Using ‘Payer’ Data to Analyze Impact of Pharmacogenomic Approaches

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Why are ‘Payer’ Data Useful?

- Data can be useful for confirming hunches (e.g. phenocopying) – or investigating clinical utility

- Data and system itself – can be used to promulgate the use of testing where appropriate
What do we mean by “payer” data?
In U.S. – eligibility, insurance, claims + genomics
- Linked and longitudinal across large numbers of patients

- Eligibility – 65 million lives (at Medco) – monthly feeds
  > AGN – artificially generated number for linkage – cross-walks for aliases
  > Age, gender, household relationships
  > Comorbidity (if coded on medical claims or by proxy with drug claims)

- Insurance information (e.g. copays, deductibles, P.A.s, etc)

- Claims data
  > Prescription data – manufacturer, drug, strength, number supplied, duration of therapy, refills (when compliant, persistent or not)
  > On the Rx data – prescriber information
  > Medical claims – ICD-9 coded visit data, outpatient hospital, lab and diagnostic test absence/presence, inpatient hospital stays

- Genomic information on subset
  > Specific test data/information
  > Biobanked DNA
### A Structured Retrospective Database Study

Could be something like...........

<table>
<thead>
<tr>
<th>DRUG PGx Test</th>
<th>Potential Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>X Yes</td>
<td>MD behavior (selection, dose, duration)</td>
</tr>
<tr>
<td>No</td>
<td>Patient behavior (compliance, persistence)</td>
</tr>
<tr>
<td></td>
<td>E.R. visits and why</td>
</tr>
<tr>
<td></td>
<td>Hospitalizations and why</td>
</tr>
<tr>
<td></td>
<td>Other tests /change or additions in therapy</td>
</tr>
<tr>
<td></td>
<td>Costs</td>
</tr>
</tbody>
</table>

By definition – non-randomized designs requiring adjustment for confounding
Phenocopying 2c19 Effect on Clopidogrel – 1 year longitudinal study of new starts to therapy

~17,000 Patient Study

- All underwent coronary procedure
- 1-year follow-up for cardiovascular outcomes
- Clopidogrel alone: n = 9862
- Clopidogrel + Potent 2c19 Proton Pump Inhibitor (PPI): n = 6828

Hospitalization*

Relative Risk 1.50 (1.39-1.62)

- 18%
- 25%

* For MI, Stroke, Angina, or CABG

Example of VA data on same topic

Table 2. Adverse Outcomes Following Hospital Discharge for Acute Coronary Syndrome (ACS)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>No. (%) of Events</th>
<th></th>
<th>Unadjusted OR (95% CI)</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clopidogrel</td>
<td>Clopidogrel</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Without PPI</td>
<td>With PPI</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(n = 2961)</td>
<td>(n = 5244)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death or rehospitalization for ACS</td>
<td>615 (20.8)</td>
<td>1561 (29.8)</td>
<td>1.62 (1.45-1.80)</td>
<td>1.25 (1.11-1.41)</td>
</tr>
<tr>
<td>Secondary outcome</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rehospitalization for ACS</td>
<td>205 (6.9)</td>
<td>764 (14.6)</td>
<td>2.29 (1.95-2.69)</td>
<td>1.86 (1.57-2.20)</td>
</tr>
<tr>
<td>Revascularization procedures</td>
<td>353 (11.9)</td>
<td>815 (15.5)</td>
<td>1.36 (1.19-1.55)</td>
<td>1.49 (1.30-1.71)</td>
</tr>
<tr>
<td>Death (all-cause)</td>
<td>493 (16.6)</td>
<td>1042 (19.9)</td>
<td>1.24 (1.10-1.40)</td>
<td>0.91 (0.80-1.05)</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; OR, odds ratio; PPI, proton pump inhibitors.

\(^{a}\) Adjusted for all variables in Table 1 except male sex.

Ho, P. M. et al. JAMA 2009;301:937-944
**Could also study: do physicians ‘act’ on a PGx study result?**

Patients who had pgx tests for warfarin whose MD changed tx within 21 days of test

<table>
<thead>
<tr>
<th>Warfarin sensitivity</th>
<th>% patients</th>
<th>Mean weekly dose change (SE)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; Normal</td>
<td>29.0%</td>
<td>+6.65 mg (1.98)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Normal</td>
<td>28.1%</td>
<td>+1.10 mg (1.40)</td>
<td>0.50</td>
</tr>
<tr>
<td>Mild</td>
<td>11.6%</td>
<td>+3.21 mg (3.41)</td>
<td>0.21</td>
</tr>
<tr>
<td>Moderate</td>
<td>25.0%</td>
<td>-3.65 mg (1.56)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>High</td>
<td>4.0%</td>
<td>-10.14 mg (3.18)</td>
<td>0.04</td>
</tr>
<tr>
<td>Very high</td>
<td>2.4%</td>
<td>-17.33 mg (4.54)</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

Genomic test outcomes that can be easily tracked with payer data

- **Compliance** – persistence of filling prescriptions (does genomic testing help?)

- **Physician behavior change** – as a result of genomic testing

- **Major clinical events** that result in outpatient or inpatient stays that are coded (e.g. myocardial infarctions)

- **Total direct medical resource utilization and costs** (whether genomic testing changes this or no)
Selected Limitations of Payer Data

- If only medical claims – no laboratory values, coding idiosyncrasies, no PRO data, biometrics
- If not a randomized study – all the usual caveats and adjustments to avoid confounding
- Claims lag on the medical side (up to 5 months) – instantaneous on the drug side
Key Aspect of Promulgating Testing (beyond evidence itself) is: **Physician Awareness of the Field**

Medco/AMA Partnership: Nationwide Survey of >10,000 Physicians (2008)

Payer Data/System Can Educate and Foster Adoption of Drug-Specific Tests Where Appropriate

How the US Wired Pharmacy System and Payer Approved Reimbursement Can Promulgate Testing

- Automated Identification
- Contact MD
- Contact Patient
- Send Test Kit
- Facilitate Lab Test & Interpretation
All about partnerships and collaborations
Acknowledge Partners and Collaborators

The >150 Payers in the Medco Research Consortium and the >50,000 Patients
Conclusions

- Payer data are useful to frame
  - Prevalence of use of genomic testing
  - Among users, who are they?
  - Comparisons between those who are and are not tested
    - Compliance
    - Behavior change
    - Major clinical events avoided or incurred
    - Total resource utilization and costs

- Ideal source to promulgate use of testing
  - When evidence is there.....