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Racial Disparities in Fifth-grade Sun Protection: Evidence from the Healthy Passages Study

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Abstract

BACKGROUND AND OBJECTIVES—Despite rising skin cancer rates among children, multiple studies reveal inadequate youth sun-protective behavior (e.g., sunscreen use). Using Healthy Passages data for fifth-graders, we hypothesized sunscreen adherence is low among these children and investigated factors related to sunscreen performance.

METHODS—Survey data were collected from 5,119 fifth-graders and their primary caregivers. Logistic regression assessed associations between sunscreen adherence and performance of other preventive health behaviors (e.g., flossing, helmet use) and examined predictors of sunscreen adherence. Analyses were repeated in non-Hispanic Black, Hispanic, and non-Hispanic White subgroups.

RESULTS—Sunscreen was almost always used by 23.4% of all students (N=5,119), 5.9% of Non-Hispanic Blacks (N=1,748), 23.7% of Hispanics (N=1,802), and 44.8% of non-Hispanic White students (N= 1,249). Performing other preventive health behaviors was associated with higher odds of sunscreen adherence (all $p < 0.001$), with the highest adjusted odds ratio for flossing

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teeth (2.41, 95% Confidence Interval 1.86 – 3.13, $p < .001$). Factors for lower odds of sunscreen adherence include being male, non-Hispanic Black or Hispanic, and having lower socioeconomic status. School-based sun-safety education and involvement in team sports were not significant factors.

CONCLUSIONS—Our data confirm low use of sun protection among fifth-graders. Future research should explore how public health success in increasing prevalence of other preventive health behaviors may be applied to enhance sun protection messages. Identifying risk factors for poor adherence enables providers to target patients who need more education. Improving educational policies and content in schools may be an effective way to address sun-safety.

Keywords

Skin neoplasms; sunscreens; agents; child behavior; health education; health policy; primary care; cohort studies; preventive behavior

INTRODUCTION

Melanoma rates are rising among adolescents and adults; it ranks as the fifth most common cancer in the United States (US) and causes 2.7 per 100,000 deaths yearly.^{1,2} Ultraviolet radiation (UVR) is the main cause of melanoma and non-melanoma skin cancer (basal and squamous cell carcinoma, NMSC).¹⁻³ NMSC is usually curable but removal may be disfiguring. Up to half of lifetime UVR exposure occurs during childhood.³ Sunscreen use is the most recommended protection method.⁴⁻⁶ Regular use of sun-protective factor (SPF) 15 sunscreen decreases melanoma and NMSC incidence,^{3,7} however use among US children remains inadequate.⁸

The Surgeon General's 2014 skin cancer call to action implores nationwide partners—parents, physicians, governments and community organizations—to advance skin cancer education and prevention policies.⁹ This study was designed to inform such interventions. First, we hypothesized that sunscreen adherence was low for fifth-graders relative to their performance of other preventive behaviors. Second, we aimed to elucidate factors contributing to or acting as barriers to sunscreen adherence.

MATERIALS AND METHODS

We analyzed 5,119 fifth-grader (ages 10-11) surveys from the 2004-2006 baseline dataset of Healthy Passages, a prospective multisite cohort study of childhood and adolescent health funded by the Centers for Disease Control and Prevention (CDC). Study details are available elsewhere.¹⁰ Eligible participants were fifth-graders (and their parents/primary caregivers and school officials) at public schools in Birmingham AL, Houston TX, and Los Angeles CA with classes of 25 students, representing >99% of public-school students per site. Institutional Review Board (IRB) approval for data collection was obtained through the CDC and each site.

Surveys detailed the performance of six preventive health behaviors: sunscreen use, brushing teeth, flossing teeth, helmet use, seat-belt use, and well-child check-ups. We dichotomized

behaviors as “*performed*” vs. “*not performed*,” based on the American Academy of Pediatrics (AAP) guidelines regarding their recommended frequencies.^{11–14}

Four responses were possible for the primary caregiver question “When your child goes outside on a very sunny day for more than one hour, how often do you use sunscreen of SPF 15 or greater on his/her skin?” “Almost always” was coded “performed” while “often,” “sometimes,” and “almost never” were coded “not performed.” Primary caregivers answered two dental hygiene questions. Flossing teeth was dichotomized into “more than once a day”/“once a day” versus three lower frequency responses. Brushing teeth was dichotomized as “more than once a day” versus four lower frequency responses. Children answered two questions regarding helmet and seat-belt use, dichotomized into “always” versus “almost always”/“often”/“sometimes”/“never.” Primary caregivers answered “yes” versus “no” to the question: “During the past 12 months, that is since [date], did [your child] receive a well-child check-up—that is a general check-up when [he/she] was not sick or injured?”

