Reducing healthcare disparities in materially deprived patients

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Learning objectives

• Characterize current research on the effects of social determinants on healthcare outcomes
• Define an area deprivation index (ADI) and contrast its measurement qualities with other patient-reported measures of social determinants
• Discuss application of an ADI through a review of case studies at Intermountain Healthcare
• Identify potential future applications of an ADI in a healthcare context
“Adversity is not randomly distributed: instead it tends to cluster and to accumulate present on top of past disadvantage”

David Blane, MD MSc
Social determinants and health

- People with a higher standard of living have better health outcomes (Marmot, 2006)
- The majority of health is driven by non-care delivery factors – genetic, social, environmental, behavioral
- Social determinants of health include the factors that influence where we live, work, play and pray
- Countries with higher ratios of social-to-health spending have statistically better health outcomes (Bradley, 2013)
Linking social determinants of health with healthcare disparities

• Clinical outcomes/mortality (Kim, 2014)
• Higher levels of ED utilization (Tozer, 2013)
• Increased readmission risk (Kind, 2013)
• Delays in time to diagnosis and time to treatment (Gattrell, 1998; McKenzie, 2008; Dialla, 2015)
• Medication adherence
• Engagement in shared decision making
Deprivation – Material and Social

- “The disadvantaged position of an individual, family, or group relative to the society to which they belong” (Marmot)
- Deprivation can be material and social
- Material deprivation includes the lack of basic resources for living
- Social deprivation includes the lack of social support mechanisms
Deprivation – Individual and Area

- Deprivation can be measured at the individual level
- Deprivation can be measured at an ecological level based upon the effect of the environment or place
- Evidence that area deprivation impacts health independent of individual-level
- Deprivation measures can be:
  - Compositional (aggregation of individual characteristics)
  - Contextual (characteristics of place)
  - Multi-level (combination)
Development of deprivation indices

- An area deprivation index is a geographic area-based measure of the disadvantaged position of residents relative to the society.
- Used extensively in Europe, Australia and New Zealand.
- Early measures compositional but have been evolving to include more contextual information.
- Most common early measure is the Townsend Index proposed by Dr. Peter Townsend in 1988.
England's most deprived areas

1. East of the Jaywick area of Clacton-on-Sea
   Tendring District

2. West of the Grant Thorold area of Grimsby
   North East Lincolnshire

3. West of the Revoe area
   Blackpool

4. West of the Anfield area
   Liverpool

5. East of Grange Park/West of Normoss area
   Blackpool

6. Speke area
   Liverpool

7. West of Burnley area
   Lancashire

8. South of Queenstown
   Blackpool

9. East of the Weir area
   Rochdale

10. Collyhurst area
    Manchester

SOURCE: DCLG

Patient reported measures key

• Across the lifespan
  – Quality of life
  – Availability of social support
  – Housing security
  – Personal violence experience

• Episodic
  – Physical functioning
  – Pain
What is the Singh area deprivation index (ADI)?

- Index developed and validated by Singh (2003) based upon 17 census measures
  - Education
  - Employment
  - Income
  - Living Conditions
- Developed at the census block group level for the state of Utah (Knighton, et al 2016)
- Patient assigned an ADI score based upon the census block group they live in
Utah ADI results
Trends of indicators over each quintile - poverty

Knighton et al., 2016
Trends of indicators over each quintile - housing

Knighton et al., 2016
Trends of indicators over each quintile – employment and education

