Feasibility of implementing a personalized approach to chronic pain management using CYP2D6 genotype in a primary care clinic

D. Max Smith, PharmD[1]; Kristin Weitzel, PharmD, FAPhA[2]; Randy Hatton, PharmD, FCCP, BCPS[2]; Amanda R. Elsey, M.H.A. [2]; Larisa Cavallari, PharmD[2]; Julie A. Johnson, PharmD[2]

[1]Department of Pharmacy, UF Health Shands Hospital, Gainesville, FL; [2]College of Pharmacy, University of Florida, Gainesville, FL.

BACKGROUND

- Codeine, tramadol, and selected other opioids are metabolized by cytochrome P450 (CYP) 2D6 to forms which have a greater affinity for μ-opioid receptors.
- *CYP2D6* genotype polymorphisms can lead to altered plasma concentrations and analgesic effects of these medications.
- Clinical Pharmacogenetics Implementation Consortium (CPIC) guidelines provide clinical guidance, but additional data are needed regarding incorporating these data into clinical practice.

OBJECTIVES

Primary:

- Determine the logistical feasibility of a personalized approach that incorporates *CYP2D6* genotype data in an interdisciplinary chronic pain management service

Secondary:

- Describe how pharmacists incorporate *CYP2D6* genotype data into medication therapy problem identification
- Summarize pharmacists' recommendations to the physician.

METHODOLOGY

Design:

- Single center, retrospective, chart review using descriptive statistics
- Approved by the University of Florida IRB

Inclusion criteria:

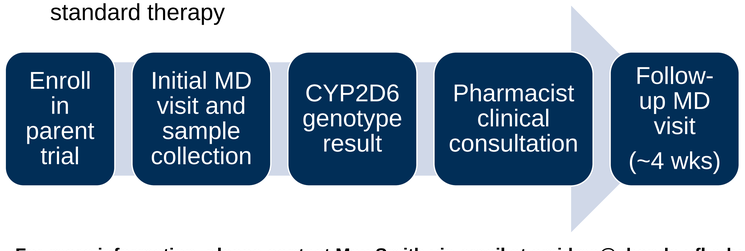
- Enrolled in parent trial at an implementation site between 05/01/2015 and 12/16/2015
  - Adults treated in a family medicine clinic
  - History of pain for at least 3 months
  - Prescribed medication for pain relief

Exclusion criteria:

- Pain for less than 3 months
- Not currently prescribed any medication for pain

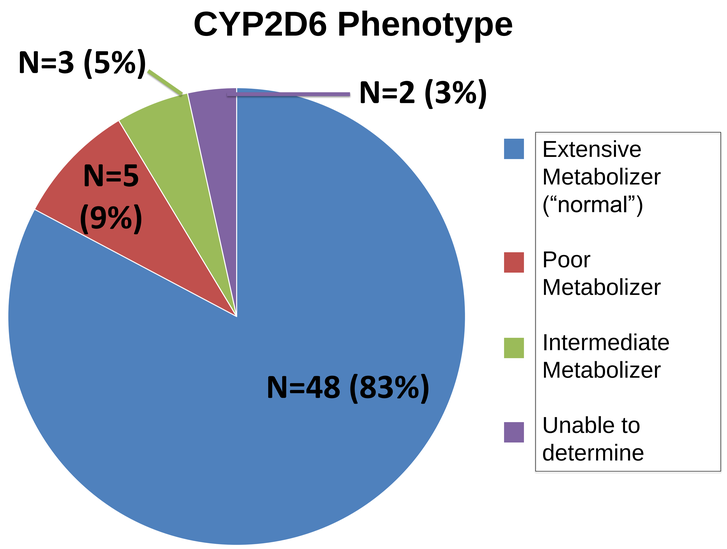
Parent Trial:

- Non-randomized, parallel assignment, open label, prospective trial
- Compares pain scores between patients who received *CYP2D6* genotyping plus a pharmacist consultation to those who received standard therapy



For more information, please contact Max Smith via email at smidma@shands.ufl.edu

BASELINE DEMOGRAPHICS



- N = 58; 43% male
- Average age: 55 years
- 72% White and 28% Black or African American
- Nearly two thirds of extensive metabolizers were prescribed a CYP2D6 interacting medication
  - Strong CYP2D6 inhibitor: 11 (23%)
  - Moderate/weak CYP2D6 inhibitor: 20 (42%)
  - No CYP2D6 inhibitor: 17 (35%)

PRIMARY OUTCOME

Determine feasibility of incorporating *CYP2D6* genotype data into pain management services.

Definition of feasibility:

- Patient buccal sample successfully ordered and collected
- *CYP2D6* genotype result entered into electronic medical record (EMR) prior to follow up visit
- Pharmacist consultation note provided to prescribing clinician prior to patient follow up visit

Results:

- 54 of 58 patients (93%) met all defined feasibility components

Reason Feasibility Component Unmet	N (%)
Sample recollection needed	2 (3.5)
Genotype required further analysis	1 (1.7)
Enrollment at an atypical time period	1 (1.7)

The authors have no conflict of interest to disclose

SECONDARY OUTCOMES

Table below summarizes the most common types of drug therapy recommendations made by pharmacists to physicians for n = 58 study subjects.

Type of Recommendation*	Non-Extensive Metabolizers (%)	Extensive Metabolizers (%)
Consideration for future therapy	56	27
Monitor for lack of efficacy	22	27
Monitor for specific adverse events	17	31

*All other drug therapy recommendations were made in ≤6% of subjects.

Table below summarizes the most common types of medication-related problems (MRPs) identified by pharmacists for n = 58 study subjects.

Type of Medication-Related Problem*	N (%)
MRP puts patient at higher risk for adverse effects or a lack in efficacy	52 (69.3)
A potential future MRP has been identified if therapy were modified	20 (26.7)

*All other MRPs occurred at a rate of ≤ 2%

CONCLUSIONS

- It is feasible to implement a personalized approach that incorporates *CYP2D6* genotype data and pharmacist consultation into an outpatient family medicine clinic.
- In addition to genotype, CYP2D6 drug interactions may also play a significant role in identified medication-related problems.
- Most recommendations were related to increased risk for adverse effects or lack of efficacy.

REFERENCES

1. Crews KR, Gaedigk A, Dunnenberger et. al; Clinical Pharmacogenetics Implementation Consortium. Clinical Pharmacogenetics Implementation Consortium guidelines for cytochrome P450 2D6 genotype and codeine therapy: 2014 update. Clin Pharmacol Ther. 2014 Apr;95(4) 376-82.
2. Implementing Genomics in Practice (IGNITE) Proof of Concept Study: Genotyping in Family Medicine Clinics. NCT02335307.

ACKNOWLEDGEMENTS

Funded by NIH grants U01 HG007269, U01 GM074492, U01 HL105198, UL1TR000064 and substantial institutional support from UF

CHFM Research Night; Gainesville, FL; June 23, 2015