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Assessing the Indoor Tanning Behaviors and Risk of Skin Cancer Among Illinois Wesleyan University Students

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Abstract

The purpose of this research is to assess the indoor tanning behaviors of students at Illinois Wesleyan University (IWU) in Bloomington, Illinois and formulate strategies to reduce students' risk of skin cancer. Skin cancer is widespread, and is the second most common cancer among people aged 15-24 years. There is strong evidence to support that many skin cancer cases seen today could have been avoided if the individual had never used an indoor tanning device. Research suggests the use of indoor tanning devices is popular among college-aged females in the US, thus persuading this demographic to reduce their indoor tanning behavior is essential in order to reduce the rates of skin cancer. However, a research gap exists in prevention efforts to reduce indoor tanning at colleges and universities. The methodology of the research included conducting a literature review on skin cancer and indoor tanning devices, interviewing three community key informants as well as 25 IWU students, investigating the indoor tanning business in the local community, and finally constructing and sending out an indoor tanning survey to IWU students (n=172). Results indicated that indoor tanning is somewhat prevalent at Illinois Wesleyan: about 18 percent of survey respondents reported using them anywhere from one to over forty times in the last year. Several strategies were suggested to reduce this rate, including appearance-based interventions, spreading awareness of the prevalence of skin cancer and the danger of indoor tanning, and providing information on alternative behaviors.

Table of Contents

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Introduction

Skin cancer has become an epidemic. There are approximately two million cases of skin cancer diagnosed annually in the United Sates (Rogers 2010). There are three forms of skin cancer, and melanoma is the deadliest. Of the top ten deadliest cancers, melanoma ranks 5th among men and 7th among women. An estimated 76,690 new cases of melanoma will be diagnosed in 2013, and 9,480 individuals will die from the disease (American Cancer Society 2013). Most alarmingly, melanoma is becoming a young person's disease. It is the most common cancer among ages 25-29 and the second most common among ages 15-24. Moreover, these increasing rates show no sign of receding (Bleyer 2006). From 1970 to 2009, there was a 400 and 800 percent increase in the incidence of melanoma in men and women, respectively (Reed 2012). Physicians and researchers have suggested various reasons for this rise, including increased exposure to UV light because of the ozone hole, sunbathing activities, and more revealing fashions. However, there is substantial evidence for the association between the rise in skin cancer rates and the engagement in one particular activity: indoor tanning.

Indoor tanning, or using indoor tanning devices, refers to the use of devices that emit UVA and UVB rays and are used mostly for cosmetic purposes of achieving a darker skin tone. Indoor tanning devices include tanning beds, booths, and sunlamps. Indoor tanning has become quite popular since the first facility opened in 1978. It has a five billion dollar estimated revenue, an increase from one billion in 1992 (Indoor Tanning Association 2009). The average American city contains 42 indoor tanning facilities, which is more than the combined total of Starbucks and McDonalds in those cities (CITY100). About 32 percent of college-aged Caucasian females used indoor tanning devices, with an average frequency of 28 sessions per year (CDC 2013). Indoor tanning is a behavior that is strongly linked to the onset of all types of skin cancer. This causation is supported by an increase in the amount of melanomas found on the trunks of young women, an area which is not usually exposed to sunlight, as well as an established dose response relationship between the amount of times an individual indoor tans and their risk of developing melanoma. A number of studies support that many skin cancer cases seen today could have been avoided if the individual had never used an indoor tanning device (Alberg 2011; Boniol 2012; Ferrucci 2012; Lazovich 2010; Zhang 2012). However, individuals continue to use these indoor tanning devices despite the links between them and skin cancer.

The main motivation for using indoor tanning devices is to achieve an "attractive" tan. The belief that tan skin is more attractive than pale skin is a belief that is perpetrated in society by the media, celebrities, pop culture and the Indoor Tanning Association. Many countries have attempted to reduce indoor tanning behavior by placing various bans and restrictions on them. In the US, indoor tanning is regulated by individual states. For example, Illinois law bans the use of indoor tanning devices for those under 18. However, this ban does not affect an important at-risk group for melanoma: college-aged females. Persuading this demographic to reduce their high rates of indoor tanning use is essential in order to reduce the rates of skin cancer. Colleges and universities offer an untapped resource to reduce the prevalence of indoor tanning among this demographic. However, a research gap exists in this area and more work must be done to in order to find which strategies are best in reducing indoor tanning among college students.

The purpose of this research was to assess the indoor tanning behaviors among students at Illinois Wesleyan University (IWU) and formulate strategies to reduce their risk of skin cancer. This research was done in collaboration with the Community Cancer Center, which provided valuable information and support. A literature review of skin cancer and indoor tanning was conducted and can be found in Appendix A. An indoor tanning facility inspection was observed to gain insight into state regulation. Interviews with key informants and IWU students were held to better understand attitudes and motivations toward indoor tanning and help formulate an indoor tanning survey. This survey assisted in formulating strategies to reduce students' use of indoor tanning devices and their risk of skin cancer.

Research Design and Methodology

Overview of Research Purpose

The increasing incidence of skin cancer among young adults in the US presents a need for IWU to protect its own students from skin cancer's associated risks. As described in the literature review (Appendix A), the use of indoor tanning devices among college students remains popular despite its strong association with skin cancer. To solve this urgent health problem, it is critical to explore perceptions and practices of indoor tanning in order to formulate strategies to reduce use. Schools traditionally play an important role in public health efforts targeting youth. There is a need for colleges and universities to take action on reducing indoor tanning among their students. The Centers for Disease Control and Prevention hosted a meeting in 2012 to discuss the current body of evidence on strategies to reduce indoor tanning. One of the strategies they identified was to develop and evaluate educational, systems, and environmental interventions in school settings (Holman 2013). Illinois Wesleyan University can provide a controlled school setting to employ the most effective strategies that reduce indoor tanning behavior among its students and their risk of developing skin cancer.

The overreaching research questions of this study are twofold: *What are the beliefs and practices of Illinois Wesleyan University students regarding indoor tanning devices? What types of policies and education are needed to lower student use of indoor tanning devices and risk of developing skin cancer?*

In order to address these questions, various activities were explored. To assess the scope of the issue, it was important to estimate how many of IWU students use indoor tanning devices and how regularly. Students' knowledge of the health risks of indoor tanning devices was also assessed in order to formulate any education programs about the associated risks with skin cancer and other adverse health effects. In was important to find out what types of students were more likely to use indoor tanning devices so health messages could be targeted at them. Finally, the barriers to reducing indoor tanning device use must be considered so as to formulate policies and education programs that are successful in reducing their use among the student population. However, current student beliefs and behaviors will only provide partial insight to formulating effective strategies and programs. The practices of tanning businesses in the Bloomington-Normal community must also be investigated to assess their influence on the student population. By assessing both the consumer and service, a number of strategies can be formulated with the

aim to lower indoor tanning device use and ultimately reduce skin cancer risk among IWU students.

Overview of Study Site

Illinois Wesleyan University is a private liberal-arts campus that straddles the twin cities of Bloomington and Normal, located in central Illinois. The relatively small size of the undergraduate population – 2,009 students – made it a manageable study site for the limited scope and time-frame of the research. There are five sororities and six fraternities on campus that consist of about thirty-two percent of the student population. About twenty-five percent of the student body is involved in intercollegiate athletics consisting of 20 different varsity sports. The racial and ethnic makeup of the University consists of International (5%), Black (5%), Native American (0.3%), Asian or Pacific Islander (5%), Hispanic (6%), White (74%), Multi-racial (1%), and Other (4%). About 56 percent of the students are female and 44 percent are male. In-state enrollment is 88 percent ("Illinois Wesleyan: Facts").

The City of Bloomington has a population of about 74,000 and the Town of Normal has a population of almost 58,000, according to a census taken in 2011. There are a total of 21 tanning salon establishments in the Bloomington-Normal area, which includes the greater McLean County. There are approximately 170,000 individuals in the county, and 78% of the McLean County population lives in Bloomington-Normal.

Overview of Community Partner

This research has been conducted through a partnership with the Community Cancer Center in Normal, IL. This organization, through community outreach and research, has identified a need to "provide education and screening for skin cancer due to the number of melanomas being diagnosed each year in the community." Any new research or significant findings on skin cancer in the community could contribute to the Center's Community Needs Assessment report.

The Community Cancer Center is a joint venture between Advocate BroMenn Healthcare and OSF St. Joseph Medical Center, the two main hospitals in Bloomington-Normal, and serves the greater McLean County. The Center and its cancer programs at both hospitals are accredited by the American College of Surgeons. Its mission is to "improve the health status of individuals by providing comprehensive, community-based cancer care." In addition to providing a full complement of treatment services, the Center also offers community and professional education programs, support groups, and counseling. Since 1995, Advocate BroMenn Healthcare and OSF St. Joseph have compiled cancer registries on all their patients diagnosed and/or treated with a malignant diagnosis and benign central nervous system tumors. These include patients diagnosed with melanoma, but not basal cell or squamous cell cancers (neither are reported nationally). The data includes information on the patient's sex, age, ethnicity, and stage at diagnosis. In 1999, the Center was built and took over compiling and maintaining these registries. These are transmitted to both the Illinois State Cancer Registry and the National Cancer Data Base as required by the American College of Surgeons. The Center compiles annual reports for each hospital, which include each one's cancer registry data and a comparison to national percentages. The reports

also describe the screening and prevention education programs conducted in the past year by the Center, and any further needs that should be addressed in the community.

The Center's cancer program has earned the Outstanding Achievement Award awarded by the American College of Surgeons' Commission on Cancer. This is a feat accomplished by only four percent of all cancer programs in the country. Because of their expert knowledge of cancer and education programs, long history of cancer registry data collection, and need for input to their community needs assessment, the Center was chosen as a prime community partner organization for this research project.

Description of Research Design

In order to answer the above research questions, a variety of research methods were used during the study period of September to December 2013. The research design is a collection of both qualitative to quantitative methods which are outlined below. Before beginning the research, a proposal for its design and methodology was approved by the IWU Institutional Review Board (IRB), a body whose purpose is to assure all human subject research conforms to Federal regulations ("Institutional Review Board at Illinois Wesleyan"). All interviewees signed an IRB approved informed consent form which described the research and assured confidentiality. This form can be found in Appendix B. A monthly research timeline of all actions and tasks of the research methodology, as well as specific interview locations and dates, can be found in Appendix C.

