Predictive Analytics Topics in Healthcare

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Disclosure

- I have a limited percentage time relationship with CMS supporting the Partnership for Patients program.
- I am not here in an official capacity representing CMS. All Comments and observations are mine and do not represent CMS.
Goals

- Pose some alternative framing to some issues as a provocation
- Give guidance on methods use analytics to improve quality, safety and efficiency in a challenging time
- Raise questions on how we use new medical records
Levels of Actions Driven from Data

- **Descriptive** –
  - Allows insight and Transparency
  - Blood use rates and Hgb level before Transfusion

- **Predictive**
  - Identifies individuals or groups

- **Predictive with recommendation**
  - Links potential action with scoring

- **Prescriptive**
  - Forces action based on finding
Groups vs. Individuals

- Predications of group averages and individuals are really different
- False positives wash out in groups but not in individuals
- View of predictive analytics different from insurance, consulting and delivery system
Population Health Management Strategy

HFPN and HFMG Commercial Population Population Segmentation

<table>
<thead>
<tr>
<th>Category</th>
<th>Prospective Risk</th>
<th>Admissions Per 1000</th>
<th>ED Visits Per 1000</th>
<th>Medical $ PMPM</th>
<th>Drug $ PMPM</th>
<th>Total $ PMPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced or Critical Illness</td>
<td>7.8</td>
<td>695</td>
<td>973</td>
<td>$2,723</td>
<td>$827</td>
<td>$3,550</td>
</tr>
<tr>
<td>Multiple Chronic Illness</td>
<td>2.5</td>
<td>164</td>
<td>489</td>
<td>$649</td>
<td>$206</td>
<td>$855</td>
</tr>
<tr>
<td>At Risk</td>
<td>1.5</td>
<td>70</td>
<td>334</td>
<td>$318</td>
<td>$77</td>
<td>$395</td>
</tr>
<tr>
<td>Stable</td>
<td>0.9</td>
<td>33</td>
<td>218</td>
<td>$168</td>
<td>$31</td>
<td>$199</td>
</tr>
<tr>
<td>Healthy</td>
<td>0.3</td>
<td>13</td>
<td>139</td>
<td>$58</td>
<td>$8</td>
<td>$66</td>
</tr>
</tbody>
</table>

Top Conditions Affecting 50 to 60% of each Segment

- Active Cancer
- Diabetes without CAD
- Renal Failure Post Transplant
- Heart Failure
- Diabetes without CAD, Hypertension
- Active Cancer, Chronic Musculoskeletal
- Diabetes without CAD, Hypertension, Healthy Female (41-64), Healthy Male (41-64)
- Healthy Female (41-64), Healthy Male (41-64), Healthy Female (16-40), Hypertension
- Healthy Female (16-40), Healthy Male (16-40), Healthy Female (41-64), Healthy Male (6-15)
Good and Evil motives

- Angel – How to slow the migration up the triangle.
  - Find analytics to alter behaviors that speed progression of chronic disease or avoid risky behaviors

- Devil – How to avoid inclusion of the top.
  - Develop strategies to avoid top heavy markets.
  - Develop strategies to shed those likely to rise up the pyramid (Credit scores etc.)
Ask the Right Question

- Flawed studies almost never have errors in the statistical methods.
- They ask questions that miss frame the issue.
- Sometimes the question’s limitations are intentional.
Test marketing of Diet Coke made with corn syrup show great results in paper cups given as samples.

The product completely failed in the market.

Large Brewing company found shockingly different results from serving samples in a test and giving unlabeled 6 packs to customers.
What does a huge increase in the sales of $\frac{3}{4}^\prime\prime$ by $\frac{3}{4}^\prime\prime$ zip-lock bags tell you?

Do you have a best friend at work?
"IT IS DIFFICULT TO GET A MAN TO UNDERSTAND SOMETHING, WHEN HIS SALARY DEPENDS UPON HIS NOT UNDERSTANDING IT"

Upton Sinclair
Keep in Mind Who Paid for Study

- Bad Pharma by Ben Goldacre
- Agency for Healthcare Policy and Research (AHCPR) and Back Surgery in 1990s
- Over-Diagnosis by Gilbert Welch
- Considerations for Predictive Analytics related to Over-Diagnosis
Huge structural variation in implementation
Very complicated back end data
Structural differences in implementations make NQF style definitions either expensive and onerous or impossible
Real Time Harm Measurement

- **DVT/PE Example**
- Tracking based on Problem list, treatment, order for CT or Doppler
- **Early Results are promising**
  - Enabling tracking practice style
  - HIT rates
  - Orders for CT rates (results an issue)
  - Enabled change in communicating results
Future of Patient Safety

- Tighter coupling of results and practice
- Focus on making specific opportunities and actions visible to care team
- Move to meeting needs of patient
Questions/Discussion