Pharmacy-Led Genomics Initiative Cuts 30-Day Hospital Readmission

By David Wild

New Orleans—A pharmacogenomics (PGx) program headed by pharmacists at the University of Illinois Hospital and Health Sciences System (UI Health) has yielded compelling evidence that targeted genotyping of high-alert medication recipients is both clinically and financially beneficial. By performing gene–drug testing and issuing dose recommendations, the pharmacists leading the program helped cut 30-day anti-thrombotic-related hospital readmissions by 77% and avoided an estimated $2,000 in spending per patient.

The project’s success received the 2015 American Society of Health-System Pharmacists’ ASHP Foundation Award for Medication-Use Excellence, with the awardees honored during the 2015 ASHP Midyear Clinical Meeting. According to one expert, the UI Health initiative provides clear evidence that pharmacists are effective leaders of PGx programs.

“A lot of us believe that pharmacists [as opposed to physicians] are best positioned to lead these programs, since our job is to optimize pharmacotherapy, and pharmacogenomics is simply another way of doing that,” commented Mark Dunnenberger, PharmD, the director of NorthShore University HealthSystem’s pharmacogenomics program, in Evanston, Ill. “It’s clear from the success of this initiative that pharmacogenomics fits well into our wheelhouse and that we can effectively integrate it into clinical care.”

Edith Nutescu, PharmD, MS CTS, the program’s co-director, said the program is a collaboration between the departments of pharmacy, medicine, cardiology, hematology, molecular pathology, and information technology and health-system administration. She stressed, however, that pharmacists have been at the helm of the PGx project, heading up everything from the program’s design to the collection, analysis and dissemination of data on the program’s influence. “With our comprehensive knowledge of medications, pharmacists are uniquely positioned to lead an
interprofessional precision medicine effort like ours and to champion the inclusion of pharmacogenomics into the therapeutic decision-making process,” Dr. Nutescu said.

**Technology Kick-Start**

UI Health’s PGx workflow starts when the clinical decision support (CDS) feature in the hospital’s electronic health record (EHR) flags a patient as a candidate for genotyping, based on the drug being prescribed. The prescribing clinician is given an option to order a genotyping test and can request a PGx consult with a clinical pharmacist. If they order a test (genotyping is done using the eSensor XT-8 system [GenMark DX]), the clinical laboratory and clinical pharmacist are notified via the EHR, and the pharmacist also verifies that genetic testing is appropriate for the patient.

“Once the order is placed, our goal is to have the genotyping results and dose recommendations available in the patient’s EHR within 24 hours,” Dr. Nutescu said.

The genotype test results are sent from the lab to the clinical pharmacist and are entered into the EHR. Based on the results and the patient’s clinical and sociodemographic factors, the clinical pharmacist issues a dosing and therapy recommendation, documenting it in the EHR in a pharmacy consult note that is forwarded to the medical team.

Dr. Nutescu noted that pharmacists continue their involvement in the care of these patients after the clinician implements the recommendations and initiates treatment, assessing the patients’ drug response and issuing additional recommendations for dose adjustments if they are required to achieve a stable therapeutic dose. Discharged patients also are given a written report with their genotype findings, along with educational materials explaining the relevance of the findings. If they are transitioned to another facility, that facility also will receive a report and dose recommendations.

UI Health is rolling out the initiative in four phases, starting with anti-thrombotic patients and widening the scope to include inpatients receiving opiates, chemotherapy drugs and antidepressants with each successive phase. To date, her team has collected clinical and financial outcomes from the first phase of implementation, focusing on patients receiving clopidogrel or warfarin (Figure).
At the time of abstract submission, 800 inpatients had been prescribed warfarin or clopidogrel and genotyped as part of the program. Dr. Nutescu’s team analyzed data from 389 of these patients who had been treated with warfarin specifically, comparing their outcomes with 308 historical controls who had received warfarin before the program’s implementation. In her group’s ASHP abstract, Dr. Nutescu reported that rates of treatment-related 30- and 90-day hospital readmissions were 77% and 68% lower, respectively, in the PGx group than in the historical comparison group (30-day readmission risk ratio [RR] for genotyped patients, 0.23; 95% CI, 0.05-1.09; P=0.06 and 90-day readmission RR, 0.32; 95% CI, 0.12-0.82; P=0.01).

The PGx program also was associated with shorter times to attain target international normalized ratio (INR) levels, she said, and as a result, these patients required less low-molecular-weight heparin use as bridge therapy to therapeutic anticoagulation. Specifically, the median time to first therapeutic INR was four days (range, two to six days) in the genotyped group, compared with 11 days (range, seven to 15 days) in the control group (P<0.001).
In an analysis weighing the costs of the program against reduced spending for treatment-related events and re-hospitalizations, Dr. Nutescu’s team found that the anti-thrombotic PGx initiative cut spending by $2,044.00 per patient.

A caveat regarding the analysis is that it did not include the cost of an initial investment in genetic testing equipment. “Depending on the volume of testing they would be performing, other institutions would need to determine whether it makes more sense to perform in-house or send out testing,” she explained.

Dr. Dunnenberger congratulated the UI Health program for “starting out by targeting warfarin patients, which is a particularly tricky population since you need those genotype findings very soon after starting therapy to make it clinically useful. They’ve managed to get those results into the clinical decision process within a day, which is very impressive.”

—David Wild

Drs. Nutescu and Dunnenberger reported no relevant financial relationships.

Five PGx Outsourcing Options

Many health systems still lack the staff expertise and equipment to start even a modest pharmacogenomics (PGx) testing program. For such facilities, outsourcing may be a good option. Although not an inclusive list, the testing companies below can be a good place to start for hospitals interested in taking a more personalized approach to medication management.

Assurex Health
https://assurexhealth.com
Specializes in tests that determine the genetically appropriate medication(s) for individual patients suffering from neuropsychiatric and other medical conditions.

GenToX
www.gentoxtesting.com
Test kit identifies genetic markers that affect drug metabolism and delivers information to clinicians “in a comprehensive report to ensure maximum drug efficacy with little to no adverse effects.” Also offers inherited cancer screenings for up to 33 genes that are common in patients with certain types of cancer including, but not limited to, breast, ovarian and colorectal.
PCLS
www.pcls.com/testing/pharmacogenetics
Offers pharmacogenetic testing that analyzes genetic variants related to patients’ responses to medications in pain management, substance abuse, and mental and cardiovascular health. Company claims turnaround times of three to five days from receipt of sample, with “easy to read reports highlighting clinical significance to help guide customized therapy.”

Admera Health
http://www.admerahealth.com/products
Offers genetic testing solutions that provide “medically actionable, clinically relevant data and interpretation for physicians… in a very easy to interpret report,” according to the company’s website. Its pharmacogenomic test covers more than 160 commercial drugs related to genes associated with pain management, cardiovascular disease, psychiatry, cancer, and other indications. Additional products include assays for cardiovascular disease and oncology.

Well Med Rx
www.wellmedrx.com
Provides genetic tests for FDA-flagged cardiovascular, pain management and psychiatric drugs that benefit from PGx testing. System integrates with most electronic health records, template letters and forms, and personalized patient prescription reports.