Literature Review

An extensive examination of the published literature was conducted in order to review the work of those who have researched the topic of indoor tanning behavior and its relation to skin cancer. The main purpose for conducting the literature review was to assess the alarming rise in skin cancer incidence among the young adult population, investigate the strong association between indoor tanning devices and skin cancer, explore the history of tanning culture and motivations behind indoor tanning, and finally to evaluate the barriers and strategies that have already been employed to reduce indoor tanning. The literature review also helped to guide the research design and give scientific and expert authority to the methods and recommendations in the following report. The full literature review can be found in Appendix A.

Interviews with Key Informants

Interviews were held with three key informants who were able to give an overview of skin cancer incidences, trends and risk factors in the Bloomington-Normal community, as well as current skin cancer prevention efforts. Full question guides for each of these informants can be found in Appendix D. Becky Powell, a health educator for the Community Cancer Center, provided data from the Center's cancer registries for the years 1998 through 2012. She also provided information on the educational programs and skin cancer screenings that the Center conducts and the results. This information gave insight into the current state of the disease within the community as well as what needs to be done.

Certified dermatologist Dr. Lucy Wisdom was interviewed and described the local rising incidences in melanoma and the dangers of indoor tanning. She also described her consultation to patients who used indoor tanning devices as well as other practices in skin cancer prevention she had performed in the community. Dr. Wisdom advised on effective indoor tanning reduction strategies that could be used when targeting young women.

McLean County Health Department Senior Sanitarian Angela Crawford was interviewed on the current state and local regulation of the indoor tanning device industry. She explained the indoor tanning facility inspection procedures as well as the county's role in enforcing state laws. She also described the prevalence and trends of indoor tanning facilities in the Bloomington-Normal area. Finally, she was asked to share her opinion on the effectiveness of legislation in reducing indoor tanning device use.

Observation of Indoor Tanning Facility Inspection

An indoor tanning device inspection of one facility in Bloomington was observed on October 23rd, 2013. This inspection was conducted by two inspectors from the McLean County Health Department: Angela Crawford and an inspector in-training. The enforcement of federal and state indoor tanning device laws was evaluated at this facility. The purpose for observation was to discover if these rules were enforced and by what methods, as well as gaining insight into the experience of indoor tanners using these facilities. Indoor tanning facilities were also located on a map of McLean County to find out their prevalence in Bloomington-Normal as well as any correlations their locations had with the demographics of the surrounding area.

Interviews with Students

Individual interviews were conducted with 12 current Illinois Wesleyan students who were all female. The students interviewed were current users of indoor tanning devices or had used them in the past. Five initial participants were selected as a convenience sample because of the researcher's personal connections to them. Snowball sampling was then used with these participants being asked to contact others they knew who had ever used indoor tanning devices and would be open to an interview. All further participants were contacted on this basis. Before the interview took place, all participants signed a consent form which can be found in Appendix B. Participants' responses were recorded using an audio recording device. Each interview lasted approximately twenty minutes and usually took place at the participant's place of residence. These student interviews were an essential first step in the research process for several reasons. First, a general sense of the perceptions of indoor tanning devices among Illinois Wesleyan students was needed before further research could continue. Second, motivations for using indoor tanning devices were required in order to formulate a relevant survey that would later be distributed to a larger student population. Finally, student knowledge of the health risks associated with indoor tanning devices and the current legislation surrounding them was needed to formulate parts of the survey. Participants were asked about their general indoor tanning device practices, their motivations for using them, how they felt when they used them, and their knowledge of the health risks and benefits. If they no longer used indoor tanning devices, they were inquired as to why. The full list of interview questions can be found in Appendix E.

A focus group was also conducted at one of the sorority houses on campus. The purpose of this focus group was to further assess the general practices and perceptions of indoor tanning devices at Illinois Wesleyan. The focus group served as an enriching supplement to the individual interviews because it provided a better understanding of social norms for indoor tanning behavior on campus. These social norms were more apparent in the focus group because participants responded to questions in the presence of their peers. Participants were recruited on a volunteer basis at their sorority chapter meeting. The focus group was held at the sorority house on the evening on October 30th, 2013. Thirteen female sorority members participated in the focus group and were provided with pizza as compensation for their time. All thirteen females signed the informed consent form. The focus group was audio recorded using the same method as in the individual interviews and lasted approximately thirty minutes. The full question guide used to facilitate the focus group can be found in Appendix F.

IWU Indoor Tanning Survey

Finally, a survey was created through the online Qualtrics program and was designed to assess the general perceptions of indoor tanning devices, their current use, and what the barriers were in reducing indoor tanning behavior among IWU students. Questions were partially formulated based on indoor tanning device surveys used in published scientific studies at other colleges and universities (Cafri 2006). Motivations and perceptions of indoor tanning device use that were expressed in IWU student interviews and focus groups were also used to formulate questions tailored to the Illinois Wesleyan community. This IWU Indoor Tanning Survey aimed to assess several questions, mainly 1) how prevalent is indoor tanning device use among students, 2) what are the main motivations for their use 3) are there certain groups on campus that have a higher prevalence of members who use indoor tanning devices, 4) what do students know about the risks of indoor tanning and 5) what are the barriers to reducing indoor tanning device use. The IWU Indoor Tanning Survey was developed in consultation with Dr. Lisa Searing and Dr. Laurine Brown of the IWU faculty. The survey was pre-tested with an IWU Environmental Studies class. The final survey was distributed via email to presidents and leaders from about twenty different registered IWU student organizations including, but not limited to, sorority and fraternity chapters, varsity athletic teams, residence halls, fine arts, volunteer, and activism clubs and groups. The questionnaire was also circulated via social media networks like Facebook and Twitter and was open to all Illinois Wesleyan students for about three days before it was closed and the results were organized. A total of 172 students responded to the survey: 8.6% of the student population. The full survey can be found in Appendix G.

Research Findings

This section will report on information and data collected in the literature review, observations, key informant and student interviews, and the IWU Indoor Tanning Survey. This section will focus on the prevalence of indoor tanning and preventative strategies to reduce this behavior and risk of skin cancer.

Findings: Literature Review

A review of the literature established the alarming increase of skin cancer incidence among young adults, as well as the association between indoor tanning and risk of skin cancer. It also confirmed the popularity of indoor tanning among young adults, providing national survey data that found that as much as one-third of non-Hispanic white women in high school and college used indoor tanning devices, with an average frequency of about 28 sessions per year. It explained an array of preventative strategies to reduce the prevalence of indoor tanning in the realms of legislation and mass media campaigns. Preventative strategies used at colleges and universities were also explored. It was found that successful ones were those that utilized fear-based messages combined with positive behavior modifications, appearance-based interventions, and social norms. The full literature review can be found in Appendix A.

Findings: Interviews with Key Informants

Skin Cancer in McLean County

Becky Powell, provided data from the Community Cancer Center's registries from Advocate BroMenn Healthcare and OSF St. Joseph Medical Center for the years 1998 through 2012. Figure 1 shows the combined number for both medical centers of melanoma cases each year that were analytic (newly diagnosed and/or treated). There is a steady rise over the years, with an increase of 37 cases in 1998 to 94 cases in 2012, with a slight drop to 59 cases in 2010. Figure 1 shows this increase. A limitation with this measurement is that it does not take into account the increase or decrease in the population of McLean County, thus cannot be considered a true rate. In 2011, the percentage of melanoma cases in terms of all registered cancer cases is slightly higher for both medical centers than compared to the National Cancer Data Base: seven percent for males at OSF St. Joseph compared to five percent nationally, and five percent for females at OSF St. Joseph compared to four percent nationally. Advocate BroMenn has similar numbers.

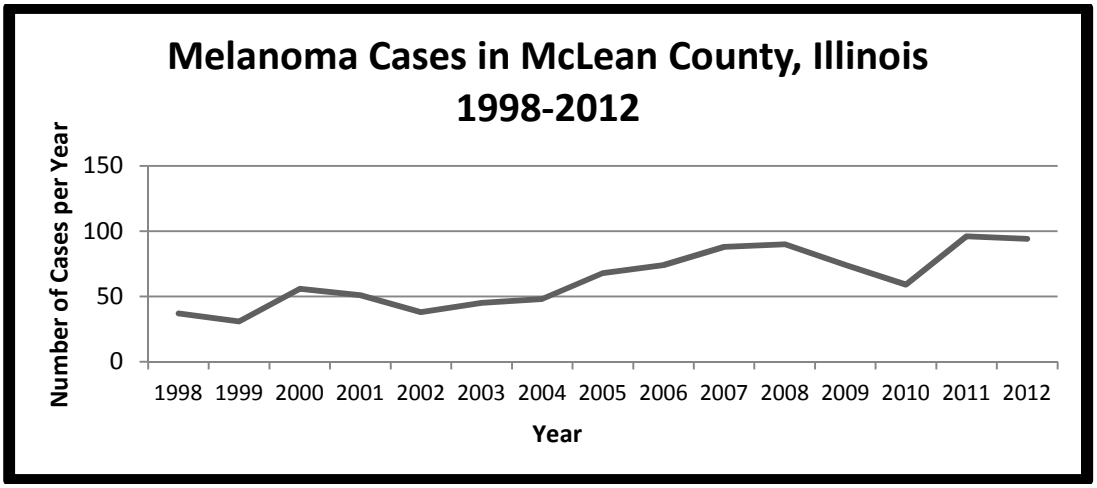

Figure 1: Total melanoma cases newly diagnosed and/or treated at Advocate BroMenn Healthcare and OSF St. Joseph Medical Centers from years 1998 to 2012. It is important to note that these have NOT been adjusted for increases/decreases in the population. Obtained from the Community Cancer Center in Normal, Illinois.

Ms. Powell also described the skin cancer education programs and screenings that had been conducted in the community over the past two years. In 2012, three education programs were offered and over 200 people were informed about skin cancer including current recommendations for lowering skin cancer risk. Also that year a WJCB radio interview was conducted regarding the new FDA recommendations for sunscreen products (WJCB radio serves McLean County). Two skin cancer screenings were offered through the Community Cancer Center and a total of 54 people were screened. The results of screenings showed three possible basal cell cancers, one possible squamous cell cancer, and one possible melanoma. There were 14 people referred for biopsies and 11 others referred for further evaluation. The next year, 2013, two screenings were offered again through the Community Cancer Center and the results showed two possible basal cell, three possible squamous cell, and three potential melanomas. There were 16 biopsies recommended and 20 in total were referred for further evaluation. Participants in these screenings aged anywhere from 21 to over 70, however the majority were over 30 years old. The lack of college-aged participants was most likely due to the fact that students live quite far from this local clinic. In order for the Center to reach this high risk group, screenings must be offered closer to where students live. One such screening was offered for the first time at Illinois Wesleyan University in August 2013. At the screening a local dermatologist conducted a "spot check" of areas or moles that participants were concerned about. A total of 24 students and faculty participated in this screening. Most of the participants were female (n=16) and about half were between the ages of 15 and 30 (n=11). Two participants were found to have a basal–cell carcinoma and nine participants had biopsies recommended to them as a result of the screening.

