

SKIN CANCER PREVENTION
AND THE SKIN SMART CAMPUS CERTIFICATION

By

MEGAN R. BAKER

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Approved By:

Dr. Robin Harris
Department of Epidemiology and Biostatistics

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Abstract

Skin Cancer is the most common type of cancer. Skin Cancer occurs when the DNA of skin cells begin to abnormally mutate, a process typically caused by Ultraviolet Radiation (UVR) emitted by the sun and indoor tanning booths. Individuals can reduce their risk of Skin Cancer by limiting or avoiding exposure to UVR. At a much larger level, states can pass legislation that supports sun-safety education programs and increases Skin Cancer prevention awareness. Colleges and universities also have the ability to prevent Skin Cancer by passing their own Skin Smart policies, in order to deter students from indoor tanning practices.

Before starting my Honors Thesis, I conducted a literature review to familiarize myself with previous research and current Skin Cancer prevention techniques. As I scoured the internet, I came across an article on the Skin Smart Campus Award. The Skin Smart Campus Initiative was designed by the National Council on Skin Cancer Prevention to encourage colleges to implement policies that discourage students from using UV tanning facilities. Currently, only twelve colleges have received this award. The goal of my Honors Thesis was to assure that the University of Arizona received this certification.

In order to get the University of Arizona (U of A) certified as a Skin Smart Campus, a number of policy changes needed to be made. Although the U of A didn't have any indoor tanning booths on campus and already had a Skin Cancer educational webpage, Cat Cards could be used to purchase UV tanning and apartments were able to list indoor tanning as an amenity on off-campus housing websites. At both CatCa\$h and Off-Campus Housing, people were worried about changing the current policies and any potential legal repercussions. After meeting with various university administrators, CatCa\$h changed their policy, as the only indoor tanning facility agreed to no longer accept CatCa\$h as a payment for UV tanning. Furthermore, U of A administration agreed to include a policy barring students from using Cat Cards to pay for indoor tanning, joining restrictions already in place for alcohol and cigarettes. In order to meet the final Skin Smart Campus criteria, a policy preventing apartments from listing "Indoor/ UV Tanning" as an amenity on the U of A Off-Campus housing website must be made. Currently, off-campus housing facilities do not have the option to select "indoor tanning" as an amenity; however, they could include it in the "description" box. This policy change is still a work in progress.

As part of the work to learn how to approach changing policies, I collected data on how many changes needed to be made at the other certified Skin Smart Campuses. Before contacting and interviewing anyone, I sent my interview questions to the IRB and got them approved. I then spoke with people at eight other Skin Smart colleges and discovered that almost 90% of said universities initially had apartments with indoor tanning listed on their off-campus housing website. Additionally, over half of these colleges originally allowed for university debit cards to pay for UV tanning. Finally, few of these colleges already had an educational webpage dedicated to Skin Cancer prevention. In my opinion, the U of A already had one of the better Skin Cancer Educational programs and should receive the Skin Smart Campus certification relatively soon.

Keywords: Skin Cancer, Prevention at the collegiate level, Policies, Skin Smart Campus

Abbreviations

ACE: Avoid, Cover Up, Examine

BCC: Basal Cell Carcinoma

DNA: Deoxyribonucleic Acid

FDA: Food and Drug Administration

IRB: International Review Board

NMSC: Non-Melanoma Skin Cancer

SCC: Squamous Cell Carcinoma

SCI: Skin Cancer Institute

SEER: Surveillance, Epidemiology, and End Results Program

USDA: United States Department of Agriculture

UVR: Ultraviolet Radiation

UofA: University of Arizona (also UA)

1. Introduction

1.1 Explanation of the problem

Skin Cancer accounts for over 50% of all cancer cases, 90% of which are caused by sun exposure.¹ Despite years of evidence identifying sun exposure and UV tanning as Skin Cancer risk factors, indoor tanning has become a part of young adults' beauty routine in the United States.² According to a 2011 study, 37% of adolescent white females and 11% of adolescent white males have admitted to using indoor tanning at least once in their lifetime.² The majority of this study's participants began indoor tanning as minors, and the practice was found to be most common in Americans ages 15 to 25.² Research also suggests that UV tanning may have some addictive properties.² Unfortunately, the risk of addiction is typically higher in individuals who began indoor tanning at a younger age.² Therefore, putting minors at a much higher risk for Skin Cancer.

As of 2018, 44 states, and Washington D.C., have implemented some form of regulation pertaining to minors and indoor tanning.³ All regulations can be clearly seen in Figure 1, a map created by the National Conference of State Legislatures. As depicted by the map, only 19 states actually prohibit minors from using all UV tanning devices.³ Currently, universities and colleges have a unique opportunity to further prevent and reduce young adult's exposure to indoor tanning by implementing skin smart policies and procedures.⁴ In 2015, an observational study examined 125 U.S. colleges, in order

to evaluate the availability of indoor tanning beds on the campuses.⁵ Over 45% of the examined colleges had indoor tanning facilities either on campus or in off-campus housing, and 14.4% of those universities also allowed for UV tanning to be paid for with a university debit card.⁵ About 12% of the surveyed colleges had indoor tanning facilities on campus, and 42.4% of them allowed students to use UV tanning beds for free in many of the off-campus housing facilities.⁵ The same survey also found that 26.9% of the Midwestern colleges had indoor tanning facilities on campus, while 67.7% of the Southern colleges had UV tanning booths present in off-campus housing facilities.⁵ If colleges and universities were to enact policies and procedures preventing indoor tanning facilities from being both on and around college campuses, they could greatly decrease students access to the harmful artificial UV rays, thus lessening student's future incidence of Skin Cancer.

A step universities can take towards preventing Skin Cancer is becoming a part of the Indoor Tan-Free Skin Smart Campus Initiative. This initiative is sponsored by the National Council on Skin Cancer Prevention and was created in response to the 2014 Surgeon General's Call to

Figure 1: US Tanning Restrictions for Minors



Action to Prevent Skin Cancer.^{1, 2} The Skin Smart Initiative encourages U.S. universities to promote Skin Cancer prevention education and policies on campus. Colleges are able to either self-nominate for the Indoor Tan-Free Skin Smart Campus Award recognition or be nominated by a member of the Indoor Tan-Free Skin Smart Campus working group. All Universities recognized by this award will have demonstrated different levels of commitment to Skin Cancer prevention and the continuous health of their students.

1.2 Specific aims and significance

The overall goals for this research project are to identify the current state of readiness of the University of Arizona to become a Skin Smart Campus and to nominate the U of A for the Platinum award. There are several levels of readiness and three major award levels for a Skin Smart Campus. I will seek to identify all policies that need remediation, so that the University of Arizona can receive the Platinum level, and highest level, of certification. As a university already dedicated to Skin Cancer prevention and research, I was surprised to find that the U of A did not meet all of the required criteria before I began this project. As someone who has lived in a sunny state for over 15 years, I know just how important it is to be sun safe, as I myself have had cancerous moles removed. However, not a lot of U of A students and administrators understand the dangers of UV radiation. This is why I have chosen to focus my Honors Thesis research project on Skin Cancer prevention though the implementation of Skin Smart university policies and procedures. This research involves three specific aims:

Aim 1: Identify the current state of readiness for the University of Arizona campus for the Skin Smart Campus certification. This step is needed before any policy changes or contact can be made, as I must know what criteria the U of A did and does not meet, so that the policy improvements being made can be tracked.

Aim 2: Implement strategies to increase the U of A's level of readiness for the certification. This aim can be accomplished by adding new programming to the university or by directly changing policies. As a second part of this aim, I will also identify the processes and strategies used by other colleges and universities as they worked to obtain any level of the Skin Smart Campus award.

Aim 3: Complete the nomination of the University of Arizona for the Skin Smart Campus certification at the Platinum level. This step will be accomplished once certain policies have been revised and a Memo of Understanding (MOU) has been signed and sent to the National Council on Skin Cancer Prevention, who will then review the application and assign the U of A an award level.

Skin Smart Campus Initiative

As previously stated, a goal of my Honors Thesis is to work with the National Council on Skin Cancer Prevention to get the U of A certified as a Skin Smart Campus. Ever since the National Council on Skin Cancer Prevention was founded in 1998, it has been a trusted resource for America's Skin Cancer prevention community.⁶ The council works with 45 different agencies,

organizations, and associations in order to prevent Skin Cancer throughout the country.⁶ The Skin Smart Campus Initiative was designed by the council to educate and advocate for Skin Cancer prevention at the college level.⁶ Led by Dr. Robert Dellavalle, Dr. Sherry Pagoto, and Nazanin Kalani, and modeled after the Tobacco-Free Campus initiative, this initiative aims to separate universities from tanning salons and to educate college students about Skin Cancer prevention.⁷ Information on this initiative can be found on the Skin Smart Campus website (<https://skinsmartcampus.org>).² As of 2019, 12 universities have received the certification at varying levels.² More and more universities are encouraged to participate every day, as they play an important role in creating a Skin Smart culture by establishing healthy behavioral norms.^{2,7} In order to promote colleges participating in these practices, the National Council on Skin Cancer Prevention provides everyone with the tools needed to make the changes on the Skin Smart Campus website.⁷

Because the National Council on Skin Cancer Prevention fully supports colleges and universities transitioning to become a Skin Smart Campus, they provide a Skin Cancer Prevention Toolkit on their website.² Resources for students and faculty looking to make changes can also be found under the “Resources” tab.² More importantly, the website describes what it takes to become a Skin Smart Campus.² Before a college or university will even be considered for the award, they must prove that there are no UV tanning facilities on campus or in a school-affiliated building.² If universities meet the other Skin Smart criteria listed below, they will be considered for one of the three certification levels (Silver, Gold, and Platinum).²

