.

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[1] Cutler DM, Everett W. "Thinking outside the pillbox: medication adherence as a priority for health care reform." *N Engl J Med.* 2010;362(17):1553-1555

[2] Watanabe J, *et al.* "Cost of Prescription Drug–Related Morbidity and Mortality." *Annals of Pharmacotherapy,* March 26, 2018. journals.sagepub.com/eprint/ic2iH2maTdI5zfN5iUay/full

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"Take a given population and look at its genetics: You will see that people respond differently, for example, to a given hypertensive medication, a given diabetes medication, a given blood-thinning medication," Steve Goldberg, MD, MBA, a member of the GTMRx Institute board and vice president, medical affairs, population health, chief health officer, health and wellness, at Quest Diagnostics.

Pharmacogenomics is the science of understanding those responses.

"PGx provides a way forward, offering the potential to personalize treatment and care of individuals, and optimize medication therapy," he says.

The challenge is getting that information into the point of care. The first step? Patient understanding.

Genetics, genomics, precision medicine, pharmacogenomics, genetic testing—for some patients, those concepts—even the language itself—can be intimidating. Any successful pharmacogenomic initiative needs to keep the patient top of mind, say Goldberg and Jane Cheshire Gilbert, CPA, director of retiree health care, Teachers' Retirement System of the State of Kentucky (TRS).

Pharmacogenomics testing with a retiree population: A program is born

For PGx to be successful, the genetics information must be intelligible and actionable. Patients must be able to understand how they will *personally* benefit when this information is incorporated into diagnosis and treatment.

That's the thinking behind the TRS Personalized Medicine Partnership. It's to help patients and reduce costs using pharmacogenomics and expert pharmacy review, explains Gilbert.

To achieve this, TRS contracted with a PGx vendor to handle the genetic testing. It also expanded its partnership with the Know Your Rx Coalition out of the University of Kentucky. The coalition's pharmacists use the genetic test results, in combination with information about other risk factors, to discuss possible medication changes with Medicare-eligible retirees and their doctors.

Before launching the pilot, TRS worked with its PGx vendor to get a baseline. "When we took a deep dive into our population, we initially discovered that 84% of our retirees are on medications that are influenced by genetics," says Gilbert. They also discovered that their Medicare-eligible retirees were on an average of 15 prescriptions. Roughly 75% of the population had high blood pressure, 58% had high cholesterol and 50% were suffering from pain and inflammation.

Using de-identified claims information, the PGx vendor provided an in-depth analysis of the possible return on investment with the program which found:

- 10% of members should stop taking a prescription immediately (potential savings: $1.7 million).
- 57% of members might need to adjust dosage (potential savings: $10 million).
- 33% of members have a better alternative medication available.

With such a significant potential impact to member health and cost savings, TRS launched a pilot for

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the TRS Personalized Medicine Partnership. The partnership includes the retirees, their doctors and pharmacists from the Know Your Rx Coalition.

It started by engaging members.

Getting buy-in: Communications matter

Communicating with members early and consistently contributed to the program's success, Gilbert says. The overarching message: TRS is making smarter use of the health care dollar through the program, because taking medications that don't work is bad for the member's health and for the TRS insurance fund.

All materials, from the invitation to participate to the data collection kits themselves, include the TRS logo. "What we wanted to do was make sure that our members were comfortable that this was a sanctioned pilot program by Teachers' Retirement System, the executive staff and the Board of Trustees." The invitation made clear that the data would be used only by the participating pharmacists and the members' physicians; TRS would have no access.

All of this contributed to members embracing the PGx program. "They're thanking us for actually running these tests. I think we underestimated our retirees and how much they would embrace this program. I'm glad we were wrong."

From early pilot success to full-scale adoption

The pilot began with those at greatest risk; after six months, the results were impressive: A 17% reduction in spending (the control group—a risk matched member group that did not enroll in the program—saw 2.5% increase in health care spending).