We calculated proportions of fifth-graders performing each behavior. The strength of associations between each behavior with sunscreen adherence was tested with bivariate and multivariate logistic regression. Multivariate regression odds ratios adjusted for demographics (sex, race/ethnicity, household income, parent age, household education level, parent employment status, and insurance status). Analyses involving helmet use were restricted to N=4,294 (84%) of cases where children reported ever riding bicycles. Repeated measures multivariate logistic regression models for each behavior tested the relative likelihood of performing each preventive behavior relative to sunscreen adherence (controlling for demographics and behavioral/environmental hypothesized predictors of sunscreen adherence: number of sunburns in the past year, presence of shaded playground/recess areas, number of sports teams, participating in other physical activities/lessons, whether parents watched children’s extracurricular activities, and whether schools taught sun-safety).

We explored 13 hypothesized predictors of sunscreen adherence with bivariate logistic regression modeling. The odds of sunscreen adherence were estimated with multivariate logistic regression, controlling for all demographics and hypothesized predictors of sunscreen usage.

Since racial/ethnic subgroups tend to have sun sensitivity differences, analyses were repeated for each subgroup. “All students” includes 320 students of “other” race/ethnicity (N=148 Asian/Pacific Islanders, N=9 Native Americans, N=163 multi-racial) not analyzed separately due to heterogeneity and small sample size.

Analyses were generated using SAS software Version 9.3 and weighted and adjusted to account for design and nonresponse weighting, clustering on school, and stratification by site.

RESULTS

Table 1 summarizes percentages of fifth-graders performing each preventive behavior. Sunscreen was used “almost always” by 23.4% of all students. In bivariate analysis among

all students, sunscreen adherence was positively associated with adherence with all preventive behaviors (all $p < .001$). In multivariate adjusted analysis, four preventive behaviors remained strongly associated with sunscreen use; however, helmet use ($p = .13$) was confounded with race/ethnicity. Flossing had the strongest association with sunscreen use followed by brushing teeth. Within each racial/ethnic subgroup, sunscreen adherence remained positively associated with adherence with other preventive health behaviors in multivariate analysis, except helmet use was not associated with sunscreen use for any subgroup, and seat belt use was non-significant for Non-Hispanic Blacks and Hispanics.

Table 1 presents results from a multivariate repeated measures logistic regression model estimating the odds of adhering to AAP guidelines for five preventive behaviors relative to sunscreen adherence. There were significant differences in the likelihoods of all students performing the six behaviors. Students were more likely to adhere to guidelines for brushing teeth, using bicycle helmets, seat belts, and having a well-child visit than to adhere to sunscreen use. Children were less likely to floss than use sunscreen. Results for racial/ethnic subgroups were similar to the overall population. Hispanics were less likely to always wear bicycle helmets than adhere to sunscreen guidelines. Non-Hispanic Blacks were more likely to adhere to other preventive behaviors, including flossing teeth, than adhering to sunscreen use.

In Table 2a, among 13 hypothesized predictors of sunscreen adherence, bivariate analysis among all students revealed significant associations with sunscreen use for all factors except for the presence of shaded playgrounds/recess areas ($p = .43$). In multivariate logistic regression among all students, sunscreen adherence was significantly more likely if the student was female, was not Non-Hispanic Black, had higher household income relative to $< \$25K$, had higher household education relative to less than high school degrees, or participated in other physical activities.

Table 2b presents bivariate and multivariate analyses among racial/ethnic subgroups. In multivariate regression with all other hypothesized predictors, Non-Hispanic Black children were more likely to use sunscreen almost always if they were female, were in households with income $> \$100,000$, or had 3 sunburns in the past year. Hispanics were more likely to use sunscreen if they were in households with higher income than $< \$25K$, had 3 sunburns, and participated in physical activities or lessons other than sports. Non-Hispanic Whites were more likely to use sunscreen if female, in households with higher income relative to $< \$25K$, or attending schools with shaded playgrounds.

