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St. Jude Implements PG4KDS Pharmacogenetic Testing

One of the biggest barriers to the adoption of pharmacogenetics is uncertainty about implementation, but major institutions are already pursuing pharmacogenetics. For instance, St. Jude Children's Research Hospital just published their pediatric pharmacogenetics program model.

St. Jude Children's Research Hospital is a pediatric treatment facility located in Memphis, Tennessee that's famous for its dedication to patient care and its embrace of innova-

tive strategies. They've always been interested in personalizing medicine—now they're implementing a new pharmacogenetics testing program as well.



"If we can test patients before they are treated with those medications, we have an opportunity to choose a better drug or a better dose of the drug right from the start."

This implementation is timelier than ever. Mary Relling, PharmD, the St. Jude Pharmaceutical Sciences chair, says in an article, "There are now several medications strongly affected by genetic variation; if we can test patients before

they are treated with those medications, we have an opportunity to choose a better drug or a better dose of the drug right from the start."

St. Jude's program involves testing CYP2D6, CYP2C19, TMPT and SLCO1B1 and tying

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Psychiatrist's Love of Technology Translates into Better Patient Care

Something a patient might notice when they're talking with Dr. Michael Rieser is his computer. It might, for instance, be filling itself with words – the patient's own words – recorded, transcribed and saved to the patient's file automatically. Dr. Rieser, a psychiatrist working in Lexington, Kentucky, has always been interested in technology that can help him provide better patient care and it's evident in his practice. Now he is using it to better manage medications as well.

"This technology is a bit like the invention of X-rays... It has a big impact on your decision making."

Dr. Rieser is board-certified in child and adolescent psychiatry, adult psychiatry and emergency medicine. He works as the medical director at the Ridge Behavioral Health System, a 110-bed practice in Lexington that consists of a mix of psychiatrists and internists who perform in-patient, multi-unit services. It can get very busy. "We get patients from all over

Kentucky at this hospital," said Dr. Rieser.

One of the biggest challenges Ridge Behavioral Health deals with is the high number of medications newly admitted patients are taking. "Some of those patients may come in with 25 or 30 medications." This can be dangerous since

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Can the Marriage of Pharmacogenetics and EHRs Solve Adoption Problems?

Don't be intimidated by the idea of starting to use pharmacogenetics in your clinic – the tools you need may already be at your disposal.

The New England Healthcare Institute states that medication management tools such as pharmacogenetic testing can help reduce readmissions and prevent costly adverse drug events. After all, a 2010 study by Davies *et al.* found that 20% of hospital readmissions were due to adverse drug reactions. However, Stanek *et al.* found in 2012 that a lack of information, especially about when and how to use pharmacogenetics, was a major barrier to adoption.

But the key to implementation may already exist in your practice.

Are you making the most of your EHR?

Medication management tools can be integrated into existing EHRs and a number of different products are available on the market today. One of the main benefits of integrating pharmacogenetic analysis is the software can evaluate all patient medication regimens and provide the prescriber with notifications of who may benefit from pharmacogenetic testing. Doctors don't have to become experts in the science of pharmacog-

“Doctors don't have to become experts in the science of pharmacogenetics, but can rely on evidence-based analysis and alerts instead.”

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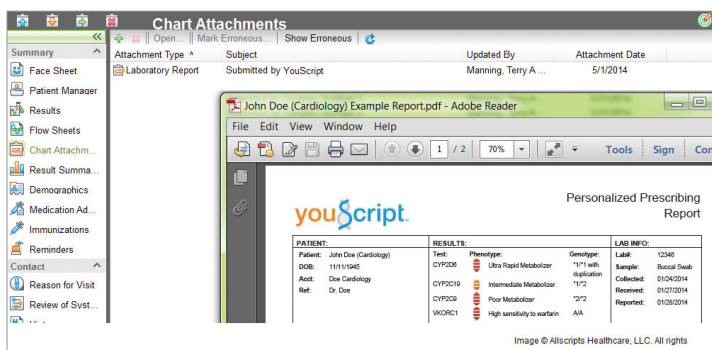
Medication management programs may also come with other benefits as well. For instance, other benefits of using the YouScript® Personalized Prescribing software can include:

- **Active Analysis:** Regular, automatic analysis highlights which patients are at risk for adverse drug events and which patients have known interactions in their drug regimen. Medications sync to YouScript from the patient's chart in real-time.
- **Automatic Notifications and Recommendations:** YouScript looks at scheduled patient appointments and automatically sends a report of high risk patients. Providers are notified when genetic test

results are ready for review.

- **Customizable Integration:** Each integration is customized to the practice's workflow to make it easy to incorporate testing and analysis. Options include a configurable requisition form which merges patient information from their chart; adding YouScript to the launch menu; and single-sign on allowing the prescriber to explore and audition new medications before making prescription changes in the EHR.

YouScript is already a certified Allscripts™ EHR Application and is working with several other EHR vendors to incorporate pharmacogenetic analysis into their workflows. If you are interested in integrating YouScript into your EHR, make your request at <http://info.youscript.com/integrate>.



St. Jude Implements Pharmacogenetic Testing

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those genotypes to twelve high-risk drugs in the EHR. Testing results showed that 78% of children tested had at least one high-risk genotype.

This program is buoyed by a strong support structure, including a Family Advisory

Council and Ethics Committee, a Pharmacogenetic Oversight Committee, a clinical pharmacogenetics coordinator and an accredited residency training program. Plans are in place to eventually implement more complex testing processes and at least eight new

Testing results showed that 78% of children tested had at least one high-risk genotype.

genes. St. Jude credits their institution-wide support and education programs for their success.

Other well-known institutions that are pursuing pharmacogenetics include the Mayo Clinic, Johns Hopkins University, the Cleveland Clinic and Baylor College of Medicine.

Opioid Overdose Continues to Rise

A worrisome trend continues. Despite medical and government efforts, opioid-related deaths continue to rise across the country. According to the CDC, drug overdose death rates have more than doubled in the past 15 years and now take more lives than automobile accidents among 25 to 64-year-olds.

Rates of abuse seem highest in white, middle-aged males and translate to a financial burden for the United States of over \$50 billion per year. Over half of the deaths the CDC reported were related to prescription medications.

“Drug overdose rates have more than doubled in the past 15 years and now take more lives than automobile accidents.”

Opioid prescriptions rates vary by state. According to the CDC's Morbidity and Mortality Weekly Report, the highest numbers seem to be concentrated in the southeast parts of the country, with Alabama, Tennessee and Kentucky topping the charts. Twelve states had more than one prescription per person. Alabama, for instance, had 143 opioid prescriptions for every 100 people.

Opioids are widely used painkillers, but dosing must

be carefully monitored due to their addictive qualities. Many patients become addicted to opioids while in the hospital and resort to illicit means to get painkillers once their prescription runs out. Government and private institutions are pushing for changes in opioid prescribing to help combat this trend, including greater access to substance abuse treatment and prescription drug monitoring programs.

Prescribers can also potentially help curb trends by being aware of the pharmacogenetic considerations surrounding opioid medications. Precisely dosing opioid medications can be difficult because many are processed by the highly variable CYP450 family of enzymes, which means other drugs within a patient's regimen and the patient's own genetics may influence the opioid's efficacy, which can, in turn, lead to accidental overdosing.

To learn more about genetically-caused opioid interactions, visit <http://genelex.com/clinical-guidance/pain/>.

Technology Translates into Better Patient Care

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a patient's chance for adverse drug effects rises with each medication they take. Luckily, there are clinical decision support tools to help avoid these problems, like YouScript®. Dr. Rieser's been one of the hospital's biggest proponents of these technologies. “They've got computers littered all over the hospital so I can go anywhere and run it. People are used to seeing me use it.”

