

SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

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Table of Contents

<i>List of Tables</i>	3
<i>Abstract</i>	4
<i>Introduction</i>	5
Background	5
Importance of skin cancer prevention practices	5
Goal of the Sun Safety Project	6
Contribution to Sun Safety Project	6
<i>Literature Review</i>	7
What is skin cancer?	7
Risk factors for skin cancer	7
Skin cancer prevention	8
Skin Cancer Prevention among College-aged students	8
<i>Methods</i>	10
Study Design	10
Survey Questions and Format	10
Study Population and Recruitment	10
Follow up	11
IRB Approval	12
Analysis Plan	12
<i>Results</i>	13
Demographics	13
Personal history	15
Perceptions	16
Behaviors	18
<i>Discussion</i>	21
Limitations	21
Future directions	22
<i>Acknowledgements</i>	23
<i>References</i>	24
<i>Appendix</i>	27
Results Tables	27
Consent Form	33

Questionnaire.....34

Domains.....39

Demographics.....39

Personal History.....42

Perceptions.....43

Behavior.....44

Residence Hall Breakdown.....46

Poster Distributed in Residence Halls.....47

List of Figures

Figure 1 Graph of Responses by date Sep-Nov 2019.....10

List of Tables

Table 1 Demographics.....12

Table 2 Residence hall responses.....13

Table 3 Personal History.....14

Table 4 Race (white vs non-white) vs Perception.....26

Table 5 Race (white vs non-white) vs Behavior.....29

Table 6 Tanning Bed Use vs Behavior.....30

Abstract

Background: Skin cancer is the most prevalent cancer in the United States despite being preventable in many cases. A major risk factor is excessive ultraviolet radiation (UVR) exposure. University-aged students are especially important to reach for prevention due to the increasing melanoma rates in people under 30 and lower use of sun safe behaviors. This project, in collaboration with the Skin Cancer Institute, sought to understand current understanding and practices of sun safety among University of Arizona (UA) students.

Methods: An online survey was developed to ask students about their demographic characteristics, personal history of skin cancer and skin characteristics, perceptions, and behaviors related to sun safety. The survey was designed to take 5-10 minutes to complete. Recruitment of students in UA residence halls occurred through posters, emails, and referrals containing the survey link during Fall semester of the 2020 academic year. The research design and materials were approved by the UA Institutional Review Board.

Results: A total of 530 students answered the survey from 21 residence halls. Personal history had almost no correlation to perception and behaviors. Gender and race had some effects on perception and behavior. Almost 63% of students reported that being tan made them feel more attractive with little variation between genders. While almost 90% of students agreed that they have access to sunscreen when they wish to use it, only 35.8% of students agreed they applied sunscreen while outside. Over 46% of respondents reported having at least 1 red and painful sunburn in the past 3 months.

Discussion: Students had knowledge of sun safety but did not actively partake in sun safe behaviors. Additionally, university students are difficult to reach for survey completion and healthy lifestyle changes. In the future, interventions should focus on not only teaching students about sun safety, but how to effectively promote sun safe behaviors.

Introduction

Background

Skin cancer is the most common cancer found in the United States; however, most cases are easily preventable (U.S. Department of Health and Human Services [HHS], 2014). Every year, around 5.4 million skin cancers are diagnosed, mainly basal and squamous cell carcinomas; however, while melanomas only account for around 1% of skin cancers, it is the most deadly (American Cancer Society, accessed 2020).

Many skin cancer cases are caused by excessive ultraviolet (UV) radiation, and, consequently, most can be prevented by reducing exposure to UV (HHS, 2014). The sun's radiation can damage skin cells within 15 minutes (Centers for Disease Control and Prevention [CDC], accessed 2020). UV radiation causes mutations at unprotected sites on the skin; therefore, sun protection is an essential method of preventing skin cancer and should be implemented as early as possible in life (Armstrong & Kricger, 2001).

Both melanoma and nonmelanoma cancers have increasing incidence rates (Linos et al., 2016). Nonmelanoma cancers include basal and squamous cell carcinomas and they have been reported to be increasing over time with at least 5.4 million new cases in the United States every year (Linos et al., 2016). While many adults commonly get this type of cancer, it is important to note that it is the third most common type of skin cancer in young adults aged 15-39 (Weir et al., 2011).

While UV radiation is a large factor for skin cancer, there are also other reasons. Melanoma, the deadliest form of skin cancer, can be passed down through families due to a genetic mutation which increases the chances of getting melanoma (HHS, 2014). Furthermore, those with lighter skin tones, easily burned or freckled skin, blue or green eyes, and familial or personal history of skin cancer are at a greater risk of skin cancer (CDC, accessed 2020).

Importance of skin cancer prevention practices

At the Skin Cancer Institute (SCI), the mission is to prevent and cure skin cancer through clinical care, research, and community outreach (Skin Cancer Institute, accessed 2020). The ACE message from SCI summarizes the keys of basic sun preventive measures: Avoid UV Rays, Cover up, and Examine (Skin Cancer Institute, accessed 2020). Avoid encourages to avoid excess UVR exposure and to seek shade when outside. Cover up aims to influence people to cover their skin to avoid excess UVR, including wearing tightly woven long sleeves and pants, a brimmed hat, sunglasses, and sunscreen with a sun protective factors (SPF) of at least 30 or higher. Examine means to examine your skin regularly for

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

changes, as it is easier to treat skin cancer in early stages. All protective behaviors together pose the greatest benefit to preventing skin damage (CDC, accessed 2020).

Previous sunburns at any point in life are positively associated with skin cancer, so preventing sunburns and excess UVR exposure can help to prevent skin cancer (International Agency for Research on Cancer, 2012). Education is an essential step in reducing the risk of skin cancer, and sun protective behaviors implemented at a young age can help to prevent UV damage and skin cancer (National Environmental Education Foundation (NEEF), accessed 2020). Educators like the Sun Wise program at NEEF and the Project Students Are Sun Safe (SASS) at the SCI can play a role in implementing sun prevention behaviors early on. It is also important to regularly visit a dermatologist in the case that physicians can catch precancerous cells (Skin Cancer Foundation, accessed 2020).

Goal of the Sun Safety Project

The purpose of this research project was to increase understanding of what University of Arizona students are currently doing about sun safety, especially when they enter the University of Arizona. This information is needed to help know what steps can be taken to change behaviors. The overall goal of this honors project was to develop and implement a survey to university freshmen to understand their current sun safety behaviors and knowledge of sun safety practices. Specifically, the aims were to:

- 1) Design an online survey suitable for understanding skin cancer risk, sun safety behaviors among UA freshmen
- 2) Develop a recruitment strategy to reach freshmen
- 3) Attain appropriate approvals from university administration and human subjects committee
- 4) Analyze data from the survey appropriate for the sponsor, the Skin Cancer Institute at the University of Arizona

Contribution to Sun Safety Project

This thesis research was done in collaboration with the Skin Cancer Institute as a part of a broader sun safety project. Results from this work will help inform the Skin Cancer Institute of sun safety behaviors of the University of Arizona. The design and implementation of the Sun Safety Survey and the analyses were done with the guidance of Dr. Robin Harris, the co-director of the Skin Cancer Institute at the Arizona Cancer Center. Dylan Miller, a graduate student in the Master of Public Health Public Health Policy and Management at the Mel and Enid Zuckerman College of Public Health was part of the research team and provided substantial assistance in data analysis.

Literature Review

What is skin cancer?

Skin cancer is an abnormal growth of cells within the epidermis caused by damage to the DNA (Skin Cancer Foundation, accessed 2020). UV exposure causes melanocytes in the skin to produce melanin which can cause a sunburn or a tan, both of which are a sign of skin and cellular DNA damage (HHS, 2014). Though, completely eradicating UV exposure is not realistic or healthy; it is important for mental and physical health to be outside in the sun (HHS, 2014).

UV rays are an invisible type of radiation that come from the sun and artificial lights including tanning beds that can penetrate and damage skin cells (CDC, accessed 2020). The DNA mutations can lead to rapidly multiply into tumors such as basal cell carcinoma, squamous cell carcinoma, and melanoma (Skin Cancer Foundation, accessed 2020).

Melanoma, the deadliest skin cancer, is one of the most common cancers within ages 15-29 and causes over 75% of deaths from skin cancer (Environmental Protection Agency [EPA], accessed 2020). The most common places that skin cancer can occur is on exposed areas such as the neck, face, and hands, but can also appear on any part of the body (National Cancer Institute, accessed 2020).

Risk factors for skin cancer

There are multiple risk factors that can increase the risk of skin cancer. Genetic factors like having a lighter skin color, blue and/or green eyes, blonde and/or red hair, moles, and easily reddened and freckled skin all increase the chances of skin cancer (HHS, 2014). People with different skin types have varied risks (HHS, 2014). The Fitzpatrick skin type classification is a system of six different skin types ranging from always burns, never tans to always burns to deeply tans and never burns (HHS, 2014). This is important because sunburns are an indicator of damaged skin and can lead to skin cancer. People with type I skin are the most at risk for sunburns and skin cancer (HHS, 2014). While people with light skin are more likely to get skin cancer, it is important to note that everyone is susceptible to skin cancer (HHS, 2014).

