# Health Literacy as a Predictor of Key Health Outcomes

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Carol J. Simon;  Optum Labs
Steven R. Rush;  United HealthCare

# 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

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# Rand Predictive Models
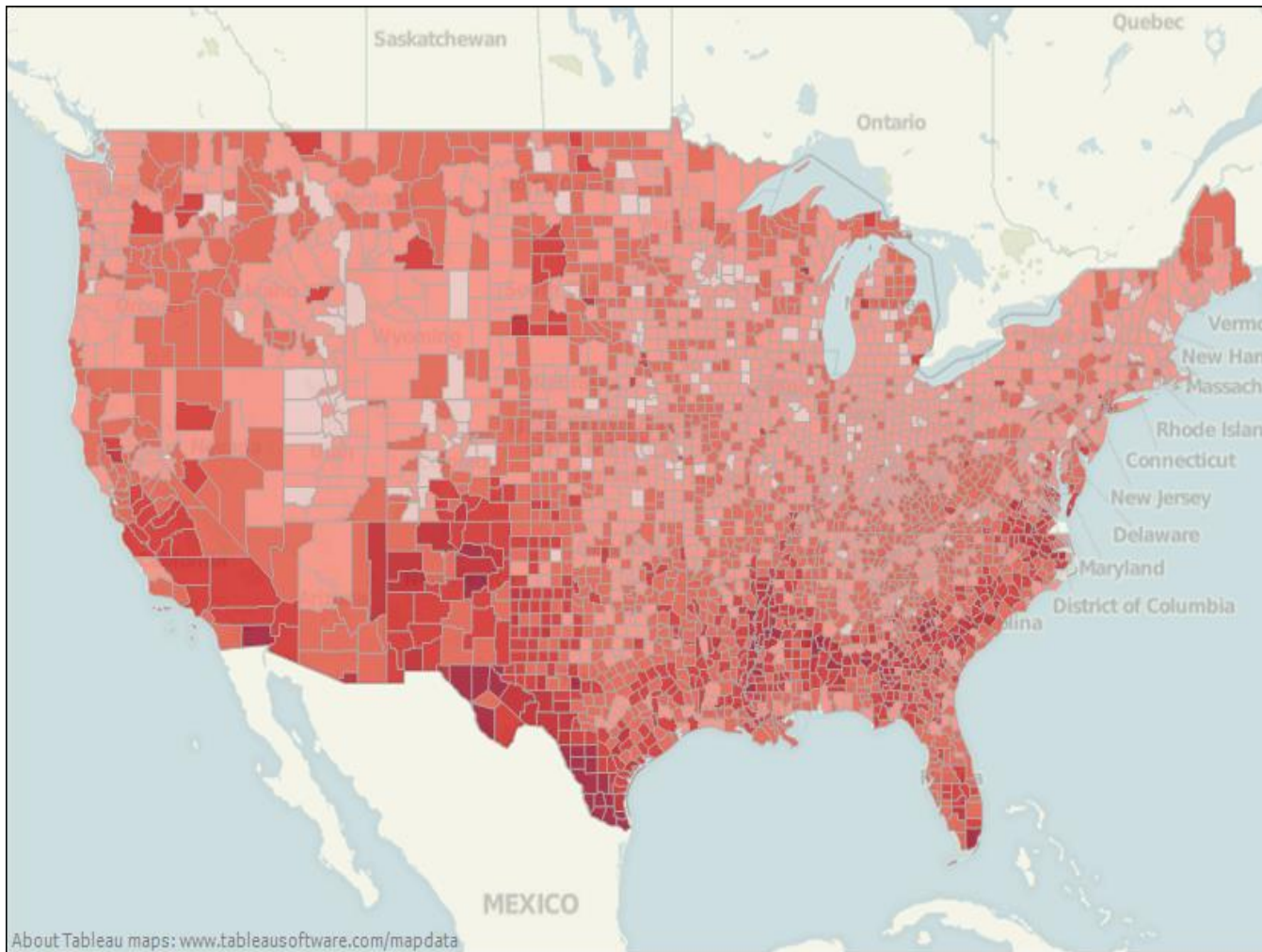
## Dependent Variables

- **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 <u>Basic</u> 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%

**Percent Above Basic**

0.4236          0.8338

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# Applying the RAND model
## Intrastate Variance in Estimated % Above <u>Basic</u> Level of Health Literacy

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?.