In order to obtain the Silver Skin Smart Campus award, colleges must meet at least one of the following criteria:

- Does not list any off-campus housing that lists indoor tanning as an amenity on the university run off-campus housing website.^{2,7}
- Does not allow an indoor tanning salon to be included as a university-affiliated debit card merchant.^{2,7}
- Provides access to a Skin Cancer educational webpage on the official university website, which focuses on the risk of UV exposure and Skin Cancer prevention practices.^{2,7}
- A member of the University faculty must sign the Memo of Understanding, which was written by the National Council on Skin Cancer Prevention, thus demonstrating the university’s formal commitment to Skin Cancer Prevention.²

The Gold Level is achieved if two of the four above criteria are met by the university.² Finally, the Platinum Level is achieved if all of the Skin Smart Campus criteria is met by the university applying.²

Figure 2: Skin Smart Campus Certification Levels



2. Background

2.1 Skin Cancer Overview

Skin Cancer is currently the most common type of cancer in both men and women, and it starts at the epidermis, the skin's topmost layer.^{8,9} The epidermis is a thin layer that provides a protective cover of skin cells, which the body continually sheds.⁹ The epidermis contains three main types of cells: squamous cells - which lie underneath the outer surface and function as the skin's inner lining, basal cells - which produce new skin cells and are directly below the squamous cells, and finally, melanocytes - which produce melanin.⁹ Melanin, the pigment that gives skin its color, is located in the lower part of the epidermis.⁹ Melanocytes are able produce more melanin when the body is exposed to the sun in order to help protect the deeper layers of the skin.⁹ Skin Cancer occurs when the DNA of skin cells begin to abnormally mutate, this process is typically caused by Ultraviolet Radiation (UVR) emitted by the sun and indoor tanning booths.¹

The mutated DNA then causes skin cells to grow out of control and form a mass of cancer cells.⁹ This irregular growth of skin cells typically develops on skin exposed to UVR.⁹ Therefore, Skin Cancer develops primarily on areas of sun-exposed skin, including the scalp, face, lips, ears, neck, chest, arms and hands, and women's legs.⁹ However, Skin Cancer can also form on areas that rarely see the light of day, such as the palms, beneath fingernails and toenails, and the genital area.⁹ Skin cancer affects people of all skin tones, including those with darker complexions.^{8,9} Where Skin Cancer begins will determine the type of Cancer and its treatment options.⁹

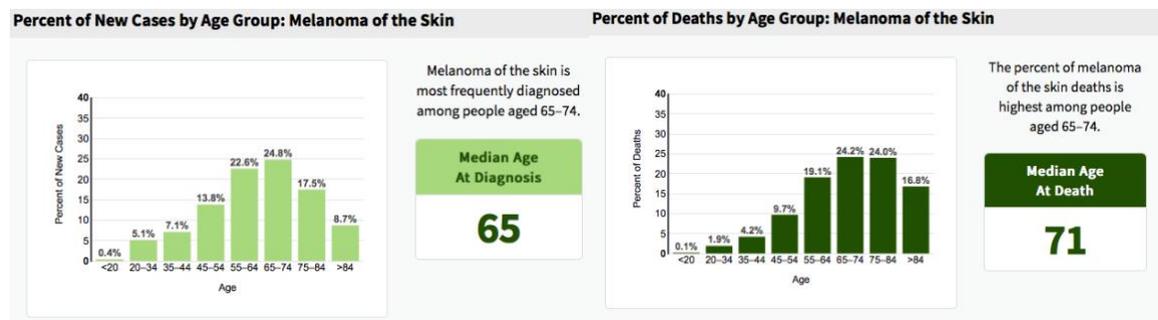
The three main types of Skin Cancer are basal cell carcinoma, squamous cell carcinoma, and melanoma.⁸ Although melanoma is much less common than the non-melanoma cancers, it is significantly more malignant and deadly.⁸ Additionally, it is more likely to occur on an area of the body not usually exposed to sunlight.⁹ When melanoma occurs in people with darker skin tones, it's more likely to occur on the palms of the hands and soles of the feet.⁹ Non-melanoma cancers, on the other hand, cause less annual deaths but are significantly more common, especially in the sunny states.⁸

Individuals can reduce their risk of Skin Cancer by limiting and avoiding exposure to UV radiation.^{8,9} There are also a number of books, articles, and videos dedicated to identifying suspicious changes in the skin, which a medical professional can then look at and properly diagnose.^{1,9} Detecting Skin Cancer early will provide anyone with the greatest chance at a successful Skin Cancer treatment.⁹ At a much larger level, states can pass legislation that supports sun-safety education programs and increases Skin Cancer prevention awareness.¹ Colleges and universities also have the ability to partake in the implementation of sun safe legislation by passing their own Skin Smart policies, which protect and deter students from indoor tanning practices.²

2.1.1 Descriptive Epidemiology

It is estimated that 1 in 50 Americans will develop melanoma in their lifetime.⁶ In 2017 over 160,000 Americans were diagnosed with melanoma alone.⁶ Of those diagnosed, about 87,000 patients had invasive melanoma, and 74,000 had melanoma in situ.⁶ Thus far in 2020, Public Health surveillance has found that melanoma accounts for 5.6% of all new cancer cases.⁶ Despite the overall increase in cancer mortality rates over the past few decades, the mortality rate for all cancers combined has declined substantially for individuals age 45 and younger.¹¹ However, the overall mortality rates have increased for individuals over the age of 55.¹¹ It appears that current Skin Cancer prevention techniques have made a large enough difference to put off the onset of Skin Cancer, but not enough to decrease the overall incidence.

Data from the NCI’s Surveillance, Epidemiology, and End Results Program (SEER) has demonstrated in Figure 3 that Americans over the age of 65 are ten times more likely to develop Skin Cancer than younger individuals.^{10,11} Additionally, Figure 3 shows that the vast majority of new melanoma cases are diagnosed to Americans ages 65 to 74, and that the median age of people diagnosed with Skin Cancer is about 65.¹⁰ Americans in the 55 to 74 age range make up over 45% of the people newly diagnosed with melanoma.¹⁰ The median age of death for those diagnosed with melanoma is 71, with the most melanoma related deaths occurring in the 65 to 84 age range.¹⁰ Nonmelanoma Skin Cancers (NMSCs) are also more common in people over the age of 55.¹² According to a 2013 study, the percentage of Americans diagnosed with NMSCs begins to double by the age of 35, and was found to be the most statistically significant in those ages 45 to 54 (18%).¹²



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When Skin Cancer is examined by other factors, such as race, it is common to see more cases of Skin Cancer in White Americans.^{6,10} Additional data collected from SEER, depicted in Figure 4, has shown that melanoma is a lot more common in White people and those who are non-Hispanic.¹⁰ 34.6 of every 10,000 new cases of melanoma are diagnosed to White people, with the Native American population in second place at an incidence of 5.9 per every 10,000.¹⁰ Additionally, White and non-Hispanic Americans are significantly more likely than all other races to die from melanoma.¹⁰ Basal cell carcinomas (BCCs), the most common NMSC, is the most common type of Skin Cancer in Caucasians, Hispanics, and Asians.¹³ Hispanic Americans are six times more likely to be diagnosed with a BCC than a

Figure 4: Melanoma of the Skin Incidence and Death Rate by Race

Rate of New Cases per 100,000 Persons by Race/Ethnicity & Sex: Melanoma of the Skin

MALES		FEMALES	
All Races	29.3	All Races	17.8
White	34.6	White	21.7
Black	1.1	Black	0.9
Asian/Pacific Islander	1.6	Asian/Pacific Islander	1.2
American Indian/Alaska Native	5.9	American Indian/Alaska Native	5.0
Hispanic	5.0	Hispanic	4.9
Non-Hispanic	33.1	Non-Hispanic	20.4

squamous cell carcinoma (SCC) and are even more likely to be diagnosed with multiple BCCs compared to a single SCC.¹³ For Caucasians, Asians, and Hispanics, SCC is the second most common Skin Cancer, and BCC is the first.¹³ Opposite of White Americans, BCC represents the second most common Skin Cancer in Blacks, with SCC being the most frequently diagnosed Skin Cancer.¹³

When examining Skin Cancer incidence, prevalence, and mortality rates by gender, multiple studies have found that males generally rank higher in all three categories.^{6,10,14,15} For example, research conducted by the National Cancer Institute has found that men are significantly more likely to develop Skin Cancer.⁸ Additionally, men are about two times more likely to die from melanoma than women, as seen in Figure 4 Cont.¹⁰ However, melanoma is the leading cause of cancer death in young women ages 25-30 and the second leading cause of cancer death in women ages 30-35.⁶ On average, males have a higher incidence rate of BCCs than women across all age groups.¹⁴ The comparison is about 1,019 per every 10,000 for women and 1,488 per every 10,000 for men.¹⁴ Finally, according to SEER data from 2008, there were two times more men diagnosed with SCCs than women.¹⁵

Figure 4 cont.: Melanoma of the Skin Incidence and Death Rate by Race

Death Rate per 100,000 Persons by Race/Ethnicity & Sex: Melanoma of the Skin

MALES		FEMALES	
All Races	3.5	All Races	1.5
White	4.1	White	1.7
Black	0.4	Black	0.3
Asian/Pacific Islander	0.4	Asian/Pacific Islander	0.3
American Indian/Alaska Native	1.0	American Indian/Alaska Native	0.5
Hispanic	0.9	Hispanic	0.5
Non-Hispanic	3.8	Non-Hispanic	1.6

