Health Literacy as a Predictor of Key Health Outcomes

Prepared for the Health Literacy Research Conference, November 3 2014

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Literacy as a Enabler of Better Health Outcomes

- Health literacy is a established predictor of better health outcomes and patient engagement in research literature

- Goals:
  - Hot-spot regions where health literacy may be a barrier
    - Use predictive model to project literacy in a community, census track, locality
    - Use this information to enhance member/patient communication; outreach; risk-adjust expected outcomes.
  - Analyze relationship between literacy and key health care outcomes in Medicare and Commercial populations
    - Findings: health literacy is a significant predictor of outcomes and costs, above and beyond socio-demographics
Predictive Model

• Prototype tool and model sponsored by Missouri Foundation for Health and developed by RAND Corp: http://www.rand.org/health/projects/missouri-health-literacy.html

• Purpose: develop predictive model for health literacy based on census-derived population characteristics (age, gender, race, tenure in U.S., income, education, language, marital status, rurality)

  – Early phase: develop specification based on literacy data from NAAL (National Assessment of Adult Literacy)

  – Later phases: apply model to estimate health literacy and pinpoint low-literacy hotspots for targeted interventions; RAND recently working with Missouri and Alabama
## Rand Predictive Models

### Dependent Variables

- **Average Health Literacy**
- **Percent Above Basic Health Literacy** *(used in this analysis)*

### Independent Variables

- **Age** **
- **Education** **
- **Gender** **
- **Language spoken at home**
- **Marital Status** *
- **MSA**
- **Income** **
- **Race/Ethnicity** */**
- **Time in US** **

*///** statistically significant @ 0.05, 0.01
Applying the RAND model—Estimated Percent Above Basic Level of Health Literacy

Lighter-shaded counties indicate a larger proportion of population with basic or above-basic health literacy.

Darker-shaded counties indicate a larger proportion of the population with below-basic health literacy.

MAX = 83.4%
MIN = 42.4%
Darker-shaded states indicate a higher county-by-county variance in the proportion of people with basic health literacy.

High variance states have a wide range of literacy levels—

• a communications and design challenge;
• spillovers as well – does the literacy of surrounding community impact own literacy and ability to engage?.

About Tableau maps: www.tableausoftware.com/mapdata
Relationship between local literacy and population health, utilization and cost: *county-level analyses*

### Dependent Variables
- Years potential life lost
- Percent of population in poor health (physical/mental)
- FFS Medicare “ambulatory-sensitive” admissions
- FFS Medicare emergency room visits per capita
- FFS Medicare readmissions
- FFS Medicare per capita costs (actual, risk adjusted)

### Independent Variables
- % below basic health literacy
- Literacy $\sigma$
- Median income
- Child poverty rate
- Unemployment
- Limited English-speaking household
- Education
- % non-white (Medicare)
### Estimated Effect of Health Literacy on Selected Health Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Population Average (county-level)</th>
<th>Impact of moving from low to high literacy community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years potential life lost</td>
<td>1.31 yrs. per capita</td>
<td><strong>Reduction of 1 yr per capita (-73%)</strong></td>
</tr>
<tr>
<td>Poor mental health days</td>
<td>3.4 days/month</td>
<td><strong>Reduction of 0.84 days per month (-18%)</strong></td>
</tr>
<tr>
<td>Medicare Ambulatory Sensitive Admissions</td>
<td>78 per 1000</td>
<td><strong>Reduction 18.6 admissions per 1000 (-23%)</strong></td>
</tr>
<tr>
<td>Medicare Readmission Rate</td>
<td>17.7%</td>
<td><strong>Decrease 1.2 percentage points (-7%)</strong></td>
</tr>
<tr>
<td>Medicare ED Visit Rate</td>
<td>645.8 per 1000</td>
<td><strong>Reduction of 100.5 visits per 1000 (-15%)</strong></td>
</tr>
<tr>
<td>Medicare per capita cost, standardized</td>
<td>$8598</td>
<td><strong>Reduction of $833 per capita (-9.7%)</strong></td>
</tr>
</tbody>
</table>
Discussion

• Predicted Health Literacy is strongly related to patient centered outcomes of interest
  – Careful on asserting causality
    • Cross sectional
    • PREDICTED not directed measured literacy
  – Nonetheless, could be a useful marker, predictor for performance
  – Next steps – further validation? prospective intervention?

• Variation in literacy also important: Spillovers?
  – *Appears* to attenuate the impact of either above/below average literacy
    • *E.g. a low literacy community performs better if near higher literacy (more variable) communities*
    • More work needed
Thank You!