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Patterns of Sunscreen Use on the Face and Other Exposed Skin among US Adults

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Abstract

Background—Sunscreen is a common form of sun protection, but little is known about patterns of use.

Objective—To assess patterns of sunscreen use on the face and other exposed skin among US adults.

Methods—Using cross-sectional data from the 2013 Summer ConsumerStyles survey (N= 4,033), we calculated descriptive statistics and adjusted risk ratios to identify characteristics associated with regular sunscreen use (*always*/*most of the time* when outside on a warm sunny day for 1+ hour).

Results—Few adults regularly used sunscreen on the face (men: 18.1%, 95% Confidence Interval [CI]: 15.8–20.6; women: 42.6%, 95% CI 39.5–46.7), other exposed skin (men: 19.9%, 95% CI 17.5–22.6; women: 34.4%, 95% CI 31.5–37.5), or both the face and other exposed skin (men: 14.3%, 95% CI: 12.3–16.6; women: 29.9%, 95% CI: 27.2–32.8). Regular use was associated with sun-sensitive skin, a household income ≥$60,000, and meeting aerobic activity guidelines (*P*s < 0.05). Nearly 40% of users were unsure if their sunscreen provided broad spectrum protection.

Limitations—Reliance on self-report and lack of information on sunscreen reapplication or other sun-safety practices.

Conclusion—Sunscreen use is low, especially among certain demographic groups. These findings can inform sun-safety interventions and the interpretation of surveillance data on sunscreen use.

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Keywords

sunscreen; sun protection; sun safety; broad spectrum; sun protection factor; skin cancer prevention

Introduction

Sunscreen is a common form of sun protection used by US adults.[1–4] According to National Health Interview Survey (NHIS) data, approximately one-third of adults *usually* or *always* use sunscreen when outdoors in the sun for one hour or more.[4] Furthermore, a study of media coverage on skin cancer prevention found more content about sunscreen than other recommended prevention strategies.[5] If used properly, regular sunscreen use can reduce risk for skin cancer[6, 7] and prevent or delay photoaging of the skin.[8–10] In 2011, the U.S. Food and Drug Administration updated regulations on sunscreen labeling to help consumers select and properly use sunscreens.[11] Sunscreen products that provide a sun protection factor (SPF) of 15 or higher and broad spectrum protection (i.e., protection from both ultraviolet A [UVA] and ultraviolet B [UVB] radiation) are labeled as protecting against sunburn, and, if used as directed, reducing the risk for skin cancer and early skin aging.

National surveys (e.g., NHIS[12]) have assessed sunscreen use among US adults but do not differentiate between use on the face versus other exposed skin and do not capture whether the sunscreen provides broad spectrum protection. Given the variety of cosmetics on the market that are labeled as providing sun protection, sunscreen use on the face is likely to be distinct from use on other exposed skin, particularly among women. The purpose of this study is to examine patterns of sunscreen use on the face and other exposed skin among US adults.

Methods

We used data from Porter Novelli's 2013 Summer ConsumerStyles survey to examine sunscreen use among US adults aged 18 years or older. The ConsumerStyles are cross-sectional online surveys designed to capture the public's opinions, beliefs, and trends in health behavior. Participants are from the GfK (http://www.gfk.com/us/) Knowledge Panel[13], which is randomly recruited by probability-based sampling using both random-digit dialing and address-based sampling methods to reach respondents regardless of landline phone or Internet availability. If needed, households are provided with a laptop computer and access to the Internet. The survey was fielded from June 28 through July 26, 2013.

Outcome measures

Sunscreen use on the face was assessed by 3 questions:

When you go outside on a warm sunny day for more than one hour, how often do you use sunscreen on your face? [*always; most of the time; sometimes; rarely; never*]

What is the SPF number of the sunscreen you usually use on your face? [*1–14; 15–49; 50+; not sure*]

Does the sunscreen you usually use on your face provide broad spectrum (UVA and UVB) protection? [*yes; no; not sure*]

Three similar questions asked about sunscreen use on "other exposed skin (not including your face)."

Other variables of interest

The survey included a question previously used on the NHIS[12] which asks about the skin's reaction to being "out in the sun for an hour without sunscreen, a hat, or protective clothing." Response options were 1) *get a severe sunburn with blisters*, 2) *have a moderate sunburn with peeling*, 3) *burn mildly with some or no tanning*, 4) *turn darker without sunburn*, 5) *nothing would happen to my skin*. Similar to the Fitzpatrick scale,[14] this variable measures sun sensitivity by assessing the skin's tendency to burn, but the question also captures the severity of the burn. Sun-sensitive skin was defined as a skin that sunburns (response options 1–3). Other variables included gender, age, race/ethnicity, geographic region, household income, having skin cancer in the past year, having a cancer other than skin cancer in the past year, having one or more children under the age of 18, meeting the 2008 Physical Activity Guidelines for Americans[15] for aerobic activity (based on self-reported average weekly physical activity; referred to as "aerobic activity guidelines" in subsequent text), body mass index (BMI; based on self-reported height and weight), and cigarette smoking status.