Improving Patient Health

Dr. Rieser started using YouScript in 2011. “When I started using it, I was so overwhelmed with how many drug interactions there were. You pick up some of these toxic antidepressant effects, it's really common... Now, even the short regimens, just a couple of medications, I check them in YouScript.”

Dr. Rieser's interest in medication management came to a head with one particular case. A boy, about 12, was admitted as psychotic. His history included ADHD, then later bipolar disorder, both of which came with various medications. As a routine part of his care, Dr. Rieser put the patient's drug list into YouScript. “When I punched it in, something jumped out at me.” The child had been prescribed both Prozac® and dextroamphetamine concurrently. “The Prozac inhibited the metabolism of the dextroamphetamine and doubled the blood level,” Dr. Rieser explained, “so the kid was basically amphetamine toxic and not sleeping. I'd get psychotic too.” The root cause of the kid's psychosis was in his

drug regimen, not his brain. Dr. Rieser decreased the child's dose of dextroamphetamine and the patient recovered.

Encouraging Adoption

Patients and other prescribers seem interested in the program, although they're sometimes hesitant to adopt it themselves. This isn't uncommon, as implementing new workflow procedures often take time. Nevertheless, Dr. Rieser feels

that most prescribers will come around.

“This technology is a little bit like what happened when physicians were being exposed to X-ray reports for the first time. You get to see stuff you've never seen before, and you end up seeing stuff you never would have imagined would have been there. It has a big impact on your decision-making.”

Why Test?



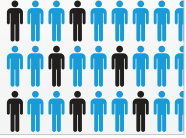
Every year, more than 2.2 million severe adverse drug events are reported in the US.

Visit www.youscript.com/riskanalysistrial to get started today.

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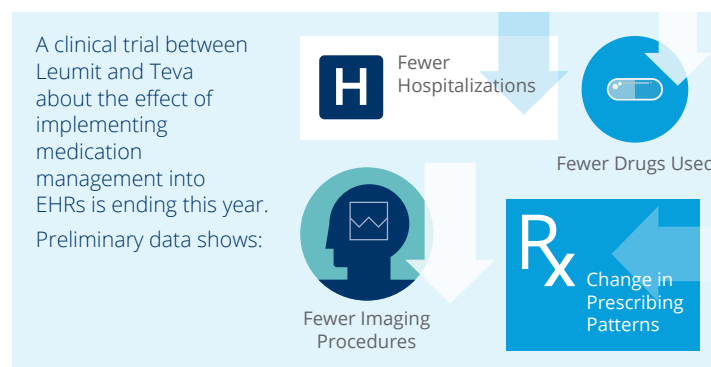
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Study Shows Promise for Reducing Unnecessary Procedures

An immense medication management trial sponsored by Leumit Health Care Services, an Israeli health fund, and Teva Pharmaceuticals is ending this year. The trial examined the clinical outcomes of using integrated drug and gene interaction alerts in an EHR, something few other studies have done and which has been sorely needed in the industry.

The study involved Leumit integrating a new medication management program, DDI+, into the EHR of half of its prescribers. This is a huge population — Leumit is working with its entire body of 2,000



doctors and 700,000 patients. Additionally, a 1000-patient genetic-testing subarm received Genelex testing for the genes CYP2D6, CYP2C9, CYP2C9 and VKORC1. DDI+ was created with information from

First Databank and YouScript® and provides prescribers with graphic alerts for potential adverse effects.

Outcome variables included the number of emergency room referrals, hospitalizations,

imaging procedures and the number of medications, as well as the costs associated with these variables. As of now, data collection is complete and preliminary numbers are promising. Initial results also showed a small but significant drop in the number of hospitalizations, drugs used and imaging procedures performed. Additionally, a substantial number of physicians changed their prescribing patterns when they received warnings.

Final analysis is still underway and is expected to be published early next year.