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Comparison of Florida Skin Cancer Screening Rates with Those in Different US Regions

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Abstract

Objectives—Florida has the second highest incidence of melanoma in the United States, and more than 600 Floridians die from melanoma annually. Given the lack of population-based data on skin cancer screening among the different US geographic regions, we compared skin cancer screening rates among Floridians to those in the rest of the South, the Northeast, the Midwest, and the West.

Methods—We used data from the 2000 and 2005 National Health Interview Survey. Data were grouped according to whether participants reported ever receiving a skin cancer examination in their lifetime. Data were pooled, and analyses accounted for sample weights and design effects. Multivariable logistic regression analyses were performed with self-reported skin screening as the outcome of interest.

Results—Results showed that compared to the rest of the US, Floridians who were women 70 years old and older, reported being of “other” race, of non-Hispanic ethnicity, having a high school education, having health insurance, and employed in the service industry or unemployed, had significantly higher lifetime skin cancer screening rates than their subgroup counterparts residing in the other regions. Multivariable logistic regression showed that Floridians remained significantly more likely to have ever been screened for skin cancer compared to the other US regions after controlling for a variety of sociodemographic variables.

Conclusions—Increasing melanoma detection remains a national cancer goal for the US, and future identification of underlying causal factors for higher screening rates in Florida could inform intervention strategies in the other US regions.

Keywords

skin cancer screening; cancer surveillance; Florida; US geographic regions; melanoma

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Florida has the second highest incidence of melanoma in the United States, with an estimated 5260 new cases in 2011.[1] More than 600 Floridians die of melanoma every year; since 1975, the number of deaths among residents older than age 50 has almost doubled.[2] Previous studies have found that melanoma rates are highest in men[3] and non-Hispanic whites.[4] Melanoma incidence is associated with a variety of socioeconomic indicators such as higher educational attainment,[5] lack of health insurance,[6] being a nonsmoker,[6] not being an excessive drinker,[6] being physically active,[6] and being employed.[7] Fortunately, the 5-year survival rate for individuals whose melanoma is treated before it spreads to the regional lymph nodes is 98%.[1]

Skin cancer screening and early detection may be accomplished by a healthcare provider (clinical examination) or by self-examination. Even though there have been no completed randomized trials to evaluate the effect of skin screening on melanoma mortality, one case-control study suggested that skin self-examination may lower melanoma-related mortality.[8] In addition, a recent cohort study found that a thorough clinical skin examination increased the likelihood of identifying suspected melanoma.[9] In a published letter, we reported that Floridians have higher skin cancer screening rates than the rest of the United States, but we did not investigate regional comparisons within the United States.[10] Although Florida has a very high ultraviolet (UV) light index,[11] it is important to focus on skin cancer prevention efforts in other areas of the US. For example, residents in other southern states also are at risk for developing melanoma due to high UV exposure.[12] Given the amount of ambient sunlight in Florida[11] and the lack of data comparing skin cancer screening rates among the different US geographic regions, we compared skin cancer screening rates in Florida with those in the rest of the South, Northeast, Midwest, and West.

Methods

The National Health Interview Survey (NHIS) is an annual, cross-sectional representative household survey of the US civilian noninstitutionalized population. We analyzed data from the 2000 and 2005 NHIS Cancer Control Modules (CCMs),[13] which are the only source of national population-based data on cancer screening. CCMs focus on issues pertaining to knowledge and practices of cancer-related health behaviors. We specifically evaluated sociodemographic, health, and risk factor data, including age, body mass index, sex, educational attainment, race, employment, health insurance, and smoking and drinking status, as well as compliance with Healthy People 2010 recommendations for physical exercise. In all of the CCMs, participants were asked, “Have you EVER had all of your skin from head to toe checked for cancer by a dermatologist or some other kind of doctor?” Data were pooled and analyses took into account sample weights and design effects. Logistic regression analyses were performed with self-reported lifetime skin screening as the outcome of interest. In the logistic regression analyses, the corresponding values are odds ratios (ORs). OR estimates >1 (with the corresponding 95% confidence interval [CI] that does not include 1) indicate that the odds or risk of screening is statistically higher than the comparison group of interest. Conversely, ORs <1 (with a corresponding 95% CI that does not include 1) indicate that the odds of screening are significantly lower than the comparison group of interest. Florida data were compared with data from the different US geographic regions, as determined by the NHIS (ie, the rest of the South (not including Florida), Midwest, West, and Northeast). (For the specific state compositions of each region, see the US Census Regions and Divisions of the US.[14])