Data analysis

The survey was sent to 6,102 adults aged 18 years or older. A total of 4,033 adults completed the survey (answered at least half the questions), yielding a response rate of 66%. The resulting data were weighted using 9 factors: gender, age, household income, race/ethnicity, household size, education, census region, metro status, and prior internet access to be representative of the US population.

We calculated the unadjusted frequency of sunscreen use on the face and on other exposed skin when outside on a warm, sunny day for more than one hour among all participants. Among participants who reported using sunscreen *always*, *most of the time*, *sometimes*, or *rarely*, we calculated the unadjusted percentages of responses to the questions about characteristics of the sunscreen used (SPF and broad spectrum protection). We defined regular sunscreen use as using sunscreen *always* or *most of the time* when outside on a warm, sunny day for more than one hour. To examine the association between individual characteristics and regular sunscreen use, we computed unadjusted percentages and adjusted risk ratios derived from the predicted marginals.[16] Analyses were stratified by the site of sunscreen use (on the face and on other exposed skin) and by gender. P values < 0.05 were considered statistically significant. Calculations were performed with SAS-callable SUDAAN to account for the complex sampling design and non-response. Percentages were weighted to generalize results to the study population. Differences between groups were assessed with general linear contrasts. CDC licenses the Summer ConsumerStyles data from Porter Novelli. Our analyses were considered exempt by CDC's Institutional Review Board because we used secondary data and personal identifiers were not included in the data.

Results

Weighted percentages of demographic characteristics of the study population are shown in Table 1. Most were non-Hispanic white (67.4%) and had an annual household income of $40,000 or more (66.8%). ETable 1 compares the survey data (weighted and unweight) to the 2013 Census estimates for select demographic variables.

Overall, 18.1% (95% confidence interval [CI]: 15.8–20.6) of men and 42.6% (95% CI: 39.5–46.7) of women regularly used sunscreen on the face, whereas 19.9% (95% CI: 17.5–22.6) of men and 34.4% (95% CI: 31.5–37.5) of women regularly used sunscreen on other exposed skin (Figure 1). Regularly using sunscreen on both the face and other exposed skin was more prevalent among women (29.9%, 95% CI: 27.2% –32.8%) than among men (14.3%, 95% CI: 12.3% –16.6%). A higher percentage of men *never* used sunscreen (on the face: 43.8%, 95% CI: 40.5–47.1; on other exposed skin: 42.1%, 95% CI: 38.8–45.4) compared to women (on the face: 27.0%, 95% CI: 24.2–30.0; on other exposed skin: 26.8%, 95% CI: 24.0–29.8; Figure 1). Among sunscreen users, over 80% used a sunscreen with an SPF of 15 or higher (Figure 2). On the face, 57.3% (95% CI: 54.5, 60.1) used sunscreen with an SPF of 15–49; 26.8% (95% CI: 24.3–29.4) used sunscreen with an SPF of 50 or higher. On other exposed skin, 55.2% (95% CI: 52.5–58.0) used sunscreen with an SPF of 15–49; 27.6% (95% CI: 25.1, 30.2) used sunscreen with an SPF of 50 or higher. About 60% used broad spectrum sunscreen (face: 60.6%, 95% CI: 57.8–63.2; other exposed skin: 59.4, 95% CI: 56.6, 62.1), but almost 40% of users (face: 37.6%, 95% CI: 35.0, 40.3; other exposed skin: 38.6%, 95% CI: 36.0, 41.4) were not sure if their sunscreen provided broad spectrum protection.

In the unadjusted analyses, regular sunscreen use on the face and on other exposed skin was associated with race/ethnicity among both men and women (all P values < 0.001; Table 2). Compared with non-Hispanic whites, non-Hispanic blacks were less likely to use sunscreen regularly on the face or on other exposed skin. Hispanics were less likely to regularly use sunscreen on other exposed skin. A higher likelihood of regular use was observed among men and women with more sun-sensitive skin compared with those whose skin did not sunburn (all *P* values < 0.001), those with a household income of $60,000 or more compared with those with a household income below $25,000 (all *P* values < 0.001), those who met aerobic activity guidelines (all *P* values < 0.05), and those who were not current smokers (all *P* values < 0.05). Regular sunscreen use on the face varied significantly by region among men (*P* = 0.009), and regular use on other exposed skin varied significantly by region among women (*P* = 0.030). Variation by age was observed among both men and women for regular sunscreen use on other exposed skin only (*P* values = 0.005 and 0.016 respectively). Among both men and women, those who had one or more children under the age of 18 years were more likely to use sunscreen on other exposed skin (*P* < 0.05). Among women only, those diagnosed with skin cancer in the past year were more likely to regularly use sunscreen on the face (*P* = 0.010), and those who were overweight or obese were less likely to use sunscreen on the face or other exposed skin than their counterparts (all *P* values < 0.001).

