Racial and socio-economic disparities in melanoma incidence rates in Georgia: 2000-2011

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ORISE Fellow

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Outline

- Background
- Trends
- Methods
- Results
- Discussion
- Implications for Public Health
Age-standardized (world standard population) incidence rates from 17 countries worldwide for the year 2002.

Garbe & Leiter 2009
Trends in the US

Figure 3. Age-Adjusted Melanoma Incidence Rates, Actual and Projected, by Sex, 1975–2020

Note: Data after vertical dotted line are projected rates.
Figure 4. Age-Adjusted Melanoma Death Rates, Actual and Projected, by Sex, 1975–2020

Note: Data after vertical dotted line are projected rates.
Racial and socio-economic disparities in melanoma incidence rates in Georgia: 2000-2011

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ABSTRACT

Background: The objective of this research was to investigate melanoma incidence rates and health outcomes in Georgia over time and by race, socio-economic status (SES), and gender.

Methods: Age-adjusted melanoma incidence rates were obtained from the Georgia Comprehensive Cancer Registry SEER*Stat Database (2000-2011). To compare incidence rates across counties, and public health districts and by race, SES and gender, maps were generated using Geographic Information Systems (GIS). A cluster analysis was performed by use of SaTScan, and maps were created to visualize clusters of melanoma cases.

Results: In Georgia, from 2000-2011, age-adjusted incidence rates for melanoma were higher among Whites than Blacks (28.6 vs. 11.4 per 100,000 population). For both races, high rates were found to be associated with higher SES. For Whites, high rates were concentrated in urban areas relative to Blacks in rural areas. Clusters of melanoma incident cases were found mainly in the north central region of Georgia.

Conclusions: For Georgia, results for map comparisons are consistent with previous research findings that higher melanoma incidence rates are associated with high SES for Whites and, to a lesser extent, for Blacks. Melanoma interventions in Georgia should focus on urban White and rural Black at-risk populations, especially those with high SES.

Keywords: melanoma, racial disparities; socioeconomic status (SES); Geographic Information Systems (GIS); cluster analysis

INTRODUCTION

Skin cancer is the most frequently diagnosed cancer in the United States (US) with melanoma, the malignant form accounting for 75% of all skin cancer deaths (Shoosh and Kashani-Sabet, 2009). Melanoma is a highly preventable form of cancer that, if caught at an early stage, can be treated with promising results. From 1992 to 2006, melanoma incidence rates among non-Hispanic Whites increased for all ages, but mortality rates increased only among persons >65 years old (Jemal et al, 2011). Educational campaigns across the US to promote awareness about melanoma have helped to slow the rising incidence of melanoma, although disparities still exist among racial groups and by socio-economic status (SES) (Giblin and Thomas, 2007).

Research on melanoma in GA has been conducted, making descriptions of geographic and racial trends a priority. The incidence of melanoma in non-Hispanic Whites is higher than among ethnic minority populations, the lifetime risk of developing melanoma is 23 times higher among Whites than among Blacks (Shoosh and Kashani-Sabet, 2009; Singh et al, 2011; American Cancer Society, 2013). Among ethnic minorities, the rarity of melanoma occurrence and atypical presentations lead to delayed diagnoses at later stages and poorer clinical outcomes (Harvey et al, 2014; Fin et al, 2014; Shoosh and Kashani-Sabet, 2009). In GA, from 2002-2006, melanoma incidence rates for Whites were the 6th highest in the US (Office of Air and Radiation, 2010). The population of GA is 62.8% White (US 77.9%) and 31.2% Black (relative to 13.1% in the US) which provides a larger sample size for...
Racial Trends & Melanoma

- Risk of developing melanoma 23 times higher among Whites than among African Americans
- Melanomas in minority populations generally appear in atypical locations
- Non-whites more likely to have advanced melanomas at diagnosis and lower melanoma-specific survival
Socio-economic Trends & Melanoma

- Generally LOW SES is associated with a high incidence rate (IR) for the most common cancers (breast, lung, GI, etc)
- For melanoma, multiple studies have shown that HIGH SES is associated with high IR
- However, LOW SES is associated with late-stage diagnosis and increased mortality rates
Melanoma in Georgia