A certified dermatologist, Dr. Lucy Wisdom, serving Bloomington-Normal residents and those in the greater McLean County was also able to assess the current skin cancer condition in the area. Dr. Wisdom confirmed that in her years of practice she has seen a growing number of melanoma cases, especially among young people. In fact, she mentioned that her practice treated double the number of melanomas this year compared to last year. According to Dr. Wisdom, this increase was partly due to the fact that more people came in for screening because of growing skin cancer awareness. It was also likely due to the rise in incidence, with indoor tanning playing a large role in that increase as well as unprotected sun exposure.

Dr. Wisdom described the dangers of indoor tanning devices. "Indoor tanning is never safe," and sometimes worse than natural sun exposure because the UV rays the devices emit are more intense and more likely to cause burns and cause cataracts of the eyes without protective eyewear. The only instance where indoor tanning devices are used for medical purposes is the treatment of psoriasis. Dr. Wisdom's clinic provides phototherapy booths for the treatment of psoriasis; however, if the patient cannot regularly come to the clinic they are recommended to use commercial indoor tanning devices closer to their home.

Dr. Wisdom stated that she examined patients who used indoor tanning devices "all the time" and she described the consultation she gave them. She stated she would usually tell the patient to stop indoor tanning by stressing the deadliness of melanoma as well as the wrinkles, brown spots, and freckles that occur from intense UV exposure. She would recommend Seasonal Affective Disorder (SAD) light therapy boxes which do not emit UV rays as an alternative for people who use indoor tanning to treat winter depression. When asked what she would tell a patient who used indoor tanning devices only once or twice per year, she stated that minimal

indoor tanning use can still increase the risk of melanoma by 75%. Dr. Wisdom also stressed it was beneficial for parents to hear about the associated risks of cancer with indoor tanning devices because they were more likely to forbid their teen from using them.

Dr. Wisdom was asked for her professional opinion on what it would take to reduce the risk of skin cancer in young women. She stressed that "pictures are worth 1000 words when it comes to making an impact on somebody." It would take dermatologists or other health professionals showing pictures of skin cancer in educational programs that would have the greatest impact on young indoor tanners. Patients who had gone through the painful and disfiguring surgeries from melanoma would also be influential when speaking to young people. Dr. Wisdom also anticipated that the new indoor tanning legislation in Illinois would have a huge effect in reducing indoor tanning among minors because parents would prevent their teens from experimenting with indoor tanning for special occasions such as prom.

Finally, Dr. Wisdom described her own prevention strategies that she had employed throughout her dermatologist profession. She described educational programs she had conducted for young girls aged nine to thirteen about acne and sun protection. She also had provided free skin cancer screenings at the Community Cancer Center which helped to raise awareness of skin cancer prevention. In her practice, she told every woman to use a moisturizer with a sunscreen and gave out free samples of these.

Regulation of Indoor Tanning Facilities in McLean County

Angie Crawford, a Senior Sanitarian at the McLean County Health Department, explained the indoor tanning facility regulation and inspection process. The regulation of the indoor tanning industry is controlled at the state level by the Illinois Department of Public Health. However, this state agency is unable to inspect the large amount of indoor tanning facilities in Illinois. They delegate this duty to local agencies, such as the McLean County Health Department, by offering training for new inspectors and issuing permits that grant them authority to inspect indoor tanning facilities. One problem with this delegation system which Ms. Crawford noted is that her department is very understaffed because the state had not offered any training in over a year. There are currently six indoor tanning facility inspectors at the McLean County Health Department who examine the 21 indoor tanning establishments in McLean County once per year. It was documented that three indoor tanning facilities in McLean County had shut down since the ten percent tax for tanning beds had gone into effect July 10th, 2010. Ms. Crawford was asked to give her opinion on the effectiveness of legislation in reducing indoor tanning device use. She expressed that in order for the legislation to have a greater effect there must be more coverage of it by the media. Parents would then take note of these laws and be more likely to prevent their children from going to indoor tanning facilities. She believed there had not been enough media coverage of the under 18 law which passed this summer and this needed to change in order for a reduction in indoor tanning among young people.

Findings: Observation of Indoor Tanning Facility Inspection

The McLean County Health Department conducts yearly inspections of the 21 tanning facilities in McLean County. These inspections usually take an hour for the inspector to assess

the list of 41 requirements, which can be found in Appendix I. The way in which the inspector would conduct the research was to ask the tanning salon manager if they were following a given requirement, as well as check their computer system that kept records of indoor tanning patrons. The inspector randomly checked for parental consent of patrons between 14 and 17 years old. They also inspected the safety of devices and the presence of a health warning sign in the individual tanning rooms. Lastly, the inspectors checked the timers on the indoor tanning devices to make sure they would go off after a given amount of time. The tanning inspector cited never having to shut down a tanning salon because of violations. At the end of the inspection process, the tanning facility had two violations – one for allowing minors to use indoor tanning devices more than once in 24 hours (item #24), and one for a device needing to be repaired because of broken plastic (item #35). The facility was told they had a few days to fix the problems before the tanning inspector would return to make sure the violation was corrected.

The indoor tanning inspection process seemed to be thorough, yet several observations should be noted. The health warning signs that were required to be placed in all the rooms were usually behind the doors and not very noticeable. Furthermore, the warning label on the individual device was hard to find and in extremely small font. Instead, what was apparent in each individual room was a large photograph of a tanned, attractive woman in a bathing suit.

The number of indoor tanning facilities in Bloomington-Normal was mapped using Google. It was found that most of the facilities were clumped near, or within one mile, of Illinois Wesleyan University, Illinois State University, Bloomington High School or Central Catholic High School. This finding is consistent with that in the literature review which stated most indoor tanning facilities are within two miles of high schools or universities.

Findings: Interviews with Students

Individual Interviews

Initial findings of IWU student perceptions and practices of indoor tanning devices were made by interviewing 12 students who currently use them or had previously. Participants were asked various questions relating to four main categories: their use and frequency of indoor tanning devices, their experience while using them, their motivations for use, and their attitudes toward them. The full question guide can be found in Appendix E.

Participants varied greatly in the use of indoor tanning devices. Some participants reported only using them once or twice per year, while others reported using them twice per week. One participant even admitted to frequenting two different indoor tanning salons so she could use indoor tanning devices twice in the same day, which is prohibited by Illinois Department of Public Health regulations (Illinois Administrative Code). Age of first exposure to indoor tanning devices also varied somewhat among participants: the youngest exposure was in the seventh grade and the oldest was freshman year of college. However, the majority of participants reported age of first use in high school. When asked why they first used an indoor tanning device, many participants indicated that they were influenced by their family or friends' use, or by the older girls in high school that were "cool" or "pretty" and always tan.

Almost all participants reported feeling "happier" after using an indoor tanning device. Many described the experience of lying in a tanning bed as "peaceful," "warm," and "a stress reliever." Descriptions of indoor tanning salons varied somewhat, but it is interesting to note that almost all participants described indoor tanning employees as looking "orange" from too much indoor tanning device use. However, none of the participants reported being put off to indoor tanning devices by an employee's orange skin tone. Health warning signs in the individual tanning device rooms did not deter participants either: most reported not reading or paying much attention to them.

Several reasons for using indoor tanning devices were stated, although the primary motivation was appearance driven. Participants stated that they "always feel they look better with a tan" or that "they look really disgusting when (they) are pale." One participant said that "guys love the way a girl looks when she's tan." Another motivating factor was the feel-good experience of using indoor tanning devices. As noted earlier, many participants enjoyed the act of indoor tanning because it made them feel happy and warm. Several participants said that they used indoor tanning devices in the winter to help with their seasonal depression. Less frequent users of indoor tanning devices reported that their main motivation for use was to look tan for special occasions, such as a wedding. One participant stated that her pediatrician had recommended indoor tanning device use as treatment for her acne.

Participants' varied perceptions and attitudes towards indoor tanning devices highlighted their use as controversial among students. Many participants that currently indoor tanned said there was not very much pressure from their parents to stop this behavior. However, most said that there was pressure from their friends at Illinois Wesleyan who would tell them to stop tanning or else they would get skin cancer. One participant stated that she "did not want people to know she used tanning beds" because she anticipated that others would disapprove and judge her poorly. Another participant said that "guys think it's stupid when girls spend money on them." Those who started using indoor tanning devices in high school reported that there was much more pressure from their peers to do so. Those same people reported less use at Illinois Wesleyan because there was less pressure to be tan owing to the "diversity" of skin tones on campus. Many participants who currently indoor tanned and were aware of some of the health risks, like skin cancer, justified their behavior because they used indoor tanning devices in moderation, meaning only for special occasions.

Participants generally indicated that their view on indoor tanning devices changed somewhat in light of recent legislation. Only one participant was aware of the recently passed under 18 age ban on indoor tanning, and the rest were informed in the interview. One participant compared the law to the ban on smoking, saying that "they make rules for a reason so it must be bad for you." Another participant said that when the ten percent tax on indoor tanning went into effect, it was "a wakeup call" to the dangers of indoor tanning and its addictive nature.

Participants who no longer used indoor tanning devices were asked why they stopped. Most stated health concerns, mainly skin cancer and the development of early wrinkles, as their reason for discontinued use. It is important to note however that all participants were aware of these health risks associated with indoor tanning devices at the time of their first use, thus other reasons actually motivated them to stop. Some of these reasons came from personal connections

to skin cancer in their family members. One participant even admitted to contracting several moles that were close to developing into melanomas and which had to be surgically removed. A few participants attributed their discontinued use to their maturity: as they grew older they realized the potential risks were not worth the present benefits of indoor tanning devices. In general, many participants seemed to have cut back on their indoor tanning device use as they grew older or entered college, citing reduced pressure from peers to look tan.