Furthermore, race and ethnicity have an important role in the risk of skin cancer because the genetic factors such as eye color and skin color are associated with race and ethnicity (HHS, 2014). People with lighter skin color like non-Hispanic white populations are more likely to be at risk for skin cancer while Black/African American and Asian/Pacific Islander populations are less (HHS, 2014). Though, there are many variations within race and skin type. Melanoma rates are increasing more in young white women and can be associated with indoor tanning (Falzone, 2017).

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Although there are many genetic and personal factors that can be risks of skin cancer, most cancers are caused by both genetic factors and UV radiation, including both from the sun and from artificial sources like indoor tanning (HHS, 2014). Indoor tanning exposes people to high UV radiation to tan skin which increases the risk of squamous cell and basal cell carcinomas as well as melanoma (HHS, 2014). It is also classified as a group 1 carcinogen (Linos et al., 2016). Current trends show that sunscreen use and sun protection are both low (HHS, 2014).

One large risk for college students is indoor tanning, and many people are able to use search engines like Google to find information on tanning (Cidre et al., 2016). Young, non-Hispanic Caucasian women most commonly use tanning beds (National Conference of State Legislatures [NCSL], 2018). Tanning beds are classified as a human carcinogen, exposing the body to excessive UVR (Environmental Protection Agency [EPA], 2010). It is difficult to combat tanning bed due to its popularity and lack of government regulation (WHO, 2003).

Skin cancer prevention

Education measures are essential in reducing the amount of UVR exposure in all ages, but especially in younger ages to promote sustainable sun safe behaviors (NEEF, accessed 2020). While being outdoors is important, avoiding direct sun between 10am and 4pm is important because this window normally has the highest UV index (SCI, accessed 2020). If outside, seeking shade is important to reduce exposure to the sun's rays (SCI, accessed 2020).

The UV Index is a measure of the level of UV radiation at a given time (World Health Organization [WHO], accessed 2020). The values range from zero and upward, and a greater value means a higher potential for the UVR to damage skin cells and is important to check for sun protection and prevention (WHO, accessed 2020).

Skin Cancer Prevention among College-aged students

Sun safety in college students is an important target for education on skin cancer risks. Melanoma rates may also be increasing in college students resulting from environmental changes and increased exposure to excess UV radiation (Basch et al., 2017). Melanoma is one of the most commonly found cancers in young adults under 30, making college-aged students at high risk (Basch et al., 2017). Moreover, 1 in 5 female high school students, most common in white non-Hispanic female students, engage in frequent indoor tanning which can influence behavior in college (Guy et al., 2015). Inadequate prevention measures are common in adolescents and adults that engage in alcohol and marijuana use and smoking (Williams Merten et al., 2016).

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Over time, skin cancer campaigns targeted both the general population and college students are needed in order to raise awareness of the risks associated with skin cancers. The Surgeon General's Call to Action noted that among young Americans aged 16-25, one third of white women reported utilizing artificial indoor tanning (HHS, 2014). Nineteen states within the United States ban the use of tanning beds for minors due to the risk of skin cancer from the excess UVR (NCSL, 2018).

While the effectiveness in changing student behavior remains unclear, these studies do impact knowledge on the topics (Felts et al., 2010). A 17 year old follow up study comparing students from 1990 and 2007 showed that both groups of students believed that artificial tanning protected the skin; however, those students more likely to report use of sunscreen were less likely to use artificial tanning (Felts et al., 2010). This study revealed that sunscreen use in the sun had increased from 1990 to 2007 from 9% to 22%. (Felts et al., 2010)

In one study, a major barrier to university students using sunscreen is forgetting (Basch et al., 2012). University populations with low levels of sunscreen use with high indoor tanning and sunburn rates have increased risks for skin cancer (Basch et al., 2012). In an Italian study of adolescent students, the majority identified what skin cancer is, possible causes, names of cancers, and risks of sunrays; however, less than 14% of students reported they always practice sun-safe behavior while almost 40% reported never using any (Suppa et al., 2013). Multiple factors influencing the use of appropriate behaviors included family and media influence, perceived gravity of skin cancer, skin type, and gender (Suppa et al., 2013).

One effective method in reaching students is through school with sun-safety intervention programs. After exposure to university student lessons, adolescents in high school and middle school had better knowledge of skin cancer and its risks (Davis et al., 2014). For youthful indoor tanning, interventions targeted toward appearance show promising deterrent results (Hillhouse, 2008). In addition, interventions actually may be stronger with an emphasis on the impact of improper sun safety on appearance in tandem with impacts to health (Thomas et al., 2011). While university students are aware that increased sun exposure correlates to increased risk of skin cancer, a study in a southern US university revealed that less than one third could identify risk reducing behaviors, and only half believed they as individuals should practice sun safety (Spradlin et al., 2010). Programs at universities that increase skin cancer awareness are necessary to influence sun safe attitude and behavior (Spradlin et al., 2010).

It has been observed that an effective way to administer sun safe lessons is over an extended period of time. For instance, younger children may be more receptive to sun safety lessons than older children and adolescents who may have more unwavering opinions on sun safety (Hart & DeMarco, 2008). Because young populations have extended interaction with social media, utilizing social media and the internet is likely to be important in disseminating skin cancer information (Falzone, 2017).

Methods

Study Design

This is a cross-sectional study design of University of Arizona students' knowledge, practices, and attitudes about skin cancer and skin cancer prevention. Originally, the plan was to conduct a follow-up study to see if students altered their behaviors over the course of a semester. However, due to the COVID-19 outbreak in Spring, 2020, students were either instructed to leave campus or consolidated into two residence halls, and the follow-up survey was not implemented. All of the participants of the survey were students enrolled at the University and living in an official UA residence hall.

Survey Questions and Format

The survey was designed as an online survey that could be accessed through electronic links from emails or QR code was developed using Qualtrics software. The survey site included a description of the purpose of the survey, a link to a consent form that students needed to read on a separate page and then the survey questions. If the student consented to take the survey, they clicked onto the next page to agree to complete the survey. At the end of the survey, directions for receipt of an incentive were given. The incentive was entry into a raffle for a free iPad and offered to students who took the online survey. If students wished to participate in the raffle, they entered their email as a chance to enter the raffle. All emails were entered into an Excel sheet, and a random number generator was used to select a number from the list to decide the winner. The randomly chosen raffle winner was given notice 3 times before moving on to the next winner chosen by the same method.

The survey consisted of demographic information including county of origin, race, eye color, age, gender, and residence hall. The next section included questions regarding knowledge of skin cancer and sun safety behaviors such as indoor tanning, protective clothing, personal skin tanning, UV index, and sunscreen. Students were then asked how often they utilized sun protective behaviors. A copy of the survey is in Appendix under Questionnaire.

Study Population and Recruitment

The online survey was distributed into every residence hall on the University of Arizona campus. It was estimated that 7000 students lived in 21 residence halls. It was not possible for the research team to utilize official listserves to contact students directly. Therefore, the survey was promoted through posters with a QR code, resident assistant referrals, classrooms/professors, and community director emails to

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

entire residence halls. For posters, the promotional posters were hung in the lobbies of the residence halls where all students enter the buildings. This survey went live in the Fall semester of the year from September 14th to November 3rd, 2019. The total number of students in the residence hall was approximately 7000, and 530 responses were gathered from the survey. All dorms were included in recruitment regardless of size, price, or location on campus. Recruitment lasted approximately two months, and multiple requests for mass e-mails were sent to each residence hall until survey closure on November 3rd. In total, 407 students entered the raffle for an iPad. Figure 1 summarizes the dates and number of responses on a given day. The boosts in responses were due to e-mails being sent to listservs in the residence halls by community directors, which proved to be the most effective recruitment method.