DISCUSSION

The Healthy Passages study is uniquely one of the largest multisite efforts to survey pre-adolescent preventive health behaviors. We found low sunscreen adherence in fifth-graders (23%) compared to adherence with other basic preventive behaviors, even among non-Hispanic Whites (45%) with particular risk of skin cancer.¹⁵ Frequent sunscreen usage is especially low among Non-Hispanic Blacks (6%) and Hispanics (24%); however, Non-Hispanic Blacks and Hispanics with 3 sunburns within 12-months were more likely to use sunscreen. Although darker skin tones may afford less sun sensitivity, melanoma incidence

is growing among Hispanic/Latino populations.¹⁶ These low rates of sunscreen adherence align with other national surveys,⁶ confirming the need for sun-safety interventions with children of all races.

Our data suggest adherence with any preventive health behavior predicted increased adherence with sun protection; children had twice the odds of using sunscreen if they performed another preventive behavior. The strength of associations between preventive behaviors was similar across race/ethnicity despite widely varying rates of sunscreen use: Non-Hispanic Blacks, Hispanics, and Non-Hispanic Whites who flossed their teeth every day were 2.11-3.45 times more likely to use sunscreen, though respective rates of sunscreen use ranged from 6-45%. Thus, perhaps the types of messages effective in instituting other behavior changes (e.g., brushing teeth) could inform efforts to develop sun-safety messages. Healthcare practitioners may use absence of other preventive behaviors as potential markers for inadequate sunscreen use, prompting point-of-care sun-safety intervention. Our data support a link between higher odds of sunscreen adherence with a well-child visit the prior year. The AAP and American Academy of Dermatology recommend incorporation of sun protection into annual well-child care,¹⁷ and the US Preventive Services Task Force (USPSTF) recommends sun exposure counseling for fair-skinned individuals.¹⁸ Physician sun-safety counseling or written materials can prompt behavioral change, but 25% of physicians offer no counseling.¹⁹ In one survey, pediatricians ranked sun-safety counseling fourth in priority (after seatbelts, helmets, and smoking), but they identified obstacles to prioritizing sun-safety education such as insufficient time, patient interest, and parent adherence.¹⁹

School sun-safety programs may alleviate the primary care burden.⁹ Educational interventions with repeated exposures over the years improve K-8 student knowledge and sun-safe habits.^{5,20} Surprisingly, we found that the presence of sun-safety education in school did not increase the odds of sunscreen use. Messaging content differences may explain this null finding. Studies including adolescents suggest appearance-based messages (regarding age spots, wrinkles) may be more effective than cancer-based messages,^{21,22} perhaps warranting investigation of appearance-based content among younger children.

Participation in sports (some outdoors) was not associated with increased sunscreen adherence. Children who participated in other physical activities/lessons were more likely to sun-protect. Perhaps these activities involved increased sun exposure, and/or parents were more involved with extracurricular activities aside from sports. School policies surrounding outdoor activities could improve sun protection regardless of race/ethnicity.⁹ Many schools teach sun-safety, but only 10% of 484 schools had policies in 2006.²³ Only California laws allowed student sunscreen use (and protective behaviors such as wearing hats outdoors) at the time data were collected.²⁴ In many US states, students still needed a prescription to apply sunscreen.²⁴ Continued efforts should be made to promote policy change, and study the most effective, age-appropriate content for school-based sun-safety education.

Children from more educated and affluent households had greater odds of sun protection. Perhaps they had higher parental awareness and practice of sun safe habits. This agrees with prior research targeting those at <200% of the poverty level for intervention.⁸ This could

reflect inability to purchase sunscreen, although only 11% of parents in one study reported sunscreen costs being prohibitive.⁴

Limitations include the study sites being in warm climates, possibly inflating sunscreen use estimates. Caregivers may be imperfect reporters of their child's behavior. Surveys are subject to recall bias, although using caregiver rather than student responses likely improved accuracy. Information about levels of sun sensitivity (e.g., Fitzpatrick Skin Type) were not available, however we assessed sunburn frequency in the prior 12 months. This study was limited to the outcome of sunscreen use of SPF 15; the often cited problems of adequate sunscreen application/reapplication could not be addressed.^{4,5,15} Other sun-protective behaviors were not included (e.g., shade seeking, protective clothing, including hats, and timing of outdoor activities families might engage in). However, sunscreen is the most commonly used sun-protective behavior in the US and an appropriate study outcome.²⁵ Finally, future study should include whether healthcare professionals counseled families about sun protection as recommended by the USPSTF.

