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MELANOMA INCIDENCE AND INCOME
IN THE U.S. THIRD NATIONAL CANCER SURVEY

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ABSTRACT

The Third National Cancer Survey data set and the 1970 U.S. Census data were used to compute incidence rates by income level for cutaneous melanoma for white men and women aged 35 to 64. A nonparametric statistical method was used to analyze the incidence rates for melanoma by income level, age and sex. Rates for women remained relatively stable over the three age groups while those for men increased with age. Incidence rates for women were higher than those for men in the 35 to 44 year age group with rates for men higher in the two older age categories. A positive relationship between income level, as measured by census tract of residence, and melanoma incidence for both women and men was noted (p=0.004 for women, p=0.006 for men). This direct relationship was not entirely consistent for either sex in the oldest age group, although there were increases in incidence rates between the lowest and the highest income groups.
An association between higher socioeconomic status (SES) and an increased incidence and mortality from malignant melanoma has been reported for both sexes in England, Wales and Western Australia (1, 2) and for men in the United States (3). We conducted this study using the Third National Cancer Survey (TNCS) data set to determine whether income as measured at the census tract level was associated with the incidence of melanoma.

Materials and Methods

The population-based TNCS was conducted in nine areas of the United States during 1969-1971 and included about 10 percent of the United States population (4). Population denominators for 1970 by geographic area, age and sex came from the United States Census Bureau.

We used the TNCS data set to calculate incidence rates for melanoma of the skin, all histologic types combined, for three age groups in white men and women. Because the majority of the TNCS cutaneous melanoma cases, 95 percent, were not specified as to tumor types (e.g., superficial spreading or nodular) we made no attempt to consider tumor histology in our analyses.
Microscopic confirmation had been obtained in 99.1 percent of the malignant melanoma cases reported to the TNCS.

The median income of the census tract of residence was used to assign each cancer case to one of three income levels. Low, medium and high levels were determined by dividing each geographic area of the TNCS into thirds based on the median family income of census tracts within each area. Each region was divided independently of the others and then all areas were combined for data analysis. The census tracts remained at the same income level originally assigned (either low, medium or high) even though the dollar amounts that separated the income values into the three categories varied by geographic area.

Data were analyzed by age and sex. The age groups, limited to those under 65, omitted the elderly who would have been most likely to have retired and moved to census tracts with residents who have lower average incomes. The association between the incidence of melanoma and the three income levels was analyzed using a nonparametric method (5).

Results

Incidence rates for melanoma among white women remained relatively stable over the three age groups considered here while those for men increased with age.
Rates for women were higher than those for men in the 35-44 year age group with rates for men higher in the two older age categories.

We noted a positive relationship between income level, as measured by census tract of residence, and melanoma incidence for both men and women in the two younger age groups (Table 2). Significance probabilities of 0.004 for women and 0.006 for men indicated that the positive association between income and the incidence of melanoma over all age groups was not likely to have been a chance occurrence. The direct relationship was not entirely consistent for either sex in the oldest age group, although there were increases in incidence between the lowest and the highest income groups.

There were no dramatic differences in the sex ratios. The ratio of incidence rates by income and age showed women in the premenopausal years to be slightly more likely than men to have been diagnosed with melanoma if they were in the medium or highest income category (Table 2).

**DISCUSSION**

Life-styles are of interest to those who work in the health field because they may provide clues to disease etiology. Many studies have been conducted that considered various measures of socioeconomic status in relation to cancer incidence (1-3, 5-9). Our results show that one factor related to life-style--higher income as measured
at the census tract level—is associated with a greater risk of cutaneous melanoma among both men and women. These findings are similar to those of other reports (1-3).

A study of the epidemiology of melanoma in Western Australia indicated that the highest incidence of the invasive form of this cancer occurred among men and women with the highest socioeconomic status (2). In the smaller group of preinvasive lesions, a similar relationship was found among women but was inconsistent for men.

Social status in that study was measured by the occupation and educational distributions of the population and by the proportion of owner-occupied homes as recorded in the census data.