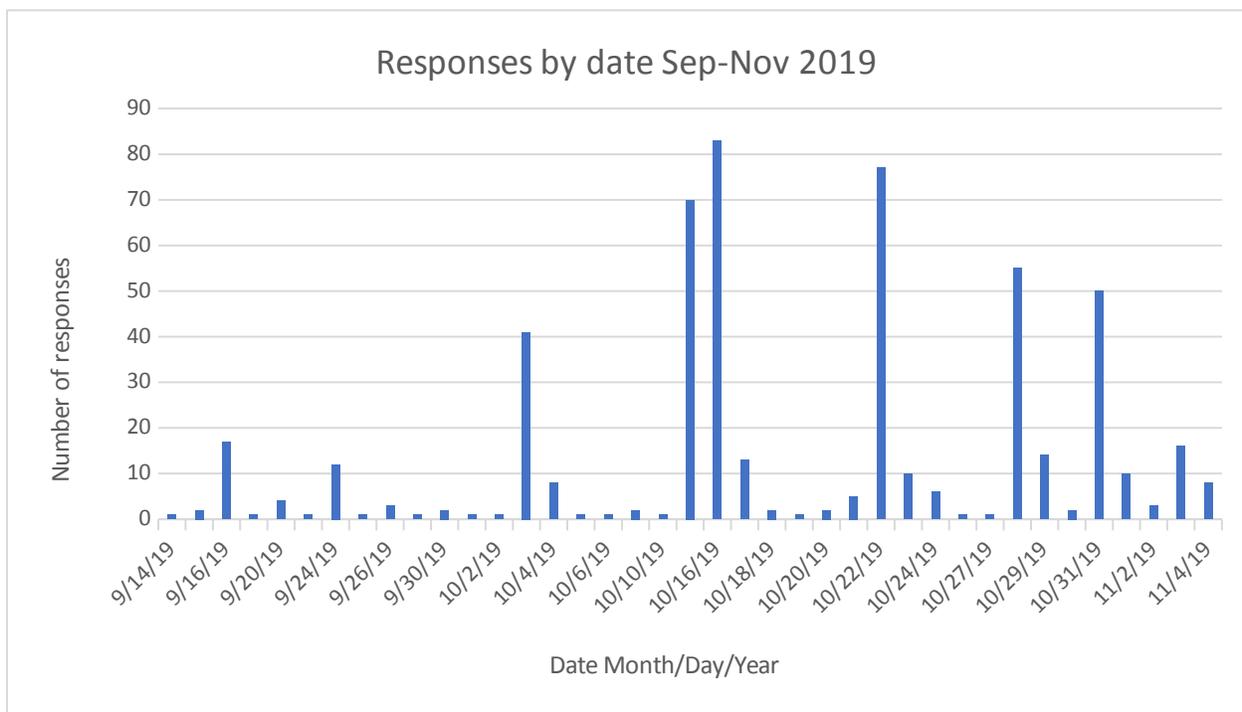


Figure 1 Graph of Responses by date Sep-Nov 2019

Follow up

A total of 230 students entered their email in agreement to receive the follow up survey. Due to the emergence of the COVID-19 pandemic, there was no follow up survey, as students in residence halls were instructed to not return if possible. Those without alternate housing were consolidated into two residence halls, so many students would not be in the same hall in the initial survey.

IRB Approval

Approval for this study was given by Housing and Residential Life and the Institutional Review Board (IRB) from the University of Arizona. See Appendix for approval email and letters. All research staff, including this student, completed the required IRB human subjects training.

Analysis Plan

There was a total of 530 students who submitted a survey response. Respondents that answered less than 25% of the questions or were incomplete by the deadline were removed from analysis, so that the final sample size was 450 respondents.

Four domains were created for analysis: demographics, personal history, perceptions, and behaviors. Frequencies and percentages of questions were calculated, both for the total population and then for demographic subsets: age, race or ethnicity, location, and gender. Personal history included skin characteristics, eye color, sunburns, having a familial history of skin cancer, and knowing someone with skin cancer. Perceptions included a subset of statements, and students were instructed to determine how much they agreed or disagreed with each statement. Behaviors included a list of behaviors related to sun safety, and students were instructed to indicate how often they performed each behavior. All frequency tables are listed in the Appendix under Domains.

Race, gender, and personal history were analyzed against perception and behavior questions to determine whether there was an association between these factors and sun safe perceptions and behaviors, using the Chi-square tests. Associations were considered statistically significant at $p < 0.05$.

Results

In total, the survey amassed 530 responses from students. The average time to complete the survey was 3 to 7 minutes. Completion time ranged from 8 seconds to 72 hours, which is the time when the survey expired if incomplete. Because of this, mean and median are better estimates of time to complete the survey. The median time was 235 seconds (3 minutes, 55 seconds), and the mode was 231 seconds (3 minutes, 51 seconds). While 450 surveys were included in analysis, none of the questions were required to be answered; therefore, number of responses varies between questions.

Demographics

Table 1 summarizes demographic characteristics of the 530 respondents of the survey. A majority of students (55.6%) reported being 19 years of age, with 6.2% being <17 and 84% being 18-22 years old. The most represented Arizona county of usual residence was Maricopa with 32.2% of responses and 19.3% were from Pima. Of note, 32.4% of the students were from outside of Arizona. A majority of respondents, 51.93%, were White or Caucasian, followed by Multiracial (16.5%) and Hispanic or Latino (15.89%). A large majority of respondents were women, 69.92%, with 26.63% from men and 3.5% identified as bisexual, gender non-conforming, or preferred not to say.

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Table 1. Demographic characteristics of respondents to Sun Safety Survey

Demographics*	Number	Percentage
Race/Ethnicity		
White	255	62.20%
Non-white	150	36.50%
Not listed/I prefer not to say	5	1.30%
Gender		
Male	131	26.60%
Female	344	69.90%
Other gender identity	17	3.50%
County		
Apache	2	0.40%
Cochise	6	1.20%
Coconino	12	2.50%
Gila	1	0.20%
Graham	0	0.00%
Greenlee	0	0.00%
La Paz	1	0.20%
Maricopa	157	32.20%
Mohave	4	0.80%
Navajo	3	0.60%
Other US State	158	32.40%
Outside of the US	21	4.30%
Pima	94	19.30%
Pinal	8	1.60%
Santa Cruz	9	1.80%
Yavapai	4	0.80%
Yuma	8	1.60%
Age		
<18	12	7.40%
18-22	136	84.00%
22+	14	8.60%

*Number of responses per question does not add to 450 due to questions left blank by respondents

Table 2 outlines the residence halls and the responses from them as well as the total population and percentage of participants from each dorm. In total, all 22 active undergraduate dorms of the 2020 academic year participated in the survey. Residence halls vary in location, price, and size. In general, these factors did not affect response as much as promotion did. Dorm size also did not have much correlation, as many of the large residence halls did not have the majority of responses. The dorms with the highest response rates (Coronado, Likins, Manzanita-Mojave, and Arbol de la Vida, Yuma) included

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

promotion by the hall Community Director through e-mail listservs. These e-mails collected a higher number of the response than other dorms that relied on posters and RA referral. 75% of total respondents got to the survey through e-mail.

Table 2. Survey response by Residence hall

Residence hall*	Number of surveys	Population of hall	Percent of hall
Apache-Santa Cruz	7	291	2.40%
Arbol de la Vida	93	722	12.80%
Arizona-Sonora	4	400	1.00%
Babcock	2	185	1.00%
Cochise	12	181	6.60%
Coconino	5	146	3.40%
Colonia de la Paz	13	482	2.70%
Coronado, Likins	78	1100	7.10%
Gila	17	176	9.70%
Graham-Greenlee	8	300	2.70%
Honors Village	13	1052	1.20%
Hopi	4	60	6.70%
Kaibab-Huachuca	6	337	1.80%
Manzanita-Mohave	72	368	19.60%
Maricopa	20	106	18.90%
Navajo-Pinal	1	152	0.70%
Pima	11	114	9.60%
Posado San Pedro	32	238	13.40%
Pueblo de la Cienega	2	238	0.80%
Villa del Puente	7	288	2.40%
Yuma	37	176	21.00%

*Number of responses per question does not add to 450 due to questions left blank by respondents

Personal history

Table 3 reports the frequency of responses to the personal history questions. One question asked students whether they have a familial history of skin cancer. Most students did not have a familial history (56.8%), although a majority of students know someone who has had skin cancer (59.3%).

The majority of respondents (53.7%) had not experienced a red or painful sunburn during the past 3 months while 26.4% reported 1 sunburn, 12.2% reported 2 times, and 7.6% reported having a sunburn more than 3 times.

When asked “Which of the following best describes what would happen to the skin on the underside of your upper arm (armpit area) if it was exposed to the summer sun in Arizona, with no protection, for 45-60 minutes?” many students (35.1%) answered “Sometimes I would burn, but then I would tan.” Overall, more students were more likely to probably not burn than to always burn.

Table 2 Personal History

Personal History*	Number	Percentage
What is your eye color?		
A color not listed	9	1.80%
Blue	101	20.50%
Brown	271	55.10%
Green	40	8.10%
Hazel	71	14.40%
Do you have a familial history of skin cancer?		
I don't know	86	17.50%
No	279	56.80%
Yes	126	25.70%
Do you know anyone who has had skin cancer?		
No	200	40.70%
Yes	292	59.30%
Which of the following best describes what would happen to the skin on the underside of your upper arm (armpit area) if it was exposed to the summer sun in Arizona, with no protection, for 45-60 minutes?		
I would always burn and never tan	48	9.80%
I would always burn and tan minimally	85	17.35%
Sometimes I would burn, but then I would tan	172	35.10%
I probably would not burn, and would always tan well	111	22.65%
I probably would not burn, and would always tan deeply	35	7.14%
I would never burn, but would tan more only with extreme sun exposure	39	7.96%
How many times did you have a red OR painful sunburn that lasted a day or more during the past 3 months?		
0 times	264	53.70%
1 time	130	26.40%
2 times	60	12.20%
3 times	25	5.10%
4 times	4	0.80%
5 or more times	9	1.80%

*Number of responses per question does not add to 450 due to questions left blank by respondents

Perceptions of sun safety awareness

There were ten perception questions that assessed student knowledge about what they thought about sun safety, sunscreen, and skin. The title of the section instructed students to answer “how strongly [they] agree or disagree with each statement.” The questions were asked on a scale of agreement, from strongly disagree, somewhat disagree, neither agree or disagree, somewhat agree, and strongly agree. Frequencies of all responses are in Appendix: Domains, Perceptions.