Data management and analyses were conducted using SAS statistical software version 9.2 (SAS Institute Inc, Cary, NC), which allows the analysis of weighted, complex sample survey data and the adjustments for sample weights and design effects. Records from each survey year were weighted according to person-level weights provided in the annual NHIS

data files. Weights were adjusted according to the number of representative years used in the analyses. All of the analyses were conducted at the Research Data Center of the National Center for Health Statistics to ensure participant confidentiality. The study was approved by the University of Miami institutional review board.

Results

Overall Sociodemographic Data

Our total sample size was 60,118 and the number of Floridians in our sample was 3963. All of the demographic variables and prevalence rates are seen in Table 1.

Prevalence Differences between Florida and Rest of South

The sample size of those in the South was 18,034. When compared with the rest of the South, Floridians reported significantly higher overall skin cancer screening rates in their lifetime. Floridians aged 30 to 39, 60 to 69, 70 to 79, and 80 years and older reported significantly higher screening rates than those groups in the rest of the South. Both male and female Floridians had significantly higher screening rates than those in the rest of the South, as well as whites, those of “other” race, and non-Hispanics. Regardless of educational attainment or health insurance status, Floridians had higher screening rates. When broken down by employment status, Floridians who were employed, unemployed (including retired), in the service sector, and blue collar workers had significantly higher screening rates than the rest of the South.

Prevalence Differences between Florida and Northeast

The sample size of those in the Northeast sample was 10,599. Floridian women had significantly higher screening rates than did those in the Northeast, as did Floridians aged 60 to 69, 70 to 79, and 80 years and older. Floridians who identified as being of “other” race, non-Hispanic, with a high school education, and with health insurance had significantly higher screening rates. In addition, people who were unemployed and service workers in Florida had significantly higher screening rates than those subgroups in the Northeast.

Prevalence Differences between Florida and Midwest

The sample size of those in the Midwest was 14,071. Overall, Floridians had higher screening rates than did the Midwest, including both men and women. All of the Floridian age groups had higher rates than those in the Midwest; however, this was not significant in those 18 to 29 years old. White, “other” race, and non-Hispanic Floridians had significantly higher rates than these groups in the Midwest, as did Floridians with a high school education or more. Employed, unemployed, white collar, and service sector Floridians had significantly higher screening rates than did those in the Midwest.

Prevalence Differences between Florida and West

The sample size of those in the West was 13,451. Overall, Floridians had significantly higher screening rates than those in the West. Both Floridian men and women had higher screening rates than those in the West, as did Floridians aged 30 to 39, 70 to 79, and 80 years and older. White, “other” race, non-Hispanics, and Hispanic Floridians had significantly higher rates. Regardless of educational attainment or health insurance status, Floridians had higher screening rates than those groups in the West. All occupational groups in Florida, except white collar and farm workers, had significantly higher screening rates than those in the West.

Logistic Regression Comparing Florida to Other US Regions

As presented in Table 2, after controlling for age, body mass index, gender, educational attainment, race, employment, health insurance, smoking and drinking status, and compliance with Healthy People 2010 recommendations for physical exercise, all regions had significantly lower lifetime skin cancer screening rates relative to Florida: South (OR 0.75, 95% CI 0.75–0.75), Northeast (OR 0.84, 95% CI 0.84–0.84), Midwest (OR 0.53, 95% CI 0.53–0.53), and West (OR 0.74, 95% CI 0.74–0.74).