2.1.2 Melanoma and Nonmelanoma Skin Cancer

The majority of all Skin Cancer cases consist of NMSCs, such as basal cell carcinomas (BCCs) and squamous cell carcinomas (SCCs).⁸ BCCs usually occur on sun-exposed areas of the body, such as the neck and face.⁹ Basal cell carcinomas may appear on the skin as a pearly or waxy bump, a flat and flesh-colored or brown scar-like lesion, or a bleeding/ scabbing sore that consistently heals and returns.⁹ Similar to BCCs, squamous cell carcinomas occur on areas of the body frequently exposed to the sun, like the face, ears, and hands.⁹ People with darker skin, and thus more melanin, are more likely to develop SCCs on areas that aren't frequently exposed to the sun.⁸ Squamous cell carcinomas usually appear as a red firm nodule or as a flat lesion with a scaly crusted surface.⁹ It is important to note that although basal cell and squamous cell carcinomas frequently occur on areas of the skin regularly exposed to the sun, they can occur anywhere on the body.¹³

Melanoma is able to develop anywhere on the body, on otherwise normal skin or in an already existing mole.⁹ Melanoma usually appears on the face or on the trunk of affected men.⁹ In women, this type of cancer most often develops on the lower legs.⁹ In both men and women, melanoma can occur on skin that hasn't been exposed to the sun.⁸ Additionally, melanoma can affect people of any skin tone.⁸ In people with darker skin tones, melanoma tends to occur on the palms or soles, or under the fingernails or toenails.⁹ Signs of melanoma are: a large brownish spot with dark speckles, a mole that changes in color, size or feel or that bleeds, a painful lesion that itches or burns, a small lesion with an irregular border and portions that appear red, pink, white, blue or blue-black, dark lesions on the palms, soles, fingertips or toes, or on the lining the mouth, nose, and genitals.⁹ More often than not, melanoma appears as a brown-pigmented patch

or bump anywhere on the body.⁹ Although the spot may resemble a regular mole, melanoma usually has a more irregular appearance.⁹ In order to decipher whether or not a mole is cancerous, the UA Skin Cancer Institute recommends using the ABCDE rule, which identifies the common signs of Skin Cancer.¹⁶

ABCDE Rule:

- Asymmetry: irregular shape ^{9,16}
- Border: blurry or irregularly shaped edges ^{9,16}
- Color: moles with more than one color ^{9,16}
- Diameter: larger than a pencil eraser (6 mm) ^{9,16}
- Evolution: enlarging, changing in shape, color, or size (this is the most important sign) ^{9,16}

2.2 Risk Factors of Skin Cancer

The factors that may increase one's Skin Cancer risk include:

- **Fair skin:** anyone, regardless of skin color, can get Skin Cancer.⁹ However, having less pigment (melanin) in your skin provides less protection from cancerous UV radiation.⁹ If you have blond or red hair and light-colored eyes, and if you freckle or burn easily, you're significantly more likely to develop Skin Cancer than a person with darker skin.^{2,9,17}
- **Increased sun exposure:** anyone who spends a considerable amount of time in the sun may develop Skin Cancer, especially if the skin isn't protected by sunscreen or clothing.^{2,8,17} Tanning, including exposure to tanning lamps and beds, also puts you at risk.^{1,2,6} Using a tanning bed before the age of 35, will increase a person's risk for developing melanoma by 75%.²
- **Sunny and high-altitude climates:** people who live in warm and sunny climates are exposed to more sunlight than people living in colder climates.^{9,16} Living at higher elevations, where sunlight is strongest, also exposes you to more UV radiation.^{9,16}
- **History of sunburns:** having had one or more blistering sunburns as a child or teenager increases your risk of developing Skin Cancer as an adult.^{2,9} On average, having five or more sunburns increases a person's risk for Skin Cancer by two.⁶ Sunburns in adulthood are also a major risk factor.⁹
- **Old Age:** A number of studies have found that as humans age, their risk of developing Skin Cancer, and all other cancers, increases.^{6,10,11}
- **Moles:** people who have a lot of moles or any abnormal moles, called dysplastic nevi, are at an increased risk for Skin Cancer.^{9,17} These abnormal moles, which look irregular and are generally larger than normal moles, are significantly more likely to become cancerous.⁹ If you have a history of abnormal moles, examine them regularly for changes.^{2,9}

- **Precancerous skin lesions:** having skin lesions can increase your risk of developing Skin Cancer.⁹ These precancerous skin growths typically appear as rough, scaly patches that range in color from brown to dark pink.⁹ They're most common on the face, head and hands of fair-skinned people whose skin has been damaged by the sun.^{8,9}
- **Personal history with Skin Cancer:** if a person has developed Skin Cancer once, they're at risk of developing it again.^{2,17}
- **Family history of Skin Cancer:** if either of one's parents or siblings has had Skin Cancer, they will have an increased risk for the disease.^{2,6,9,17}
- **Weakened immune system:** people with weakened immune systems have a greater risk of developing Skin Cancer.⁹ This includes people living with HIV/AIDS and those taking immunosuppressant drugs after an organ transplant.⁹
- **Exposure to radiation and other substances:** people who received radiation treatment for skin conditions such as eczema and acne may have an increased risk of Skin Cancer, particularly basal cell carcinoma.⁹ Additionally, exposures to certain substances like arsenic, may also increase risk of Skin Cancer.⁹

2.3 Skin Cancer Prevention

When the Surgeon General's Call to Action to Prevent Skin Cancer was released in 2014, it called on a number of various partners throughout the nation to address Skin Cancer Prevention practices.¹ Five strategic goals designed to support Skin Cancer prevention were included in the Call to Action: "increase opportunities for sun protection; provide individuals with the information needed to make healthy choices about UVR exposure; promote policies that advance the national goal of Skin Cancer prevention; reduce indoor tanning; and strengthen the research, surveillance, monitoring, and evaluation of skin Cancer prevention."¹ These five Skin Cancer prevention goals can be implemented by everyone at varying levels in order to decrease Skin Cancer incidence in the American population.

Beginning at the individual level, there are many things a person can do to protect their own skin from harmful UV rays.^{1,8,16} The WHO's International Agency for Research on Cancer has compiled a list of sun safe behaviors that have been supported by both the CDC and the Mayo Clinic.^{9,17,18} These general sun safe behaviors consist of, but are not limited to: seeking shade whenever possible, avoiding the sun during hours of peak sunlight, using sunscreen, and wearing tightly woven clothing with a protective hat.^{9,17,18} The same tenants of sun protection have also been supported by the University of Arizona Skin Cancer Institute's (SCI) "ACE" Plan, depicted in Figure 5, to protect the skin from the sun's harmful effects.¹⁶ ACE stands for A - avoid UV rays, C - cover-up, and E - examine your skin.¹⁶

Figure 5: Be An ACE!



Although humans need Vitamin D, which can be provided by sun exposure, it is still best to avoid the sun whenever possible.¹⁶ It's important to avoid the sun during the middle of the day when UVR is at its peak.^{9,16} For many people in North America, the sun's rays are typically the strongest between about 10 a.m. and 4 p.m.⁹ In order to avoid exposure, it is recommended that people schedule outdoor activities for other times during the day, even in winter and when the sky is cloudy.⁹ UV radiation is absorbed by the skin year-round, and clouds offer little protection from the damaging UV rays.⁹ Avoiding the sun at its strongest will also help people avoid the sunburns and suntans that can cause skin damage and increase the risk of developing Skin Cancer, as sun exposure accumulated over time often leads to Skin Cancer.⁹

If it is impossible to avoid going outside and being exposed to UVR, it is crucial that one covers-up their skin. Covering the skin with dark, tightly woven clothing that covers the arms and legs, and a broad-brimmed hat will provide more protection than either a baseball cap or a visor.^{9,16} Some companies even sell photoprotective clothing, which dermatologists can provide recommendations for.⁹ It is also important to protect the eyes by wearing sunglasses.^{9,16} In order to be truly effective, sunglasses will need to block both types of UV radiation, UVA and UVB.⁹ On any patch of skin that is not covered by a piece of UVR protectant clothes, one should wear sunscreen.^{9,16} Although sunscreens don't filter out all harmful UV radiation, they still play a major role in overall sun protection.⁹ A broad-spectrum sunscreen with an SPF of at least 30 should be used every day, again, even when it's cloudy.^{9,16} Sunscreen should be applied generously and reapplied every two or more hours especially if swimming or sweating.^{8,9}

Checking all of one's skin regularly and reporting changes to a medical professional is crucial for identifying Skin Cancer at the earliest stage possible.^{9,16} Examine the skin about once a month for new skin growths or changes in existing moles, freckles, bumps and birthmarks.^{9,16} Examine the chest and trunk first, and then the tops and undersides of the arms and hands.⁹ Next examine both the front and back of the legs and feet, including the soles and the spaces between each toe.^{8,9} Finally, with the help of mirrors or another person, it is possible to check the face, neck, back, ears and scalp.^{8,9}

At the Federal and state level, intervention strategies that address both social and contextual factors have the potential to make a broad Public Health impact.¹ Said impact will occur by making the healthy choice the easy or default choice for all.¹ Policies, legislation, and regulation are examples of such interventions, which reach a wide segment of communities while requiring minimal individual effort, when compared to the interventions directed only at individuals.¹ Unfortunately, policies that address Skin Cancer prevention vary across the country.^{1,3}