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

As shown in Table 4 (Appendix: Results Tables) almost 90% of students would agree somewhat or strongly to being confident in knowing to protect skin from the sun. However, only 46.5% of students agreed with 'sunscreen feels good on my skin'. A majority of students agreed that 'it is easy to find shade on the University of Arizona campus' (61.6%). 62.7% of students agree that 'being tan makes them feel more attractive'. In regards to sunscreen, 88.6% agree that they 'have access to sunscreen if they wish to use it', 57% would use sunscreen if they had access to it, but only 35.8% of students would agree to applying sunscreen when they are outside. Despite only around one third of students using sunscreen when they go outside, 82.3% of students agreed that they have the knowledge of when to wear sunscreen. Half of the students reported knowing what the UV index is.

Race and Perception

For a comparison of attitudes and perceptions by race and ethnicity, two groups were created, white and non-white. Non-white participants included non-white racial groups except multiracial and 'I prefer not to say,' as the groups could not be identified as white or non-white. When comparing white students to non-white students, statistically significant differences were noted for four questions (Table 4). More white students agreed somewhat or strongly agreed to the statement 'I am confident that I know how to protect my skin from the sun' ($p=0.02$). However, white students were also more likely to disagree strongly and somewhat to the statement 'Sunscreen feels good on my skin' ($p=0.001$). White students also were more likely to agree with the statement 'Sunscreen makes me break out,' ($p=0.04$). The most significant difference between race and ethnicity was the perception of beauty and tanning. White students were more likely to agree to the statement 'Being tan makes me feel more attractive' than non-white students ($p<0.00001$).

Perception and Personal History

Not shown in a table, familial history of skin cancer did not affect student perceptions and did not show any correlation. The only statement showed to be statistically significant was 'Being tan makes me feel more attractive.' Respondents with a familial history of skin cancer were more likely to agree to this statement (80.7%, $p=0.00016$). Also, people with no familial history of skin cancer tended to disagree with the statement (16.9%).

When comparing whether students knew someone with skin cancer resulted in more significantly different responses, for a majority of perceptions, there was not much correlation. Students that did not know anyone with skin cancer were more likely to neither agree or disagree to the statement 'Being tan makes me feel more attractive' ($p=0.00005$). Students knowing someone with skin cancer were also more likely to agree to the statement (71%) compared to those that did not know someone with skin cancer

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

(50.5%). Students that knew someone also reported more that sunscreen makes their skin break out ($p=0.02$). Similarly, these students also disagreed more with the statement ‘Sunscreen feels good on my skin’ ($p=0.0003$).

Perception and gender

There were some differences with gender correlating with perception. For analysis, gender responses were consolidated into Male, Female and Other gender identity which included transgender, non-binary, genderqueer or gender non-conforming, identity not listed, and I prefer not to say. Other genders responded most to neither agree or disagree with the statement ‘Sunscreen makes my skin break out’ (43.8%) and none reported to strongly agree with the statement, and more men disagreed with this statement. For the statement ‘Being tan makes me feel more attractive,’ other genders again reported to neither agree or disagree to this statement more than men and women. 61.6% of men and 64.9% of women agreed with this statement either somewhat or strongly, which is much more than other genders. Women responded more frequently (41.3%) to agree to the statement ‘I apply sunscreen when I am going outside’ than other genders (37.6%) and men (20.8%) and is statistically significant ($p=0.01$).

Behaviors to protecting skin

Another set of ten questions was created to assess student behavior in protecting their skin and their responses are reported in Appendix: Domain, Behaviors. The title of the sections asked students to ‘indicate how often [they] perform each of the listed activities.’ The answers ranged from never, almost never, occasionally, most of the time, and always or almost every day.

Only 27.6% of students reported that they always or most of the time protected their skin with sunscreen. More students actually reported to never or almost never using sunscreen, with 32.9% of responses. Even on warm days, only 33.1% of students reported using sunscreen. Even more students reported almost never or never using sunscreen, with 37.4%. However, 90.3% of students reported never using an artificial tanning bed at all. Only 15.2% of respondents said that they check the UV index, with a majority responding never or almost never (66.4%). Almost half of students reported always or most of the time engaging in physical activity outside (42.2%). A huge majority of students (73%) reported never or almost never wearing a long sleeved shirt when in the sun and 54.1% reported never or almost never staying inside to protect the skin compared to and only 21.2% of students reporting always or most of the time using this behavior. 46.8% of students reported never or almost never spending time in the sun for a tan.

Behaviors by Race/Ethnicity

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Four out of ten questions were significantly different by race and ethnicity (Table 5, Appendix: Results Tables). While most students never and almost never check the UV index, white students were more likely to check the UV index most of the time or occasionally ($p=0.001$). White students also were more likely to engage in physical activity outside most of the time and always or almost every time ($p=0.04$). While a majority of white students most of the time or always wear sunglasses, less than half of non-white students wear sunglasses. A larger proportion of non-white students never or almost never wear sunglasses ($p=0.003$). The most significant difference in behavior was spending time in the sun with the intent of developing a tan ($p<0.00001$). Almost 70% of non-white students reported never or almost never spending time in the sun with intent of developing a tan as opposed to 34.1% of white students. Furthermore, white students reported a higher proportion of always or most of the time trying to develop a tan outside, 34.6% compared to 9.1% of non-white students.

Behaviors by Family History of Skin Cancer

While 90.5% of respondents reported never using a tanning bed, people that did not have a familial history of tanning had more responses to most of the time and always or almost every time using an artificial tanning bed ($p=0.007$). Those with a familial history of skin cancer were less likely to always or most of the time wear a wide brimmed hat while outside in the sun than those without or that didn't know of familial history ($p=0.05$). Respondents with a familial history of skin cancer were also more likely to always or most of the time spend time in the sun with the goal of developing a tan ($p=0.01$).

For respondents, knowing someone with skin cancer mostly had no correlation to behaviors. However, the only statistically significant one is to "Spend time in the sun with the goal of developing a tan." More people that knew others with skin cancer reported to most of the time/always engage in this behavior ($p=0.00009$).

Behaviors by Gender

More women reported protecting their skin with sunscreen than men both in general and on warm days ($p=0.0002$, $p=0.003$). Men reported to most of the time or always engage in physical activity outside (54.5%) and to wear a wide-brimmed hat outside in the sun more than women or other genders ($p=0.003$). Other genders reported to never spending time in the sun with the goal of developing a tan (100%). Women reported to spend time in the sun to develop a tan more than men (28% of women vs 16.6% of men). However, there was no significance between gender and indoor tanning.

Relationship between Tanning Bed use and perception/behavior

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Tanning bed use as a behavior generally did not affect perception of sun safety (Table 6, Appendix: Results Tables). However, those respondents that reported they always or most of the time used tanning beds agreed more with the statement ‘Sunscreen makes my skin breakout’ than other respondents ($p=0.005$), even those same individuals were more likely to agree more with the statement ‘I have access to sunscreen if I wish to use it’ ($p=0.004$). There was no statistical significant difference between whether students that utilized tanning beds felt more attractive when tan or whether they applied sunscreen when going outside. However, tanning bed use had much more effect on other behaviors. Tanning bed users (always or most of the time) reported more to always spending time in the sun with the purpose of developing a tan ($p<0.00001$) but also reported more sun protective behaviors like wearing a long sleeve ($p=0.00008$) or sunglasses ($p<0.00001$) while in the sun. Also, students that always/most of the time used an artificial tanning bed were more likely to report they protected their skin with sunscreen more including on warm days ($p=0.1$, $p=0.1$). These respondents also reported checking the UV index always or most of the time significantly more than other students that did not use artificial tanning beds ($p<0.00001$).

Discussion

This survey of 530 UA students who live on campus sought to identify their current knowledge, perceptions, and behaviors about sun protection. There seems to be a gap between student perceptions of importance of sun safety and the students actually performing sun safe behaviors. Furthermore, the information of a personal history of both familial history of skin cancer and knowing someone with skin cancer was not highly associated with actual behaviors.

Almost 63% of students reported that being tan makes them feel more attractive and there was little difference between genders. While almost 90% of students agreed that they have access to sunscreen when they wish to use it, only 35.8% of students agreed they applied sunscreen while outside. Contrarily, 82.3% of students agreed to having the knowledge of when to wear sunscreen. Furthermore, while over 80% of students claimed to have this knowledge, only 27.6% always or most of the time protected their skin with sunscreen, and an even greater amount claim to never use sunscreen. These observations emphasized the gap between student knowledge and student action to participate in sun safe behavior. Of note, 90.5% of students report to never have used a tanning bed.