Discussion

The daily routine of Floridians exposes them to more UV rays than most other people in the US.[11] Increased sun exposure equals an increased risk of developing skin cancer, but it does not necessarily translate to increased awareness of or participation in cancer screening. Our results found that compared with the rest of the nation, Floridians who were women older than 70 years, who reported being of “other” race, of non-Hispanic ethnicity, who had a high school education, who had health insurance, who were employed in the service industry, or who were unemployed (including those who are retired) had significantly higher skin cancer screening rates than their counterparts residing in the rest of the South, the Northeast, the Midwest, and the West. Even after adjusting for the sociodemographic and health-related indicators, Floridians retained significantly higher odds of reporting lifetime skin cancer screening compared with the other regions in the US. The biggest difference found was between Florida and the Midwest, with Florida having much higher screening rates. This shows that regional variations in screening rates exist in the US; these results are consistent with the limited number of previous research studies on this topic[15]; however, no previous studies have separated Florida, a state where residents are exposed to high UV rays all year long, from other distinct US regions to evaluate skin cancer–screening behaviors. It is important to note that all individuals in the US are exposed to UV rays no matter what their state of residence. For example, the mean UV index (on a scale of 0–12, 12 being the highest) for residents living in the rest of the South in July is between 8 and 9.[11]

The literature has shown that elderly adults bear a disproportionate burden of morbidity and mortality from melanoma,[16] and melanoma incidence is highest in non-Hispanic whites.[4] Fortunately, in Florida, these groups reported the highest rates of skin cancer screening compared with the other US geographic regions. This positive health behavior may be due to several cancer initiatives in Florida that influence screening activities, which could be applied to other regions of the country. For example, the American Academy of Dermatology reports that Florida, compared with all other US states, has the highest number of free skin cancer screening sites.[17] Included in this are the efforts of the Moffitt Cancer Center and Research Institute’s program, Mole Patrol, which provides free skin cancer screenings to individuals on Florida’s beaches, and that partners with several other Florida organizations to increase cancer awareness.[18] Florida also has a comprehensive cancer plan, in which several government-led organizations focus on decreasing the incidence and mortality of cancer.[19]

Previous studies have found an association between higher dermatologist densities and lower melanoma mortality rates, due to greater opportunities for earlier detection.[20,21] A higher density of dermatologists in Florida compared with other states also may help account for higher screening rates.[20,22] Although it is not likely that other regions of the country can easily change the density of dermatologists within their region, it may be feasible to offer a greater number of free skin screenings, especially in the context of high-sun-exposure outdoor activities. Regardless, educational initiatives for both patients and health practitioners also can highlight the potential benefits and recommendations for skin cancer screening.

Consistent with previous studies, skin cancer screening rates have been shown to increase with a variety of socioeconomic indicators, such as higher educational attainment, health insurance, physical activity, and low unemployment.[15] Therefore, increased targeting for those of lower socioeconomic status is warranted, particularly for Hispanics and people of African descent (who often do not believe they are at risk for skin cancer due to their darker skin tone).[23]

It is important to note that, to date, the US Preventive Services Task Force has not found sufficient evidence to make recommendations regarding skin cancer screening[24]; however, recent findings from a population-based skin cancer study in Germany strongly suggests that early detection does save lives.[25,26] This screening effort led to the detection of more than half of the melanomas diagnosed in the Schleswig-Holstein area of Germany. This resulted in an (expected) increase in melanoma incidence rates,[26] but a decline in the age-standardized melanoma mortality rate by nearly 50%.[25] The American Cancer Society recommends monthly self-examinations and yearly skin examinations by a doctor to detect skin cancer early and to make it easier to treat.[27] The American Academy of Dermatology and the Centers for Disease Control and Prevention also recommend that "physicians should examine exposed areas of the skin for cancer whenever the opportunity arises."[28]

The limitations of the present study include the cross-sectional nature of the NHIS. Another limitation is the self-reported nature of the NHIS data, which can limit its validity; however, a similarly worded question regarding self-reported whole-body skin examination has been validated with a sensitivity of 90.5, although it is important to note that this study was conducted outside the United States.[29] Also, there is no way to determine who is conducting the screening, and the literature has shown that screening accuracy varies by the type of practitioner.[24] Finally, it is unknown whether te older participants moved to Florida to retire or have lived their whole lives in Florida.