- Melanoma IR in Georgia was 13% higher than the national average
- Among whites, GA had the 6th highest IR in the US
Methods

- Age-adjusted melanoma incidence rates obtained from the Georgia Comprehensive Cancer Registry SEER*Stat Database (2000-2011)

- Geographic Information Systems (GIS ArcMap software) was used for visualization of data
  - Hot spots of melanoma incidence analyzed at the county level for whites
  - SaTScan software was used to analyze clusters of melanoma incidence
Melanoma Incidence Rates for Georgia and the US by Race and Gender (2000-2011)

<table>
<thead>
<tr>
<th>Race</th>
<th>Gender</th>
<th>GA (Incidence Rate (CI))</th>
<th>United States (Incidence Rate (CI))</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td></td>
<td>21.0 (20.7-21.3)</td>
<td>20.3 (20.2-20.4)</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>27.9 (27.4-28.4)</td>
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<td>30.6 (30.4-30.8)</td>
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Melanoma Incidence Rates in Georgia Over Time

Rates are per 100,000 and age-adjusted to the 2000 US Standard Population (19 age groups - Census P25-1130) standard.
Stage at Diagnosis of Melanoma by Race (2000-2011)

**Whites**
- Localized

**Blacks**
- Localized
- Regional
- Distant
- Unknown/unstaged

Seer*Stat Summary Stage 2000
Georgia Public Health Districts (identified by their number) ranked by the median per capita income of the counties within each district.

*Black line depicts the median of the median per capita incomes of the districts ($20,005).
Figure 2. Melanoma Incidence Rates by Public Health District for Whites and Blacks 2000-2011

Data Source: Georgia Comprehensive Cancer Registry SEER*Stat Database.
* Rates are per 100,000 and age-adjusted to the 2000 US Standard Population (19 age groups - Census P25-1130) standard.
** Highlighted areas are categorized as high SES compared to the median of the median per capita income of the Public Health districts ($20,005).
Figure 3. Getis-Ord Gi* Statistic for hot spot analysis of melanoma incidence for all races and among whites by county, 2000-2011

Positive Z-score indicates clustering of high values. Negative Z-score indicates clustering of low values. Highlighted area indicates statistically significant cluster, $p<0.05$. 
Racial Distribution in Georgia, 2010
Figure 4. Clusters of age-adjusted melanoma incident cases for both races, 2000-2011

SaTScan Parameters: Discrete Poisson model adjusted for age (N=43,559). 50% spatial scanning window, 999 simulations. Data Source: Georgia Comprehensive Cancer Registry
Results

- Melanoma incidence rates were slightly higher in GA compared to the rest of the US
- Age-adjusted incidence rates significantly higher among Whites compared to Blacks
- For both races, high melanoma incidence rates were associated with high SES
- Hot spots and clusters of melanoma incidence rates were located mainly in urban areas around the city of Atlanta
Discussion

- From 2000-2011, burden of melanoma heavier among Whites than Blacks in GA, consistent with previous studies.

- New melanoma diagnoses among Whites have been increasing in GA, similar to trends in the US.
  - More natural and artificial UV radiation exposure
  - General cancer awareness and early detection
High IR for Whites found in urban areas, high IR for Blacks found in rural areas, consistent with previous studies.

- Screening more readily available
- Urban dwellers receive intermittent exposure to UV radiation but don’t protect themselves as well as rural inhabitants that receive more constant exposure.

In GA, individuals with high SES typically live in more urban areas than rural ones
Strengths

- Comprehensiveness of analysis among a variety of factors as well as use of mapping tools for data visualization
- Use of pre-existing datasets to generate hypotheses on overall trends as well as by race illustrates what populations are most at risk for melanoma development
- First descriptive epidemiologic study of melanoma in Georgia
Limitations

- Lack of melanoma cases among Blacks at the county level
- Challenges of determining SES
- Disparities by race were analyzed at the public health district level rather than the more specific county level
Implications for Public Health

- Higher melanoma incidence rates associated with high SES and geographic locations:
  - Northern, urban regions among Whites
  - Rural regions among Blacks
- Public health interventions could focus on Whites in and around Atlanta and Blacks in northern and southern rural areas, especially those with high SES
Questions?

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.