One student interviewed was a former tanning facility employee and was asked about her job experience. She claimed that the main difficulty at the job was the high degree of confrontation with customers. Some customers, due to their light skin tone, were limited to shorter times when using the indoor tanning device. She said many people wanted to use the device for the maximum amount of time that they paid, and thus got upset when they were told they could not. She also observed a decrease in the amount of customers when the ten percent tax on indoor tanning beds went into effect. Additionally, she said that she indoor tanned more when she worked at the facility because employees were expected to be tan.

Focus Group

The focus group, conducted with thirteen IWU sorority females, offered more insight into the social norms surrounding indoor tanning devices as well as students' perceptions of tanned skin. Of the participants, six currently used indoor tanning devices, one no longer used them, five had never used them, and one did not say. Many cited indoor tanning as losing popularity with young people because it was not as "cool" to be tan. Tanning culture was then discussed. Participants claimed that natural skin tones were more prevalent in the fashion and film world and so there was less pressure to look tan. Many said that in high school there was a belief that to be pretty one should be tan; in college that belief was not as strong. Indoor tanning was compared to smoking. Many participants believed tan culture will become even less prevalent in the future because indoor tanning will become "as taboo as smoking." It was also observed that the non-indoor tanners spoke more during the focus group, suggesting indoor tanners felt pressure not to voice any opinion in defense of their use. The full focus group question guide can be found in Appendix F.

Summary of Student Interviews

From conducting individual interviews and a focus group with a total of 25 Illinois Wesleyan students, many motivations for indoor tanning were discovered. These included achieving an "attractive" tan, feeling warmth and relaxation, feeling happier in the winter, and clearing acne. Social norms seemed to be a good indicator for the prevalence of indoor tanning, since most seemed to indicate reduced indoor tanning at college than at high school where there was more pressure to be tan. All indoor tanners thoroughly enjoyed the experience of indoor tanning. In terms of frequency, indoor tanners varied greatly, some going twice a year and some going twice a week. All indoor tanners were aware of the risks of skin cancer associated with indoor tanning, but many were not aware of the recent passing of the under age 18 ban in Illinois for indoor tanning. Finally, almost all indoor tanners reported burning from an indoor tanning device at least once.

Findings: IWU Indoor Tanning Survey

There were 172 Illinois Wesleyan students who responded to the survey (available for three days) assessing indoor tanning behavior, knowledge of associated risks, and effectiveness of strategies to reduce indoor tanning device use. All ages of respondents were represented fairly equally with a range of 18 to 22 years old. Eighty-three percent of those respondents were female and 17% were male. Races or ethnicities represented in survey respondents were Hispanic/Latino (2%), American Indian/Alaskan Native (1%), Asian (4%), African American (2%), Caucasian (90%) and other (2%). These demographics do not match those of the entire Illinois Wesleyan student body, thus are not a representative sample of the university. Regardless, they do represent 8.6% of the student population and give some indication about their indoor tanning practices. Results are summarized below. The full survey can be found in Appendix G, and charts of the responses of selected questions can be found in Appendix H.

Thirty-four percent (n=59) of respondents reported ever use of an indoor tanning device, defined as a sun lamp, sunbed, or tanning booth. Of those ever-users, 68% (n=40) started using indoor tanning devices in high school, 24% (n=14) in college, and 8% (n=5) in middle school (grades 6^{th} through 8^{th}). Of those ever-users, 44% (n=26) stated they had not used an indoor tanning devices in the past 12 months, possibly indicating they no longer use indoor tanning devices. Those who reported current use (within the last 12 months) was 19% (n=33 of 172) of total survey respondents. Their frequency of use in the past 12 months varied, reporting 1 or 2 times (21%), 3 to 9 times (37%), 10 to 19 times (24%), 20 to 39 times (9%), and 40 or more times (9%). Twenty-seven percent of total survey respondents (n=46 of 172) reported they had siblings who had ever used an indoor tanning device and 23% percent (n=40 of 172) reported they had parents or guardians who had ever used an indoor tanning device.

Motivations for using indoor tanning devices were assessed. Respondents were given a list of seven motivating factors for indoor tanning based off of those cited in the literature review and asked to mark all that apply. Eighty-three percent of ever-users (n=49 of 59) indicated they indoor tanned to look good for a special occasion. Other motivations for use were feeling more confident (42%), not wanting to burn before a vacation (41%), feeling happier (32%), thinking their pale skin was unattractive (32%), clearing their acne (31%), and being recommended by a physician (3%). Other reasons that respondents noted were competitive dance coaches requiring their use and peer pressure.

Reasons for not using indoor tanning devices were also assessed. Respondents who indicated they had never used an indoor tanning device and those who had reported not using one in the past 12 months (n=139 of 172 total survey participants) were given a list of possible reasons why and asked to mark all that applied. Most respondents (80%; n=111 of 139) indicated that they were concerned about the health risks associated with indoor tanning devices. Other reasons were that they did not have a desire to be tan (51%), indoor tanning devices were too expensive (37%), and pressure from friends and/or family has influenced them not to tan (17%). Respondents also had the option to write in their own reason for why they did not use indoor tanning devices. Some common responses were that they burned very easily, they already had tan skin, and that indoor tanning devices were "just stupid."

All respondents were also assessed on their knowledge of indoor tanning device's associated risk with skin cancer. Respondents were asked to indicate if they were aware of the following information:

> The International Agency for Research on Cancer categorizes ultraviolet tanning devices in Group 1, a list of the most dangerous cancer-causing substances. Group 1 also includes agents such as plutonium, cigarettes, and solar UV radiation. Additionally, research has found that people who first use an indoor tanning device before age 35 increase their risk for melanoma by 75 percent. (Melanoma is the most serious form of skin cancer and can be deadly.)

About half (49%; n=84) of total survey respondents said that they were already aware of this information, and the other half of respondents said that they were only somewhat (44%; n=76) or not aware (7%; n=12).

Barriers and strategies to reduce indoor tanning among students was assessed. Respondents who had previously indicated that they currently used indoor tanning devices were asked if they were likely to change their indoor tanning behavior based on the above information. About half said that they were either likely or somewhat likely to reduce their indoor tanning in light of the information, while the other half said they were unlikely, somewhat unlikely, or undecided. Respondents were then asked as to why or why not and asked to provide written feedback. Those who indicated they were likely to reduce their indoor tanning behavior generally stated that the given information was "scary" and there were too many risks associated with them. Those who indicated they were not likely to reduce their indoor tanning behavior gave several reasons why not. These can also be considered barriers to reducing indoor tanning behavior. Responses that were popular are listed below:

1. "I feel like I will minimize my risk by not going as much"
2. "I only tan for special occasions"
3. "I really want to look good for the dance"
4. "I hate being pale"
5. "Live fast, die pretty"
6. "I will continue to go to make myself feel better in the winter"
7. "I've been prescribed by a doctor"

Motivations for not using indoor tanning device use were assessed to formulate possible strategies that could be applied to a larger student population. Those who indicated they had never used an indoor tanning device, as well as those who indicated they had used an indoor tanning device but not in the past 12 months, (n=139) were asked why not and to mark all responses that applied. The majority of them (n=21) stated that they were concerned about the health risks associated with indoor tanning devices. Other reasons were that indoor tanning devices were too expensive (n=10), they did not have the desire to have tan skin (n=9), and friends or family had influenced them not to use indoor tanning devices (n=1).

Results were assessed for correlation. Groups that had a higher association with indoor tanning were those who indicated they were involved in Greek life, women, Caucasian, never or rare use of sunscreen, and family members who had also used an indoor tanning device. In fact,

[1]The Fitzpatrick skin typing test is used as a way to classify the response of different skin types to UV light. The test classifies skin types into types I through VI, with type I being the most sensitive and at-risk for skin cancer. It is a

recognized tool used by dermatologists to assess skin cancer risk. It is also used by indoor tanning facilities to determine the time allowed to indoor tan (Fitzpatrick Skin Type 1988).

88 percent (n=52) of those who indicated that they had ever used an indoor tanning device were members of a Greek organization. Participants' skin type was calculated from their responses to the Fitzpatrick skin typing test[1]. There was also a correlation with never using an indoor tanning devices to those who had type I skin, the lightest skin tone and most at-risk for skin cancer.

Limitations

There are several limitations with the IWU Indoor Tanning Survey. As mentioned earlier, the demographics of survey participants do not match with those of the total IWU student population, thus they cannot be considered a true representation of the student body. There were many more females that took the survey than males, and it is known that females are far more likely to indoor tan than males. Thus, the actual percentage of IWU students who indoor tan will most likely be lower than that of the participants in the survey. Furthermore, a high percentage (64%) of survey participants indicated they were Greek affiliated. These results suggest that Greek students are far more likely to indoor tan than non-Greek students. This skewed distribution towards Greek students will also result in an inflated percentage of indoor tanners compared to the actual percentage of IWU students. Finally, 8.6% of the student population took the survey. More respondents would be needed to gain a more accurate representation of the percent of indoor tanners at Illinois Wesleyan.

Discussion and Recommendations

The original purpose of this research was to assess two questions. Each of these questions will be assessed in regards to the findings.

What are the beliefs and practices of Illinois Wesleyan University students regarding indoor tanning devices?

The current practices of students regarding indoor tanning devices were assessed from feedback from interviews with 25 IWU students and the results from the IWU Indoor Tanning Survey responses from 172 students. The survey found that approximately 34 percent of 172 respondents had ever used indoor tanning devices. However, about 19 percent of 172 respondents reported current use. This figure is lower than the national average, which is 32 percent among college-aged Caucasian females (CDC 2013). About 42 percent of IWU indoor tanners reported using indoor tanning devices at least ten times per year. This figure is also lower than the national average, which is 58 percent of young, female indoor tanners reporting use at least ten times per year (CDC 2013). While Illinois Wesleyan females seem to use indoor tanning devices somewhat less than most young women, there is still significant use among the student body. What is concerning is that about 18 percent of IWU indoor tanners reported using indoor tanning devices 20 to 40+ times per year. Indoor tanners seemed to be reporting less use in college than in high school, which is consistent with findings in the literature review that report indoor tanning behavior decreases with age.