In general, personal history was not associated with perception and behavior. However, when there was an association, many of them were contrary to assumptions. While I hypothesized that answering “Yes” to either having a familial history of skin cancer or knowing someone with skin cancer may lead to more protective skin cancer behaviors and perceptions, those with a familial history spent more time outside with the goal of developing a tan and also did not wear wide brimmed hats while out in the sun. Although, people with familial history of skin cancer also responded they were less likely to use artificial tanning beds. Also, knowing someone with a history of skin cancer showed almost no association with behaviors except that people that knew someone with skin cancer responded to spend more time outside with the goal of developing a tan than those that did not know anyone. These responses showed that the responses appear to be conflicting and need more data to identify the issues.

While much of the literature points toward artificial tanning being a large risk factor for university-aged students, most students do not utilize tanning beds. Over 90% of students report never using one. However, those that are report using tanning beds always or most of the time utilize protective, sun safe behaviors at higher rates than non-users when not using tanning bed.

Limitations

Although an estimated 7000 students live in the residence halls at the UA, only 530 responses were recorded and not all of those responding students answered all of the questions. When initially sending out the surveys, the only promotion was posters distributed in residence halls. These posters were

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

implemented in the lobbies of residence halls in hopes to be seen by all students that walked in the front doors. However, the responses were low in these initial stages, at around 50 responses within the first 2 weeks. I contacted Desk Managers that supervise the front desk staff to promote the surveys with the posters and a QR code on them so that students could use their camera to go to the link. Resident Assistants that lived in the hall were also contacted to promote directly to residents and were provided with a link to the survey. This strategy boosted the responses to around 100 within 3-4 weeks of the survey. However, the most effective method was to contact Community Directors that monitor resident interactions and several agreed to contact residents directly about this survey through email. This strategy proved to be the most effective method, as the dorms with the most responses were the ones that had community director interventions. However, even with this boost, the overall response was low and may not reflect a representative sample of the students in the residence halls.

One consequence of the low response rate was the low response by gender. Only 17 respondents of the 492 gender responses identified as genders other than women and men which meant that it was not possible to determine if there are specific issues for sun safety/sun protection for these groups of students. In an analysis of gender versus the behavior "Check the UV index," there were discrepancies in reporting for other genders compared to men and women. Other genders reported the most responses to never/almost never and most of the time/always partaking in this activity than both men and women.

Future directions

While many studies show that artificial tanning is a large risk factor of college-aged students, many of the responses indicated that lack of sunscreen use is an even larger factor. Over 90% of students in the sample reported to never using artificial tanning beds. Furthermore, there was no statistical significant difference between women utilizing tanning beds more than men or other genders. This protective behavior was higher than the use of sunscreen, which was less than 25% of students. In the future, there should be more studies on the use of sunscreen and also sunscreen knowledge in college-aged students.

One large takeaway from this study is that university-aged students are difficult to reach in terms of completing a survey and in practicing good lifestyle behaviors. University students are hard to reach for sampling as well. Many students did not want to participate even with the incentive of an iPad. Researchers must take into account what incentive to create for students, whether that be one large item or multiple smaller items. Overall, recruitment numbers were fastest when links could be sent directly to student emails. Finally, there needs to be more research on how to address this gap and to help students participate in the sun safe behaviors that they claim to already know about.

In conclusion, university students continue to be a difficult group to reach while still being at risk for skin cancers. More research must be done to find the most effective way to not only reach students, but to promote sun safe behaviors that reflect their knowledge.

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Appendix

Results Tables

Table 3 Race (white vs non-white) vs Perception

Race vs Perception*	Non-white %	n	White %	n	Total
I am confident that I know how to protect my skin from the sun					
Strongly agree	32.7%	48	49.6%	123	171
Somewhat agree	50.3%	74	41.5%	103	177
Neither agree nor disagree	9.5%	14	6.9%	17	31
Somewhat disagree	5.4%	8	1.6%	4	12
Strongly disagree	2.0%	3	0.4%	1	4
Sunscreen feels good on my skin					
Strongly agree	21.8%	32	12.9%	32	64
Somewhat agree	38.8%	57	26.6%	66	123
Neither agree nor disagree	16.3%	24	20.6%	51	75
Somewhat disagree	20.4%	30	23.8%	59	89
Strongly disagree	2.7%	4	16.1%	40	44
It is easy to find shade outdoors on the UA campus					
Strongly agree	17.7%	26	21.5%	53	79
Somewhat agree	39.5%	58	43.7%	108	166

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Neither agree nor disagree	12.9%	19	13.4%	33	52
Somewhat disagree	25.9%	38	19.8%	49	87
Strongly disagree	4.1%	6	1.6%	4	10
Sunscreen makes my skin break out					
Strongly agree	10.9%	16	11.3%	28	44
Somewhat agree	18.4%	27	30.8%	76	103
Neither agree nor disagree	21.8%	32	15.8%	39	71
Somewhat disagree	24.5%	36	22.7%	56	92
Strongly disagree	24.5%	36	19.4%	48	84
Being tan makes me feel more attractive					
Strongly agree	16.4%	24	46.0%	114	138
Somewhat agree	21.2%	31	31.0%	77	108
Neither agree nor disagree	41.8%	61	12.5%	31	92
Somewhat disagree	8.2%	12	5.6%	14	26
Strongly disagree	12.3%	18	4.8%	12	30
I have access to sunscreen if I wish to use it					
Strongly agree	54.5%	79	65.9%	162	241
Somewhat agree	29.7%	43	23.6%	58	101
Neither agree nor disagree	6.9%	10	4.1%	10	20
Somewhat disagree	6.9%	10	4.9%	12	22

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Strongly disagree	2.1%	3	1.6%	4	7
If I had access to sunscreen I would use it					
Strongly agree	35.4%	52	24.3%	60	112
Somewhat agree	28.6%	42	29.6%	73	115
Neither agree nor disagree	23.8%	35	21.5%	53	88
Somewhat disagree	11.6%	17	20.6%	51	68
Strongly disagree	0.7%	1	4.0%	10	11
I apply sunscreen when I am going outside					
Strongly agree	15.6%	23	11.7%	29	52
Somewhat agree	29.9%	44	18.5%	46	90
Neither agree nor disagree	15.6%	23	18.1%	45	68
Somewhat disagree	27.9%	41	32.7%	81	122
Strongly disagree	10.9%	16	19.0%	47	63
I have the appropriate knowledge to make decisions on whether to wear sunscreen					
Strongly agree	37.4%	55	45.2%	112	167
Somewhat agree	42.9%	63	39.1%	97	160
Neither	12.2%	18	9.3%	23	41

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

agree nor disagree					
Somewhat disagree	4.8%	7	4.8%	12	19
Strongly disagree	2.7%	4	1.6%	4	8
I have a strong understanding of what UV index is					
Strongly agree	23.1%	34	32.7%	81	115
Somewhat agree	28.6%	42	32.7%	81	123
Neither agree nor disagree	17.0%	25	12.1%	30	55
Somewhat disagree	21.8%	32	15.7%	39	71
Strongly disagree	9.5%	14	6.9%	17	31

*Number of responses per question does not add to 450 due to questions left blank by respondents

Table 4 Race (white vs non-white) vs Behavior

Behavior vs race*	Non-white %	n	White %	n	Total
Protect your skin with sunscreen					
Always or almost every day	16.9%	24	9.5%	23	47
Most of the time	14.8%	21	16.0%	39	60
Occasionally	36.6%	52	41.2%	100	152
Almost Never	25.4%	36	30.0%	73	109
Never	6.3%	9	3.3%	8	17
Protect your skin with sunscreen on warm days					
Always or almost every day	17.6%	25	11.9%	29	54
Most of the time	21.8%	31	17.7%	43	74
Occasionally	24.6%	35	34.6%	84	119
Almost Never	26.8%	38	29.6%	72	110
Never	9.2%	13	6.2%	15	28
Use an artificial tanning bed					
Always or almost every day	2.1%	3	0.4%	1	4
Most of the time	1.4%	2	1.7%	4	6
Occasionally	5.7%	8	4.1%	10	18
Almost Never	2.8%	4	3.7%	9	13
Never	87.9%	124	90.1%	218	342
Check the UV index					