Only a few states, such as California and New York, have passed legislation requiring all schools to allow students to use sun-protective clothing and sunscreen on campus.^{1,3} Certain California laws also urge employers to identify and ameliorate any workplace hazards connected to UV radiation.¹ A few states have even passed legislation that supports sun-safety education programs and Skin Cancer prevention awareness.¹ Laws in Arizona and New York mandate instruction on Skin Cancer prevention as part of the health education curriculum in public schools.³ New York also mandates sun-safety education for all state employees that spend more than 5 hours per week outdoors.¹ Kentucky has also passed a law encouraging Skin Cancer education in schools.¹ The Indoor Tan-Free Skin Smart Campus Initiative is another excellent intervention, which

encourages American colleges and universities to promote Skin Cancer prevention policies and education on campus.²

Most Skin Cancer cases are preventable, and in order to protect oneself, it's important to follow all of these Skin Cancer prevention tips

2.4 Current Skin Cancer Risk Behaviors and Prevention Behaviors Among Adolescents

Evidence shows that exposure to ultraviolet radiation (UVR) from tanning lamps during indoor tanning sessions is a risk factor for both melanoma and squamous cell carcinomas.²⁰ Moreover, indoor tanning use before the age of 35 increases melanoma risk by 75%.²⁰ A study conducted on Texas State University students sought to evaluate their behavior and knowledge regarding Skin Cancer signs and symptoms, use of tanning beds, and assessment of oneself for Skin Cancer.¹⁹

The Texas State University study found that ethnicity was the most significant factor that influenced students' knowledge of Skin Cancer and behaviors to prevent it.¹⁹ Specifically, Hispanic and African American students possessed a lower level of Skin Cancer awareness.¹⁹ Another study identified correlated intentional indoor tanning to being an older female adolescent, and, for persons of White race, having a darker skin tone and lower sun sensitivity.²¹ Non-White individuals (both teens and parents, with a statistically significant difference for parents only) tanned less often than Whites.²² However, it's important to note that most studies on indoor tanning have not included many, if any, people of color.²¹

These studies have also found that more female students than male students use tanning beds, even though students reported using UV tanning infrequently. Using the Texas data weighted to national levels, 36.8% of white female adolescents and 11.2% of white male adolescents have used a tanning booth at least once in their life, while 28.1% and 6.9% of the female and male adolescents, respectively, reported using tanning booths 3 or more times.²² A separate study on White Americans also estimated that the percentage of female adolescents using tanning booths 3 or more times increased with age, from 11.2% at age 13 to 47.0% at age 18.²² The percentage of White adolescents tanning indoors also increased with greater tanning ability, from 12.6% of the poor tanners to 38.1% of those with a strong tanning response.²² In 2011, 17.1% of girls and 3.2% of boys across all races and ethnicities admitted to using indoor tanning at least once.²⁰ The high rate of indoor tanning use, particularly by U.S. adolescent girls, which is significantly higher than the rate of adolescent boys, is alarming, as rates are as high as 40% among older adolescent girls.²⁰ These findings could explain the recent rise in melanoma incidence among young American women.²⁰

A National study on adolescents use of UV tanning indicated that several psychosocial and demographic variables significantly predicted indoor tanning use.²⁰ The predictors included being female, older, and White; having a larger allowance and a parent who used indoor tanning and allows their adolescent to use it; and holding certain beliefs about indoor tanning's consequences.²⁰ Living within 2 miles of a tanning facility also was a significant predictor.²⁰ Additionally, residing in a state with youth-access legislation was not significantly associated

with use.²⁰ After adjustment, the researchers discovered that those residing in the Midwest or South, attending a rural high school, and reporting the use of 2 or 3 substances were more likely to use indoor tanning facilities, as were dieters regardless of their body mass index.²² Decreased odds of indoor tanning were observed among those with a college-educated mother and greater cognitive ability while routine participation in physical activity significantly lowered the odds of indoor tanning among female adolescents.²² Indoor tanning is prevalent, particularly among female adolescents, and aligns with other risk behaviors, appearance-related factors, and intentional sunbathing.^{22,23} The risks of artificial tanning needs increased emphasis among adolescents, especially in the Midwest and South where extremes in the availability of natural light appear to send intentional tanners indoors.²²

As the ecological models suggests, indoor tanning by adolescents is likely influenced by a combination of psychosocial and individual factors, environmental factors, and policy-related factors.²⁰ Previously, research on correlates of adolescents' indoor tanning has focused on the psychosocial level.²⁰ However, a 2007 study examined the influence of parents and peers on adolescent indoor tanning, and discovered that teens idolizing their peers prefer to be tan, and a perceived percent of peers who tan indoors were also significantly associated.²¹ Interventions targeting adolescent indoor tanning should now address both family and peer related factors.²¹

An increased understanding of the health risks associated with indoor tanning has led to efforts to reduce use.²³ Although the data has been useful for designing interventions, it may represent only part of the picture.²⁰ For example, many U.S. states have passed indoor tanning legislation related to access by youths, but currently no studies have evaluated whether the presence or absence of legislation was associated with indoor tanning use.²⁰ Likewise, although evidence exists explaining that availability of commercial indoor tanning is high, and that tanning facilities may be more prevalent in neighborhoods with higher numbers of young adults and high schools, and tanning facilities are not complying with the youth-access laws, clear relationships between the data and actual indoor tanning use has not been properly assessed.²⁰

Most environmental and systems efforts in the U.S. have occurred at the state level.²¹ At the national level, the U.S. Food and Drug Administration and the Federal Trade Commission regulate indoor tanning devices and advertising, respectively.^{21,23} In July 2009, the International Agency for Research on Cancer, which is part of the World Health Organization, elevated tanning beds to the highest risk category: carcinogenic to humans.²⁰ In March 2010, the U.S. Food and Drug Administration (FDA) convened an advisory panel to more comprehensively address indoor tanning risks and relevant classifications and policies.^{20,23} Behavioral intervention is critical in reducing students' risk of Skin Cancer in later years, and university students must acquire knowledge to increase their awareness of skin health and to minimize their risk of developing Skin Cancer.¹⁹ Additionally, radiation therapists are uniquely positioned to share knowledge of Skin Cancer.¹⁹ Current laws appear ineffective in reducing indoor tanning, so bans are likely to be needed.²⁰ The American Academy of Dermatology has recommended banning the non-medical use of indoor tanning booths, and as an interim measure, prohibiting use of tanning booths by minors.²¹

Indoor tanning is widespread among young adults in the United States despite evidence establishing it as a risk factor for skin cancer.²⁴ Indoor tanning also has acute health

consequences, including eye and skin burns, other ocular disorders, and suppression of immune functioning.²¹ Because the availability of tanning salons on or near all college campuses has not been formally evaluated, a study conducted by Dr. Pagoto in 2015 sought to evaluate the availability of UV tanning facilities on 125 U.S. college campuses and their surrounding off-campus housing.²⁴

Dr. Pagoto's observational study, sampled the top 125 US colleges and universities listed on the U.S. News and World Reports.²⁴ Investigators then searched the websites of the colleges and nearby housing and contacted them by telephone inquiring about tanning services, frequency of indoor tanning facilities on college campus and in off-campus housing facilities, and payment options for UV tanning.²⁴ Of the 125 colleges, 48.0% had indoor tanning facilities either on campus or in off-campus housing, and 14.4% of the colleges allowed campus cash cards to be used to pay for tanning.²⁴ Indoor tanning was available on campus in 12.0% of colleges and in off-campus housing in 42.4% of colleges.²⁴ In fact, most off-campus housing facilities with indoor tanning provided to tenants for free.²⁴ Midwestern colleges had the highest prevalence of indoor tanning on campus, whereas Southern colleges had the highest prevalence of indoor tanning in off-campus housing facilities.²⁴ Presence of on-campus tanning facilities was significantly associated with enrollment, region, and presence of a school of Public Health, but not private vs public status or presence of a tobacco policy.²⁴ Presence of tanning facilities in off-campus housing was significantly associated with region and private vs public status, but not enrollment, tobacco policy, or presence of a school of public health.²⁴ Reducing the availability of indoor tanning on and around college campuses should be an important Public Health target for all U.S. universities.²⁴

3. Present Study

3.1 Overview

In order to begin my Honors Thesis centered around Skin Cancer prevention, I conducted a literature review to familiarize myself with previous research and current Skin Cancer prevention techniques. As I used numerous scholarly search engines, such as the National Center for Biotechnology Information, I found a peer reviewed article on the Skin Smart Campus Award. The study's lead writer was Dr. Sherry Pagoto, who worked on getting both Rutgers and Temple University certified as Skin Smart Campuses. The Skin Smart Campus Initiative was designed by the National Council on Skin Cancer Prevention, in order to encourage colleges to implement policies that discourage students from using indoor tanning booths.

The effects of the initiative are backed by quite a few research studies, and the Surgeon General's 2014 Call to Action to Prevent Skin Cancer. In order to get the University of Arizona certified as a Skin Smart Campus, a number of policy changes would need to be made, as the U of A did not initially meet all of the Platinum Level requirements. Although the U of A doesn't have any indoor tanning booths on campus and has an excellent Skin Cancer educational webpage, Cat Cards could be used to purchase UV tanning and apartments were able to list indoor tanning as an amenity on the off-campus housing website.

In order to make the necessary policy changes, I contacted people throughout the University of Arizona campus. In my attempt to determine who would be able to change policies, I sent almost 100 emails and called over 20 people. I had to be persistent, as this topic wasn't necessarily a top priority for all departments. At both CatCa\$h and Off-Campus Housing, people were worried about changing the current policies and potential legal repercussions. Both of these departments worked with private businesses, who essentially pay the U of A to include them on websites and ads.