The beliefs and attitudes of Illinois Wesleyan students regarding indoor tanning devices varied greatly. Many indoor tanners indicated they believed tan skin was more attractive than pale skin. However, many non-indoor tanners indicated they did not have a desire to have tan skin. Many of these non-indoor tanners also viewed the use of indoor tanning devices as "stupid" and said they would never participate in such an activity. However, many indoor tanners reported frequent use and would continue use in spite of their knowledge of adverse health risks. The dominant "tan culture" seen nationally seems to have a presence at Illinois Wesleyan; however its magnitude is unclear.

What types of policies and education are needed to lower student use of indoor tanning devices and risk of developing skin cancer?

In order to lower the use of indoor tanning devices by IWU students that indicate use, several strategies must be employed due to the wide range indoor tanning practices on-campus. Students who indicate that they tan only a few times per year or only tan for special occasions could reduce their behavior by reading simple brochures focused on the adverse appearance-related effects of indoor tanning, as indicated in the literature review. Health-related brochures could also help to reduce indoor tanning behavior in these individuals. As shown from the survey, most students who stopped indoor tanning did so because they became aware of the seriousness of the health effects associated with the devices. Students who indoor tan for warmth or mood elevating effects could reduce their behavior by being given information on alternative ways to fight depression in the winter. Those who report extremely high rates of indoor tanning or have been indoor tanning since high school or middle school pose the greatest challenge when trying to reduce their behavior. Some strategies could include behavioral counseling; however it would be hard to identify these frequent indoor tanners. Dr. Wisdom's suggestion of having skin cancer survivors talk about their experience with the disease could be a solution. Since many indoor tanners were women and involved in Greek life, sororities could host one of these speakers. In this way, all of their members would be exposed to the speaker without having to single out indoor tanners. Changing campus social norms may also be a solution. Negative campus media, such as articles in the newspaper or posters that illustrate indoor tanning in a negative light may help to increase the growing stigma associated with indoor tanning among the IWU student body.

Regular skin cancer screenings of students will help increase awareness of skin cancer and increase preventative measures. As indicated by the Community Cancer Center's screening results, few people under 30 years old are screened at their establishment. The lack of college age students is most likely because the Center's location is inaccessible to IWU students and the lack of awareness of its screenings. As mentioned, the screening conducted at IWU this past August had 24 participants, with nine biopsies recommended as a result of the screening. Skin cancer screenings held on Illinois Wesleyan's campus should continue on a regular occurrence because they are successful in catching skin cancer early.

Conclusions

Skin cancer is a major health concern in the US and worldwide. The literature review from this research study revealed that the increase in melanoma incidence among young women is alarming because melanoma accounts for the vast majority of skin cancer deaths. Since skin cancer is due in large part to environmental risk factors, measures should be taken to prevent it. However, the cultural belief of "attractive" tan skin has contributed to an increase in indoor tanning behavior, an undeniable skin cancer risk factor.

The community of Bloomington-Normal has a population very vulnerable to indoor tanning because of its high amount of indoor tanning facilities and two universities. College students, including those at IWU, are one group most likely to indoor tan, and living in close proximity to an indoor tanning facility increases likelihood to engage in the behavior. Local health officials and doctors are working to prevent skin cancer and reduce indoor tanning behaviors. However, much more needs to be done in order to reduce this behavior among college students.

At Illinois Wesleyan University, students must be made aware of the health risks associated with indoor tanning. The survey results from IWU students indicated that approximately one-third of all respondents had ever used an indoor tanning device. While the results suggested that student attitudes towards indoor tanning are somewhat split – some have very negative feelings towards this behavior while others engage in it frequently – there is a general belief on campus that tan skin is attractive. This belief needs to be changed in order for students to stop indoor tanning and lower their risk of skin cancer. Students also need to be educated on skin cancer prevention. Recommendations to achieve these outcomes include distributing informative brochures or posters, hosting health officials or skin cancer victims for sorority members, holding health or beauty fairs on campus where students can learn about the appearance based risks associated with tanning, and continuing skin cancer screenings on the IWU campus. Through these combined efforts, the health and well-being of IWU students, as well as the community, will be improved.

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Appendices

Appendix A: Literature Review-Skin Cancer and Indoor Tanning Devices
Appendix B: Informed Consent Form
Appendix C: Research Timeline
Appendix D: Key Informant Interview Question Guides
Appendix E: Student Interview Question Guide
Appendix F: Focus Group Question Guide
Appendix G: IWU Indoor Tanning Survey
Appendix H: IWU Indoor Tanning Survey Results: Selected Charts
Appendix I: Indoor Tanning Inspection Form
Appendix J: Indoor Tanning Warning Statement

Appendix A: Literature Review

Skin Cancer and Indoor Tanning Devices

A Brief Overview:

Introduction

An examination of the published literature was conducted in order to survey the work of those who have researched the topic of indoor tanning behavior and its relation to skin cancer. The alarming growth of skin cancer incidence, especially in young people, highlights the need for colleges to educate and protect its students from its risks. While there are many risk factors that can contribute to the development of skin cancer, exposure to ultraviolet (UV) radiation is an environmental risk factor that is largely controllable, presenting an opportunity to develop strategies to lower risk among students. The literature review focuses on exposure to UV radiation from indoor tanning devices.[1] Only in the past several years has the link between indoor tanning device use and skin cancer development become very strong. The scientific studies supporting this association will be reviewed below. The national trends as well as the current use of indoor tanning devices are given. In order to develop strategies to reduce their use among students, motivations for use are explored. The glamour and attractiveness associated with tanned skin itself is a topic that will be investigated in order to gain more insight into societal norms. Barriers to reducing indoor tanning behavior are considered before delving into prevention strategies that have been employed by governments, organizations, health professionals, national campaigns, and colleges and universities. These strategies are compared for their effectiveness in reducing indoor tanning device use and used to give credibility to the researcher's final recommendations.

The body of published research on the following topics is large. While this literature review is not inclusive of all studies pertinent to each topic, it does aim to highlight their key findings in order to provide sufficient background information. The main purpose for conducting the literature review is to guide the research design and give scientific and expert authority to the methods and recommendations in the preceding report.

Incidence, Mortality, and Patterns of Skin Cancer

There are three main types of skin cancer: basal cell, squamous cell, and melanoma. The incidences of all three have been increasing throughout the world for several decades (Armstrong 2011). Skin cancer is the most common form of cancer in the United States, with over two million people diagnosed annually (Rogers 2010). An estimated one in five Americans will develop skin cancer over the course of their lifetime (Robinson 2005).

Basal cell (BCC) and squamous cell (SCC) are the most common forms of skin cancer: about 1 in 2 Americans who live to age 65 will develop BCC or SCC at least once in their lifetime (Sun Protection 2009). BCC and SCC incidence rates are increasing at alarming rates. The number of women under age 40 diagnosed with BCC has doubled in the last 30 years, and their SCC diagnosis rates have increased almost 700 percent. BCC and SCC are classified as non-malignant skin cancers (NMSC) because they are rarely fatal. Even so, they can be highly disfiguring if allowed to grow (Rogers 2010). Furthermore, the national cost of treating them is especially high because of their magnitude. The incidence of NMSC is higher than all other cancers combined, with more than 1.3 million cases per year (Stanford 2013), resulting in a total

[1] Indoor tanning devices, as defined by the Centers for Disease Control and Prevention, include tanning beds, booths, and sunlamps (CDC 2006).

direct cost of $1.4 billion per year (Lewen 2005). Since the majority of skin cancers occur in people over age 55, these costs put a huge strain on the Medicare program as the population continues to age.

While melanoma is not nearly as common as BCC or SCC, it accounts for the vast majority of skin cancer deaths. An estimated 9,480 people will die of melanoma in 2013: about one death every hour (American Cancer Society 2013). Mortality for melanoma depends on the stage at diagnosis: if caught early and confined to the primary site the 5-year relative survival is 98.3 percent. This percent drops dramatically to 62.4 percent if it spreads to the lymph nodes, and again to 16 percent survival if it has metastasized. Based on rates from 2008-2010, 1 in 49 men and women will be diagnosed with melanoma sometime during their lifetime (Howlander 2009). The estimated cost of treating melanoma in 2010 was $2.36 billion (National Cancer Institute 2011).

These skin cancer rates are concerning, and they show no sign of receding because skin cancer is increasing among young people. Melanoma is the most common form of skin cancer for young adults aged 25-29 years and the second most common cancer for young people aged 15-29 years (Bleyer 2006). From 1970 to 2009, the incidence of melanoma increased by 800 percent among young women and 400 percent among young men (Reed 2012). Those who survive melanoma are much more likely to develop a new melanoma later in life – about nine times more likely than the general population (Bradford 2010). The diagnosis of melanoma to a young person is devastating because they would have to deal with a much higher risk of a recurring melanoma for the rest of their lifetime.

Skin cancer's increasing incidence rates, its high costs, and the growing prevalence of melanoma in the young population are all cause for grave concern. Because of these figures, scientific research over the risk factors and prevention of skin cancer has increased exponentially in the last few decades in the US and worldwide, with indications that much of the general population is at-risk for skin cancer.

Skin Cancer Risk Factors

While genetics does play a significant role, the risk factors for skin cancer are mainly environmental (NIH 2012). Skin cancer is correlated with lifetime exposure to ultraviolet (UV) radiation. Ultraviolet radiation contains two wavelengths: UVA and UVB rays. UV radiation damages the skin's cellular DNA, which produces genetic mutations that can lead to skin cancer. Sunburn, or inflammation of the skin, is primarily caused by UVB radiation. UVA radiation is the major tanning agent and penetrates deeper into the skin's layers that UVB. Tanning, or the darkening of skin, is the body's imperfect natural defense to UV penetration. Melanocytes are skin cells that produce a pigment called melanin. When UV radiation hits melanocytes they produce extra melanin. Both UVA and UVB radiation are known to cause skin cancer in laboratory tested animals as well as humans (Woo 2010). UVA is also associated with aging and the wrinkling of the skin. Natural sunlight is made up of about 90-95 percent UVA and 5-10 percent UVB (Epstein). Thus, the more sunlight a person is exposed to over the course of his or her lifetime, the higher their risk of developing skin cancer.

There has been some debate over whether the amount of UV exposure an individual receives in earlier stages of his or her life has a greater effect in increasing their risk of skin cancer. Autier and Dore (1998) found that individuals in their study had higher incidences of melanoma if they had more sunburns in childhood. However, an inherent error in this study was recall bias of the subjects. A study that eliminated this source of error was conducted by Armstrong and Kricker (2001) who observed that risk of melanoma was lower in individuals who moved to Australia, a country with high sun exposure, after ten years of age than residents who moved before the age of ten. Thus, this would suggest that exposure to sunlight in childhood plays a greater role in the risk of melanoma development than exposure in adulthood. An explanation for this pattern is that youth is a time of peak melanocytic activity (Abdulla 2005). The Skin Cancer Foundation states that just one sunburn in childhood doubles the chances of developing melanoma later in life. High sun exposure to infants and toddlers is also extremely dangerous because they have not developed the melanin in their skin that provides some protection against its radiation.