CONCLUSION

Parents from the Healthy Passages study, a large US multisite cohort of 5,119 fifth-graders, report only 23.4% of fifth-graders almost always use SPF 15 sunscreen. Even in the most adherent group, non-Hispanic Whites, only 44.8% always use sunscreen. Students least likely to engage in sun-protective behavior include non-performers of other preventive health behaviors, males, Blacks, Hispanics, and those living in lower socioeconomic status households. Educating fifth-graders and their parents generally about preventive behaviors may be helpful. School sun-safety policies could address sports and shade structures. Overall, our results support implementing broad-based school, primary care, and community programs, especially in lower resourced communities where there are weaker sun protection efforts. Our findings may inform public health campaigns, policies, and guide future research.

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ABBREVIATIONS

AAP	American Academy of Pediatrics
CDC	Centers for Disease Control and Prevention

IRB	Institutional Review Board
NMSC	Non-melanoma (basal and squamous cell) skin cancer
SPF	Sun protective factor
UVR	Ultraviolet radiation
US	United States
USPSTF	United States Preventive Services Task Force

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STATEMENT OF IRB APPROVAL AND INFORMED CONSENT

An appropriate institutional review board approved the project, and informed consent was appropriately obtained.

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TABLE 1

Prevalence of Preventive Health Behaviors and Odds of Sunscreen Use

Preventive Health Behavior ^a	Frequency of Performance %	Bivariate Odds Ratio (95% Confidence Interval) for using sunscreen ^b	Multivariate Odds Ratio (95% Confidence Interval) for using sunscreen (controlling for demographics) ^b	Multivariate Odds Ratio (95% Confidence Interval), for performance of AAP guidelines for preventive health behaviors relative to sunscreen adherence ^e
All Students (N=5,119)^c				
Sunscreen Use	23.4	—	—	—
Brushing Teeth	57.9	2.10 (1.81 – 2.45), p<.001	1.71 (1.45 – 2.03), p<.001	4.84 (4.41 - 5.31), p<.001
Flossing Teeth	12.9	2.07 (1.66 – 2.57), p<.001	2.41 (1.86 – 3.13), p<.001	0.48 (0.43 - 0.53), p<.001
Helmet Use ^d	25.7	2.08 (1.73 – 2.50), p<.001	1.17 (0.96 – 1.42), p=.13	1.12 (1.01 - 1.25), p=.03
Seat Belt Use	67.3	1.65 (1.36 – 2.00), p<.001	1.35 (1.10 – 1.67), p=.005	7.37 (6.67 - 8.14), p<.001
Well Check-up	68.0	1.37 (1.17 – 1.61), p<.001	1.52 (1.29 – 1.78), p<.001	7.60 (6.88 - 8.40), p<.001
Hispanics (N=1,802)				
Sunscreen Use	23.7	—	—	—
Brushing Teeth	59.7	1.70 (1.36 – 2.14), p<.001	1.72 (1.37 – 2.17), p<.001	4.97 (4.27 - 5.78), p<.001
Flossing Teeth	11.2	2.61 (1.76 – 3.88), p<.001	2.61 (1.77 – 3.87), p<.001	0.40 (0.33 - 0.48), p<.001
Helmet Use ^d	19.9	1.29 (0.93 – 1.80), p=.13	1.21 (0.85 – 1.73), p=.29	0.79 (0.65 - 0.95), p=.01
Seat Belt Use	66.5	1.38 (0.97 – 1.95), p=.07	1.35 (0.96 – 1.89), p=.09	6.70 (5.72 - 7.86), p<.001
Well Check-up	62.6	1.54 (1.18 – 2.01), p=.001	1.51 (1.15 – 1.98), p=.003	5.61 (4.82 - 6.54), p<.001
Non-Hispanic Blacks (N=1,748)				
Sunscreen Use	5.9	—	—	—
Brushing Teeth	47.6	2.28 (1.47 – 3.54), p<.001	2.10 (1.34 – 3.27), p=.001	15.38 (12.11 - 19.53), p<.001
Flossing Teeth	15.1	3.58 (2.04 – 6.27), p<.001	3.45 (1.96 – 6.07), p<.001	2.89 (2.27 - 3.69), p<.001
Helmet Use ^d	14.0	1.77 (1.11 – 2.82), p=.02	1.43 (0.89 – 2.32), p=.14	2.63 (1.98 - 3.49), p<.001
Seat Belt Use	61.5	1.10 (0.67 – 1.80), p=.70	0.99 (0.59 – 1.67), p=.97	27.46 (21.23 - 35.53), p<.001
Well Check-up	75.4	3.50 (1.77 – 6.92), p<.001	3.11 (1.59 – 6.10), p<.001	53.61 (41.87 - 68.66), p<.001
Non-Hispanic Whites (N=1,249)				
Sunscreen Use	44.8	—	—	—
Brushing Teeth	65.5	1.86 (1.35 – 2.57), p<.001	1.66 (1.20 – 2.31), p=.002	2.42 (2.03 – 2.88), p<.001
Flossing Teeth	12.6	2.13 (1.42 – 3.20), p<.001	2.11 (1.41 – 3.17), p<.001	0.17 (0.14 - 0.21), p<.001