After adjusting for all other variables in the models, we observed that among both men and women, those with more sun-sensitive skin were more likely to regularly use sunscreen on

the face and on other exposed skin compared with those whose skin did not sunburn (all *P* values < 0.001; Table 3). Additionally, adults with a household income below $60,000 were significantly less likely to use sunscreen regularly compared to those with higher incomes (all *P* values < 0.001). Among women only, non-Hispanic blacks were significantly less likely to regularly use sunscreen on the face or other exposed skin compared to non-Hispanic whites (all *P* values < 0.05). Among men only, those living in the Northeast were more likely to regularly use sunscreen on the face compared to those living in the Midwest and South ($P = 0.04$). Those who met aerobic activity guidelines were significantly more likely to regularly use sunscreen than those who did not (all *P* values < 0.05), with the exception of male sunscreen use on other exposed skin ($P = 0.056$). Among women only, those who were overweight or obese were less likely to regularly use sunscreen on the face compared to women of a healthy weight ($P = 0.016$), and current smokers were less likely to regularly use sunscreen on the face or on other exposed skin compared to non-smokers (all *P* values < 0.05).

Discussion

About 30% of women and less than 15% of men regularly use sunscreen on both the face and other exposed skin. Some adults, particularly women, use sunscreen regularly on the face but not on other exposed skin. This pattern may reflect the many cosmetic products containing SPF that are marketed to women for use on the face. Similarly, focus group data from a 1997 study suggested that women may focus sunscreen use on the face for antiaging purposes.[17] Estimates that do not differentiate between use on the face versus other exposed skin should be interpreted with caution. Sun-safety messages should encourage women to protect all skin from the sun rather than just the face.

The association between sunscreen use and demographic characteristics is informative for future intervention efforts. For example, consistent with previous findings, this study suggests that sunscreen use is low among non-Hispanic blacks and those who tend not to sunburn.[1, 2, 4] These groups may have a lower perceived susceptibility to sun damage and need guidance on balancing the risks and benefits of sun exposure, given the variation in susceptibility even within racial/ethnic groups.[18–21] Similar to previous findings, men tend to use sunscreen less frequently than women, and many do not use sunscreen at all.[1, 2, 4] Men may view sunscreen as non-masculine, messy, or inconvenient,[22, 23] and sunscreen ads target women more often than men.[24,25] Men may rely on protective clothing and shade more than sunscreen,[2] and these alternatives could be encouraged. However, there may still be times when sunscreen is necessary for adequate protection, and more research is needed to develop effective sun-safety interventions targeting men. The inverse association between sunscreen use and household income suggests that cost may be a barrier to sunscreen use, a concern also raised by others.[22, 26] Creating environmental supports for sun-safety (e.g., providing free sunscreen or shade in outdoor settings) may mitigate individual-level barriers like cost.

Regular sunscreen use was also associated with health-related factors. The positive relationship between sunscreen use and aerobic activity is noteworthy given previous findings that adults who are more physically active are more likely to experience sunburn.[21]

Although seemingly contradictory, these findings may reflect increased time outdoors and greater total sun exposure among the more physically active, creating a need for more vigilant protection. The association between BMI and sunscreen use was consistent with other studies that have indicated higher BMI is positively associated with skin cancer risk behaviors[27–28] and sunburn.[21] Regular sunscreen use was not significantly associated with having skin cancer in the past year in the adjusted analyses, suggesting a need for interventions targeting this high-risk group. There was also no significant association between having a child under the age of 18 years and sunscreen use. Parents provide sun protection and serve as role models for their children and should be encouraged to protect both themselves and their families from the sun.

Sunscreen works best when used as directed and in combination with other forms of sun protection.[29] Among sunscreen users, nearly 40% were unsure if their sunscreen provided broad spectrum protection. When a sunscreen does not provide adequate protection, users may have a false sense of protection, possibly leading to more total sun exposure.[30] Additional guidance on characteristics to look for in a sunscreen and provision of sun-safety supports at the community level (e.g., accessible consumer information about effective protection strategies and shade planning in outdoor settings) could complement and support individual sun-safety efforts.[31] The Community Preventive Services Task Force provides guidance on evidence-based community-level skin cancer prevention interventions,[32] and the US Preventive Services Task Force provides guidance on skin cancer prevention counseling in clinical settings.[33]

Limitations

This study has several limitations. One, the study relies on self-reported information which is subject to error. Two, the study had a 66% response rate and potential for non-response bias. However, we weighted the data to the US population and accounted for non-response, which may have mitigated this effect. Three, the study did not include data on other skin cancer risk-related behaviors or the context in which sunscreen was used (e.g., use of other forms of sun protection), all of which factor into ensuring adequate sun protection.