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Always or almost every day	7.1%	10	4.1%	10	20
Most of the time	9.2%	13	16.0%	39	52
Occasionally	12.1%	17	18.5%	45	62
Almost Never	9.2%	13	18.9%	46	59
Never	62.4%	88	42.4%	103	191
Engage in physical activity outside					
Always or almost every day	14.8%	21	15.7%	38	59
Most of the time	18.3%	26	33.1%	80	106
Occasionally	45.1%	64	36.8%	89	153
Almost Never	16.9%	24	13.2%	32	56
Never	4.9%	7	1.2%	3	10
Wear a long sleeved shirt when I go outside into the sun					
Always or almost every day	5.6%	8	2.5%	6	14
Most of the time	8.5%	12	9.9%	24	36
Occasionally	33.8%	48	25.1%	61	109
Almost Never	23.9%	34	34.2%	83	117
Never	28.2%	40	28.4%	69	109
Wear a wide brimmed hat when I go outside in the sun					
Always or almost every day	2.1%	3	1.6%	4	7
Most of the time	10.6%	15	7.4%	18	33
Occasionally	15.5%	22	18.9%	46	68
Almost Never	21.8%	31	28.8%	70	101
Never	50.0%	71	43.2%	105	176
Stay inside with the intention of protecting your skin					
Always or almost every day	7.0%	10	4.9%	12	22
Most of the time	20.4%	29	13.2%	32	61
Occasionally	31.0%	44	21.4%	52	96
Almost Never	20.4%	29	25.5%	62	91
Never	21.1%	30	35.0%	85	115
Wear sunglasses					
Always or almost every day	22.5%	32	31.4%	76	108
Most of the time	16.9%	24	24.8%	60	84
Occasionally	23.2%	33	27.3%	66	99
Almost Never	18.3%	26	9.1%	22	48
Never	19.0%	27	7.4%	18	45
Spend time in the sun with the goal of developing a tan					
Always or almost every day	2.8%	4	10.7%	26	30
Most of the time	6.3%	9	23.9%	58	67
Occasionally	23.9%	34	31.3%	76	110
Almost Never	21.8%	31	18.1%	44	75
Never	45.1%	64	16.0%	39	103

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

*Number of responses per question does not add to 450 due to questions left blank by respondents

Table 5 Tanning Bed Use vs Behavior

Tanning Bed Use vs Behavior*	Always/Most of the time %	n	Occasionally %	n	Never/Almost Never %	n	Total
Protect your skin with sunscreen							
Always or almost every day	33.3%	4	0.0%	0	12.2%	53	57
Most of the time	41.7%	5	10.5%	2	14.7%	64	71
Occasionally	0.0%	0	63.2%	12	39.5%	172	184
Almost Never	16.7%	2	26.3%	5	28.3%	123	130
Never	8.3%	1	0.0%	0	5.3%	23	24
Protect your skin with sunscreen on warm days							
Always or almost every day	16.7%	2	0.0%	0	14.5%	63	65
Most of the time	50.0%	6	10.5%	2	18.6%	81	89
Occasionally	8.3%	1	63.2%	12	28.5%	124	137
Almost Never	16.7%	2	26.3%	5	30.3%	132	139
Never	8.3%	1	0.0%	0	8.0%	35	36
Check the UV index							
Always or almost every day	33.3%	4	15.8%	3	4.1%	18	25
Most of the time	50.0%	6	31.6%	6	10.8%	47	59
Occasionally	8.3%	1	31.6%	6	15.0%	65	72
Almost Never	0.0%	0	0.0%	0	18.4%	80	80
Never	8.3%	1	21.1%	4	51.6%	224	229
Engage in physical activity outside							
Always or almost every day	33.3%	4	15.8%	3	14.3%	62	69
Most of the time	41.7%	5	10.5%	2	27.6%	120	127
Occasionally	16.7%	2	63.2%	12	39.2%	170	184
Almost Never	8.3%	1	10.5%	2	16.1%	70	73
Never	0.0%	0	0.0%	0	2.8%	12	12
Wear a long sleeved shirt when I go outside into the sun							
Always or almost every day	16.7%	2	5.3%	1	2.5%	11	14
Most of the time	25.0%	3	21.1%	4	7.4%	32	39

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Occasionally	25.0%	3	26.3%	5	29.2%	127	135
Almost Never	8.3%	1	36.8%	7	31.7%	138	146
Never	25.0%	3	10.5%	2	29.2%	127	132
Wear a wide brimmed hat when I go outside in the sun							
Always or almost every day	16.7%	2	0.0%	0	1.4%	6	8
Most of the time	16.7%	2	21.1%	4	7.4%	32	38
Occasionally	16.7%	2	47.4%	9	15.4%	67	78
Almost Never	16.7%	2	15.8%	3	26.2%	114	119
Never	33.3%	4	15.8%	3	49.7%	216	223
Stay inside with the intention of protecting your skin							
Always or almost every day	8.3%	1	0.0%	0	5.7%	25	26
Most of the time	33.3%	4	21.1%	4	14.7%	64	72
Occasionally	25.0%	3	42.1%	8	23.9%	104	115
Almost Never	8.3%	1	15.8%	3	25.3%	110	114
Never	25.0%	3	21.1%	4	30.3%	132	139
Wear sunglasses							
Always or almost every day	18.2%	2	21.1%	4	28.0%	122	128
Most of the time	27.3%	3	15.8%	3	23.0%	100	106
Occasionally	36.4%	4	52.6%	10	23.9%	104	118
Almost Never	0.0%	0	5.3%	1	13.3%	58	59
Never	18.2%	2	5.3%	1	11.7%	51	54
Spend time in the sun with the goal of developing a tan							
Always or almost every day	50.0%	6	10.5%	2	6.2%	27	35
Most of the time	16.7%	2	42.1%	8	15.4%	67	77
Occasionally	25.0%	3	36.8%	7	28.7%	125	135
Almost Never	0.0%	0	5.3%	1	20.0%	87	88
Never	8.30%	1	5.30%	1	29.70%	129	131

*Number of responses per question does not add to 450 due to questions left blank by respondents

Consent Form

Welcome to the University of Arizona. This is an exciting time and we know that you are busy finding your way around campus, starting classes, and discovering things to do. We are asking if you can take a few minutes to help us.

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

A group of UA public health students and faculty members are seeking to know what students coming to the UA know about being safe in the sun. We are asking students like yourself to complete a brief (-10 minutes) set of questions about your sun habits and sun protection habits. We will also invite you to participate in a second, short survey in Spring Semester 2020. We will summarize this information to help the campus know what is needed to become more sun safe.

TO LEARN MORE ABOUT THIS PROJECT... [CLICK HERE](#)

IF YOU AGREE, NOW LET'S BEGIN... You can take this survey online by clicking on the accept button

below and beginning the survey. By clicking on the button, you are consenting to participate in this research.

If you have questions about this project, please feel free to contact one of us:

- **Coordinator: Zoe Baccam (Public Health student)** zoebaccam@email.arizona.edu
- **Faculty Lead: Robin Harris, PhD (Professor in Public Health)**
rbharris@email.arizona.edu
- **Graduate assistant: Dylan Miller (MPH student)** dylanmiller@email.arizona.edu
- **For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team,** you may contact the Human Subjects Protection Program at 520-626-6721 or online at <http://rgw.arizona.edu/compliance/human-subjects-protection-program>.

URL Consent form: https://uarizona.co1.qualtrics.com/CP/File.php?F=F_d6Y0SitLRKO8GSV

Questionnaire

IF YOU AGREE, NOW LET'S BEGIN... You can take this survey online by clicking on the accept button below and beginning the survey. By clicking on the button, you are consenting to participate in this research.

Accept (1)

Decline (2)

This first set of questions helps us know the general background of the students answering this questionnaire.

Q1 What is your age?

Fill in own answer (1)

Q2 With which race/ethnicity do you identify? (Select all that apply)

African American or Black (1)

American Indian or Alaska Native (2)

Asian American or Asian (3)

Hispanic or Latino (4)

Middle Eastern (5)

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

- Multiracial (6)
- Pacific Islander (7)
- White or Caucasian (8)
- An identity not listed (9)
- Prefer not to say (10)

Q3 Which of the following counties are you from?

>Drop down menu>

Q4 What is your current dorm?

<Drop Down List of dorms so it can be selected>

Q5 How did you get this survey?

- Word of mouth (1)
- Orientation (2)
- Email (3)
- RA referral (4)

Q6 What is your eye color?

- Blue (1)
- Brown (2)
- Green (3)
- Hazel (4) -
- A color not listed (5)

Q7 With which gender do you identify? (Select all that apply)

- Woman (1)
- Man (2)
- Transgender (3)
- Non-binary (4)
- Genderqueer or gender nonconforming (5)
- An identity not listed (6)
- I prefer not to say (7)

Q8 Do you have a familial history of skin cancer?

- Yes (1)
- I don't know (2)
- No (3)

Q9 Do you know anyone who has had skin cancer?

- Yes (1)
- No (2)

Q10 Which of the following best describes what would happen to the skin on the underside of your upper arm (armpit area) if it was exposed to the summer sun in Arizona, with no protection, for 45-60 minutes?

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

I would always burn and never tan. (1)

I would always burn and tan minimally. (2)

Sometimes I would burn, but then I would tan. (3)

I probably would not burn, and would always tan well. (4)

I probably would not burn, and would always tan deeply. (5)

I would never burn, but would tan more only with extreme sun exposure. (6)

Q11 How many times did you have a red OR painful sunburn that lasted a day or more during the past 3 months?