Preventive Health Behavior ^a	Frequency of Performance %	Bivariate Odds Ratio (95% Confidence Interval) for using sunscreen ^b	Multivariate Odds Ratio (95% Confidence Interval) for using sunscreen (controlling for demographics) ^b	Multivariate Odds Ratio (95% Confidence Interval), for performance of AAP guidelines for preventive health behaviors relative to sunscreen adherence ^e
Helmet Use ^d	49.8	1.26 (0.97 – 1.64), p=.09	1.10 (0.82 – 1.48), p=.54	1.23 (1.02 – 1.48), p=.04
Seat Belt Use	76.4	1.48 (1.12 – 1.95), p=.005	1.42 (1.04 – 1.94), p=.03	4.20 (3.45 – 5.13), p<.001
Well Check-up	69.1	1.53 (1.20 – 1.94), p<.001	1.49 (1.16 – 1.91), p=.002	2.86 (2.37 – 3.45), p<.001

^aAll behaviors are presented as dichotomous. Behaviors were considered to have been performed if teeth were brushed “more than once a day”; if teeth were flossed “once a day” or more; if seat belts and helmets were used “always”; and if sunscreen was used “almost always” (well child checkup was a ‘yes’ or ‘no’ question in the survey).

^bOdds of sunscreen use if also performing the other preventive health behavior compared to not performing the other preventive health behavior. Multivariate odds ratios control for student gender and insurance status, household income and education, parent age and working status, and, for “All Students” results, race/ethnicity.

^c320 records from other racial groups (Asian-Pacific Islanders, Native Americans, and multiracial) were included in “All Students” results.

^dHelmet use is restricted to the N=4,294 students who report ever riding a bicycle.

^eOdds of performance of AAP guideline for this behavior relative sunscreen use. Tests control for behavioral, environmental, and demographic factors (student gender and insurance status, household income and education, parent age and working status, and, for “All Students” results, race/ethnicity). For each student group, p<0.001 for overall 5df Type III tests for differences across the six behaviors.

TABLE 2a

Multivariate Logistic Regressions Predicting Odds of Sunscreen Use in Fifth-Graders: All Students (N=5,119)