In February 2020 I scheduled meetings with people at both CatCa\$h and Off-Campus housing. Before my intervention, students were able to purchase indoor tanning with their Cat Card at Beach Bunny Tanning. I spoke with Jonathan Millay, who then contacted Beach Bunny's manager to see if CatCa\$h would be willing to make some changes to their U of A contract. Beach Bunny's Manager agreed to no longer accept CatCa\$h as a payment for indoor tanning. Now, UV tanning is considered a nefarious item, and students can no longer purchase it with their CatCa\$h. The next step towards obtaining the Skin Smart Campus certification was to create a policy that prevents apartments from listing "Indoor/ UV Tanning" as an amenity on the U of A Off-Campus housing website. Currently, apartments and other housing opportunities do not have the option to select "indoor tanning" as an amenity; however, they could potentially include it in their "description" box. This policy change is still a work in progress.

Once the U of A policies met the Skin Smart Campus criteria, I began collecting data on how many changes needed to be made at the other certified Skin Smart Campus universities. I called and emailed all of the other certified colleges and asked them a few questions about the process they went through while obtaining the certification. However, before I actually contacted and interviewed anyone, I sent my interview questions to the IRB and got this part of my Honors Thesis approved (approval in Appendix A). All of the questions were specifically about the college and its policies, and none of the questions required any kind of personal information from the interviewee (see Appendix A).

In total, I spoke to people at eight other colleges who received the Skin Smart Campus certification. After interviewing those who applied for the certification, I organized all of the data with Google Spreadsheets so that my colleagues could view the data as I inputted it. After examining the data from the eight certified colleges, as well as the U of A's data, I found multiple trends. Almost 90% of the colleges initially had apartments with indoor tanning available listed on the university's off-campus housing website. Additionally, over half of the universities originally allowed for university debit cards to pay for UV tanning. Finally, few of the colleges had an educational webpage already set up and dedicated to Skin Cancer prevention. The U of A already happened to have one of the better Skin Cancer educational programs. Additionally, the U of A was one of the only colleges with an entire class dedicated to Skin Cancer education and prevention.

3.2 Methods

In order to increase my understanding of Skin Cancer prevention and prevention policies, I conducted a literature review. Beginning with the University of Arizona's Library Advanced

Search engine, the key words I selected were “Skin Cancer” and “Prevention.” The search was modified to include only peer-reviewed articles that were published after 2010. Another source of information used was the National Center for Biotechnology Information website. There I continued to search for recent studies on Skin Cancer data and Skin Cancer prevention plans. After discovering the article written by Dr. Sherry Pagoto on the Skin Smart Campus Initiative, I used its respective website to learn more about the organization. The Skin Smart Campus initiative award then became a part of my research objectives, while getting the University of Arizona the Skin Smart Campus Platinum Level award became my goal.

3.2.1 Identifying the Current Skin Smart Campus Readiness for the U of A

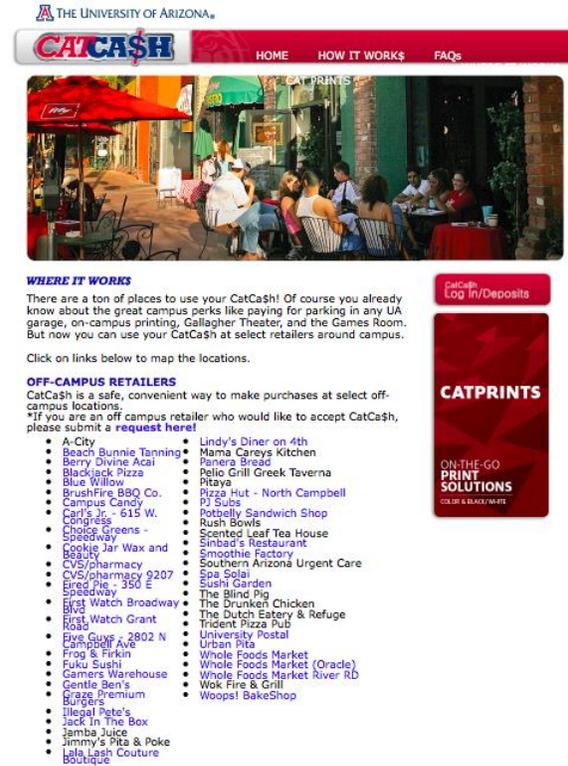
After reading about how important sun safe policies are, I wanted to know the requirements for the Skin Smart Campus certification. On the <http://skinsmartcampus.org> website, I found the requirements for the certification, and determined where the University of Arizona would rank before my intervention. Table 1 shows the Skin Smart Campus criteria and identifies where the U of A meets the criteria. Because the U of A already had an entire website dedicated to Skin Cancer prevention and awareness (<https://azskincancerinstitute.org/sci/skin-cancer-prevention>), one of the criteria was immediately met. A second criteria that could easily be met by the U of A was a Memo of Understanding (MOU), which must be signed by a U of A faculty member. The National Council on Skin Cancer Prevention has sent the document to me, so now it simply needs to be signed, which is why the U of A could be classified as a Gold Level certification.

Table 1: U of A Skin Smart Campus Classification Level

Skin Smart Campus Award Level	No indoor tanning devices on campus or in any college/university-affiliated building	One of the four Skin Smart criteria has been met	Two of the four Skin Smart criteria are met	Meets all of the Skin Smart Campus criteria
Platinum	X			X
Gold	X		U of A w/ MOU	
Silver	X	U of A		

There were two areas of concern, as to why the U of A initially only qualified for a Gold Level certification. At the time, students could purchase indoor tanning with their Cat Cards through CatCa\$h at Beach Bunny Tanning. This business offers spray tans, UV tanning, and a multitude of additional beauty services, and they have been a CatCa\$h merchant for a number of years, seen in Figure 6. Another necessary policy change involved the Off-Campus housing website, which did not explicitly state that apartments could not list indoor tanning as an amenity. Currently, apartments are not given “indoor tanning” as an option for the list of amenities (see Image 7 or Appendix B); however, they could potentially list it in the description box.

Figure 6: CatCa\$h Debit Card Merchants



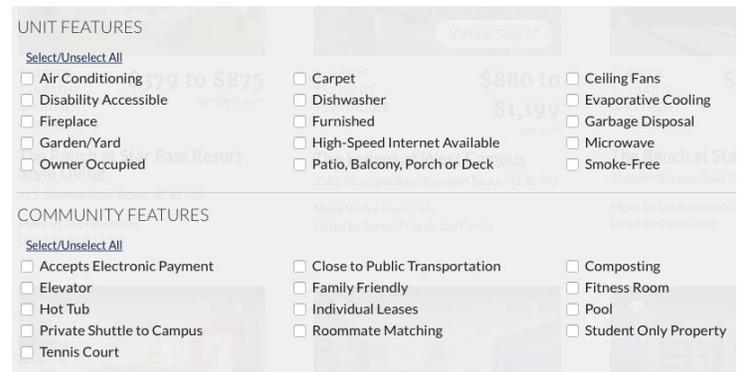
3.2.2 Implementation of Skin Smart Campus Policies

In order to make the necessary policy changes, I contacted multiple University of Arizona staff members working at both CatCa\$h and Off-Campus Housing. After I was able to meet with Jonathan Millay at CatCa\$h and Teresa Kolb at Off-Campus Housing, I brainstormed different ways to implement the Skin Smart Campus requirements into the U of A legislature. At both CatCa\$h and Off-Campus Housing, people were concerned about changing the current policies, and the potential legal repercussions. Both of these departments worked with private businesses who pay the U of A to include them on websites and in ads. In order to effectively work with the U of A faculty and a private entity, compromises needed to be made.

At CatCa\$h, Jonathan Millay was very interested in making the policy change happen, as he thought the Skin Smart policy change to be a noble and effective effort. There were two routes we could take in order to make the policy change happen. The first, and by far the easiest, was to ask the Beach Bunny manager if she would be willing to exclude indoor tanning from their contract with CatCa\$h. The second option was to take legal action against Beach Bunny Tanning in the event that they sued the U of A for attempting to violate their CatCa\$h contract. Luckily, the first option mentioned was the only action necessary. All of the communication was done between Beach Bunny’s Manager and Mr. Millay.

Figure 7: Off-Campus Housing Amenities

In order to make the necessary changes for the U of A Off-Campus housing website, I worked with Teresa Kolb in the Off-Campus Housing department. A different approach was taken when determining how to change the requirements for listing an off-campus housing facility. This website did not allow for apartments to list “indoor/UV tanning” as an amenity, because unit and community features only let applicants select



certain boxes. However, apartments are still able to write whatever they want, with some minor restrictions, in the “descriptions” box on the application. In order to assure that indoor tanning cannot appear as an amenity, I am seeking to obtain a statement and policy that prohibits applicants from listing indoor tanning as an amenity on the U of A Off-Campus housing website. This policy change is still in process, as a higher-ranking U of A official will need to be the one to make any of these major changes.

3.2.3 Skin Smart College Campus Data Collection and Analysis

During the efforts to change the U of A policies to meet the Skin Smart Campus requirements, I sought information from other Skin Smart Campuses, specifically how they obtained the certification and how they changed policies. I designed a 14 question, semi-structured interview to be completed, either by telephone or email, by the schools that had received the certification. The project’s methods and the questionnaire were reviewed by the U of A International Review Board (IRB) and deemed acceptable (see Appendix A). I also completed the required IRB training for the human subject research exam, in order to obtain a CITI certification.