Knighton et al., 2016
# Profiling disparities by quintile

<table>
<thead>
<tr>
<th>Category</th>
<th>Census indicators</th>
<th>Census mean values, by ADI quintile</th>
<th>Ratio Q5/Q1</th>
<th>Ratio Q5/Q3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Q1 - Least</td>
<td>Q3</td>
<td>Q5 - Most</td>
</tr>
<tr>
<td>Income/Poverty</td>
<td>Median family income, $</td>
<td>$105,045</td>
<td>$65,252</td>
<td>$41,539</td>
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<tr>
<td></td>
<td>Income disparity</td>
<td>0.40</td>
<td>0.65</td>
<td>1.24</td>
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<tr>
<td></td>
<td>Families below poverty level, %</td>
<td>4.4%</td>
<td>7.7%</td>
<td>20.2%</td>
</tr>
<tr>
<td></td>
<td>% population below 150% poverty threshold, %</td>
<td>11.2%</td>
<td>19.4%</td>
<td>39.6%</td>
</tr>
<tr>
<td></td>
<td>Single parent households with dependents &lt;18, %</td>
<td>5.6%</td>
<td>9.2%</td>
<td>13.0%</td>
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<tr>
<td></td>
<td>Households without a motor vehicle, %</td>
<td>2.1%</td>
<td>4.2%</td>
<td>8.0%</td>
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<tr>
<td></td>
<td>Households without a telephone, %</td>
<td>1.3%</td>
<td>2.2%</td>
<td>3.6%</td>
</tr>
<tr>
<td></td>
<td>Occupied housing units without complete plumbing, %</td>
<td>0.2%</td>
<td>0.4%</td>
<td>0.8%</td>
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<tr>
<td>Housing</td>
<td>Owner occupied housing units, %</td>
<td>83.0%</td>
<td>73.1%</td>
<td>53.8%</td>
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<tr>
<td></td>
<td>Households with &gt;1 person per rm, %</td>
<td>1.4%</td>
<td>3.0%</td>
<td>6.4%</td>
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<tr>
<td></td>
<td>Median monthly mortgage, $</td>
<td>$2,077</td>
<td>$1,337</td>
<td>$1,032</td>
</tr>
<tr>
<td></td>
<td>Median gross rent, $</td>
<td>$760</td>
<td>$799</td>
<td>$723</td>
</tr>
<tr>
<td></td>
<td>Median home value, $</td>
<td>$383,380</td>
<td>$197,560</td>
<td>$126,620</td>
</tr>
<tr>
<td>Employment</td>
<td>Employed person 16+ in white collar occupation, %</td>
<td>50.3%</td>
<td>34.6%</td>
<td>24.5%</td>
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<tr>
<td></td>
<td>Civilian labor force unemployed (aged 16+), %</td>
<td>5.5%</td>
<td>7.0%</td>
<td>10.4%</td>
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<tr>
<td>Education</td>
<td>Population aged 25+ with &lt;9 yr education, %</td>
<td>0.8%</td>
<td>2.7%</td>
<td>7.0%</td>
</tr>
<tr>
<td></td>
<td>Population aged 25+ with at least high school education, %</td>
<td>97.1%</td>
<td>91.8%</td>
<td>81.9%</td>
</tr>
</tbody>
</table>

Knighton et al., 2016
Perceived barriers to healthcare for patients in poverty

• Living conditions
• Poor quality of interaction with providers
• Complexity of health system organization and functioning

(Loignon, 2015)
Case study - Community Health Needs Assessment

- Non-profit hospitals conduct a tri-annual community health needs assessment (CHNA)
- Goal – promote shared ownership of community health
- Strategic planning team established geographically based regions to evaluate socio-economic diversity
- Opportunity: used ADI to develop plans to address needs in more deprived areas
Case study – High-risk patient identification for care management interventions

- Patients with higher deprivation are at increased risk of health complications and utilize more services
- Goal – identify patients who need navigation support across health and healthcare services
- Community health programs evaluating use ADI in risk-detection algorithm
- Opportunity: improve identification of high risk patients who will benefit most directly from care management services
Adjustment factors include age, sex, ethnicity, race, marital status, Charlson comorbidity score, Medicaid payer status (*p<.05)

INPATIENT VISITS PER HIGH-UTILIZING PATIENT

Adjusted incident Rate Ratio (IRR) (95% CI)

邻里区 ADI 五分位数 (1-5)

(n=5158)
Adjustment factors include age, sex, ethnicity, race, marital status, Charlson comorbidity score, Medicaid payer status (*p<.05)
The impact of community

- Neighborhood material deprivation → Social isolation +
- Social isolation → Patient Outcome
- Patient-reported faith identification or urban residence → Social isolation -
EFFECT MODIFICATION OF INFORMAL SOCIAL SUPPORTS ON HF PATIENT 30-DAY MORTALITY

Adjusted Odds of 30-Day Mortality

OR 0.35 (95% CI: 0.14-0.87); p=.03

Bottom 90% Top 10%

Neighborhood Material Deprivation

(n=6065) No faith affiliation Faith affiliation
EFFECT MODIFICATION OF RURAL RESIDENCE ON HF PATIENT 30-DAY MORTALITY

OR 0.29 (95% CI: 0.09-0.98); p=0.05

Adjusted Odds of 30-Day Mortality

Bottom 90%  Top 10%

Neighborhood Material Deprivation

Rural residence  Urban residence

(n=6065)
Case study – Identifying patients most likely to benefit from a community-based program

- Need to develop partnerships between the delivery system and community programs
- Goal – efficiently identify patients most likely to benefit from referral to community-based programs
- Implementing data-driven methodology to target high-risk patients most likely to benefit
- Opportunity: inform clinical judgement
% Invited Patients Enrolled/Retained - By Payer Type

% Enrolled - Medicaid
% Retained - Medicaid
% Enrolled - Commercial
% Retained - Commercial
Application of new criteria

- 1/3 of those currently being invited
- Double the odds of retention in the criteria population (OR 2.30 95%CI 1.05-5.05; p=.04).
- 19 women who were retained originally would not have been invited
- Data-driven approach informs clinical judgement – does not replace it
In Summary

• Research on the impact of social determinants of health on healthcare is developing
• ADI holds promise as a potentially useful surrogate measure of patient material deprivation when combined with other patient/family information
• More contextual work is needed to understand the conditions where additional intervention is needed
• Population-based solutions require the ongoing development of community-based partnerships in health
HCIA Round 1 award from the Center for Medicare and Medicaid Innovation 1C1CMS330978, LA Savitz, Project Director, 7/2/12-12/31/15.
References