		Odds Ratio (95% Confidence Interval) for Sunscreen Use	
	Reference group	Bivariate	Multivariate model: All predictors
Female Child	Male	1.24 (1.10-1.39), p<.001	1.31 (1.13-1.51), p<.001
Hispanic/Latino		5.00 (3.75-6.68), p<.001	6.05 (4.64-7.88), p<.001
White	Black	13.05 (10.01-17.01), p<.001	8.41 (6.48-10.93), p<.001
Other		6.33 (4.19-9.58), p<.001	4.84 (3.27-7.15), p<.001
Household Income of \$25-49K		1.89 (1.56-2.29), p<.001	1.54 (1.23-1.92), p<.001
Income of \$50-99K	<\$25K	3.04 (2.51-3.69), p<.001	1.41 (1.07-1.85), p=.01
Income of \$100K		5.78 (4.75-7.03), p<.001	1.98 (1.47-2.66), p<.001
Income Not Reported		1.69 (1.27-2.26), p<.001	1.10 (0.78-1.55), p=.58
Primary Caregiver Age, per 10 years		1.28 (1.15-1.43), p<.001	1.01 (0.87-1.17), p=.93
Parent with High School or GED ^b		1.04 (0.82-1.32), p=.75	1.26 (0.91-1.74), p=.16
Some College or 2-year Degree	Some high school w/o Graduation	1.32 (1.06-1.64), p=.01	1.44 (1.04-1.99), p=.03
4 year College Degree		3.20 (2.63-3.90), p<.001	1.61 (1.13-2.29), p=.008
Unemployed/Retired/Disability		0.45 (0.33-0.60), p<.001	0.85 (0.63-1.14), p=.27
Homemaker	Parent Working	1.03 (0.88-1.21), p=.73	0.91 (0.74-1.12), p=.38
Student		0.85 (0.54-1.34), p=.49	0.83 (0.49-1.42), p=.49
Child has Health Insurance	Not insured	1.50 (1.14-1.95), p=.003	1.21 (0.94-1.57), p=.15
Child with 1-2 Sunburns in past year	No sunburns	2.09 (1.76-2.47), p<.001	1.11 (0.92-1.33), p=.27
Three Sunburns		2.66 (1.92-3.69), p<.001	1.25 (0.88-1.78), p=.22
Playground Area is Shaded	Not Shaded	0.88 (0.64-1.21), p=.43	1.05 (0.87-1.26), p=.61
Child Participated in 1 sports team		1.21 (0.99-1.49), p=.06	1.05 (0.83-1.34), p=.67
Child Participated in 2 sports teams	No sports teams	1.22 (0.98-1.52), p=.07	0.96 (0.73-1.27), p=.79
Child Participated in 3 sports teams		1.41 (1.16-1.71), p<.001	1.04 (0.83-1.30), p=.76
Other Physical Activity or Lesson	None	1.54 (1.27-1.87), p<.001	1.29 (1.04-1.60), p=.02
Parents Sometimes Watched Sports/ Activities		0.97 (0.77-1.21), p=.75	0.84 (0.67-1.07), p=.15
Parents Often Watched	Almost Never Watched	1.38 (1.06-1.79), p=.02	1.03 (0.77-1.39), p=.85
Parents Almost Always Watched		1.62 (1.29-2.04), p<.001	1.22 (0.93-1.58), p=.15
School did not report if Taught	Not Taught	0.66 (0.54-0.79), p<.001	0.91 (0.67-1.24), p=.57
School reports Sun-Safety Taught		1.31 (1.13-1.50), p<.001	1.13 (0.92-1.38), p=.23

^bGeneral Education Development Degree

TABLE 2b

Multivariate Logistic Regressions Predicting Odds of Sunscreen Use in Fifth-Graders: By Race

