Pharmacogenomics in Community Pharmacy
“Better Information, Better Decisions”

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Goodrich Pharmacies
CEO – Managing Partner
What is Pharmacogenomics?

PGx
Pharmacogenomics (PGx)

PGx = how genes affect a person’s response to medication

PGx testing helps predict how patients may respond to medications

Previous misconception that drugs are “one size fits all”

http://personalizedhealthsolutions.com/services/pharmacogenomics/
PGxTesting

- Start with a cheek swab
- Lab creates report
- Report contains four types of proteins
  - Enzymes
  - Receptors
  - Transporters
  - Neurotransmitters
Drug-Metabolizing Enzymes

- **Poor Metabolizer**—poor functioning enzyme (potential for increased toxicities)
- **Normal Metabolizer**—normal functioning enzyme
- **Rapid Metabolizer**—rapid functioning enzyme (potential for ineffective drug therapy)
How to Utilize Results

**Efficacy**
- Medication selection
- Appropriate dosing

**Safety**
- Eliminating adverse drug events
- Fewer side effects

**Adherence**
- Avoiding drug-drug interactions
- Feeling better = proven efficacy
Clopidogrel (Plavix) Metabolic Pathway

A Prodrug Requiring Activation by CYP2C19

https://www.pharmgkb.org/pathway/PA154424674
How many medications are prodrugs?

Since 2008, more than 12% of newly approved small molecules are prodrugs and this number is expected to climb.

Approximately 10% of all drugs worldwide are prodrugs!

With an estimated 3,732 approved drugs internationally, that means there are approximately...

400 prodrugs!
Implementation
Starting With Opioids

- Codeine (a prodrug) is activated by \textbf{CYP2D6} to Morphine
- There is a large variance amongst \textbf{CYP2D6} enzymes across patient populations.
- Great impact on patients
  - Ineffective drug if poorly metabolized
  - Severe side effects if metabolized to quickly
Pharmacy Work Flow

Recruitment: Referrals, Handoffs, Walk-ins

Pre-Test: Medication review as part of initial visit and sample collection

CMR & Swab

Follow-Up: Recommendations given to patient and sent to providers

Summary Letter

RPh Counseling

Results reviewed with patient by RPh
Results

Patients

- 13 Total Patients
- 7 Referrals
- 2 Self-ID
- 12 Follow-Ups

Max Out of Pocket: $459

Insurance Coverage

- 7 Private Insurance
- 3 Medicare Eligible
- 3 State-subsidized

Of these:

- 5 MTM reimbursed
- 7 Incentive Grant Funded

DTPs

- Avg. of 2 DTPs/Patient

1. Safety
2. Indication & Efficacy
3. Convenience

Of 26 DTPs ID’d, 10 were non-mental health.
Pharmacist Time

- 17 hours Appointment Time
- Education > Initial Visit Time
  - Different from traditional MTM
- $2,835 charged for RPh time
  - $2,503.87 reimbursed (88.3%)
  - $990 from grant funding
Testing Companies & Finance

Precision medicine. Informed care.

GET STARTED

Our Testing Partner
Basing Therapy on Genetics, Not Condition

Especially patients with mental health conditions where therapy is often trial and error.

https://blog.goodaudience.com/pharmacogenomics-and-its-poised-to-disrupt-the-world-4be9ecc0f130
# Mental Health and PGx

<table>
<thead>
<tr>
<th>Past</th>
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<tbody>
<tr>
<td>● Learn why medications in the past may have failed</td>
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<tr>
<td>● Medications with long $T_{1/2}$ …long time to steady-state</td>
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<thead>
<tr>
<th>Present</th>
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<tr>
<td>● Guide effective doses</td>
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<tr>
<td>● Reduce risk of medication failure</td>
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<tr>
<td>● Several CPIC guidelines</td>
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<td>● FDA package inserts</td>
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<th>Future</th>
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<tr>
<td>● Fewer adverse events</td>
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<td>● Finding “right” medication on first try</td>
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<td>● Decreasing need for “add-on” therapies</td>
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<td>● Building trust with therapeutic relationship</td>
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Collaboration with Other HC Providers

Challenge 1: Pharmacist Comfort
- Varying levels of comfort interpreting results exist.
- Evidence-Based guidelines do not exist.

Challenge 2: Provider Comfort
- Knowledge about testing offering and access.
- Varying levels of understanding what Pharmacogenomics is.

Challenge 3: Care Team Collaboration
- Time between providers is difficult to set aside.
- Sharing value of testing with diverse backgrounds.
Challenges
Where to Store Data?

AKA Privacy
No CPT Codes for Pharmacogenomics

MTM Codes Only

Poor MTM Reimbursement
- No charge for CMS patients
- Private Insurance - No Coverage
  - United Healthcare – Oct. 2019

High Out of Pocket Costs
EMR Systems

How to share Data with other HC Providers?
Message: the pharmacists at Goodrich Pharmacy have PGx information for your Patient?
Create a LAB or Allergy Code?

Documentation- MTM Express
- Dispensing software integration
- Documentation only
- Time consuming

Provider Access to Results
- Non-standardized EMR
- Access to Testing Portal

Uploading Data to EMR
- No standard place to import results
- No standard language
GoodrichPGxSurvey Data
How Important is it to Know How Your Body Responds to Medications?

- Absolutely Essential (3.0)
- Very Important (3.0)
- Of Average Importance
- Of Little Importance
- Not Important At All
How Would You Describe the Impact of PGx Testing on Your Mental Health?
Would You Recommend PGx Testing To a Friend or Relative Taking Meds for Mental Health?

- Yes
- No
- Not Yet
Thank you!