There has been much research into the relative risks of occupational versus intermittent sun exposure. In one study it was shown that occupational exposure (individuals who were exposed to the sun daily because of their career) showed a reduced risk of development of melanoma compared to intermittent sun exposure (individuals exposed to the sun seasonally or sporadically). It also gave evidence that intermittent sun exposure had a significant positive correlation with development of melanoma (Elwood 1997). Another study further confirmed this finding by demonstrating that sunburns at any age (intermittent exposure) had a positive correlation with melanoma (Armstrong 2001). Three of the four states with the highest rates of mortality from melanoma – Delaware, Nevada, and Vermont – have populations that experience irregular sun exposure (Abdullah 2005). Finally, sunburns have also been shown to be a strong factor when considering the risks of developing non-melanoma skin cancers (Rosso 1999). From these studies, it strongly supported that sunburns are a serious risk factor in the development of all forms of skin cancer.

Genetics do play a significant role outside of the multitude of environmental risk factors for skin cancer. Those that have lighter skin tones are at an increased risk for skin cancer. Caucasians have a much higher incidence rate of all forms of skin cancer than blacks, Asians, Pacific Islanders, American Indians, and Hispanics. For example, the incidence rate per year for melanoma in Caucasian men is 31.9 out of 100,000, compared to 4.7 out of 100,000 for Hispanic men (Howlader 2009). A family history of skin cancer and the prevalence of moles on the body are also genetic risk factors (Stanford 2013).

As noted above, it has been shown thus far that genetic susceptibility and environmental factors, such as childhood and overall lifetime exposure to UV radiation, especially radiation that resulted in sunburn, are all risk factors for the development of skin cancer. However, these risk factors do not explain why skin cancer rates have been increasing, even though the incidence rates of a number of other cancers have been declining or remaining stable. Between 1997 and 2006 melanoma incidence increased 2.2% and 2.1% each year among Caucasian males and females, respectively (Howlader 2009). These increases have made melanoma rank first among men and second among women as the fastest increasing cancer for the ten most common cancers in Caucasians. Based on the known risk factors, speculations about the cause of this increase

could be made. These would include an increased exposure to UV rays from the sun through more widespread sunbathing or more revealing fashions, or because of the enlarged hole in the ozone. However, studies have shown a strong and well-supported correlation of skin cancer with a particular environmental risk factor: indoor tanning.

Indoor Tanning Devices

Indoor tanning is an artificial source of ultraviolet radiation that has grown in popularity since the early 1980s. A convenience survey which sampled 100 beachgoers aged 18 to 30 years old living in Chicago people showed that people who used indoor tanning devices increased dramatically from just one percent in 1988 to 27% in 2007 (Robinson 2008). Access to indoor tanning has concurrently increased dramatically over the last four decades. The indoor tanning industry's annual revenue was one billion in 1990 and currently has annual revenue of over five billion. There are an estimated 19,000 professional indoor tanning facilities in the country and about ten percent of the American public frequent them each year (Indoor Tanning Association 2009). National surveys report that indoor tanning use is especially popular among college-aged Caucasian females. For example, the National Health Interview Survey[2] (NHIS) revealed that 32 percent of this demographic reported using indoor tanning devices in the year 2010 (CDC 2013). Another survey, the Youth Risk Behavior Surveillance System[3], indicated even younger ages of use: 29 percent of high school Caucasian girls reported use in the year 2011 (CDC 2013). Furthermore, those surveyed indicated frequent use: indoor tanners in the NHIS reported an average of 28 sessions in the past year, with 58 percent of women and 40 percent of men indicating that they went at least ten times per year.

Indoor tanning devices emit both UVA and UVB radiation in order to darken the user's skin. However, this radiation is not equivalent to the sun's radiation in terms of magnitude or composition. Indoor tanning devices usually emit much more UVA radiation than UVB, and they are typically 10-15 times stronger than midday sunlight. Repeated exposure to the large amounts of UV rays they emit in a relatively short period of time constitutes a new experience for humans (Boniol 2012). This fact along with the high reported use of these devices by young people and their concurrent increase in skin cancer rates has led the scientific community to establish an association between these two variables.

Research suggests indoor tanning is a behavior that is strongly linked to the onset of all types of skin cancer. However, evidence of these links has emerged only in the last several years. Studies began to assess the relationship between artificial UV radiation and malignant melanoma in the late 1980s and 1990s. These studies used a case-control approach and used melanoma patients from either hospitals or the general population. The results between different case studies varied highly: some showed strong to moderate correlation between artificial UV radiation and melanoma, while others showed none (Young 2003). However, these studies had

[2]The National Health Interview Survey (NHIS) has monitored the health of the nation since 1957. NHIS data on a broad range of health topics are collected through personal household interviews. For over 50 years, the U.S. Census Bureau has been the data collection agent for the NHIS (CDC 2013).

[3]The Youth Risk Behavior Surveillance System (YRBSS) monitors health-risk behaviors that contribute to the leading causes of death and disability among youth and adults. YRBSS includes a national school-based survey conducted by the Centers for Disease Control and Prevention (CDC 2013).

several limitations. Many did not adjust for the patient's natural sun exposure, a risk factor also correlated with melanoma. Most did not include the age at which participants started using indoor tanning devices, thus failing to assess whether the age of exposure made a difference on melanoma onset. Studies also did not address whether the patient had burned from the indoor tanning device. In most studies cases were diagnosed prior to 1990 when indoor tanning devices emitted different types and intensities of UV radiation than the devices today. No study measured the dose response relationship, in other words, measuring if melanoma occurrence increased with more frequent indoor tanning sessions. This dose response relationship is essential in supporting causation, rather than correlation, between melanoma incidence and indoor tanning. A dose response relates an increase in the first variable to an increase in the second, providing support that one variable depends on the other. A dose-response would mean that the more an individual used indoor tanning devices, the higher would be their risk for developing melanoma.

The first landmark study which addressed these limitations was published in 2010 and used a large sample population in Minnesota. In this study, cases of malignant melanoma that were diagnosed between 2004 and 2007 at ages 25 to 59 were obtained from the Minnesota cancer registry, while controls were randomly selected. Questionnaires and telephone interviews were then distributed to these case-controls that obtained information on the ever use of indoor tanning, device types used, age of first use, period of use, does, duration, and indoor tanning related burns. Odds ratios were adjusted for known melanoma risk factors like natural sun exposure, genetic history and skin sensitivity. The results of this study concluded that frequent indoor tanning increased melanoma risk, regardless of type of device used. The results also showed that the number of times an individual used indoor tanning devices was more important than being exposed to indoor tanning at an early age. The study provided much stronger evidence for this relationship than previous studies because it found a significant dose response relationship between melanoma risk and indoor tanning measured by total hours, sessions, or years. Additionally, this study found that the dose-response was seen for melanomas arising on the trunks of women, an area which is not usually exposed to the sun except when tanning or sunbathing. Overall, this study provided strong support for the association between indoor tanning and melanoma risk (Lazovich 2010).

The same year in 2010, the Union for International Cancer Control, an organization with 760 members across 155 countries, released a study with similar methods and results. It used cases and controls from the Australian Melanoma Family Study. It concluded that among those who had ever used an indoor tanning device and were diagnosed with melanoma between ages 18 and 39 years of age, 76% of those melanomas were attributable to their indoor tanning use. This study differed from the previous one in that it found that earlier age of use was correlated with a higher risk for melanoma. It is also interesting to note that after this study adjusted for skin type, the association between indoor tanning devices with melanoma was minimally affected. This meant that individuals at a low risk for skin cancer due to their low skin sensitivity had the same risk of melanoma when using an indoor tanning device than individuals at a high risk for skin cancer due to heightened skin sensitivity (Cust 2010).

More studies contributed to the mounting evidence of the link between indoor tanning devices and melanoma. The British Medical Journal, one of the oldest and most prestigious

general medical journals, published a study in 2012 which compared the results of 27 observational studies published within the last 30 years. These studies collectively showed that the risk of melanoma was increased to 20% for those who had ever used an indoor tanning device, and the risk of melanoma was doubled when the age of first use was before 35 (Boniol 2012). An ecological study in Iceland, a country where sunny days are uncommon, found that the incidence of melanoma increased sharply in young women after 1990, but then declined after 2000 when health authorities began to regulate the indoor tanning industry. These melanoma incidences were also found mainly on the trunk of Icelandic women, indicating that exposure to indoor tanning was the likely cause of melanoma rather than natural sun exposure (Alberg 2011).

In addition to melanoma, indoor tanning is also strongly linked with basal cell carcinoma and squamous cell carcinoma. A study from the Journal of Clinical Oncology which observed 73,494 female nurses over the course of 20 years provided evidence for a dose response relationship between indoor tanning and BCC, with a stronger association for patients at a younger age of first exposure. The study concluded that just one indoor tanning session per year in high school or college boosted the risk of BCC by ten percent, with that risk increasing to 73 percent if the individual indoor tanned six times per year. The risk for SCC was found to increase to 15 percent if the individual indoor tanned four times per year (Zhang 2012). Another case-control study published in the Journal of American Academy of Dermatology found that approximately 27 percent of early onset BCCs could have been avoided if the individual had never used an indoor tanning device (Ferrucci 2012).

In summary, these studies support the link between indoor tanning and the onset of all three types of skin cancer. Key findings supporting this link were the confirmed dose response relationship and the increased number of melanomas found on the trunk of the body. Additional findings were that an early age of exposure to indoor tanning devices played a significant role in the onset of skin cancer, and all skin types had a similar level of risk when exposed to indoor tanning devices. Studies support that many skin cancer cases seen today could have been avoided if the individual had simply never used an indoor tanning device. The question then becomes: why do so many people continue to use indoor tanning devices despite the high risks involved?

Tanning Behavior: Why do people tan?

Several topics need to be explored in order to answer this question. Motivations for using indoor tanning devices must be identified. This will lead to a discussion of the belief that people look better when they have tan skin than pale skin. Why this belief exists and how it has developed in current society must be assessed. Finally, answering these questions will lead to a discussion of tan skin as a cultural norm and the agents that perpetuate this norm.