The strengths of this study include the use of the NHIS CCMs, which are the only source of national population-based data on cancer screening.[13] In addition, using the NHIS and conducting analyses at the Research Data Center allowed for large sample sizes and the ability to compare Florida to the different geographic regions of the US.

Conclusions

In summary, living in the "Sunshine State" may raise awareness of the need for skin cancer screening, especially among individuals who are most at risk for melanoma. The results provided in the present study could be used by public health officials in other states, with the support of primary care physicians and other health care providers, to develop and implement local community health fairs specifically targeting the delivery of mass screening programs. This is particularly important for high-risk groups reporting low skin examination rates. In addition, other states with a high UV index (eg, the rest of the South) should develop targeted public health initiatives for their states. Increasing the early detection and prevention of melanoma remains a national cancer goal for the United States, especially in areas with a high UV index.

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Key Points

- There is a lack of population-based data on skin cancer screening among the different US geographic regions.
- Multivariable logistic regression showed that Floridians remained significantly more likely to have ever been screened for skin cancer compared to other US geographic regions.
- The identification of underlying causal factors for higher screening rates in Florida in future studies could inform intervention strategies in other US geographic regions.

Table 1

	Florida			Rest of South			Northeast			Midwest			West		
Independent variable	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Total	3963	20.9	19.3–22.7	18,034	15.5*	14.8–16.2	10,599	20.4	19.5–21.4	14,071	14.0*	13.3–14.8	13,451	16.7*	15.9–17.6
Sex															
Male	1738	18.1	16.3–19.9	7727	15.4*	14.4–16.4	4455	18.9	17.5–20.5	6149	13.0*	12.2–13.9	6048	16.6*	15.6–17.7
Female	2225	23.6	20.7–26.7	10,307	15.6*	14.8–16.5	6144	21.7*	20.4–23.0	7922	15.0*	14.0–16.1	7403	16.8*	15.6–18.1
Age, y															
18–29	694	6.9	5.0–9.5	3623	6.2	5.3–7.3	1788	9.7*	8.0–11.6	2800	6.6	5.6–7.9	2783	6.9	5.8–8.3
30–39	818	15.1	12.1–18.8	3583	11.4*	10.2–12.8	2072	15.8	14.2–17.5	2738	10.0*	8.9–11.3	2828	10.9*	9.7–12.4
40–49	734	17.0	13.7–21.0	3497	17.1	15.7–18.6	2142	22.5*	20.8–24.3	2733	13.5*	12.1–15.1	2743	15.6	14.0–17.4
50–59	578	21.7	18.1–25.9	2858	20.6	18.8–22.5	1750	25.4*	23.2–27.6	2211	18.4*	16.7–20.3	2107	21.4	19.3–23.7
60–69	507	32.4	26.7–38.6	2050	24.3*	22.0–26.8	1186	25.0*	22.2–27.9	1589	23.4*	21.3–25.7	1335	29.9	26.7–33.4
70–79	423	42.0	37.7–46.5	1572	24.6*	22.1–27.3	1025	32.1*	28.7–35.7	1231	23.2*	20.8–25.8	1061	31.2*	27.7–35.0
≥80	209	44.0	35.0–53.3	851	22.9*	19.4–26.9	636	24.8*	21.1–29.0	769	21.9*	19.0–25.2	594	30.5*	26.0–35.4
Race															
White	3212	23.3	21.2–25.5	13,209	17.3*	16.5–18.0	8438	22.4	21.4–23.5	12,005	14.8*	14.0–15.6	11,094	18.3*	17.4–19.3
Black	654	9.7	7.9–11.8	4006	10.1	8.9–11.4	1429	10.8	9.5–12.2	1634	8.5	6.8–10.6	778	8.9	7.1–11.1
Other	97	13.0	4.6–31.9	819	7.6*	5.7–10.1	732	8.2*	6.1–11.1	432	7.1*	4.6–10.9	1579	8.7*	7.1–10.5
Ethnicity															
Non-Hispanic	2867	24.3	22.5–26.3	15,337	16.5*	15.7–17.2	9147	21.6*	20.6–22.7	13,358	14.4*	13.6–15.2	9147	20.2*	19.2–21.3
Hispanic	1096	7.6	5.6–10.3	2697	6.7	5.5–8.2	1452	8.4	7.0–10.0	713	6.0	3.8–9.3	4304	5.4*	4.6–6.3
Education															
<High school	751	11.9	9.0–15.7	4196	9.7*	8.7–10.9	1853	12.2	10.6–14.0	1973	10.5	9.0–12.2	3047	6.6*	5.5–7.9
High school	1169	19.8	17.0–23.0	5113	12.1*	11.0–13.2	3219	15.0*	13.8–16.2	4575	10.7*	9.5–12.1	3235	12.5*	11.0–14.1
>High school	2010	24.5	22.7–26.5	8550	20.1*	19.1–21.2	5466	25.8	24.3–27.3	7441	17.0*	15.9–18.1	7092	21.9*	20.8–23.2
Health insurance status															
Insured	3074	24.6	23.0–26.4	14,272	17.7*	16.9–18.5	9340	21.9*	20.8–22.9	12,392	15.1*	14.3–15.9	10,616	19.2*	18.2–20.3