Intrastate variance - Per..

0.00806          0.08112

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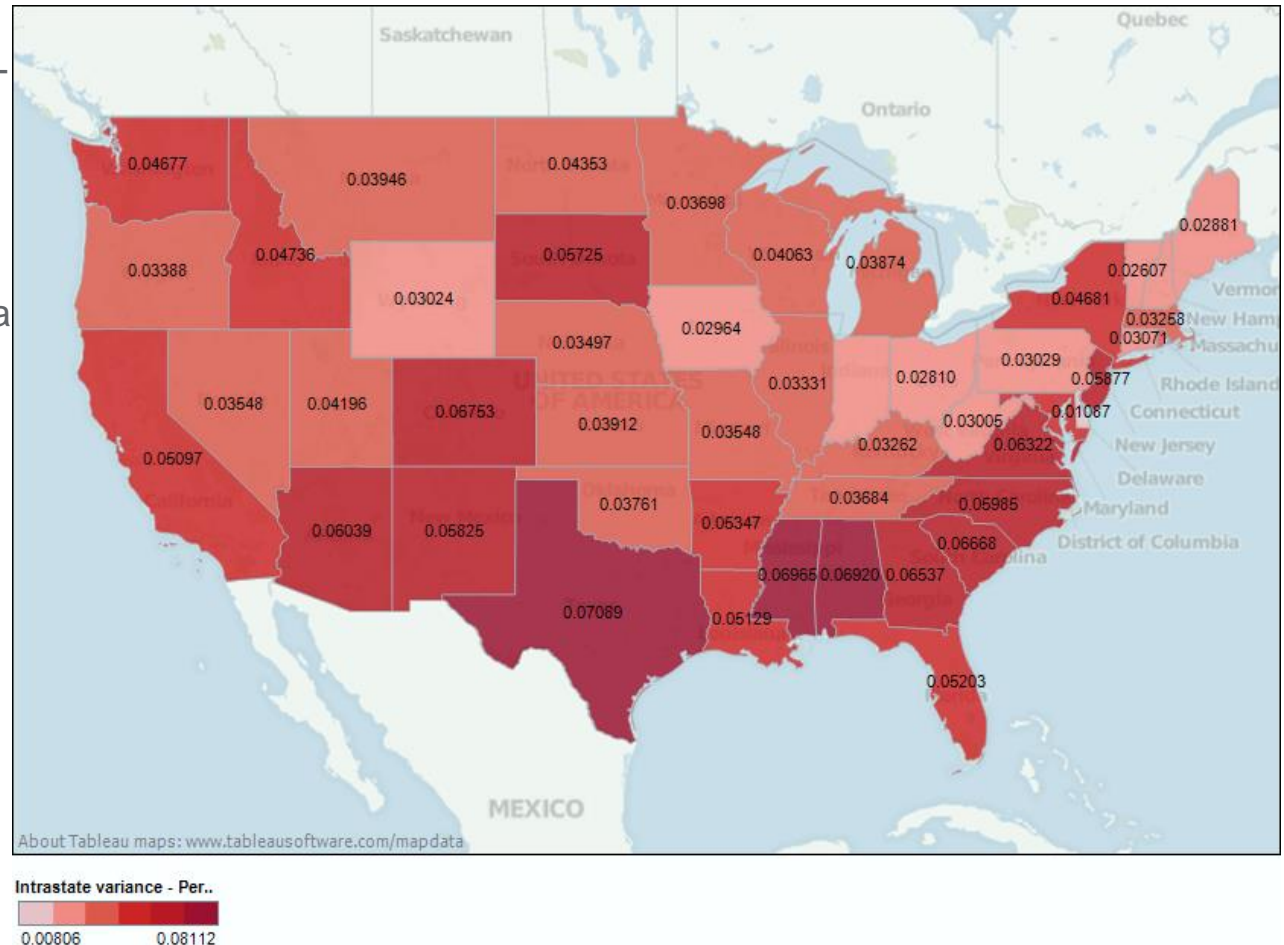
# Relationship between local literacy and population health, utilization and cost: *county-level analyses*

## 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)

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# Estimated Effect of Health Literacy on Selected Health Outcomes

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

# 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!*