Published surveys have shown that the main motivations for using indoor tanned devices are to achieve an attractive tan, for warmth, light, and relaxation (Mathys 1999, Geller 2006). Surveys have also indicated that motivations include getting a pre-vacation tan so as to not burn, to clear or reduce the appearance of acne, and making users feel happy (Woo 2010). Indoor tanning devices are known to induce endorphins (Juzeniene 2012), which would explain this mood-elevating effect. There have even been several studies that suggest that indoor tanning devices are addictive. One study found a positive correlation between indoor tanning device

frequency of use and difficulty quitting using them in adolescents (Zeller 2006). Additionally, a survey study of 145 beachgoers found that about half of them met a tanning-modified Diagnostic and Statistical Manual 4th Edition diagnosis for substance-related disorder with respect to indoor tanning devices (Warthan 2005). The potentially addicting nature of indoor tanning devices would make it hard for frequent users to quit despite having knowledge of associated risks.

Several studies have shown that the perception that tanned skin is more attractive than pale skin is the primary motivating factor for people to use indoor tanning devices (Beasley 1997). Additionally, women are three times more likely to use indoor tan than men (Robinson 1997). In one study, women's perception of the physical attractiveness of tanned skin was assessed for accuracy. In this study, male college students were asked to rate the attractiveness of pictures of women who had their skin digitally manipulated to light, medium, and dark tanned skin. Findings indicated that men perceived the dark-tanned women as physically more attractive, thinner, and healthier than both medium- and light- tanned women (Banerjee 2008). Limitations of this study were that the participating males were predominantly Caucasian (64%), thus not all ethnicities were equally represented. A similar study was performed with female respondents, aged 21 to 35, who were asked to rate the attractiveness on a scale from one to ten of pictures of women whose skin tone was digitally manipulated. The results of this study were similar, although less pronounced. The mean score rating for the untanned images was 6.3 and the mean score for the tanned images was 6.5, each with a standard deviation of 2.3 (Chung 2010). While the results did indicate that women found the tanned females slightly more attractive than the untanned females, the difference in mean scores was not particularly strong. However, these studies do give some validity to the belief that tanned females are perceived as more physically attractive than lighter skinned females.

The belief that females with tanned skin are more attractive than females with pale skin is one that is perpetrated by American society. However, having tanned skin is neither a universal nor timeless mark of beauty. The "ideal" skin color varies among different cultures and changes with time. In fact, there are countless examples of cultures throughout history in which pale or fair skin has been held as the aesthetic ideal. This fair skin ideal dates back as early as 2500 B.C. to ancient Egyptians women who would apply pigments to their skin to make it lighter (Bouvier 2009). Ever since the eighth century, Japanese women would powder their faces white and where dark clothing to accentuate their light skin (Ko 2011). Nineteenth century European women would often cover up with long clothing and carry umbrellas to protect their skin from the harsh sun and sustain a pale appearance (Holt 2009). In the past tan skin indicated that one had to work outdoors doing manual labor, whereas pale skin was a sign of status and wealth because it meant one could afford to stay out of the sun. Today, many cultures still view fair skin as the "ideal" skin tone. In India, some women and men use "fairness creams" to lighten their complexions. Women in China, Thailand and Korea also strive to look fairer and pink in skin tone by avoiding exposing their skin to sun (Aghassian 2009). Only a brief examination of history will reveal that the bronze look is not universal and is a fairly recent phenomenon in the Western world.

The tanning trend came about in the early twentieth century with the onset of the industrial revolution. People began to work indoors away from sunlight, thus reducing the association between the lower class and tanned skin. Less sunlight also meant the onset of sunlight-deficiencies such as rickets and other bone deformities. Doctors began to treat many

ailments like tuberculosis, depression, and even madness with artificial light therapy, thus the sun began to be associated with health (Andrieu 2009). Then, in the 1920s, fashion icon Coco Chanel popularized the idea of tanning when she went on vacation and was "accidentally" bronzed by the sun (Sarnoff 2013). She is credited for making the tan a status symbol, one that is associated with possessing wealth and leisure. As people began to accrue more wealth and were actually able to afford these tropical vacations, tanning behavior took off. Sunbathing became an activity and ordinary people "worked on their tans." By the 1960s, tanning culture had established itself as evidenced by tanned celebrities like George Hamilton and Bridgette Bardot, advertisements that sported tanned models and actors, and a vast array of tanning products such as tanning oil and self-tanners. In 1959, Coppertone ran its infamous ad of a dog pulling down the bathing suit of a girl to show her tan lines with the catchphrase "Don't be a pale face" (Klinkenberg 2004). Having a tan in the winter became a novel trend and was made possible for everyone with the introduction of indoor tanning devices in the 1970s (Woo 2010). Tanning culture continued to grow over the next few decades as evidenced by the indoor tanning industry growth as well as the growing prevalence of tan celebrities whose images were propagated by the media. In this way, tanning was glamorized and became the social norm.

Today in the US and many other countries with a high proportion of Caucasians, having tan skin is still viewed as healthy, attractive, and possessing sex appeal, despite the strength of evidence linking UVR exposure and skin cancer risk (Rawe 2006). These beliefs persist in part because of their reinforcement by pop culture, the media and the indoor tanning industry. Celebrities such as Kim Kardashian, Pippa Middleton, and Mitt Romney continue to show off their tans, making it socially acceptable for the public to mimic their behavior. Advertisements in magazines continue to use tanned models. A controversial 2012 swimsuit spread by the clothing line H&M showed the model Isabeli Fontana sporting a tan extremely darker than her natural skin tone, leading many to believe that her skin was darkened with makeup or computer enhancements (White 2012). The indoor tanning industry has become highly effective at marketing their product. The phrase "healthy glow," propagated by the industry, is associated with having tanned skin. The industry has promoted tanning as beneficial to one's health as well as being attractive and sexually appealing (Greenman 2010). These widely held beliefs must be dispelled if indoor tanning use is to decrease.

Strategies and Barriers to Reduce Indoor Tanning

There is no single approach recommended by public health experts to reduce the rate of indoor tanning. Instead, a multitude of strategies exist in the policy, environmental, and psychosocial realms. By utilizing a diverse array of strategies, one can target a diverse array of indoor tanning users. In order to efficiently develop campaigns and strategies to reduce indoor tanning device use, at-risk individuals must be identified. This way, these campaigns can be developed to target these groups, as well as formulate tailored strategies. There is a substantial body of evidence indicating individuals more at-risk to use indoor tanning devices than others. One study interviewed 6,125 adolescents in the 100 most populous US cities found that girls are far more likely than boys to use indoor tanning devices. Many other variables also predicted this behavior, including being Caucasian, being between the age of 18 and 25, having a larger allowance (greater than 25 dollars per week), having friends or family that used indoor tanning devices, having a parent who did not forbid their use, living within two miles of an indoor

tanning facility, living in the Midwest or South, participating in other unhealthy behaviors such a poor diet or non-regular sunscreen use, being appearance–oriented and holding positive beliefs about indoor tanning (Mayer 2011). The following sections will explore prevention strategies, some of which have been implemented to influence these risk factors.

Legislation

Legislation can be effective in reducing the rate of indoor tanning device use. Internationally, ten European countries have outlawed indoor tanning for individuals younger than 18 years old, and Brazil is the only country to put a complete ban on indoor tanning devices for cosmetic purposes (Pawlak 2012). There is evidence that new legislation implemented in Australia in conjunction with mass media campaigns played an important role in decreasing the number of indoor tanning facilities (Makin 2009). Australia has one of the highest rates of melanoma in the world (Ferlay 2004). In 2007, negative publicity surrounding indoor tanning led several state governments to restrict access by minors and those with fair skin. Changes in the number of indoor tanning facilities in Australian states were monitored over the next few years and by 2009, those states which had introduced legislation had the most substantial reduction in indoor tanning facilities, some as high as 51 percent decrease (Makin 2009).

In the US, the regulation of indoor tanning devices is mainly controlled at the state level, with some federal regulation as well. The strength of indoor tanning legislation varies across states. As of December 2013, 6 states have banned indoor tanning for individuals age 18 and under, and at least 39 states regulate the use of indoor tanning by minors. Many states have forms of restrictions such as requiring written consent or accompaniment from a parent for use by minors. Other common requirements include the use of eye-protection, limiting exposure time (e.g. no more than 20 minutes), or having customers sign a warning statement before using indoor tanning devices (National Conference of State Legislatures 2014). At the federal level, there is less stringent legislation. The U.S. Food and Drug Administration (FDA) classifies indoor tanning devices as Class I medical devices – the same category as bandages (U.S. Food and Drug Administration 2012). This classification is starkly different from the classification the World Health Organization (WHO) gave to indoor tanning devices in 2009. WHO move indoor tanning devices up from Group II, agents probably carcinogenic to humans, to Group I, agents most carcinogenic to humans. Included in Group I are agents such as cigarettes, plutonium, and mustard gas (IARC 2013). The FDA does regulate indoor tanning device manufacturers, requiring certain lamp specifications, posting of warning labels that explain health risks, and stipulation appropriate eyewear. However, these regulations have not been updated since 1985 (U.S. Department of Health and Human Services 1985). Most recently, indoor tanning legislation was passed in 2010 in section 10907 of the Affordable Care Act which created a 10% tax on indoor tanning services (IRS 2012).

Despite these state and federal regulations in the US, there is little evidence to support their effectiveness in reducing indoor tanning. One study found no significant difference in indoor tanning behavior among adolescents in states with some form of age restriction laws versus states without such law (Mayer 2011). Possible reasons for this ineffectiveness are that parents can still provide consent, underage indoor tanners are falsifying parents' signatures, and facilities are not complying with state laws. Indeed, there is much evidence of lack of

compliance with state laws as well as a lack of strong enforcement by government agencies. One study found that 95 percent of indoor tanners exceed the FDA-recommended tanning exposure times (Hornung 2003). Another study in 2008 found that 64 percent of 28 US cities failed to conduct routine annual inspections for all indoor tanning facilities (Mayer 2008). The federal excise tax was found to be somewhat effective in reducing indoor tanning: a 2012 study found that 26% of indoor tanning salons reported fewer customers after implementation of the tax (Jain 2012). More regulation and stronger enforcement of indoor tanning is needed to reduce this behavior. The American Journal of Preventative Medicine outlines several strategies at the local, state, and federal levels. These include an FDA reclassification of indoor tanning devices, a tax on indoor tanning, age bans for minors, strengthening consent mechanisms, banning unsupervised tanning such as in homes or gyms, and a national ban on indoor tanning devices used for cosmetic purposes (Watson 2013).