Conclusion

This study provides new information about patterns of adult sunscreen use. Sunscreen use is particularly low among certain groups such as men, non-Hispanic blacks, those with less sun-sensitive skin, and those with lower incomes. These groups may benefit from guidance on alternative methods of sun protection. Many users are unsure if their sunscreen provides broad spectrum protection, and among women, regularly using sunscreen on the face but not on other exposed skin is common. Additional guidance on how to most effectively use sunscreen is warranted. Environmental supports such as shade in outdoor settings could complement efforts to promote individual sun-safety.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations and acronyms

CI	Confidence Interval
NHIS	National Health Interview survey
SPF	Sun Protection Factor
UVA	ultraviolet A radiation
UVB	ultraviolet B radiation

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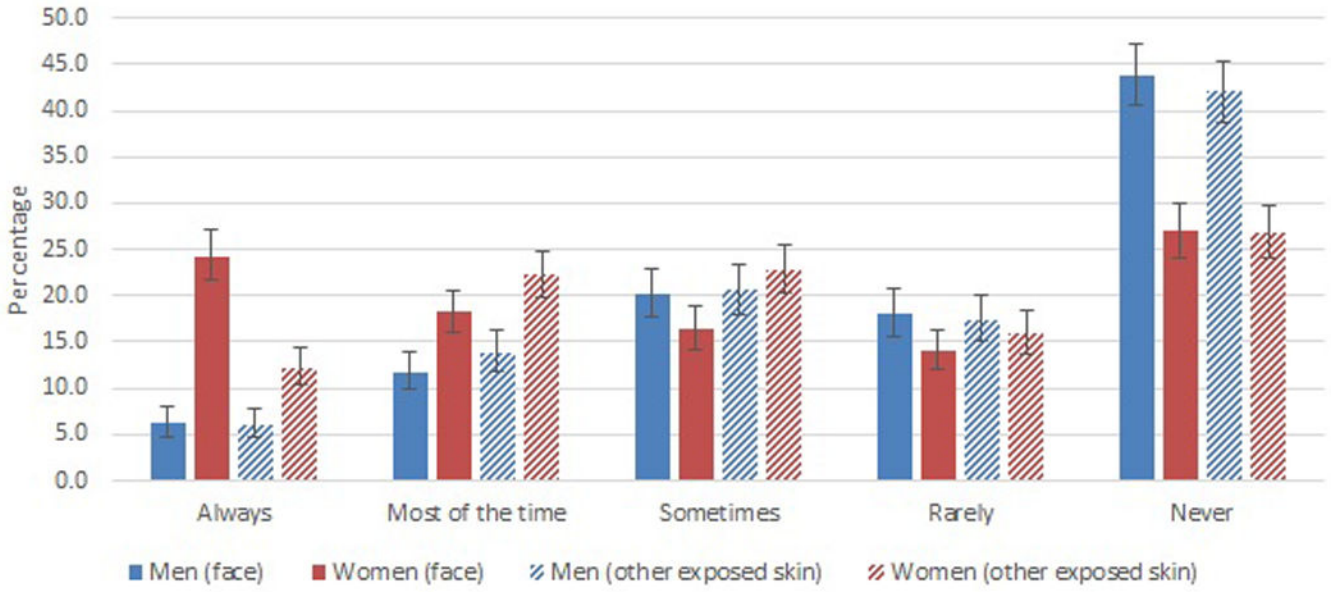

Figure 1.

Unadjusted frequency of sunscreen use on the face and other exposed skin by gender among US adults when outside on a warm, sunny day for more than one hour.