		Odds Ratio (95% Confidence Interval) for Sunscreen Use	
	Reference group	Bivariate	Multivariate model: All predictors
Hispanics (N=1,802)			
Female Child	Male	1.17 (0.97-1.42), p=.11	1.14 (0.91-1.43), p=.25
Household Income of \$25-49K		1.78 (1.37-2.30), p<.001	1.71 (1.27-2.31), p<.001
Income of \$50-99K	<\$25K	1.91 (1.35-2.71), p<.001	1.22 (0.80-1.85), p=.36
Income of \$100K		2.70 (1.65-4.41), p<.001	2.09 (1.31-3.34), p=.002
Income not reported		0.88 (0.60-1.30), p=.53	0.89 (0.60-1.33), p=.58
Primary Caregiver Age, per 10 years		1.07 (0.89-1.28), p=.47	1.05 (0.86-1.26), p=.65
Parent with High School or GED ^b		1.61 (1.21-2.15), p=.001	1.39 (0.96-1.99), p=.08
Some College or 2-year Degree	Some High School	2.11 (1.59-2.80), p<.001	1.50 (0.99-2.28), p=.06
4 year College Degree		2.25 (1.60-3.16), p<.001	1.13 (0.72-1.78), p=.60
Unemployed/Retired/Disability		0.68 (0.40-1.14), p=.14	0.84 (0.53-1.34), p=.46
Homemaker	Parent Working	0.73 (0.57-0.94), p=.01	0.83 (0.63-1.11), p=.21
Student		1.41 (0.70-2.85), p=.34	0.92 (0.46-1.85), p=.82
Child has Health Insurance	Not insured	1.54 (1.17-2.01), p=.048	1.22 (0.88-1.67), p=.23
Child with 1-2 Sunburns in past year	No sunburns	1.18 (0.93-1.48), p=.17	1.06 (0.82-1.37), p=.67
3 Sunburns		1.89 (1.17-3.06), p=.009	1.71 (1.01-2.89), p=.047
Playground Area is Shaded	Not Shaded	0.91 (0.65-1.28), p=.59	0.92 (0.69-1.23), p=.59
Child Participated in 1 sports team		1.02 (0.78-1.34), p=.86	0.93 (0.69-1.25), p=.62
Child Participated in 2 sports teams	No sports teams	1.03 (0.72-1.47), p=.88	0.86 (0.56-1.31), p=.47
Child Participated in 3 sports teams		1.43 (1.07-1.90), p=.01	1.25 (0.89-1.74), p=.20
Other Physical Activity or Lesson	None	1.62 (1.18-2.22), p=.003	1.51 (1.09-2.09), p=.01
Parents Sometimes Watched		0.91 (0.67-1.25), p=.57	0.87 (0.62-1.23), p=.42
Parents Often Watched	Almost Never Watched Sports/ Activities	1.26 (0.83-1.92), p=.28	1.06 (0.66-1.71), p=.80
Parents Almost Always Watched		1.72 (1.20-2.45), p=.003	1.43 (0.99-2.09), p=.06
School did not report if Taught		0.94 (0.67-1.31), p=.71	1.01 (0.58-1.78), p=.97
School reports Sun-Safety Taught	Not Taught	1.22 (0.96-1.54), p=.10	1.18 (0.87-1.60), p=.28
Non-Hispanic Blacks (N=1,748)			
Female Child	Male	1.82 (1.18-2.81), p=.007	1.75 (1.10-2.80), p=.02
Household Income of \$25-49K		1.27 (0.76-2.11), p=.36	1.26 (0.60-2.65), p=.55
Income of \$50-99K	<\$25K	2.22 (1.33-3.73), p=.002	1.16 (0.56-2.39), p=.70