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	Florida			Rest of South			Northeast			Midwest			West		
Independent variable	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**	**n**	**%**	**95% CI**
Uninsured	879	7.5	5.4–10.3	3696	6.7	5.9–7.7	1210	9.1	7.4–11.1	1637	6.4	5.1–8.0	2787	6.2*	5.2–7.3
Employment status															
Employed	2311	16.2	14.7–17.9	10,477	14.6*	13.9–15.4	6129	18.8*	17.7–20.0	8698	12.3*	11.4–13.3	7900	14.5*	13.6–15.4
Unemployed	1619	27.9	25.2–30.8	7382	17.0*	15.9–18.2	4409	23.0*	21.6–24.4	5291	17.1*	16.0–18.3	5474	20.2*	18.7–21.7
White collar	1390	19.1	16.7–21.8	6009	18.8	17.7–19.9	3789	23.3*	21.8–24.9	5154	14.7*	13.5–16.0	4597	18.6	17.3–20.0
Service	387	15.9	11.0–22.4	1747	10.7*	9.1–12.6	1076	13.2*	11.3–15.4	1303	10.1*	8.3–12.2	1344	10.9*	9.1–12.9
Farm	40	5.4	1.2–21.1	152	7.0	3.3–14.0	55	7.6	2.7–19.5	138	7.3	4.0–13.0	225	6.9	3.5–13.2
Blue collar	507	9.3	6.5–13.1	2618	8.4*	7.2–9.7	1224	10.0	8.4–11.7	2127	8.4	7.1–9.9	1771	7.0*	5.8–8.4

*Prevalence comparison between Florida and region is significant at the $P < 0.05$ level.

Table 2

Independent variable	OR	95% CI
Age, y	1.03	1.03–1.03
BMI	0.99	0.99–0.99
Sex		
Male	1.00	—
Female	1.14	1.14–1.14
Education		
>High school	1.00	—
High school	0.55	0.55–0.55
<High school	0.44	0.44–0.44
Race		
Non-Hispanic white	1.00	—
Non-Hispanic black	0.62	0.62–0.62
Hispanic	0.46	0.46–0.46
Other	0.48	0.47–0.48
Employment status		
Employed	1.00	—
Unemployed	1.09	1.09–1.09
Health insurance status		
Insured	1.00	—
Uninsured	0.65	0.65–0.65
Smoking status		
Nonsmoker	1.00	—
Former	1.10	1.10–1.11
Current	0.86	0.86–0.86
Drinking status		
Nondrinker	1.00	—
Former	1.29	1.28–1.29
Current	1.51	1.51–1.51
Compliant with Healthy People 2010 recommendations for physical exercise		
Yes	1.00	—
No	0.69	0.69–0.69
Regional comparisons		
Florida	1.00	—
Rest of South	0.75	0.75–0.75
Northeast	0.84	0.84–0.84
Midwest	0.53	0.53–0.53
West	0.74	0.74–0.75

CI, confidence interval; OR, odds ratio.