0 times (1)

1 time (2)

2 times (3)

3 times (4)

4 times (5)

5 or more times (6)

For this set of questions, indicate how strongly you agree or disagree with each statement

Q12 I am confident that I know how to protect my skin from the sun

Strongly agree (1)

Somewhat agree (2)

Neither agree nor disagree (3)

Somewhat disagree (4)

Strongly disagree (5)

Q13 Sunscreen feels good on my skin

Strongly agree (1)

Somewhat agree (2)

Neither agree nor disagree (3)

Somewhat disagree (4)

Strongly disagree (5)

Q14 It is easy to find shade outdoors on the UA campus

Strongly agree (1)

Somewhat agree (2)

Neither agree nor disagree (3)

Somewhat disagree (4)

Strongly disagree (5)

Q15 Sunscreen makes my skin break out

Strongly agree (1)

Somewhat agree (2)

Neither agree nor disagree (3)

Somewhat disagree (4)

Strongly disagree (5)

Q16 Being tan makes me feel more attractive

Strongly agree (1)

Somewhat agree (2)

Neither agree nor disagree (3)

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Somewhat disagree (4)
Strongly disagree (5)

Q17 I have access to sunscreen if I wish to use it

Strongly agree (1)
Somewhat agree (2)
Neither agree nor disagree (3)
Somewhat disagree (4)
Strongly disagree (5)

Q18 If I had access to sunscreen I would use it

Strongly agree (1)
Somewhat agree (2)
Neither agree nor disagree (3)
Somewhat disagree (4)
Strongly disagree (5)

Q19 I apply sunscreen when I am going outside

Strongly agree (1)
Somewhat agree (2)
Neither agree nor disagree (3)
Somewhat disagree (4)
Strongly disagree (5)

Q20 I have the appropriate knowledge to make decisions on whether to wear sunscreen

Strongly agree (1)
Somewhat agree (2)
Neither agree nor disagree (3)
Somewhat disagree (4)
Strongly disagree (5)

Q21 I have a strong understanding of what UV index is

Strongly agree (1)
Somewhat agree (2)
Neither agree nor disagree (3)
Somewhat disagree (4)
Strongly disagree (5)

For this set of Questions, indicate how often you perform each of the listed activities

Q24 Protect your skin with sunscreen

Every day (1)
At least weekly (2)
Monthly (3)
Less than 6 times a year (4)
Yearly (5)
Never (6)

Q25 Protect your skin with sunscreen on warm days

Every day (1)
At least weekly (2)

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

- Monthly (3)
- Less than 6 times a year (4)
- Yearly (5)
- Never (6)

Q26 Use an artificial tanning bed

- Every day (1)
- At least weekly (2)
- Monthly (3)
- Less than 6 times a year (4)
- Yearly (5)
- Never (6)

Q27 Check the UV index

- Every day (1)
- At least weekly (2)
- Monthly (3)
- Less than 6 times a year (4)
- Yearly (5)
- Never (6)
- Don't know what UV index is (7)

Q29 Engage in physical activity outside

- Every day (1)
- At least weekly (2)
- Monthly (3)
- Less than 6 times a year (4)
- Yearly (5)
- Never (6)

Q30 Wear a long-sleeved shirt when I go outside into the sun

- Every day (1)
- At least weekly (2)
- Monthly (3)
- Less than 6 times a year (4)
- Yearly (5)
- Never (6)

Q31 Wear a wide brimmed hat when I go outside into the sun

- Every day (1)
- At least weekly (2)
- Monthly (3)
- Less than 6 times a year (4)
- Yearly (5)
- Never (6)

Q32 Stay inside with the intention of protecting your skin

- Every day (1)
- At least weekly (2)
- Monthly (3)
- Less than 6 times a year (4)

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Yearly (5)
Never (6)

Q33 Wear sunglasses

Every day (1)
At least weekly (2)
Monthly (3)
Less than 6 times a year (4)
Yearly (5)
Never (6)

Q34 Spend time in the sun with the goal of developing a tan

Every day (1)
At least weekly (2)
Monthly (3)
Less than 6 times a year (4)
Yearly (5)
Never (6)

Q35 Do you have any comments or questions for us about sun safety or sunscreens that might help us with this project?

SURVEY CLOSING

We would like to contact you again in January 2020, to see how your freshmen year is going. We would ask you a short set of questions, similar to the ones you just completed. These questions would take about 5-10 minutes of your time. This will help us understand more about UA students and the issues with sun protection.

Q36 If you are willing to receive this second questionnaire, please enter your email below.

THANK YOU for helping us with this project.

<Click here submit your survey >

If you would you like to be entered into a raffle to receive an IPAD for completion of this survey, please click on the arrow below. You will be prompted to submit your email address. No other information will be collected and your email address will not be linked to your survey responses. We will only use your email to enter you into the raffle and we will not distribute your email address to a third party.

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

Domains

Demographics

Q2 – What is your age?

#	Answer
16	2
17	10
18	0
19	90
20	0
21	30
22	16
23	8
25	1
26	1
28	1
29	1
33	1
51	1

Q3 - With which race/ethnicity do you identify? (select all that apply)

#	Answer	%	Count
1	African American or Black	3.46%	17
2	American Indian or Alaska Native	0.61%	3
3	Asian American or Asian	8.35%	41
4	Hispanic or Latino	15.89%	78
5	Middle Eastern	1.83%	9
6	Multiracial	16.50%	81
7	Pacific Islander	0.41%	2
8	White or Caucasian	51.93%	255
9	An identity not listed	0.20%	1
10	I prefer not to say	0.81%	4
	Total	100%	491

Q4 - Which of the following counties are you from?

#	Answer	%	Count
1	Apache	0.41%	2

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

2	Cochise	1.23%	6
3	Coconino	2.46%	12
4	Gila	0.20%	1
5	Graham	0.00%	0
6	Greenlee	0.00%	0
7	La Paz	0.20%	1
8	Maricopa	32.17%	157
9	Mohave	0.82%	4
10	Navajo	0.61%	3
11	Pima	19.26%	94
12	Pinal	1.64%	8
13	Santa Cruz	1.84%	9
14	Yavapai	0.82%	4
15	Yuma	1.64%	8
16	Other US State	32.38%	158
17	Outside of the US	4.30%	21
	Total	100%	488

Q5 – How did you get this survey?

#	Answer	%	Count
1	Word of mouth	13.62%	67
2	Orientation	0.20%	1
3	Email	76.42%	376
4	RA Referral	9.76%	48
	Total	100%	492

Q7 - With what gender do you identify?

#	Answer	%	Count
1	Woman	69.92%	344
2	Man	26.63%	131
3	Transgender	0.41%	2
4	Non-binary	1.42%	7
5	Genderqueer or gender nonconforming	0.81%	4
6	An identity not listed	0.00%	0
7	I prefer not to say	0.81%	4
	Total	100%	492

Q21- What is your current dorm?

#	Answer	%	Count
1	Babcock	0.45%	2
2	Coconino	1.13%	5
3	Hopi	0.90%	4
4	Kaibab-Huachuca	1.35%	6
5	Navajo-Pinal	0.23%	1

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

6	Apache-Santa Cruz	1.58%	7
7	Cochise	2.70%	12
8	Gila	3.83%	17
9	Graham-Greenlee	1.80%	8
10	Manzanita-Mohave	16.22%	72
11	Maricopa	4.50%	20
12	Pima	2.48%	11
13	Yuma	8.33%	37
14	Arbol de la Vida	20.95%	93
15	Arizona-Sonora	0.90%	4
16	Colonia de la Paz	2.93%	13
17	Coronado, Likins	17.57%	78
18	Posado San Pedro	7.21%	32
19	Pueblo de la Cienega	0.45%	2
20	Villa del Puente	1.58%	7
21	Honors Village	2.93%	13
	Total	100%	444

Personal History

Q6 – What is your eye color?

#	Answer	%	Count
1	Blue	20.53%	101
2	Brown	55.08%	271
3	Green	8.13%	40
4	Hazel	14.43%	71
5	A color not listed	1.83%	9
	Total	100%	492

Q8 – Do you have a familial history of skin cancer?

#	Answer	%	Count
1	Yes	25.66%	126
2	I don't know	17.52%	86
3	No	56.82%	279
	Total	100%	491

Q9 – Do you know anyone who has had skin cancer?

#	Answer	%	Count
1	Yes	59.35%	292
2	No	40.65%	200
	Total	100%	492

Q10 - Which of the following best describes what would happen to the skin on the underside of your upper arm (armpit area) if it was exposed to the summer sun in Arizona, with no protection, for 45-60 minutes?

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

#	Answer	%	Count
1	I would always burn and never tan	9.80%	48
2	I would always burn and tan minimally	17.35%	85
3	Sometimes I would burn, but then I would tan	35.10%	172
4	I probably would not burn, and would always tan well	22.65%	111
5	I probably would not burn, and would always tan deeply	7.14%	35
6	I would never burn, but would tan more only with extreme sun exposure	7.96%	39
	Total	100%	490

Q11 - How many times did you have a red OR painful sunburn that lasted a day or more during the past 3 months?

#	Answer	%	Count
1	0 times	53.66%	264
2	1 time	26.42%	130
3	2 times	12.20%	60
4	3 times	5.08%	25
5	4 times	0.81%	4
6	5 or more times	1.83%	9
	Total	100%	492

Perceptions

Q13-24 - For this set of questions, how strongly do you agree or disagree with each statement?

