Can Information Technologies Enhance Access to Health Information for Vulnerable Communities

Garth Graham, MD, MPH, FACP, FACC
Where health happens

6,000 hours awake each year

2-3 hours in a doctor’s office

Neighborhoods Matter for Health

- Health outcomes—including life expectancy—vary sharply by neighborhood.
- Between 2003 and 2007, life expectancy varied by as much as 33 years between census tracts in Boston.
- The census tract with the lowest life expectancy (in Roxbury, 58.9 years) is shorter than the life expectancy of many third world countries.

Source: Center on Human Needs, Virginia Commonwealth University, September 2012
Racial Disparities in Patient Characteristics and Survival After Acute Myocardial Infarction

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Abstract

IMPORTANCE Black patients experience worse outcomes than white patients following acute myocardial infarction (AMI).

OBJECTIVE To examine the degree to which nonrace characteristics explain observed survival differences between white patients and black patients following AMI.

DESIGN, SETTING, AND PARTICIPANTS This cohort study used the extensive socioeconomic and clinical characteristics from patients recovering from an AMI that were prospectively collected at 31 hospitals across the contiguous United States between 2003 and 2008 for the Prospective Registry Evaluating Myocardial Infarction: Events and Recovery registry and the Translational Research Investigating Underlying Disparities in Acute Myocardial Infarction Patients’ Health Status registry. Survival was assessed using data from the National Death Index. Data were analyzed from December 2016 to July 2018.

MAIN OUTCOMES AND MEASURES Patient characteristics were categorized into 8 domains, and the degree to which each domain discriminated self-identified black patients from white patients was calculated.

Key Points

Question Does race serve as a surrogate for socioeconomic and clinical factors, and, after adjusting for those factors, do long-term mortality rates differ between black patients and white patients following acute myocardial infarction?

Findings In this cohort study of 6402 patients from 2 acute myocardial infarction registries, self-identified black patients and white patients differed in several clinical and socioeconomic characteristics. The higher the prevalence of characteristics associated with being a black patient, the higher the 5-year mortality rate, but no race differences were observed in 5-year mortality rates for patients with low prevalence of such characteristics.
Propensity Scores for Black Race (Unadjusted Probability)
Association between the Propensity to be Black with 1- and 5-year Mortality

1-Year Mortality By Full Propensity Score

5-Year Mortality By Full Propensity Score

- White race
- Black race

p=0.20

p=0.11
Relative increase in midlife mortality

Increase in death rate for working-age adults (2010-2017)

### Appalachian states

<table>
<thead>
<tr>
<th>States (N=13)</th>
<th>Excess midlife deaths (2010-2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohio</td>
<td>4,730</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>3,179</td>
</tr>
<tr>
<td>Kentucky</td>
<td>1,524</td>
</tr>
<tr>
<td>North Carolina</td>
<td>1,330</td>
</tr>
<tr>
<td>Tennessee</td>
<td>1,257</td>
</tr>
<tr>
<td>Maryland</td>
<td>1,123</td>
</tr>
<tr>
<td>West Virginia</td>
<td>1,023</td>
</tr>
<tr>
<td>Virginia</td>
<td>890</td>
</tr>
<tr>
<td>Alabama</td>
<td>729</td>
</tr>
<tr>
<td>Mississippi</td>
<td>482</td>
</tr>
<tr>
<td>South Carolina</td>
<td>453</td>
</tr>
<tr>
<td>Georgia</td>
<td>298</td>
</tr>
<tr>
<td>New York</td>
<td>38</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>17,056 (49.6%)</strong></td>
</tr>
<tr>
<td><strong>UNITED STATES</strong></td>
<td><strong>33,307</strong></td>
</tr>
</tbody>
</table>

“Why do we keep treating people for illnesses only to send them back to the conditions that created illness in the first place?”

Potential to Bridge the Gap

- Expand health into the real world.
- Generate user-friendly tools.
- Ask new questions.
- Scale to entire populations
- Facilitate more efficient and representative research.
What are the barriers we face to really having technology improve lives in communities

Focusing on three priorities

1) Access to adequate internet coverage
2) Embedding of bias into various algorithms
3) Purposeful distribution of technology
Multi-faceted challenges to broad band access

79% of white Americans report having access to home broadband compared to 66 percent of Black and 61 percent of Hispanic Americans.

64 percent of households with incomes of $25,000 or lower report having broadband internet access.

More than 30 percent of Hispanic or black children do not have a computer at home, as compared to 14 percent of white children.

Owning a desktop or laptop computer, which 82 percent of white people do, followed by 58 percent of Black people and 57 percent of Hispanic people.
Bias is baked into many health tech tools and datasets
Continuum of Information Technologies

**Measurement**
- Sensor sampling in real time
- Integration with health data

**Diagnostic**
- Diagnostics
- Portable imaging
- Biomarker sensing
- Clinical decision making

**Treatment**
- Dissemination of health information
- Chronic disease management
- Service Access
- Remote treatment
- Disease surveillance
- Prevention and wellness interventions
- Remote Clinical trials

**Global**
- Service Access
- Remote treatment
- Dissemination of health information
- Disease surveillance
- Medication tracking and safety
- Disaster support/care
- Prevention and wellness interventions
Community Engagement and Partnerships

Primary Care and Public Health: Exploring Integration to Improve Public Health; National Academies of Sciences, Institutes of Medicine, March 2012