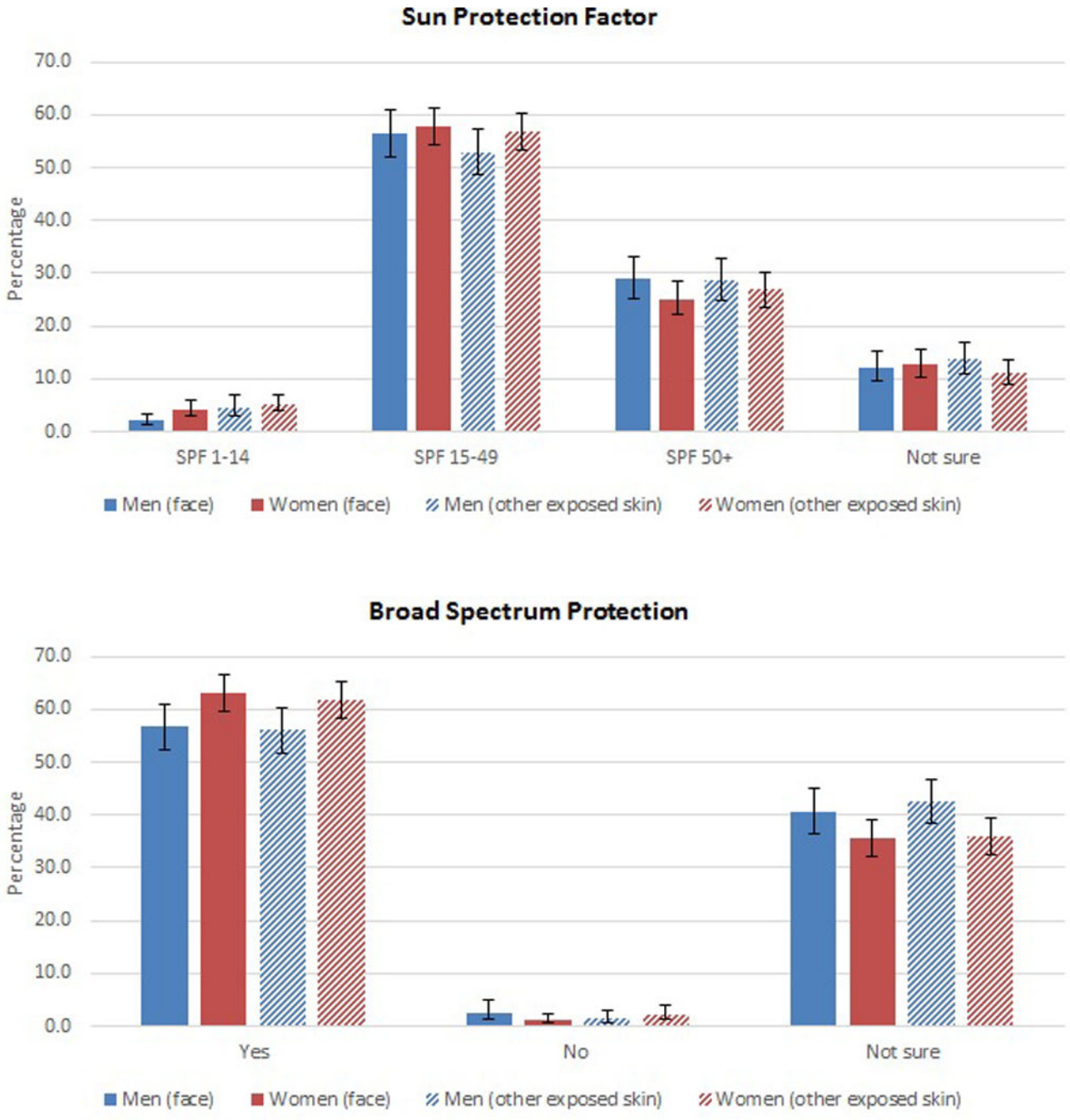

Figure 2.

Knowledge of the characteristics (sun protection factor and broad spectrum protection) of the sunscreen used on the face and other exposed skin by gender among US adults.

Table 1

Weighted percentage of demographic characteristics of the study population – 2013 Summer ConsumerStyles (n = 4,033)[a]

Gender	% (95% CI)[b]
Men	48.1 (45.9, 50.4)
Women	51.9 (49.6, 54.1)
Age (years)	
18–24	12.2 (10.6, 14.1)
25–34	17.3 (15.6, 19.3)
35–44	16.7 (15.0, 18.5)
45–54	18.4 (16.7, 20.1)
55–64	16.8 (15.3, 18.5)
65+	18.6 (17.0, 20.2)
Race/ethnicity	
Non-Hispanic white	67.4 (65.1, 69.6)
Non-Hispanic black	11.3 (9.8, 12.9)
Hispanic	14.2 (12.5, 16.1)
Non-Hispanic other	7.2 (5.9, 8.6)
Region	
Northeast	18.4 (16.7, 20.2)
Midwest	21.7 (19.9, 23.6)
South	37.2 (35.0, 39.4)
West	22.7 (20.9, 24.8)
Household income	
<$25K	18.4 (16.6, 20.3)
$25K – <$40K	14.8 (13.3, 16.5)
$40K – <$60K	17.2 (15.6, 18.9)
$60K+	49.6 (47.4, 51.9)

[a] n = Sample size.

[b] CI = Confidence interval; Percentages and 95% CIs are weighted to the study population.