Figure 8 shows the Skin Smart Campuses that were identified from the website by level of certification. Attempts were made to contact all 12 campuses using email addresses available from the website. This process required an average of 5 emails per college for a response from the person who actually sent in the application. Of note, 70% of the time the initial call or email was not to the person who actually filled out the application, however, the contact always knew who did. It usually took about two emails to the correct person before all 14 questions were answered. Overall, I was able to collect data from eight colleges, nine if you include the U of A. I input the data on to a Google spreadsheet because the majority of my questions were yes and no, with room for text explanations if relevant. I then calculated the frequencies and percentages of the different variables to create both pie and bar charts, thus allowing me to make comparisons between participating universities.

3.3 Results

3.3.1 Identifying the Current Skin Smart Campus Readiness for the U of A

As I learned from all of my literature research, the best way to prevent Skin Cancer is to protect oneself from the sun, and to avoid indoor tanning. However, the most effective way for colleges and universities to prevent Skin Cancer is to provide access to plenty of shade during the day, and to discourage and prevent students from participating in UV tanning. In order to help colleges enforce these strategies, the National Council on Skin Cancer Prevention designed five

Figure 8: Current Skin Smart Campuses

Skin Smart Campuses

Platinum Level

University of Connecticut, honored November 2019

[UConn's skin safety webpage](#) [↗](#)

[Press Release](#) [↗](#)

Carroll College, honored October 2019 (Gold status achieved April 2019)

[Carroll's skin safety webpage](#) [↗](#)

[Press Release](#) [↗](#)

[Carroll College students recognized as "Your Skin Is In" Ambassadors](#) [↗](#)

University of Maryland, Baltimore, honored July 2019

[UMB's skin safety webpage](#) [↗](#)

Rutgers University, honored July 2019 (Gold status achieved April 2019)

[Rutger's skin safety webpage](#) [↗](#)

Loyola University New Orleans, honored June 2019

[Loyola's skin safety webpage](#) [↗](#)

policies that colleges can implement in order to prevent students from using indoor tanning. The first major requirement being that colleges cannot have any UV tanning beds on campus or in a university affiliated building.² Secondly, housing that offers indoor tanning as an amenity is not to be included on the Off-Campus housing website organized/ run by the university.² Colleges can also not permit tanning salons to be university-affiliated debit card merchants.² The fourth Skin Smart criteria requires universities to provide educational programming, such as a website, on the risks of exposure to ultraviolet rays and Skin Cancer prevention practices for all students, faculty, and staff.² The final criteria requires that a University faculty member signs a Memo of Understanding written by the National Council on Skin Cancer Prevention.²

Table 2: U of A Pre and Post Intervention Skin Smart Campus Award Levels

U of A Pre and Post Certification Levels	Does not list any off-campus housing that has UV tanning as an amenity	Does not permit an indoor tanning salon to be included as a university debit card merchant	Provides access to an educational webpage on Skin Cancer prevention practices	Signs a Memo of Understanding drafted by the National Council
Pre	X		X	
Post	X	X	X	X
	Silver Level			
	Platinum Level			

3.3.2 Implementation of Skin Smart Campus Policies

Although many schools have made strides towards Skin Cancer prevention, only a small fraction of American universities meet the requirements set by the Skin Smart Campus Initiative. As someone who has thoroughly researched the certification process, I understand why so many universities cannot meet these requirements. At the University of Arizona, two of the requirements were not initially met, as students could purchase indoor tanning with CatCa\$h and our Off-Campus housing website listed apartments with indoor tanning as an amenity on their personal website. In an effort to change these two policies, I worked with people at both CatCa\$h and Off-Campus housing.

In order to change CatCa\$h’s policy towards indoor tanning, I emailed Jonathan Millay who is the Executive Director of the Arizona Student Unions. He responded after my first email and was excited about becoming a Skin Smart Campus. We met in person two weeks later to discuss how we would accomplish changing this particular aspect of the policy. In the meeting I stressed the importance of the certification, and how ridiculous it is that students could purchase indoor tanning with their Cat Card. He then decided to reach out to the manager of Beach Bunny Tanning and ask if she would be willing to no longer accept CatCa\$h as a form of currency for indoor tanning services. She agreed and was willing to change that part of their contract right away. The manager at Beach Bunny was happy to be a part of this change, and wasn’t at all concerned about losing money, because her customers rarely used CatCa\$h, and almost never paid for UV tanning with it. Additionally, UV tanning at the University and Park location was

overall not a popular purchase for this demographic. Because Beach Bunnies' Manager didn't expect any lost revenue for this simple policy change, "UV/ indoor tanning" was added to the list of things students are unable to purchase with their Cat Card. Now, UV tanning is considered a nefarious item, and students can no longer purchase it with their CatCa\$h, which is clearly stated in Figure 9. Everyone who works at Beach Bunnie has been informed of the policy change and will no longer accept CatCa\$h as a form of payment for indoor tanning.

Changing Off-Campus housing's policies has proven to be a little bit more difficult, as Teresa Kolb, the Senior Program Coordinator for Off-Campus housing is unable to make the necessary changes. Currently, when apartments apply to be listed on the Off-Campus housing website (<https://offcampus.arizona.edu>), amenities are listed in a check the box format, and indoor tanning is not listed as one. Therefore, Off-Campus housing managers cannot list indoor tanning as an amenity. However, there is a description box, where apartments could potentially fill in "indoor tanning" as an additional amenity. In an attempt to prevent applicants from doing this, a statement must be included on the application, which informs apartments that they "cannot list UV or indoor tanning as an amenity anywhere on the application." In addition, a more formal policy should be made, in order to truly enforce the Skin Smart Campus requirement. I am still currently working on adding the required statement and policy, however thus far none of the apartments or houses listed on the website mention indoor tanning. I am planning on sending a letter to the President and Vice President of the University of Arizona, in order to implement the Skin Smart policy.

3.3.3 Skin Smart College Campus Data Collection and Analysis

After pushing for the University of Arizona's policy changes, I began asking other colleges what they went through as they applied for the Skin Smart Campus certification. About 70% of the people who nominated a university for the certification were adults who either worked at the university or were in an adjoining Dermatology department of the school. The remaining 30% consisted of students, like me, who were completing this as either an internship or an Honors Thesis.

Figure 9: UV Tanning Services Listed as a Restricted CatCa\$h Item

FREQUENTLY ASKED QUESTIONS

Click on the questions to display the answers.

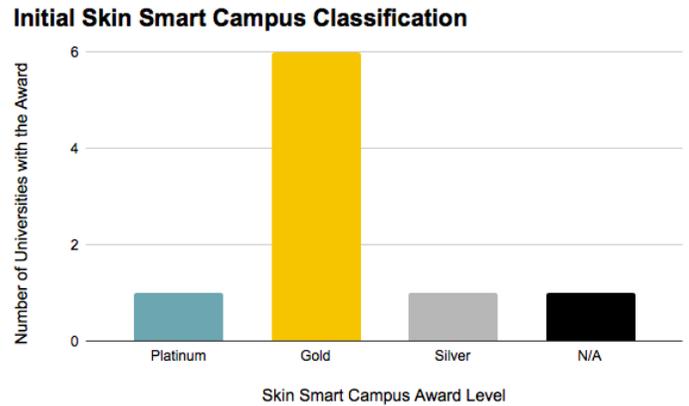
CatCa\$h FAQs

CATPRINTS FAQs

- Q. How do I deposit money into CatCa\$h? ▾
 - Q. Are there limitations? ▾
 - Q. Can I use CatCa\$h on campus? ▾
 - Q. Does the bookstore accept CatCa\$h? ▾
 - Q. Can I pay for meals on campus with CatCa\$h? ▾
 - Q. Can I pay for Library fines with CatCa\$h? ▾
 - Q. Is CatCa\$h tax exempt like my MealPlan? ▾
 - Q. Do I need a CatCa\$h account; isn't it just a debit card? ▾
 - Q. Are there any restrictions? ▲
- A.
Yes, you cannot buy alcohol, tobacco, firearms, lottery tickets, UV tanning services, gift cards or other nefarious items with CatCa\$h.
- ▲ TOP
-
- Q. How do I load CatCa\$h onto my CatCard? ▾
 - Q. Am I required to open a Wells Fargo account to use CatCa\$h? ▾

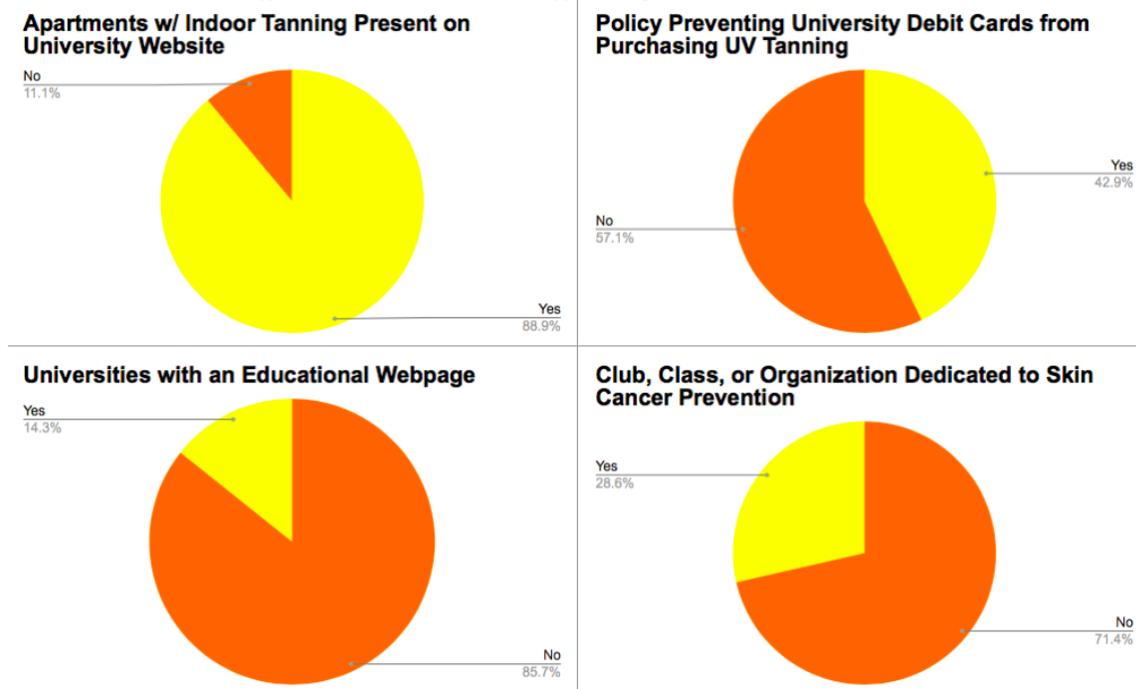
I also found that the majority of the colleges initially met more of the Skin Smart Campus criteria than the U of A. Figure 10 shows that out of the eight colleges surveyed, nine including the U of A, six of the universities qualified for the Gold Level Award immediately. After making the necessary policy changes, eight of these colleges achieved the Platinum Level certification.