			Odds Ratio (95% Confidence Interval) for Sunscreen Use	
	Reference group		Bivariate	Multivariate model: All predictors
Income of \$100K			6.87 (3.82-12.38), p<.001	3.87 (1.52-9.81), p=.004
Income not reported			1.40 (0.53-3.65), p=.50	1.06 (0.32-3.55), p=.92
Primary Caregiver Age, per 10 years			1.13 (0.86-1.49), p=.39	1.00 (0.69-1.44), p=.99
Parent with High School or GED ^b			0.88 (0.40-2.40), p=.96	0.94 (0.40-2.22), p=.89
Some College or 2-year Degree	Some High School		1.89 (0.84-4.26), p=.13	1.89 (0.70-5.10), p=.21
4 year College Degree			3.74 (1.66-8.43), p=.002	2.43 (0.93-6.32), p=.07
Unemployed/Retired/Disability			0.52 (0.27-1.02), p=.06	0.80 (0.40-1.60), p=.52
Homemaker	Parent Working		0.48 (0.22-1.06), p=.07	0.50 (0.20-1.23), p=.13
Student			0.57 (0.14-2.41), p=.44	0.38 (0.08-1.79), p=.22
Child has Health Insurance	Not insured		3.18 (0.93-10.87), p=.07	2.46 (0.77-7.83), p=.13
Child with 1-2 Sunburns in past year	No sunburns		2.50 (1.33-4.71), p=.005	1.81 (0.86-3.84), p=.12
3 Sunburns			7.31 (2.43-21.97), p<.001	7.99 (2.38-26.88), p<.001
Playground Area is Shaded	Not shaded		1.04 (0.63-1.73), p=.88	1.12 (0.68-1.85), p=.66
Child Participated in 1 sports team			1.25 (0.78-2.01), p=.35	0.04 (0.61-1.73), p=.89
Child Participated in 2 sports teams	No sports teams		1.40 (0.65-3.02), p=.39	1.15 (0.55-2.40), p=.72
Child Participated in 3 sports teams			1.51 (0.80-2.85), p=.20	1.37 (0.85-2.12), p=.40
Other Physical Activity or Lesson	None		1.75 (1.17-2.63), p=.007	1.34 (0.85-2.12), p=.21
Parents Sometimes Watched	Almost Never		0.68 (0.38-1.22), p=.19	0.58 (0.33-1.01), p=.06
Parents Often Watched	Watched		1.67 (0.76-3.67), p=.20	1.32 (0.61-2.87), p=.48
Parents Almost Always Watched	Sports/Activities		1.33 (0.80-2.21), p=.27	0.99 (0.56-1.77), p=.98
School did not report if Taught	Not Taught		0.98 (0.62-1.55), p=.93	0.93 (0.53-1.66), p=.82
School reports Sun-Safety Taught			1.41 (0.89-2.23), p=.14	0.96 (0.52-1.76), p=.89
Non-Hispanic Whites (N=1,249)				
Female Child	Male		1.39 (1.10-1.76), p=.007	1.34 (1.02-1.76), p=.04
Household Income of \$25-49K			1.38 (0.80-2.36), p=.24	1.59 (0.92-2.74), p=.09
Income of \$50-99K	<\$25K		1.75 (1.08-2.85), p=.02	1.89 (1.13-3.15), p=.02
Income of \$100K			2.14 (1.33-3.45), p=.002	2.15 (1.47-3.58), p=.003
Income not reported			2.27 (1.10-4.70), p=.03	2.32 (1.15-4.67), p=.02
Primary Caregiver Age, per 10 years			1.09 (0.87-1.36), p=.44	0.96 (0.76-1.22), p=.76
Parent with High School or GED ^b			0.89 (0.39-2.04), p=.78	0.63 (0.28-1.42), p=.26
Some College or 2-year Degree	Some High School		0.72 (0.33-1.55), p=.40	0.54 (0.26-1.11), p=.09
4 year College Degree			1.13 (0.54-2.33), p=.75	0.80 (0.38-1.68), p=.55

Odds Ratio (95% Confidence Interval) for Sunscreen Use			
	Reference group	Bivariate	Multivariate model: All predictors
Unemployed/Retired/Disability		0.54 (0.30-0.98), p=.04	0.5999 (0.29-1.20), p=.15
Homemaker	Parent Working	1.08 (0.83-1.42), p=.57	1.06 (0.76-1.48), p=.72
Student		1.02 (0.44-2.32), p=.97	1.04 (0.35-3.13), p=.94
Child has Health Insurance	Not insured	1.03 (0.57-1.86), p=.92	0.82 (0.48-1.39), p=.46
Child with 1-2 Sunburns in past year	No sunburns	0.95 (0.74-1.21), p=.66	1.00 (0.79-1.27), p=.99
3 Sunburns		0.82 (0.52-1.29), p=.39	0.86 (0.54-1.37), p=.53
Playground Area is Shaded	Not Shaded	1.21 (0.97-1.51), p=.10	1.25 (1.02-1.53), p=.03
Child Participated in 1 sports team		1.26 (0.86-1.84), p=.23	1.25 (0.83-1.90), p=.28
Child Participated in 2 sports teams	No sports teams	1.22 (0.91-1.64), p=.19	1.09 (0.73-1.62), p=.69
Child Participated in 3 sports teams		1.01 (0.74-1.38), p=.95	0.99 (0.67-1.46), p=.95
Other Physical Activity or Lesson	None	1.27 (0.99-1.63), p=.06	1.10(0.83-1.45), p=.53
Parents Sometimes Watched	Almost Never	0.99 (0.62-1.57), p=.95	0.87 (0.53-1.42), p=.57
Parents Often Watched	Watched	1.03 (0.66-1.62), p=.88	0.84 (0.53-1.34), p=.46
Parents Almost Always Watched	Sports/Activities	1.00 (0.67-1.49), p=.98	0.93 (0.61-1.43), p=.74
School did not report if Taught	Not Taught	0.69 (0.49-0.97), p=.03	0.78 (0.60-1.01), p=.06
School reports Sun-Safety Taught		1.07 (0.84-1.35), p=.60	1.09 (0.89-1.34), p=.39

^b General Education Development Degree