Table 2

Unadjusted percentages of US adults who regularly use sunscreen[a] on the face and on other exposed skin by gender and by demographic and other individual characteristics – 2013 Summer ConsumerStyles

	Face				Other Exposed Skin			
	Men (n[b] = 1918)		Women (n[b] = 2115)		Men (n[b] = 1918)		Women (n[b] = 2115)	
	% (95% CI)[c]	*P* value[d]	% (95% CI)[c]	*P* value[d]	% (95% CI)[c]	*P* value[d]	% (95% CI)[c]	*P* value[d]
Age (years)		0.389		0.192		0.005		0.016
18–24	16.9 (10.5, 26.2)		36.1 (26.8, 46.5)		20.5 (13.0, 30.8)		34.6 (25.4, 45.2)	
25–34	18.3 (12.8, 25.6)		47.1 (39.1, 55.2)		23.5 (17.2, 31.3)		39.4 (31.8, 47.6)	
35–44	21.1 (15.2, 28.7)		49.5 (41.5, 57.4)		26.7 (19.8, 34.9)		44.6 (36.9, 52.7)	
45–54	18.8 (14.3, 24.3)		38.5 (32.2, 45.3)		19.2 (14.7, 24.8)		29.4 (23.9, 35.6)	
55–64	13.7 (10.3, 18.0)		40.3 (33.7, 47.3)		11.9 (8.8, 15.9)		31.7 (25.5, 38.5)	
65+	19.1 (14.6, 24.6)		42.6 (36.4, 49.0)		17.4 (13.2, 22.6)		28.8 (23.5, 34.8)	
Race/ethnicity		< 0.001		< 0.001		< 0.001		< 0.001
Non-Hispanic white	21.9 (19.1, 25.0)		48.5 (45.0, 52.0)		25.1 (22.0, 28.6)		40.0 (36.5, 43.5)	
Non-Hispanic black	4.3 (2.0, 9.2)		15.0 (9.4, 23.1)		7.2 (3.2, 15.5)		10.1 (5.7, 17.3)	
Hispanic	16.0 (10.3, 23.9)		36.3 (27.2, 46.5)		11.9 (7.4, 18.8)		25.7 (18.2, 35.1)	
Non-Hispanic other	7.5 (3.5, 15.0)		41.9 (30.0, 54.9)		6.5 (3.0, 13.4X)		36.4 (24.8, 49.8)	
Skin's reaction to 1 hour unprotected in the sun		< 0.001		< 0.001		< 0.001		< 0.001
Severe sunburn	35.8 (26.1, 46.9)		61.2 (52.1, 69.5)		40.6 (29.9, 52.3)		59.4 (50.5, 67.7)	
Moderate sunburn	26.3 (21.7, 31.6)		53.9 (48.4, 59.3)		28.8 (24.0, 34.2)		45.5 (40.1, 51.0)	
Mild sunburn	19.4 (15.2, 24.4)		43.1 (37.6, 48.8)		21.8 (17.2, 27.1)		30.4 (25.5, 35.8)	
Turn darker without sunburn/nothing would happen to skin	6.2 (4.0, 9.5)		24.8 (19.9, 30.4)		6.6 (4.1, 10.4)		18.6 (14.2, 24.0)	
Region		0.009		0.452		0.067		0.030
Northeast	25.9 (19.7, 33.3)		44.0 (37.1, 51.2)		26.3 (19.8, 33.9)		42.4 (35.5, 49.7)	
Midwest	14.2 (10.8, 18.6)		40.4 (34.3, 46.8)		16.3 (12.2, 21.4)		32.0 (26.2, 38.3)	
South	14.9 (11.6, 19.0)		40.4 (35.4, 45.7)		17.6 (14.0, 21.9)		30.1 (25.6, 35.1)	
West	21.2 (16.3, 27.1)		46.5 (40.0, 53.1)		22.6 (17.3, 28.8)		36.9 (30.9, 43.4)	
Household income		< 0.001		< 0.001		< 0.001		< 0.001
<$25K	7.6 (4.9, 11.5)		26.0 (19.8, 33.4)		9.6 (6.5, 13.9)		15.6 (10.9, 21.9)	
$25K – <$40K	16.9 (11.7, 23.7)		36.0 (29.0, 43.5)		15.7 (10.9, 22.2)		28.0 (21.6, 35.3)	