Figure 10: Initial Skin Smart Campus Classification



All of the data collected during the interview process was compiled into the pie charts seen in Figure 11. None of the colleges surveyed had any form of indoor tanning device on campus or in a university affiliated building. Almost 90% of the colleges allowed for apartments with indoor tanning to be listed on the college’s off campus housing website before intervention. Only 42% of the colleges had a policy in place preventing students from using a university debit card from purchasing UV tanning. Only two of the universities, one being the U of A, had a website on Skin Cancer prevention before discovering the Skin Smart Campus Initiative. Furthermore, even after applying for the certification, over 70% of the colleges have maintained only an informational webpage. There is no one regularly updating the Skin Cancer prevention educational webpage. Each time I have visited a Platinum Level website, there was rarely a difference in how the school presented their information. For example, here are the links to Eastern Tennessee State University and Brown University’s Skin Cancer websites: <https://www.etsu.edu/cph/skin-smart/default.php> & <https://www.brown.edu/campus-life/health/services/promotion/general-health-physical-health/sun-safety-and-skin-cancer>. In addition to not updating the educational website regularly, many universities posted what was simply expected of them, and didn’t include any information pertinent to that location or college.

Figure 11: Skin Smart College Campus Interview Results



Throughout the interviews, the U of A stood out in one aspect, as it already had an informational webpage on Skin Cancer prevention. The U of A also had an entire class (EPID 497S) dedicated to Skin Cancer education and prevention, which goes out into the community and educates Middle and High School children about the importance of prevention. In fact, only 30% of the certified colleges had a class, club, or organization designed to conduct Skin Cancer prevention presentations throughout the community.

As more policies and interventions are put into place, fewer and fewer college students will subject themselves to UV tanning. All of the Skin Smart universities are preventing students from seeing indoor tanning as a university supported activity, in addition to making it harder for them to find UV tanning near campus. Additionally, by providing an educational webpage on Skin Cancer, colleges are able to inform their students of the dangers of indoor tanning and actively discourage them from beginning or continuing such a harmful activity.

3.4 Strengths and Limitations

Embarking on a project wherein I had to rely on other people has been a challenge for me. I am used to being the person who gets things done. It felt weird to ask strangers to talk with me and help me with my project; however, I do think that it all worked out well. I am proud of the amount of work I have done, and I do plan on checking up on this project every once in a while.

Throughout the whole process, I realized where my strengths were. Firstly, I was persistent and determined when it came to getting responses from other people and colleges. Also, I thought that these people were, for the most part, willing to help me with both my thesis research and all of the Skin Smart Campus policy changes. The Skin Smart Campus certification is a noble cause, which can only help people in the long run. I also feel as though people were more willing to answer honestly because I didn't ask any personal or biased questions. Although the results from these actions will not be seen for years to come, I do believe that I have made a difference here at the University of Arizona.

There were a number of limitations I found while trying to get the U of A certified and while I was interviewing people. The limitation that came up the most often was people not wanting to respond to a stranger. Luckily, after a few tries I did get multiple responses and was able to finally collect data. Collecting data this way also had its limits, as my interviewees could have potentially lied to me about their university and all of the policy changes that needed to be made. Another limitation I found was money, not necessarily for me, but those at both CatCa\$h and Off-Campus housing were very worried that they would lose money if the Skin Smart policies were enacted. The final limitation I saw fairly often was the lack of awareness for both the National Council on Skin Cancer Prevention and the Skin Smart Campus Award. When people learned about what it was and does, they seemed very interested in helping. However, very few people knew what it was before I emailed them and provided them with all of the links and necessary information.

4. Discussion and Conclusions

4.1 Key Findings

By conducting a literature review, it was clear how important university policies are in preventing UV tanning, and therein Skin Cancer and that many American colleges and universities inadvertently support indoor tanning, either by allowing students to purchase it with their university debit cards, or by actually having tanning beds on campus or in university endorsed off-campus housing.

After learning what the certification requirements are for the Skin Smart award, I determined that the University of Arizona could achieve a Gold Level certification before any intervention. However, after persistently contacting people throughout the University of Arizona campus, changes were made to university policies. While the topic wasn't necessarily a top priority for all departments, they were willing to listen to me plead my case for policy changes.

Eventually, the persistent efforts made changes at both CatCa\$h and Off-Campus housing. Before my intervention, students were able to purchase indoor tanning with their Cat Card at Beach Bunny Tanning and a result of the conversations, CatCa\$h was willing to make changes to their U of A contract. Off-Campus housing did not currently include indoor tanning beds as an amenity; however, there still needs to be an official policy for that option to not inadvertently be added to the website. This policy change is, however, still in process.

On the Skin Smart Campus website (<https://skinsmartcampus.org>), there were twelve colleges certified. These colleges were approached through the information available on the Skin Smart Campus website, to ask about their experiences in gaining the certification. Eight colleges responded and were able to be interviewed. It was clear with these interviews, that I was having a much more difficult time when it came to changing policies, although this was partially due to the U of A not starting out with fulfilling much of the criteria.

4.2 Recommendations

1. At the University of Arizona, it's likely that this project will need to be carried on by another Project SASS student interested in Public Health policy and Skin Cancer prevention.
 - a. This current project only focused on UV tanning beds, but it's also important to consider student's daily UV exposure as they walk to and from class all day.
 - b. A future student interested in Environmental Health could potentially conduct a shade analysis of the school in order to determine how much access students have to shade, as well as what percentage of the university is protected from the sun's harmful UV rays.
2. For all other universities who have completed the certification, I would recommend regularly reminding students about the importance of sun safety.

- a. Perhaps the U of A Skin Cancer Institute could develop a project to reach out to these colleges and expand upon their educational materials, as I saw few differences in how the schools presented their Skin Cancer prevention information. For example, here are the links to the Eastern Tennessee State University and Brown University's Skin Cancer websites:
<https://www.etsu.edu/cph/skin-smart/default.php> &
<https://www.brown.edu/campus-life/health/services/promotion/general-health-physical-health/sun-safety-and-skin-cancer>. In addition to not updating the educational website regularly, many universities posted what was simply expected of them, they didn't make it their own. I believe that statistics and data from their region, when included on the educational webpage, could make a huge difference in the way that students view and understand the content provided to them.

4.3 Conclusions and Public Health Implications

Changing a public university's policies is a hard task. There are a number of challenges one must face, and it is not a task that can be accomplished in a month. It takes work, persistence, and tenacity in order to make a difference. I am glad that I had this experience, and I am glad that I had so many people helping me along the way. Although I was unable to get all of the necessary changes made, I will not give up. I will continue working until I know that the University of Arizona will remain and keep a Platinum Level Skin Smart Campus Award.

After working on changing policies for quite some time, I was not surprised to discover that the U of A was one of the more difficult universities to get certified. While so many other colleges were able to apply on day one with little interference, a whole team had to help me get the job done, and I am still getting emails about it to this day. Hopefully in the future these kinds of changes will not require as much work, and hopefully by shedding light on all of these issues, I will make it easier for the next student who wants to make a change to get the job done.

3. Appendices

Appendix (A): IRB Approved Skin Smart Campus Interview Questions



Human Subjects
Protection Program

1618 E. Helen St.
P.O. Box 245137
Tucson, AZ 85724-5137
Tel: (520) 626-6721
<http://rgw.arizona.edu/compliance/home>

Date: December 20, 2019
Principal Investigator: Megan Renee Baker

Protocol Number: 1912255803
Protocol Title: Skin Smart Certification Process

Determination: Human Subjects Review not Required

Documents Reviewed Concurrently:
HSPP Forms/Correspondence: *M. Baker_NewDeterminationofHR_Honors Thesis_SkinSmart_12.18.19.pdf*

Regulatory Determinations/Comments:

- Not Research as defined by 45 CFR 46.102(l): As presented, the activities described above do not meet the definition of research cited in the regulations issued by U.S. Department of Health and Human Services which state that "Research means a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge. Activities that meet this definition constitute research for purposes of this policy, whether or not they are conducted or supported under a program that is considered research for other purposes. For example, some demonstration and service programs may include research activities. For purposes of this part, the following activities are deemed not to be research."

The project listed above does not require oversight by the University of Arizona.

