State Disparities in Colorectal Cancer Mortality Patterns in the United States

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Background

Colorectal Cancer (CRC) mortality rates in the US have been decreasing for several decades and this decrease has accelerated in the most recent time period.
Objectives

• Whether the decreasing Colorectal Cancer (CRC) mortality rates vary across states.

• Whether this accelerated decrease has influenced the geographic patterns of the rates across the nation.
METHODS

• Temporal trends in age-standardized CRC death rates from 1990-2007 were examined using joinpoint regression

• Change in death rates between 1990-94 and 2003-07 were calculated using rate ratios
  • US state maps were created to illustrate changes in geographic patterns of CRC death rates between 1990-94 and 2003-07

• Relationship between percent change in death rates from 1990-94 and 2003-07 and screening rates for 2004 (BRFSS) was examined using Pearson’s correlation (SAS)
RESULTS

State trends in CRC mortality rates based on Joinpoint analysis, 1990-2007

• Decreasing trend in all states, except in Mississippi.

• In the NE states, APC: RI 6.3*
  MA 5.3*
  CT 5.1*
  NY 4.5*

• In Southern states, APC: KY 1.7*
  WV 1.2*
  AL 0.7*
  MS 0.2

**APC's:**
- MA: \((1990-02=-2.8^*,
  \text{2002-07}=-5.3^*)\)
- NY: \((1990-00=-2.3^*,
  \text{2000-07}=-4.5^*)\)
- AL: \((1990-07=-0.7^*)\)
- MS: \((1990-07=-0.2)\)

* Significant at \(\alpha=0.05\)

Symbols represent observed data
Lines represent fitted data
Similar pattern observed in the change in death rates between 1990-94 and 2003-07

<table>
<thead>
<tr>
<th>State</th>
<th>Mortality Rate 1990-94</th>
<th>Mortality Rate 2003-07</th>
<th>Rate Ratios (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Massachusetts</td>
<td>27.5</td>
<td>17.4</td>
<td>0.63 (0.61,0.65)</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>26.3</td>
<td>17.1</td>
<td>0.65 (0.60,0.70)</td>
</tr>
<tr>
<td>New York</td>
<td>26.4</td>
<td>17.4</td>
<td>0.66 (0.65,0.67)</td>
</tr>
<tr>
<td>Connecticut</td>
<td>24.1</td>
<td>16.1</td>
<td>0.67 (0.64,0.70)</td>
</tr>
<tr>
<td>Kentucky</td>
<td>26.1</td>
<td>20.8</td>
<td>0.80 (0.77,0.83)</td>
</tr>
<tr>
<td>West Virginia</td>
<td>24.8</td>
<td>21</td>
<td>0.85 (0.80,0.90)</td>
</tr>
<tr>
<td>Louisiana a</td>
<td>24.3</td>
<td>20.9</td>
<td>0.86 (0.82,0.90)</td>
</tr>
<tr>
<td>Alabama a</td>
<td>20.4</td>
<td>18.6</td>
<td>0.91 (0.87,0.95)</td>
</tr>
<tr>
<td>Mississippi a</td>
<td>21.1</td>
<td>20.3</td>
<td>0.96 (0.91,1.02)</td>
</tr>
</tbody>
</table>

*Annual Percentage Change in trend significant at the 5% level of confidence. a States affected by Hurricane Katrina.

Geographic Variation

Mortality Rates, 1990-1994

Mortality Rates, 2003-2007
Correlation between % change in Mortality Rates (1990-94 to 2003-07) and % Screened for CRC (2004)

$r = -0.65$, $p<0.0001$
DISCUSSION:

Factors contributing to state disparities in CRC death rates:

Risk factors and access to care
Obesity and smoking affect the trend in CRC mortality.

- Obesity is much higher in a majority of counties in the southern states of AL, LA, MS and TN among others, than in the northern states*

- According to BRFSS, smoking rates among adults are also much higher in the Southern states with 28% of adult smokers in KY, 24% in MS and TN and 27% smokers in WV.

Source: * MMWR, 2008
Access to care: Screening for CRC / Treatment Differences

- % Below Poverty Line (2007)
  - MS: 20.7%
  - LA: 18.8%
  - MA: 10%
  - National Rate: 13%

- % Uninsured (2007)
  - MS: 18.8%
  - LA: 18.5%
  - MA: 5.4%
  - National Rate: 15.3%
• Delay in getting screened and treated for CRC results in a higher proportion of late stage CRC cases observed in Southern states
  - Poorer outcomes

• Southern states have a relatively large black population and this population group is associated with having
  • Lower socioeconomic status
  • Higher prevalence of obesity
  • Higher risk perception to interventions
  • Poorer screening rates
LIMITATIONS

• We can only speculate about factors contributing to state disparities in CRC mortality declines.

• Inaccuracies in underlying cause of death and in race/ethnicity classification in death certificates.

• Variations in the race/ethnicity composition among states
Conclusion

Progress in reducing CRC mortality rates varies significantly across states

- Northeastern states – most progress
- Southern states – least progress

- Highest burden of CRC mortality shifted from Northeast to Southern states along the Appalachian corridor -- from 1990-94 to 2003-07.

- Need for wider dissemination of CRC screening to decrease high burden of CRC deaths.
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