	Face				Other Exposed Skin			
	Men (n[b] = 1918)		Women (n[b] = 2115)		Men (n[b] = 1918)		Women (n[b] = 2115)	
	% (95% CI)[c]	*P* value[d]	% (95% CI)[c]	*P* value[d]	% (95% CI)[c]	*P* value[d]	% (95% CI)[c]	*P* value[d]
$40K – <$60K	15.9 (11.5, 21.6)		36.3 (30.0, 43.0)		15.4 (11.1, 20.8)		31.9 (25.8, 38.7)	
$60K+	23.3 (19.6, 27.4)		52.4 (48.0, 56.8)		26.9 (22.8, 31.4)		43.7 (39.4, 48.1)	
Has 1+ children <18 years of age		0.264		0.102		0.013		0.019
Yes	20.5 (15.8, 26.1)		46.6 (40.7, 52.7)		26.2 (20.6, 32.6)		40.2 (34.5, 46.3)	
No	17.2 (14.7, 20.0)		40.8 (37.3, 44.4)		17.7 (15.1, 20.6)		32.0 (28.7, 35.5)	
Has or had skin cancer in past year		0.081		0.010		0.093		0.287
Yes	31.0 (18.4, 47.3)		70.6 (51.7, 84.3)		32.3 (19.4, 48.6)		46.5 (27.5, 66.5)	
No	17.7 (15.4, 20.3)		42.0 (39.0, 45.2)		19.4 (16.9, 22.1)		34.1 (31.2, 37.2)	
Has or had cancer other than skin cancer in past year		0.789		0.420		0.972		0.203
Yes	19.7 (10.1, 34.8)		34.2 (18.1, 55.1)		19.5 (9.9, 34.6)		22.9 (10.8, 42.2)	
No	18.0 (15.7, 20.5)		42.6 (39.5, 45.7)		19.7 (17.2, 22.4)		34.4 (31.5, 37.5)	
Meets recommendations for aerobic activity[e]		0.037		< 0.001		0.011		< 0.001
Yes	20.2 (17.2, 23.5)		50.4 (46.1, 54.8)		22.7 (19.4, 26.3)		41.1 (36.9, 45.4)	
No	15.0 (11.7, 19.0)		35.6 (31.5, 40.1)		15.9 (12.4, 20.3)		28.7 (24.8, 33.0)	
Overweight or obese[f]		0.641		< 0.001		0.714		< 0.001
Yes	17.7 (15.0, 20.7)		37.2 (33.3, 41.3)		20.1 (17.2, 23.4)		30.3 (26.6, 34.3)	
No	18.9 (14.9, 23.7)		51.0 (46.1, 56.0)		19.1 (15.0, 24.0)		41.7 (36.9, 46.6)	
Current smoker		0.023		< 0.001		0.022		< 0.001
Yes	12.8 (8.3, 19.1)		28.6 (21.3, 37.3)		14.4 (9.5, 21.1)		18.6 (12.8, 26.2)	
No	19.9 (17.3, 22.9)		46.0 (42.6, 49.4)		22.1 (19.2, 25.3)		37.5 (34.2, 40.8)	

[a] n = sample size

[b] Regular sunscreen use is defined as using sunscreen *always* or *most of the time* when outside on a warm, sunny day for more than one hour.

[c] CI = Confidence interval; Percentages and 95% CIs are weighted to the study population.

[d] *P* value was calculated with the Wald F statistic (for multivariable analysis).

[e] Met the Physical Activity Guidelines for Americans (for aerobic activity): www.health.gov/paguidelines/

[f] Has a body mass index of 25 or higher: www.cdc.gov/obesity/adult/defining.html

Table 3

Adjusted[a] risk ratios for regular sunscreen use[b] on the face and other exposed skin, by gender and by demographic and other individual characteristics – 2013 Summer ConsumerStyles

	Face				Other Exposed Skin			
	Men (n[c] = 1751)		Women (n[c] = 1863)		Men (n[c] = 1749)		Women (n[c] = 1858)	
	Risk Ratio (95% CI)[d]	*P* value[e]	Risk Ratio (95% CI)[d]	*P* value[e]	Risk Ratio (95% CI)[d]	*P* value[e]	Risk Ratio (95% CI)[d]	*P* value[e]
Age (years)		0.783		0.226		0.010		0.466
18–24	0.8 (0.5, 1.5)		0.7 (0.5, 0.9)		1.4 (0.8, 2.3)		1.0 (0.7, 1.4)	
25–34	1.1 (0.7, 1.8)		1.0 (0.8, 1.2)		1.7 (1.1, 2.5)		1.1 (0.9, 1.5)	
35–44	1.2 (0.7, 1.8)		1.0 (0.8, 1.3)		1.4 (0.9, 2.2)		1.3 (0.9, 1.7)	
45–54	1.1 (0.8, 1.6)		0.9 (0.8, 1.2)		1.2 (0.8, 1.8)		1.0 (0.8, 1.3)	
55–64	0.9 (0.6, 1.3)		1.0 (0.8, 1.2)		0.8 (0.6, 1.2)		1.1 (0.9, 1.5)	
65+	Ref		Ref		Ref		Ref	
Race/ethnicity		0.010		0.010		< 0.001		0.019
Hispanic	0.9 (0.6, 1.3)		0.9 (0.7, 1.2)		0.5 (0.3, 0.9)		0.8 (0.6, 1.1)	
Non-Hispanic black	0.5 (0.2, 1.1)		0.5 (0.3, 0.8)		0.7 (0.4, 1.5)		0.5 (0.3, 0.9)	
Non-Hispanic other	0.3 (0.1, 0.7)		1.0 (0.8, 1.3)		0.3 (0.1, 0.6)		1.1 (0.8, 1.5)	
Non-Hispanic white	Ref		Ref		Ref		Ref	
Skin's reaction to 1 hour unprotected in the sun		< 0.001		< 0.001		< 0.001		< 0.001
Severe sunburn	4.6 (2.6, 8.0)		2.1 (1.7, 2.7)		4.5 (2.6, 7.6)		2.6 (1.9, 3.5)	
Moderate sunburn	2.9 (1.7, 4.7)		1.7 (1.4, 2.2)		3.0 (1.9, 4.9)		1.9 (1.4, 2.5)	
Mild sunburn	2.3 (1.4, 3.8)		1.4 (1.1, 1.8)		2.4 (1.5, 4.1)		1.2 (0.9, 1.7)	
Turn darker without sunburn/nothing would happen to skin	Ref		Ref		Ref		Ref	
Region		0.026		0.702		0.148		0.220
Midwest	0.6 (0.4, 0.9)		1.0 (0.8, 1.3)		0.7 (0.5, 1.0)		0.8 (0.6, 1.0)	
South	0.7 (0.5, 1.0)		1.1 (0.9, 1.3)		0.8 (0.6, 1.2)		0.8 (0.7, 1.0)	
West	1.0 (0.7, 1.4)		1.1 (0.9, 1.3)		1.0 (0.7, 1.5)		0.9 (0.7, 1.1)	
Northeast	Ref		Ref		Ref		Ref	
Household income		< 0.001		< 0.001		< 0.001		< 0.001
<$25K	0.4 (0.3, 0.7)		0.7 (0.5, 0.8)		0.5 (0.4, 0.8)		0.5 (0.3, 0.7)	