Skin Smart Interview Questions

1. What is the name of the University you attend/work at?
2. How did you hear about the Skin Smart certification/program?
3. When you first heard about Skin Smart, what would your University have been classified as (platinum, gold, silver, etc.)?
4. Which of the requirements did said University meet?
5. Which of the requirements did it not meet?
6. Did you work to change any of the Universities policies so that your University may be certified?
7. If you worked to change any policies:
 - a. Which policies were changed?
 - b. How did they get changed (the steps and measures taken)?
 - c. How long did it take for the new policies to be adapted?
8. Was a Skin Cancer educational webpage already established by your school? If so, what organization is in charge of it?
9. What certification level did you apply for?
10. What certification level did you meet?
11. How long did it take for the application to be processed? i.e. how long before you heard back?
12. Is anyone currently working to keep the campus certified as Skin Smart? If so, how?
13. Have any new clubs/classes/or organizations developed since the increase in Skin Cancer awareness?
14. Since the initial certification, has anyone done anything to update/upgrade the certification (if the campus did not achieve the Platinum level)?

Appendix (B): U of A Off-Campus Housing Information

UNIT FEATURES

[Select/Unselect All](#)

<input type="checkbox"/> Air Conditioning	<input type="checkbox"/> Carpet	<input type="checkbox"/> Ceiling Fans
<input type="checkbox"/> Disability Accessible	<input type="checkbox"/> Dishwasher	<input type="checkbox"/> Evaporative Cooling
<input type="checkbox"/> Fireplace	<input type="checkbox"/> Furnished	<input type="checkbox"/> Garbage Disposal
<input type="checkbox"/> Garden/Yard	<input type="checkbox"/> High-Speed Internet Available	<input type="checkbox"/> Microwave
<input type="checkbox"/> Owner Occupied	<input type="checkbox"/> Patio, Balcony, Porch or Deck	<input type="checkbox"/> Smoke-Free

COMMUNITY FEATURES

[Select/Unselect All](#)

<input type="checkbox"/> Accepts Electronic Payment	<input type="checkbox"/> Close to Public Transportation	<input type="checkbox"/> Composting
<input type="checkbox"/> Elevator	<input type="checkbox"/> Family Friendly	<input type="checkbox"/> Fitness Room
<input type="checkbox"/> Hot Tub	<input type="checkbox"/> Individual Leases	<input type="checkbox"/> Pool
<input type="checkbox"/> Private Shuttle to Campus	<input type="checkbox"/> Roommate Matching	<input type="checkbox"/> Student Only Property
<input type="checkbox"/> Tennis Court		

OVERVIEW	AMENITIES	FLOORPLANS	MAP	AREA INFO
<p>Convenient for</p> <ul style="list-style-type: none"> • Faculty/Staff • Graduate Students • Undergraduates 		<p>Unit Features</p> <ul style="list-style-type: none"> • Air Conditioning • Ceiling Fans • Disability Accessible • Furnished • High-Speed Internet Available • Microwave • Patio, Balcony, Porch or Deck 		
<p>Community Features</p> <ul style="list-style-type: none"> • Accepts Electronic Payment • Close to Public Transportation • Elevator • Fitness Room • Hot Tub • Individual Leases • Pool • Private Shuttle to Campus 		<p>Lease Information</p> <ul style="list-style-type: none"> • 12 month lease (December/July Expiration's) • Lease renewal offered 		
<p>Security</p> <ul style="list-style-type: none"> • Gated Community 		<p>Utilities Included In Rent</p> <ul style="list-style-type: none"> • Electricity • Gas • High-Speed Internet • Water/Sewer 		

Description

Let Sahara's unique remodel fill you with a sense of nostalgia while providing an amazing modern residential experience! Enjoy convenient access to nearby restaurants, museums, entertainment, freeways, downtown, and Fourth Avenue; all while being just moments from the University of Arizona.

Our gated community features a fitness center and yoga studio, a refreshing pool for you to enjoy while you BBQ with friends, fully remodeled game room and social lounge, computer center, and 12 on-site laundry centers.

[Amenities Next →](#)

References

1. Office of the Surgeon General. *Surgeon General Call to Action to Prevent Skin Cancer: Exec Summary*. Washington D.C.: U.S. Department of Health and Human Services; 2014. <https://www.hhs.gov/surgeongeneral/reports-and-publications/skin-cancer/executive-summary/index.html>. Accessed April 17, 2020.
2. National Council on Skin Cancer Prevention. Indoor Tann-Free Skin Smart Campus. <https://skinsmartcampus.org>. Accessed April 2, 2020.
3. National Conference of State Legislatures. Indoor Tanning Restrictions for Minors | A State-By-State Comparison. Ncsl.org. <https://www.ncsl.org/research/health/indoor-tanning-restrictions.aspx>. Published May 20, 2019. Accessed April 17, 2020.
4. Holman DM., Fox KA., Glenn JD., et al. Strategies to reduce indoor tanning: current research gaps and future opportunities for prevention. *Am J Prev Med*. 2013;44(6):672–681. doi:10.1016/j.amepre.2013.02.014.
5. Pagoto SL., Lemon SC., Oleski JL., et al. Availability of Tanning Beds on US College Campuses. *JAMA Dermatol*. 2015;151(1):59–63. doi:10.1001/jamadermatol.2014.3590.
6. National Council on Skin Cancer Prevention. Skin Cancer in America: A Growing Epidemic. Skincancerprevention.org. <https://skincancerprevention.org>. Accessed April 19, 2020.
7. Center for Disease Control and Prevention. Reducing Indoor Tanning on College Campuses. CDC.gov. <https://www.cdc.gov/cancer/skin/success-stories/reducing-tanning.htm>. Last Reviewed June 24, 2019. Accessed April 3, 2020.
8. National Cancer Institute. Skin Cancer (Including Melanoma) – Patient Version. Cancer.gov. <https://www.cancer.gov/types/skin>. Accessed April 20, 2020.
9. Mayo Clinic. Skin Cancer. MayoClinic.org. <https://www.mayoclinic.org/diseases-conditions/skin-cancer/symptoms-causes/syc-20377605>. Accessed April 2, 2020.
10. National Cancer Institute: Surveillance, Epidemiology, and End Results Program. Cancer Stat Facts: Melanoma of the Skin. Seer.cancer.gov. <https://seer.cancer.gov/statfacts/html/melan.html>. Accessed April 18, 2020.
11. Nazario, LA., Macheledt, JE., & Vogel, VG. Epidemiology of Cancer and Prevention Strategies. *Oncology Journal*. 1995 <https://www.cancernetwork.com/articles/epidemiology-cancer-and-prevention-strategies#Descriptive%20Epidemiology>. Accessed April 4, 2020.
12. Dacosta Byfield S., Chen D., Yim YM., Reyes C. Age distribution of patients with advanced non-melanoma skin cancer in the United States. *Arch Dermatol Res*. 2013;305(9):845–850. doi:10.1007/s00403-013-1357-2.
13. Bradford PT. Skin cancer in skin of color. *Dermatol Nurs*. 2009;21(4):170–178.
14. Wu S., Han J., Li WQ., Li T., Qureshi AA. Basal-cell carcinoma incidence and associated risk factors in U.S. women and men. *Am J Epidemiol*. 2013;178(6):890–897. doi:10.1093/aje/kwt073.
15. Saba NF., Goodman M., Ward K., et al. Gender and ethnic disparities in incidence and survival of squamous cell carcinoma of the oral tongue, base of tongue, and tonsils: a surveillance, epidemiology and end results program-based analysis. *Oncology*. 2011;81(1):12–20. doi:10.1159/000330807.

16. University of Arizona Cancer Center Skin Cancer Institute. Screening and Early Detection. Skincancerinstitute.org. <https://azskincancerinstitute.org/sci/skin-cancer-prevention/detection>. Accessed April 21, 2020.
17. Centers for Disease Control and Prevention. What are the Risk Factors for Skin Cancer? Cdc.gov. https://www.cdc.gov/cancer/skin/basic_info/risk_factors.htm. Last Reviewed April 9, 2020. Accessed April 18, 2020.
18. International Agency for Research on Cancer. *IARC Handbook on Cancer Prevention*. Volume 5: Sunscreens. Lyon, France: International Agency for Research on Cancer, World Health Organization; 2001.
19. Trad M. & Estaville L. University Student Awareness of Skin Cancer: Behaviors, Recognition, and Prevention. *Radiol Technol*. 2017 Mar;88(4):373-377.
20. Mayer JA., Woodruff SI., Slymen DJ., et al. Adolescents' use of indoor tanning: a large-scale evaluation of psychosocial, environmental, and policy-level correlates. *Am J Public Health*. 2011;101(5):930–938. doi:10.2105/AJPH.2010.300079
21. Hoerster KD., Mayer JA., Woodruff SI., Malcarne V., Roesch SC., Clapp E. The influence of parents and peers on adolescent indoor tanning behavior: findings from a multi-city sample. *J Am Acad Dermatol*. 2007;57(6):990–997. doi: 10.1016/j.jaad.2007.06.007
22. Demko CA., Borawski EA., Debanne SM., Cooper KD., Stange KC. Use of Indoor Tanning Facilities by White Adolescents in the United States. *Arch Pediatr Adolesc Med*. 2003;157(9):854–860. doi:10.1001/archpedi.157.9.854
23. Watson M., Holman DM., Fox KA., et al. Preventing skin cancer through reduction of indoor tanning: current evidence. *Am J Prev Med*. 2013;44(6):682–689. doi:10.1016/j.amepre.2013.02.015
24. Pagoto SL, Lemon SC, Oleski JL. Availability of tanning beds on US college campuses. *JAMA Dermatol*. 2015 Jan;151(1):59-63. doi: 10.1001/jamadermatol.2014.3590.