Racially and Economically Disparate Common Diseases in 2020 – A BRFSS Analysis

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August 17th, 2022
Background: Racial and Income Disparities

- 13.8% of African Americans, 10% of Hispanics, 17.4% of American Indians and Alaska Natives reported having **fair or poor health** compared with 8.3% of non-Hispanic Whites as of 2020
- Since 2001, **life expectancy** increased by 2.5 years for top 5% of the income distribution, but no gains for bottom 5%
Goal

- Identify the existence and extent of disparities in the prevalence of common diseases by race/ethnicity and income level in 2020

Purpose

- Provide an understanding of the latest available evidence of health disparities
- Help target actions (programs, policies, research) on key common diseases
Most disparate health condition among common diseases in the United States

Oh, et al AJRCCM (2016)
Methods
Data Source - BRFSS

- Behavioral Risk Factor Surveillance System (BRFSS)
- Health-related telephone surveys that collect state data about U.S. residents ages 18 or older (health-related risk behaviors, chronic health conditions, use of preventive services)
- Conducted in all 50 states and U.S. territories
Main Measure – Disparity Ratio

- Disparity ratio = RateA / RateB
  - RateA: prevalence rate for selected population (RateA) for selected health indicator
  - RateB: “best prevalence rate” for selected health indicator
  - Determines how much more likely a particular event is to occur in a population compared to another population

- Best rate is the lowest prevalence rate among each race/ethnicity and income level group for each indicator
Secondary Measure – Prevalence Ratio

- Prevalence ratio = RateA / RateB
  - RateA: prevalence rate for a non-White population (RateA) for selected health indicator
  - RateB: prevalence rate for White population for selected health indicator
Independent Variable – Race/Ethnicity

“What is your race/ethnicity:

- White, NH
- Black, NH
- American Indian/Alaskan native, NH
- Asian, NH
- Native Hawaiian/other Pacific Islander, NH
- Other race, NH
- Multiracial, NH
- Hispanic

- White, NH
- Black, NH
- Native, NH
- Asian/PI, NH
- Hispanic
“Is your annual household income from all sources:”

- <10K
- <15K
- <25k
- <30k
- <35k
- <50k
- <75K
- ≥75K

- <75k
- ≥75K
## Dependent Variables - Prevalence

<table>
<thead>
<tr>
<th>Original selected disease</th>
<th>BRFSS Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>Asthma</td>
</tr>
<tr>
<td>COPD</td>
<td>COPD, emphysema, chronic bronchitis</td>
</tr>
<tr>
<td>Adult obesity</td>
<td>Adult obesity</td>
</tr>
<tr>
<td>Coronary heart disease</td>
<td>Coronary heart disease or angina</td>
</tr>
<tr>
<td>Childhood obesity</td>
<td>N/A</td>
</tr>
<tr>
<td>Type 2 diabetes</td>
<td>N/A</td>
</tr>
<tr>
<td>N/A</td>
<td>Kidney disease</td>
</tr>
</tbody>
</table>
Calculations

- **Prevalence estimates for each disease by race/ethnicity or income**
  - respondents in a population with disease at time of survey / total number of respondents in that population
  - Ex: number of Hispanics with asthma / total number of Hispanics who answered that question

- **Prevalence ratio between non-White and White populations**
  - prevalence rate of disease in non-White population / prevalence rate of disease in White population

- **Disparity ratio**
  - Highest prevalence rate of disease / lowest prevalence rate of disease
Results
# Demographics

<table>
<thead>
<tr>
<th>Sex at Birth</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>46,371</td>
</tr>
<tr>
<td>Female</td>
<td>54,541</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>295,900</td>
</tr>
<tr>
<td>Asian/PI</td>
<td>12,147</td>
</tr>
<tr>
<td>Black</td>
<td>30,130</td>
</tr>
<tr>
<td>Hispanic</td>
<td>36,322</td>
</tr>
<tr>
<td>Native</td>
<td>6,813</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Income</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;75K</td>
<td>203,122</td>
</tr>
<tr>
<td>≥75K</td>
<td>118,779</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>54,141</td>
</tr>
<tr>
<td>COPD, emphysema, bronchitis</td>
<td>401,953</td>
</tr>
<tr>
<td>Adult obesity</td>
<td>360,601</td>
</tr>
<tr>
<td>CHD, angina</td>
<td>401,955</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>401,952</td>
</tr>
</tbody>
</table>
Results: Race/Ethnicity
## Summary: Prevalence Ratio Between Non-White and White Participants