	Face				Other Exposed Skin			
	Men (n[c] = 1751)		Women (n[c] = 1863)		Men (n[c] = 1749)		Women (n[c] = 1858)	
	Risk Ratio (95% CI)[d]	*P* value[e]	Risk Ratio (95% CI)[d]	*P* value[e]	Risk Ratio (95% CI)[d]	*P* value[e]	Risk Ratio (95% CI)[d]	*P* value[e]
$25K – <$40K	0.7 (0.5, 1.0)		0.8 (0.6, 0.9)		0.6 (0.4, 0.8)		0.8 (0.6, 1.0)	
$40K – <$60K	0.6 (0.4, 0.9)		0.7 (0.6, 0.8)		0.6 (0.4, 0.8)		0.7 (0.6, 0.9)	
$60K+	Ref		Ref		Ref		Ref	
Has 1+ children <18 years of age		0.674		0.521		0.297		0.396
Yes	1.1 (0.8, 1.5)		1.1 (0.9, 1.3)		1.2 (0.9, 1.6)		1.1 (0.9, 1.4)	
No	Ref		Ref		Ref		Ref	
Has or had skin cancer in past year		0.199		0.061		0.135		0.271
Yes	1.4 (0.9, 2.3)		1.4 (1.1, 1.9)		1.4 (0.9, 2.2)		1.3 (0.9, 1.9)	
No	Ref		Ref		Ref		Ref	
Has or had cancer other than skin cancer in past year		0.803		0.259		0.776		0.252
Yes	1.1 (0.6, 2.0)		0.8 (0.5, 1.3)		1.1 (0.6, 1.9)		0.8 (0.4, 1.3)	
No	Ref		Ref		Ref		Ref	
Meets recommendations for aerobic activity[f]		0.039		< 0.001		0.056		< 0.001
Yes	1.4 (1.0, 1.8)		1.4 (1.2,1.6)		1.3 (1.0, 1.7)		1.4 (1.2, 1.6)	
No	Ref		Ref		Ref		Ref	
Overweight or obese[g]		0.147		0.016		0.918		0.269
Yes	0.8 (0.6, 1.1)		0.8 (0.7, 1.0)		1.0 (0.7, 1.3)		0.9 (0.8, 1.1)	
No	Ref		Ref		Ref		Ref	
Current smoker		0.601		0.047		0.637		0.011
Yes	0.9 (0.6, 1.4)		0.8 (0.6, 1.0)		0.9 (0.6, 1.4)		0.7 (0.5, 0.9)	
No	Ref		Ref		Ref		Ref	

[a] Results for each variable are adjusted for all other covariates in the model.

[b] Regular sunscreen use is defined as using sunscreen *always* or *most of the time* when outside on a warm, sunny day for more than one hour.

[c] n = sample size

[d] CI = Confidence interval; Risk ratios and 95% CIs are weighted to the study population.

[e] *P* value was calculated with the Wald F statistic.

[f] Met the Physical Activity Guidelines for Americans (for aerobic activity): www.health.gov/paguidelines/

[g] Has a body mass index of 25 or higher: www.cdc.gov/obesity/adult/defining.html