In a study of melanoma and social status in England and Wales, male professional and administrative workers had the highest incidence and mortality rates from malignant melanoma (1). Women who were classified by their husband's occupations showed a similar relationship to social status. Unskilled and partly skilled workers had the lowest rates for both men and women.

A positive association between the incidence of melanoma and income or college education was noted for men in the TNCS interview study although no such association was found for women (3). The reasons for the difference between the findings for women in the interview study and our study may be several. The interview
study, for example, included data for only about 100 melanoma patients (both sexes combined) while we included nearly 1,200 cases. In addition, our age-group restrictions (35-64 years) may have uncovered an association between income and melanoma in women since our results were relatively undiluted by older persons who may have moved to census tracts with residents who had lower average incomes. Finally, the interview study obtained information about income from individuals while we used average income of the census tract. Women who were not working or who worked part-time could possibly have been recorded in different income groups in the two studies.

A population-based study of melanoma cases and controls in women also showed an association between the incidence of superficial spreading melanoma and number of years of schooling completed (P=0.02; 9). Although the relative risks were elevated, this association with education was not statistically significant when all histologic types were combined even though the superficial spreading form of the disease included 68 percent of the cases.

The increased incidence of cutaneous melanoma with higher income reported in the present data set was relatively consistent by sex and by age group. The aspect of life-style associated with an increase in melanoma that may be
measured by income is unknown. It has been suggested that intermittent rather than cumulative exposure to sunshine could possibly be a risk factor for melanoma (10). Persons with higher incomes who work indoors are more likely to take vacations in sunny climates than are those with lower incomes who are employed out-of-doors (2). Whether higher rates of melanoma among the relatively affluent are partially due to these factors or to others remains an open question.
Table 1. Incidence Rates for Cutaneous Melanoma in Whites by Age and Sex, TNCS 1969-1971

Incidence Rates per 100,000 population

<table>
<thead>
<tr>
<th>Age</th>
<th>Women (n=613)</th>
<th>Men (n=585)</th>
<th>F/M</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-44</td>
<td>7.7</td>
<td>6.7</td>
<td>1.14</td>
</tr>
<tr>
<td>45-54</td>
<td>7.8</td>
<td>8.2</td>
<td>.95</td>
</tr>
<tr>
<td>55-64</td>
<td>7.3</td>
<td>9.5</td>
<td>.77</td>
</tr>
</tbody>
</table>
Table 2. Incidence Rates for Cutaneous Melanoma in Whites by Age, Sex and Income Level, TNCS 1969-1971

Rates per 100,000 population

<table>
<thead>
<tr>
<th>Age and Income Level</th>
<th>Women (No.)</th>
<th>Men (No.)</th>
<th>Rate-Ratio F/M</th>
</tr>
</thead>
<tbody>
<tr>
<td>35-44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (low)</td>
<td>6.1 (28)</td>
<td>5.9 (28)</td>
<td>1.0</td>
</tr>
<tr>
<td>2</td>
<td>7.5 (75)</td>
<td>6.0 (59)</td>
<td>1.3</td>
</tr>
<tr>
<td>3 (high)</td>
<td>8.8 (123)</td>
<td>7.4 (98)</td>
<td>1.2</td>
</tr>
<tr>
<td>45-54</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>6.6 (40)</td>
<td>6.4 (35)</td>
<td>1.0</td>
</tr>
<tr>
<td>2</td>
<td>6.7 (72)</td>
<td>6.4 (63)</td>
<td>1.0</td>
</tr>
<tr>
<td>3</td>
<td>9.0 (115)</td>
<td>10.0 (125)</td>
<td>.90</td>
</tr>
<tr>
<td>55-64</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>6.7 (40)</td>
<td>6.3 (32)</td>
<td>1.1</td>
</tr>
<tr>
<td>2</td>
<td>5.4 (45)</td>
<td>10.0 (72)</td>
<td>.54</td>
</tr>
<tr>
<td>3</td>
<td>9.3 (75)</td>
<td>9.7 (73)</td>
<td>.96</td>
</tr>
<tr>
<td>Total No. of Cases</td>
<td>(613)</td>
<td>(585)</td>
<td></td>
</tr>
</tbody>
</table>

P = 0.004        P = 0.006
REFERENCES


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