<table>
<thead>
<tr>
<th>Disease</th>
<th>Race/Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Asian/PI</td>
</tr>
<tr>
<td>Asthma</td>
<td>0.601</td>
</tr>
<tr>
<td>COPD, emphysema, bronchitis</td>
<td>0.296</td>
</tr>
<tr>
<td>Adult obesity</td>
<td>0.394</td>
</tr>
<tr>
<td>CHD, angina</td>
<td>0.286</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>0.280</td>
</tr>
</tbody>
</table>
Results: Com

Asthma

0

0.2

0.4

0.6

0.8

1

1.2

1.4

1.6

1.8

Prevalence Ratio

Prevalence Ratio Between Non-White and White Participants

Adult Obesity

Asian/PI

Black

Hispanic

Native

COPD, emphysema, bronchitis

CHD, angina

Kidney disease
## Summary: Disparity Ratio

<table>
<thead>
<tr>
<th>Disease</th>
<th>Calculation</th>
<th>Disparity Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>Native / Asian/PI</td>
<td>2.560</td>
</tr>
<tr>
<td>COPD, emphysema, bronchitis</td>
<td>Native / Asian/PI</td>
<td>4.559</td>
</tr>
<tr>
<td>Adult obesity</td>
<td>Black / White</td>
<td>3.399</td>
</tr>
<tr>
<td>CHD, angina</td>
<td>Native / Asian/PI</td>
<td>3.621</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>Black / Asian/PI</td>
<td>4.192</td>
</tr>
</tbody>
</table>
Most Racially Disparate Common Diseases

- Asthma
- COPD, emphysema, bronchitis
- Adult obesity
- CHD, angina
- Kidney disease

Disparity Ratio

- Asthma: 2.5
- COPD, emphysema, bronchitis: 4.5
- Adult obesity: 3.5
- CHD, angina: 3.0
- Kidney disease: 4.0
Results: Income
## Summary: Disparity Ratio

<table>
<thead>
<tr>
<th>Disease</th>
<th>Disparity Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td>1.292</td>
</tr>
<tr>
<td>COPD, emphysema, bronchitis</td>
<td>2.901</td>
</tr>
<tr>
<td>Adult obesity</td>
<td>1.219</td>
</tr>
<tr>
<td>CHD, angina</td>
<td>1.953</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>2.043</td>
</tr>
</tbody>
</table>
Most Economically Disparate Common Diseases

Disparity Ratio

Asthma, COPD, emphysema, bronchitis, Adult Obesity, CHD, angina, Kidney disease

Most Economically Disparate Common Diseases
Conclusions

‣ Race/ethnicity
  • Prevalence ratio
    – Asthma most severe disparity for native population
  • Disparity ratio
    – Most racially disparate condition: COPD, emphysema, bronchitis

‣ Income level
  • Disparity exists for every chosen common disease
  • Most economically disparate condition: COPD, emphysema, bronchitis

‣ Implication
  • Focus research, interventions on COPD, emphysema, bronchitis
Limitations

- 1 year of phone survey data
- Income doesn’t adjust for cost of living
- Variables aren’t precise
  - COPD, emphysema, bronchitis
  - CHD, angina
- Missing data varies by:
  - Disease
  - Race/ethnicity or income level
Limitations – Missing Responses by Race/Ethnicity
Limitations – Missing Responses by Income
My Role and Lessons Learned

- **R**
  - Extracted data, cleaned data
  - Computed calculations
  - Experience graphing

- Reproducing findings is difficult
  - Choosing the right data is key
    - BUT complete databases are hard to find

- Self-guided learning
Acknowledgements

- Dr. Himes
- Joanne Levy
- SUMR Cohort
Thank you! Any questions?