#	Question	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree	Total
1	I am confident that I know how to protect my skin from the sun	43.63% 209	45.30% 217	7.31% 35	2.92% 14	0.84% 4	479
2	Sunscreen feels good on my skin	16.88% 81	29.58% 142	19.38% 93	22.50% 108	11.67% 56	480
3	It is easy to find shade outdoors on the UA campus	19.83% 95	41.75% 200	13.15% 63	22.13% 106	3.13% 15	479
4	Sunscreen makes my skin break out	11.69% 56	23.80% 114	19.00% 91	23.38% 112	22.13% 106	479
5	Being tan makes me	34.17% 163	28.51% 136	23.27% 111	6.50% 31	7.55% 36	477

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

	feel more attractive											
6	I have access to sunscreen if I wish to use it	60.92%	290	27.73%	132	4.20%	20	5.25%	25	1.89%	9	476
7	If I had access to sunscreen I would use it	28.45%	136	28.45%	136	23.01%	110	17.36%	83	2.72%	13	478
8	I apply sunscreen when I am going outside	13.13%	63	22.71%	109	16.88%	81	30.83%	148	16.46%	79	480
9	I have the appropriate knowledge to make decisions on whether to wear sunscreen	42.50%	204	39.79%	191	10.63%	51	5.42%	26	1.67%	8	480
10	I have a strong understanding of what UV index is	28.96%	139	31.04%	149	13.75%	66	18.13%	87	8.13%	39	480

#	Question	Strongly agree		Somewhat agree		Neither agree nor disagree		Somewhat disagree		Strongly disagree		Total
1	I am confident that I know how to protect my skin from the sun	43.63%	209	45.30%	217	7.31%	35	2.92%	14	0.84%	4	479
2	Sunscreen feels good on my skin	16.88%	81	29.58%	142	19.38%	93	22.50%	108	11.67%	56	480
3	It is easy to find shade outdoors on the UA campus	19.83%	95	41.75%	200	13.15%	63	22.13%	106	3.13%	15	479
4	Sunscreen makes my skin break out	11.69%	56	23.80%	114	19.00%	91	23.38%	112	22.13%	106	479
5	Being tan makes me feel more attractive	34.17%	163	28.51%	136	23.27%	111	6.50%	31	7.55%	36	477
6	I have access to sunscreen if I wish to use it	60.92%	290	27.73%	132	4.20%	20	5.25%	25	1.89%	9	476
7	If I had access to sunscreen I would use it	28.45%	136	28.45%	136	23.01%	110	17.36%	83	2.72%	13	478
8	I apply sunscreen when I am going	13.13%	63	22.71%	109	16.88%	81	30.83%	148	16.46%	79	480

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

9	outside I have the appropriate knowledge to make decisions on whether to wear sunscreen	42.50%	204	39.79%	191	10.63%	51	5.42%	26	1.67%	8	480
10	I have a strong understanding of what UV index is	28.96%	139	31.04%	149	13.75%	66	18.13%	87	8.13%	39	480

Behavior

Q25-36 - For this set of questions, indicate how often you preform each of the listed activities

#	Question	Always or almost every day		Most of the time		Occasionally		Almost Never		Never		Total
1	Protect your skin with sunscreen	12.39%	58	15.17%	71	39.53%	185	27.78%	130	5.13%	24	468
2	Protect your skin with sunscreen on warm days	14.10%	66	19.02%	89	29.49%	138	29.70%	139	7.69%	36	468
3	Use an artificial tanning bed	1.07%	5	1.50%	7	4.08%	19	3.00%	14	90.34%	421	466
4	Check the UV index	5.57%	26	12.63%	59	15.42%	72	17.13%	80	49.25%	230	467
5	Engage in physical activity outside	14.99%	70	27.19%	127	39.61%	185	15.63%	73	2.57%	12	467
6	Wear a long sleeved shirt when I go outside into the sun	3.21%	15	8.55%	40	28.85%	135	31.20%	146	28.21%	132	468
7	Wear a wide brimmed hat when I go outside in the sun	1.71%	8	8.33%	39	16.88%	79	25.43%	119	47.65%	223	468
8	Stay inside with the intention of protecting your skin	5.77%	27	15.38%	72	24.79%	116	24.36%	114	29.70%	139	468
9	Wear sunglasses	27.84%	130	22.70%	106	25.27%	118	12.63%	59	11.56%	54	467
10	Spend time in the sun with the goal of developing a tan	7.48%	35	16.88%	79	28.85%	135	18.80%	88	27.99%	131	468

UA SUN SAFETY BEHAVIORS IN COLLEGE AGED STUDENTS

#	Field	Minimum	Maximum	Mean	Std Deviation	Variance	Count
1	Protect your skin with sunscreen	1.00	5.00	2.98	1.06	1.13	468
2	Protect your skin with sunscreen on warm days	1.00	5.00	2.98	1.17	1.36	468
3	Use an artificial tanning bed	1.00	5.00	4.80	0.68	0.46	466
4	Check the UV index	1.00	5.00	3.92	1.28	1.65	467
5	Engage in physical activity outside	1.00	5.00	2.64	1.00	1.00	467
6	Wear a long sleeved shirt when I go outside into the sun	1.00	5.00	3.73	1.06	1.13	468
7	Wear a wide brimmed hat when I go outside in the sun	1.00	5.00	4.09	1.06	1.12	468
8	Stay inside with the intention of protecting your skin	1.00	5.00	3.57	1.22	1.49	468
9	Wear sunglasses	1.00	5.00	2.57	1.32	1.75	467
10	Spend time in the sun with the goal of developing a tan	1.00	5.00	3.43	1.26	1.59	468

#	Question	Always or almost every day		Most of the time		Occasionally		Almost Never		Never		Total
1	Protect your skin with sunscreen	12.39%	58	15.17%	71	39.53%	185	27.78%	130	5.13%	24	468
2	Protect your skin with sunscreen on warm days	14.10%	66	19.02%	89	29.49%	138	29.70%	139	7.69%	36	468
3	Use an artificial tanning bed	1.07%	5	1.50%	7	4.08%	19	3.00%	14	90.34%	421	466
4	Check the UV index	5.57%	26	12.63%	59	15.42%	72	17.13%	80	49.25%	230	467
5	Engage in physical activity outside	14.99%	70	27.19%	127	39.61%	185	15.63%	73	2.57%	12	467
6	Wear a long sleeved shirt when I go outside into the sun	3.21%	15	8.55%	40	28.85%	135	31.20%	146	28.21%	132	468
7	Wear a wide brimmed hat when I go outside in the sun	1.71%	8	8.33%	39	16.88%	79	25.43%	119	47.65%	223	468
8	Stay inside with the intention of protecting your skin	5.77%	27	15.38%	72	24.79%	116	24.36%	114	29.70%	139	468
9	Wear sunglasses	27.84%	130	22.70%	106	25.27%	118	12.63%	59	11.56%	54	467
10	Spend time in the sun with the	7.48%	35	16.88%	79	28.85%	135	18.80%	88	27.99%	131	468

goal of developing a tan											
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Residence Hall Breakdown

Hall Location (District)	Hall Name
Historic	Babcock, Cochise, Coconino, Gila, Manzanita-Mojave Maricopa, Pima, Yavapai, Yuma
Highland	Apache Santa Cruz, Colonia de la Paz, Graham-Greenlee, Hopi, Likins, Stadium, Posado San Pedro, Pueblo de la Cienega, Villa del Puente
North	Honors Village
Park	Arbol de la Vida, Arizona-Sonora, Coro, Kaibab-Huachuca

Hall price	Hall Name
\$	Babcock, Coconino, Hopi, Kaibab-Huachuca, Navajo-Pinal (Stadium)
\$\$	Apache-Santa Cruz, Cochise, Gila, Graham-Greenlee, Manzanita-Mohave, Maricopa, Pima, Yavapai, Yuma
\$\$\$	Arbol de la Vida, Arizona-Sonora, Colonia de la Paz, Coronado, Likins, Posado San Pedro, Pueblo de la Cienega, Villa del Puente
\$\$\$\$	Honors Village

Hall Size	Hall Name
Small	Babcock, Cochise, Coconino, Gila, Maricopa, Navajo-Pinal, Pima, Yuma
Medium	Apache-Santa Cruz, Graham-Greenlee, Kaibab—Huachuca, Likins, Manzanita-Mohave, Posado San Pedro, Pueblo de la Cienega, Villa del Puente
Large	Arbol de la Vida, Colonia de la Paz, Coronado, Honors Village

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**UNIVERSITY OF ARIZONA MEL AND ENID
ZUCKERMAN COLLEGE OF PUBLIC HEALTH**

SUN SAFETY SQUAD ASKS:

Do you know your risks for skin cancer?

HINT: IT'S WAY HIGHER THAN YOU THINK!

We are conducting a quick 5-10 minute survey on skin cancer prevention/awareness in University students living in dorms just like you.



**TAKE A PICTURE OF
OUR QR CODE FOR A
CHANCE TO WIN A
FREE IPAD!**

The Sun Safety Squad is a group of undergraduate and graduate students in the College of Public Health aiming to improve skin cancer prevention and raise awareness

The University of Arizona Institutional Review Board has reviewed and approved this Sun Safety at the University of Arizona Study

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