Relationship of Community Level Socioeconomic Status and Stage at Diagnosis of Colorectal Cancer in Florida

Recinda L. Sherman, CTR
Florida Cancer Data System
Colorectal Cancer

• Common cancer in industrialized world
  – High incidence; high mortality

• Risk Factors
  – Diet, obesity, exercise, smoking,
    • supplements (HRT, aspirin, Vit D reduce risk)
  – Pre-existing conditions (bowel inflammation, genetic predisposition, diabetes)
  – Social factors (education and income level, race/ethnicity and sex, place of residence)
Colorectal Cancer Screening

- Screening and early detection
  - Most important for survival
- Multiple tests/Recommendations
  - Lack of national consensus
- Reduce mortality
- Reduce incidence
  - Secondary prevention; colonoscopy
Socioeconomic Status

• Mortality and morbidity
  – Disparities documented since ancient civilizations forward
  – Not explainable by genetic or behavioral risk factors alone

• Cancer Disparities
  – Greatest disparities for cancers with good prognosis (if dx at early stage)
    • Stage at diagnosis, Screening
Socioeconomic Status

• Concept of social class
  – Social relationship; multi-level (person, family, community)
  – No single link between social class and health
    • Variety of interconnected pathways
    • Influences all stages of life
  – Social construct
    • Temporal, complex, “organic”

• Occupation, income, and education
  • Race/ethnicity as surrogate
  • Poverty and degree of income inequality
Area Based Measures

• Rationale
  – Majority of SES and health research conducted outside the US
  – Individual level data not collected
  – Community level socioeconomic status
    • Surrogate for individual SES
    • Stand alone health predictor

• Utility
  – Use GIS to link disparate data sources based on geography
  – Free, easily accessible data sources
    • US Census

• Community based risk; Population based health
  – Crux of public health epidemiology
Study Objective

• Evaluate the influence of community level SES (poverty) on the stage at diagnosis of colorectal cancer

• Hypothesis
  – Increasing poverty is associated with an increased risk of a colorectal cancer being diagnosed at a late stage
Study Methods

- Ecological, population based
- Block Group level data aggregated by SES level
- Stratified analysis
  - Sex, Race, Ethnicity, Urban/Rural
Study Methods

- Florida Cancer Data System
  - Legal mandate
  - Contract held at University of Miami
    - 1978
    - Reference year 1981
    - 96,000 incident cases annually
    - NAACCR Certified
      - Every data year included in study
Study Methods

- Case Selection
  - Aggregated years 1998-2002
    - To align with 2000 Census data
  - Age 50+
  - Primary CRC
    - Previous dx of cancer ok
  - no DCO, no autopsy unless CRC COD
  - Adenocarcinomas only
Study Methods

- **Socioeconomic Status**
  - Single variable
  - % people living below poverty
    - US Census
    - 4 levels
- **Urban/Rural Status**
  - Single variable
  - % people living in urban area
    - US Census
  - Dichotomous variable
Study Methods

• Age-Adjusted Rates
  • Gamma confidence intervals

• Early and Late Stage IRR
  • Standard confidence intervals
    – Higher Early:Late Ratio
Study Methods

• Ratio of Early:Late
  – Incidence Rates
    • Delta confidence intervals
  – Accommodate for variation in risk of total CRC by SES
• Results shown as a ratio
  • Higher ratio
    – More early cases
    – Better prognosis
  • Lower ratio
    – More late cases
    – More risk of late stage diagnosis
## Results

<table>
<thead>
<tr>
<th>Case distribution by stage</th>
<th>Early</th>
<th>Late</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Percent*</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blacks</td>
<td>1,175</td>
<td>34%</td>
</tr>
<tr>
<td>Whites</td>
<td>16,193</td>
<td>36%</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanics</td>
<td>1,655</td>
<td>34%</td>
</tr>
<tr>
<td>Non-Hispanic, Whites</td>
<td>14,514</td>
<td>37%</td>
</tr>
</tbody>
</table>

* Percent based on total cases meeting criteria; including unknown stage and DCO cases; 18% of total cases
Results – Rates by SES

Colorectal Cancer Incidence Rates by SES Level
Florida, 1998-2002

Age-Adjusted Rate per 100,000

Early Stage Incidence

Late Stage Incidence

SES 1 (Highest)  SES 2  SES 3  SES 4 (Lowest)
Results – Early:Late Ratio

- But incidence varies by SES
  - Increases by SES
    - All combined, White, Non-Hispanic White, Urban (combined)
  - Decreases by SES
    - Blacks, Hispanics, Rural (combined)
- Ratio of Early:Late Stage Incidence
Results – Early:Late Ratio by SES

Ratio Early:Late Colorectal Cancer Incidence, All Floridians 1998-2002

SES 1 (Highest) □ SES 2 □ SES 3 □ SES 4 (Lowest)
Results – Early:Late Ratio by SES

Ratio Early:Late Colorectal Cancer Incidence, Urban Residents 1998-2002

- All Florida
- Females
- Males

SES 1 (Highest)  SES 2  SES 3  SES 4 (Lowest)
Results – Early:Late Ratio by SES

• No pattern
  – Hispanics
  – Blacks
  – Rural Residents

• Residual confounding?
  – Poverty?
### Results

<table>
<thead>
<tr>
<th></th>
<th>Percent of Florida Population</th>
<th>Percent Living Below Poverty</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Floridians</strong></td>
<td>100%</td>
<td>12.5%</td>
</tr>
<tr>
<td><strong>Blacks</strong></td>
<td>15%</td>
<td>25.9%</td>
</tr>
<tr>
<td><strong>Whites</strong></td>
<td>78%</td>
<td>9.5%</td>
</tr>
<tr>
<td><strong>Hispanics</strong></td>
<td>17%</td>
<td>18.0%</td>
</tr>
<tr>
<td><strong>White, Non-Hispanics</strong></td>
<td>65%</td>
<td>8.1%</td>
</tr>
</tbody>
</table>

Data from US Census 2000, based on single race reporting
Results – Early:Late Ratio by SES (Quartiles)

Ratio Early:Late Colorectal Cancer Incidence,
Urban Blacks 1998-2002
Study Summary

- Risk of late stage colorectal cancer at diagnosis increases with increasing poverty
  - Whites, Non-Hispanic Whites
    - Urban environments
    - Men
  - Blacks
    - Quartiles
- Hispanics, Rural
  - No discernable pattern
Discussion

• Non-linear trend (still decreasing)
  – Women, Blacks (adjusted),
  – Second lowest SES highest risk
  – Possibly due to health access behaviors
    • Poorest are Medicaid eligible

• Heterogeneity of Hispanics
  – Lack of BG level poverty data for race-specific Hispanic analysis
Discussion

- Lack of stage information (18%)
  - Hispanics
  - Rural
  - Increasing poverty = increasing % unknowns
- Other risk factors
- Accuracy of geocoding; Accuracy/Applicability of address at diagnosis
- Screening effect
  - Low incidence may reflect high screening
    - Precancerous diagnoses are removed
    - Potential inflation of risk
Study Conclusion

- Screening must be increased
  - poor communities may benefit the most
- The identification of neighborhoods of low SES is simple
  - free and readily available Census data
- Targeting poor communities for enhancing screening efforts should be incorporated into public health policy
Acknowledgements

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