The program is now open to all of TRS's 36,000+ Medicare-eligible retirees, who have been invited to participate. To date, 7,875 have enrolled and of those, 5,741 have returned the kits with their saliva samples.

Bringing it home

When she talks about the program's success, Gilbert often shares one particular success story involving a retired teacher and her husband. The husband had a heart attack and, after a few days, was released from the hospital on a blood thinner.

"The retiree and the spouse had the wherewithal, on the way home, to call the Know Your Rx Coalition—which is pretty impressive." They told the pharmacist the husband had been prescribed clopidogrel, and they wanted to make sure it worked well with his genetic makeup. "Believe it or not, the husband was one of the 30% of people who did not respond to clopidogrel in any way, shape or form. So that drug was not going to be thinning his blood and helping him to stay away from another heart attack." He was put on a different medication and so far, is doing well.

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Pharmacists have developed medication action plans for 4,788 program enrollees. Both the physician and the patient receive a copy of the plans, which explains the results of the testing and the pharmacist's recommendation.

Of the medication action plans delivered for those enrolled in the program, 64% resulted in medication changes by a pharmacist. "That's pretty astounding," Gilbert says. Over 40% of the suggested medication changes are associated with drugs with DNA implications. The rest are the result of what she calls the "halo effect of working with the pharmacists." The medication therapy management process—in which the pharmacist spends about an hour with a patient—also identified drug-drug interactions, side effects and other issues that necessitated a change in therapy.

Enlisting the pharmacist: Patient-centered counseling

TRS was already using the Know Your Rx Coalition pharmacists to help members find lower-cost generic alternatives, to help when a drug changed tiers, etc. So, the PGx vendor trained and embedded those pharmacists in the PGx program. "We made sure that if a retired teacher wanted to have their DNA tested, that, when those results were known, we would have a pharmacist in place who could communicate the results to the patient in language they understood," says Gilbert.

Pharmacists would spend, on average, an hour discussing the results with a patient; this likely made a tremendous difference in the program's success—especially given that most of these patients are elderly. The average age of the TRS Medicare-eligible retiree is 74. As of the most recent annual inquiry, 39 are over 100, and more than 6,300 are older than 80.

After these conversations with patients, the pharmacists then reach out to the primary care physician, with the patient's permission, and discuss the recommended medication changes. And those recommendations are taken seriously.

Physicians embrace medication therapy management

Gilbert found the physicians' acceptance of the initiative gratifying and "astounding." Prescribing physicians almost universally accepted the pharmacists' recommendations.

"We were worried that physicians would not accept the results, but they did—94% of the time," Gilbert says. Like the retirees, physicians were generally appreciative. "We're hearing a lot of positive feedback, such as 'you're helping me become a better doctor, to take better care of my patients and to be able to prescribe the right drug at the right time for them.'"

This surprises Goldberg not at all. "From the perspective of the physician, pharmacogenomics testing has at least three benefits," he says. It avoids wasting money on ineffective medications, it prevents avoidable unpleasant—or possibly fatal—side effects related to some medications and it improves the efficacy of the physician's comprehensive treatment plans, which leads to improved quality of life.

"One of our goals is for doctors to no longer have to do a trial-and-error type of prescribing, no more just titrating and playing with the dosage. Our hope is just the same as the Get the Medications Right Institute's: that we can get the medication right the first time, saving our members considerable pain and suffering and saving the plan a lot of money," Gilbert says.

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Integrating the data

Genetic testing, although essential, is merely the first step. The data must be integrated.

Test results have to be gathered, rigorously vetted and communicated in a way that both the primary care physician and the patient can understand. They need to be viewed in the context of dozens of other patient-specific prescribing risks. "Information has to be in a form that can be discussed with a given patient, and engaged by a prescriber, and by a pharmacist who can work as part of an interdisciplinary care team, to drive the optimal outcomes that will follow from this medication," Goldberg says.

Gilbert agrees. "Real-time modeling should allow pharmacists and doctors to see the results of medication changes before they experiment with them on their patients."

