

# Community pharmacists' experience with pharmacogenetic testing

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## Abstract

**Objective:** To characterize the experiences and feasibility of offering pharmacogenetic (PGx) testing in a community pharmacy setting.

**Design:** Pharmacists were invited to complete a survey about PGx testing for each patient who was offered testing. If the patient consented, pharmacists were also asked to complete a follow-up survey about the process of returning PGx testing results to patients and follow-up with the prescribing provider.

**Setting:** Community pharmacies in North Carolina from August through November 2014.

**Participants:** Pharmacists at five community pharmacies.

**Main outcome measures:** Patient consent for testing, time to introduce PGx testing initially and communicate results, interpretation of test results, and recommended medication changes.

**Results:** Of the 69 patients offered testing, 56 (81%) consented. Pre-test counseling typically lasted 1–5 minutes (81%), and most patients (55%) did not have any questions about the testing. Most pharmacists reported test results to patients by phone (84%), with discussions taking less than 1 minute (48%) or 1–5 minutes (52%). Most pharmacists believed the patients understood their results either very well (54%) or somewhat well (41%). Pharmacists correctly interpreted 47 of the 53 test results (89%). All of the incorrect interpretations were for patients with test results indicating a dosing or drug change (6/19; 32%). Pharmacists reported contacting the ordering physician for four patients to discuss results indicating a dosage or drug change.

**Conclusion:** The provision of PGx services in a community pharmacy setting appears feasible, requiring little additional time from the pharmacist, and many patients seem interested in PGx testing. Additional training may be necessary to improve test result interpretation, as well as for communication with both patients and ordering physicians.

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Pharmacogenetic (PGx) testing analyzes genes involved in drug metabolism, transport, or drug targets and is therefore capable of providing important information about a patient's genetic likelihood to respond to a given medication or risk of an adverse drug response (ADR).<sup>1</sup> Accordingly, a number of drug labels have been revised to include information about the impact of genetic variants on drug efficacy or ADRs.<sup>2</sup>

The drugs impacted by PGx variants span a range of clinical indications in a variety of practice areas, including oncology, psychiatry, and cardiology. For example, the cytochrome P450 (CYP) 2C19 gene is associated with ADRs for the commonly used antiplatelet drug clopidogrel, while the solute carrier organic anion transporter family member 1B1 (SLCO1B1) gene is associated with reduced efficacy for the cholesterol-lowering medication simvastatin.

As many as 30% of patients of European ancestry taking clopidogrel may have a genetic variant associated with a lack of response.<sup>3,4</sup> In addition, the U.S. Food and Drug Administration (FDA)-approved package insert for clopidogrel includes a black box warning about reduced effectiveness in patients with a variant in the CYP2C19 gene resulting in poor metabolism.<sup>5</sup> The SLCO1B1\*5 genetic variant has been associated with myalgia in patients taking simvastatin.<sup>6</sup> Guidelines developed by the Clinical Pharmacogenetics Implementation Consortium (CPIC) provide recommendations for

management of poor, intermediate, extensive, and ultra-rapid CYP2C19 metabolizers,<sup>7</sup> as well as SLCO1B1\*5 variants.<sup>8</sup>

As more PGx tests become available, the issue of how best to deliver clinical testing must be considered. A number of delivery methods using multiple potential providers have been proposed,<sup>9</sup> including test ordering by community pharmacists.<sup>10-12</sup> In addition to their primary role of dispensing medication,<sup>13</sup> pharmacies offer such health services as blood pressure monitoring, vaccinations, and clinical testing and screening.<sup>14-16</sup> Because pharmacists are trained to screen for drug interactions that may cause ADRs or have poor response, the introduction of PGx testing would be a logical extension of the services currently provided at community pharmacies. Further, patient trust and physician acceptance of pharmacist recommendations suggest that pharmacists may be optimal providers of PGx testing.<sup>17,18</sup>

## Objective

The primary goal of our study was to characterize community pharmacists' early experiences with PGx testing. Specifically, we were interested in 1) the amount of time it would take pharmacists to provide PGx testing, 2) patient interest in undergoing PGx testing, 3) pharmacists' perception of patients' post-test comprehension, 4) pharmacists' interactions with prescribing physicians regarding PGx test results, and 5) changes made to prescriptions based on PGx test results. These objectives are all related to factors that would likely have a considerable impact on the decision to provide PGx testing as an adjunct to other pharmacy services, as well as on the practice of providing PGx testing in a community pharmacy. This study is significant because it demonstrates the feasibility of offering PGx testing in a community pharmacy setting and will therefore inform other pharmacies that are considering offering PGx testing.

## Methods

### Study period

The study took place between August and November 2014. Pharmacists completed surveys at two time points for each patient offered PGx testing: 1) when testing was offered (pre-test survey) and 2) after testing was completed for consenting patients and test results were communicated (post-test survey). The Duke University Health System Institutional Review Board approved this study.

### Delivery of PGx testing

Participating community pharmacies offered PGx testing for CYP2C19 (for patients with an active prescription for clopidogrel) and/or SLCO1B1 (for patients with an active prescription for simvastatin). Pharmacists initially contacted patients by phone or in person to introduce and discuss PGx testing. To encourage standardized

## Key Points

### Background:

- Pharmacogenetic (PGx) testing may improve treatment outcomes by providing information about efficacy of a given medication or risk of adverse response.
- PGx testing is typically offered in clinic and hospital-based settings but is beginning to be offered in community pharmacies.
- The experiences and knowledge of community pharmacists using PGx testing is unclear at this time.

### Findings:

- Customer interest as evidenced by the high rate of consent to testing and the minimal time required of pharmacists to conduct testing indicates that it may be feasible to provide PGx testing services in the community pharmacy setting.
- Additional pharmacist training in PGx and physician consultation may be warranted to improve interpretation of PGx testing results and follow-up with health care providers.

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