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The testing was not reimbursable, so the TRS medical insurance trust fund decided to cover the costs. Ideally, that will be a short-term solution as reimbursement improves. "Our goal is that this become a standard of care so we can make sure that the large payers in the nation are paying for this as they do with any other standard of care."

A scalable model

There's tremendous interest in pharmacogenomics in general and the TRS program in particular. Gilbert believes it can be a model for employers and other benefit managers because it's fully scalable.

"I think we're all trying to move forward with pharmacogenomics being a standard of care and folks not spending months or years on a drug that's doing them no good whatsoever or, in fact, hurting them," she says. "The science exists. We just want to make sure that becomes a standard of care."

Goldberg agrees. The next step, he says, is to integrate comprehensive medication management into pharmacogenomics. "Other examples show even greater gains from implementing full comprehensive medication management. It's to everyone's benefit to make these services available much more expansively. It saves lives *and* saves money." GTMR

About the Experts

Jane Cheshire Gilbert, CPA
Director of Retiree Health Care for the Teachers' Retirement System of the State of Kentucky

Jane Cheshire Gilbert has served TRS retirees since April 2002. She manages two retiree health plans covering 48,000 retirees. She also serves as a leader in the areas of health insurance cost containment, project management, risk management and federal health care solutions.

Gilbert served in management and directorship positions for a Louisville, Kentucky law firm and a cost containment company, The Rawlings Company, from 1989 through 2002. Prior to that, she worked as an accountant for a national CPA firm.

Gilbert earned a bachelor's degree in accounting from Bellarmine University in Louisville, Kentucky and is a certified public accountant and a certified government benefits administrator. She currently serves on the board of the State and Local Government Benefits Association and is a member of the Public Sector Healthcare Roundtable.
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About the Experts *(cont.)*

Steven Goldberg, MD, MBA
Vice President, Medical Affairs, Population Health, Chief Health Officer, Health and Wellness at Quest Diagnostics

Steven Goldberg, MD ("Dr. G") works to drive innovation and value in employer population health and precision medicine. He serves as the vice president, medical affairs, population health, chief health officer, health and wellness, at Quest Diagnostics, a position he has held since 2016.

At Quest, he leads employee health, where his team has driven improved member experience, improved population health and bent cost trends for the company's 46,000 employees and their families. The Medical Affairs division at Quest Diagnostics, for which he serves as the vice president, provides publications support for Quest's diagnostics pipeline.

Before joining Quest, Steve was senior vice president and chief medical officer at WellCare Health Plans, a provider of government-sponsored managed care services, where he was responsible for leading WellCare's clinical functions, including enterprise-wide quality and accreditation results. He has previously served in executive medical management roles with Aetna, Express Scripts, Humana and Excellus BCBS.

Steve earned his undergraduate degree from Georgetown University, his MD from Jefferson Medical College, completed the United Health Services Family Medicine Residency in Binghamton, New York, and earned an MBA at Binghamton University. He is board certified in family medicine and maintains a part-time clinical practice. He is a volunteer for No More Red Dots, an initiative dedicated to reducing incidents of gun violence in Louisville, Kentucky.

GTMRx Institute™
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8230 Old Courthouse Road, Ste. 420
Tysons Corner, VA 22182
703.394.5398 ▪ www.gtmr.org

Our **VISION** is to enhance life by ensuring appropriate and personalized use of medication and gene therapies.

Our **MISSION** is to bring critical stakeholders together, bound by the urgent need to optimize outcomes and reduce costs by *getting the medications right.*

About the GTMRx Institute The GTMRx Institute is a catalyst for change that brings critical stakeholders together, bound by the urgent need to get the medications right. We are physicians, pharmacists, caregivers health IT innovators, drug and diagnostics companies, consumer groups, employers, payers and health systems—aligned to save lives and save money through comprehensive medication management, or CMM. By showcasing evidence and innovation, we motivate practice transformation and push payment and policy reform. Together, we ACT to champion appropriate, effective, safe and precise use of medication and gene therapies. Learn more at gtmr.org.