The state of Illinois has several laws and regulations regarding indoor tanning devices. Before 2013, use was banned for individuals under age 14 and those that were age 14 through 17 were required to obtain parental approval in the form of written consent as well as accompaniment to the indoor tanning facility. Customers of indoor tanning facilities are required to sign a warning statement which states a possible risk of skin cancer associated with indoor tanning devices (the full warning statement can be found in Appendix J). Individuals are banned from using an indoor tanning device twice in less than 24 hours. Indoor tanning facilities are also required to be inspected annual for compliance with these laws as well as harm reduction requirements such as providing appropriate eyewear (Illinois Administrative Code). Starting January 1st, 2014, indoor tanning use for those under 18 will be banned (Illinois House 2013).

Legislation is key to reducing the use of indoor tanning devices, as well as changing social norms regarding their use. Legislation is powerful because it can influence the public's beliefs, thus legislation that restricts or prohibits indoor tanning devices may create a negative stigma associated with them. Even though the Illinois General Assembly has passed a ban on indoor tanning for those under age 18, this legislation does not affect college-aged individuals. It may, however, influence their attitudes about them and reduce their use in this way.

Mass Media Campaigns

Rising skin cancer rates among the youth and knowledge about the risk factors has produced a multitude of mass media campaigns across various countries aimed to reduce the risk of skin cancer and use of indoor tanning devices. The first campaign was in Australia in 2007, sparked by the death of a young woman named Clare Oliver who attributed her melanoma to her use of indoor tanning devices (Oliver 2007). Negative media surrounding indoor tanning devices encouraged public outrage over her death. This media attention became a catalyst to the various bans placed on indoor tanning devices throughout the country. The result was a substantial decrease in the number of indoor tanning salons across the Australian states, with the highest reduction in Melbourne of 51 percent (Makin 2009). It is too early to assess the incidence rate of malignant melanoma among these Australian state populations.

Campaigns to reduce the indoor tanning device use have also sprouted in the United States. The Skin Cancer Foundation started a print ad campaign titled "Go with Your Own

Glow" that was developed to "encourage women to love — and protect — their skin, whatever its natural hue" (skincancer.org). The campaign not only depicts indoor tanning devices in a negative light, but also focuses on fashion and beauty trends to show that tanning is not fashionable or flattering and is obsolete as a lifestyle**.** Additionally, the fashion magazine *Cosmopolitan* has already covered the dangers of indoor tanning as part of an ongoing Practice Safe Sun campaign (Colino 2012). Even though there is no formal evaluation of the effects of these campaigns on the reduction of indoor tanning, the Community Preventative Services Task Force[4] has strongly recommended the use of mass media campaigns to achieve this objective (Holman 2013). Additionally, they recommend engaging celebrities and other public figures in these mass media campaign efforts. A number of celebrities and models, such as Victoria Beckam, Heidi Klum, and Miley Cyrus, have already spoken out about the dangers of indoor tanning and have promoted healthy, natural skin tones (Murray 2013). Popular mass media has a strong influence on social norms. Thus, it should be further utilized as a strategy to change popular belief about indoor tanning and the attractiveness of tans.

Indoor Tanning Industry

The indoor tanning industry has a large influence over the public regarding the perceptions of indoor tanning devices as well as public policy regarding their regulation. The prevalence of indoor tanning facilities alone is an indication of their influence in American culture. A study in 2006 found that there are an average of 42 indoor tanning facilities in major U.S. cities, exceeding their number of Starbucks and McDonalds (CITY100). Furthermore, studies show that living within two miles of an indoor tanning salon will increase an individual's likelihood of indoor tanning (Mayer 2011). Tanning facilities are more likely to be in neighborhoods with certain demographic and environmental factors, such as having more females aged 15-29 years, non-Hispanic Whites, and more high schools (Patel 2007). These groups are more likely to indoor tan and so they will have greater access to them.

One of the barriers to reducing indoor tanning is the public misconception about their health effects, and the Indoor Tanning Association (ITA) likely contributes to this misinformation. The ITA gives several misleading claims about the benefits of indoor tanning on their website. One of these is that "the industry's roots are therapeutic, and many Americans do in fact visit tanning facilities for the positive effects of UV light" (ITA 2013). These positive effects, the industry claims, are increased Vitamin D production. While Vitamin D deficiency is a problem in populations that receive limited sunlight for parts of the year, like those in the northern United States, the World Health Organization recommends much safer ways than indoor tanning to obtain sufficient Vitamin D levels such as dieting and supplements (WHO 2008). Another claim of the ITA is that indoor tanning is more responsible than outdoor tanning because it "minimizes the risk of overexposure to UV light" (ITA 2013). However, as stated earlier, indoor tanning emits UV light that is 10-15 times stronger than midday sunlight (Boniol 2012). Furthermore, studies have shown that many indoor tanners burn when they use indoor tanning devices and as many as 95 percent do not follow the FDA exposure time

[4] On August 20th, 2012, the Center for Disease Control and Prevention (CDC) hosted a meeting to discuss the current body of evidence to reduce indoor tanning as well as research gaps. The CDC appointed an independent, nonfederal, unpaid panel of public health and prevention experts for this task called the Community Preventative Services Task Force (Holman 2013).

recommendations (Hornung 2003). The industry also claims that "moderate tanning, for individuals who can develop a tan, is the smartest way to maximize the potential benefits of sun exposure while minimizing the potential risks associated with either too much or too little sunlight" (ITA 2013). This claim is inaccurate based on current research: as stated previously, even moderate indoor tanning can increase an individual's risk for melanoma by 75% (Cust 2010).

The various deceptive claims by the Indoor Tanning Association have not gone completely uncontested. In 2012, members of the U.S. House of Representatives Energy and Commerce Committee released a report titled: "False and Misleading Health Information Provided to Teens by the Indoor Tanning Association Industry: Investigative Report" (U.S. House 2012). The report found that 74 percent of indoor tanning facilities failed to follow FDA recommendations on tanning frequency. Additionally, 78 percent of facilities also reported health benefits when asked by customers, frequently citing FDA approval as evidence that the devices were safe. In response to this report, the U.S. Federal Trade Commission charged the ITA with making false health and safety claims about indoor tanning (FTC 2010). The ITA was required to include health disclosures in certain advertisements.

If indoor tanning behavior is to be reduced, the misinformation that the ITA and the indoor tanning industry have perpetrated must be corrected and the public must be clearly informed about the dangers of indoor tanning. The Community Preventative Services Task Force has suggested that this increased public awareness about the industry will facilitate efforts to help policy makers better regulate, restrict, and even prohibit indoor tanning devices (Holman 2013). Many researchers have even compared the fight against the indoor tanning industry to the fight against the tobacco industry. Thus, as seen with tobacco, it is essential that the industry be targeted in order for indoor tanning to be reduced.

College Students

Colleges and universities present an untapped yet important resource to reduce the prevalence of indoor tanning among young people. Among adults, indoor tanning is most common among those aged 18-25 years (CDC 2012). Additionally, social norms regarding indoor tanning within one's own peer group are also strongly correlated with indoor tanning (Holman 2013). These correlates make colleges and universities ideal venues to address the problem because they provide a controlled setting for which social norms can be influenced and changed within their student bodies. However, there is insufficient evidence to determine the effectiveness of previous college-based interventions to reduce the risk of skin cancer. The Community Preventative Services Task Force conducted an assessment of published studies on preventative strategies conducted at high schools and universities. However, due to the lack of available studies, the variability of their outcomes, and their limitations in design and execution, they labeled evidence as insufficient and identified education and policy approaches at secondary schools and colleges as a research gap (Task Force 2004).

Nonetheless, some of these studies had interesting findings. One studied the effectiveness of fear-based messages in promoting skin protection among women undergraduates. Usually, scare-tactics are avoided when promoting a certain health message because the public generally regard them as extreme and so will not heed their advice. The study used fear-based tactics such

as providing participants with graphic pictures of skin cancer surgeries as well as pamphlets that highlighted the deadliness of skin cancer. Additionally, participants were provided with information about practical ways to protect themselves from ultraviolet radiation. Participants reported increasing suggested behaviors that reduced their ultraviolet exposure in follow-up interviews. Overall, this study found that fear-based messages can be effective if combined with positive messages that promote alternative behaviors (Stephenson 1998).

Another study compared the effectiveness of health-based versus appearance-based interventions on university students' intentions to practice sun-protective behaviors. Students read essays that related to the health risks of UV radiation or the harmful effects of tanning on physical appearance. The study found that appearance-based interventions were more effective in promoting intentions to practice sun-protective behaviors (Jones 1994). Yet another study examined the effectiveness of appearance-based interventions as well as the role of social norms affecting the sun-protective behaviors of undergraduate women. The study used personalized UV photos which depicted the participant's underlying skin damage combined with information pamphlets about photo-aging as their appearance-based intervention. To study social norms, participants were led to believe an inflated statistic which alleged that 85 percent their peers used sunscreen on a daily basis. The results indicated that the appearance-based intervention was highly effective in increasing undergraduate's sun protective behaviors, especially when they were led to believe most of their peers were engaging in the same activity (Mahler 1997). This study indicates the importance of changing underlying social norms when it comes to reducing high risk behaviors regarding health in college-age individuals.

Since there are many motivations behind indoor tanning, there is no single preventative strategy that is able to reduce the indoor tanning among individuals with varying motivations. One study suggests that there are four different types of indoor tanners, based on their motivations and frequency of use, and different preventative strategies can used to target each corresponding group. The first Type I is referred to as the event tanners. Type I is the most common indoor tanner and indoor tans only occasionally for special events. They also tend to have the lowest level of positive attitudes towards indoor tanning devices. Their indoor tanning behavior can be reduced when given simple information about the appearance-related effects of indoor tanning and behavioral changes that can be made. Type II are mood tanners and are motivated by indoor tanning's mood elevating effects. Their behavior can be reduced by informing them about alternative ways to fight seasonal affective disorder (SAD) in the winter. Type III and IV tanners engage in indoor tanning the most and can pose the greatest challenge for making a behavioral change. Suggestions the study provides are the promotion of sunless tanning products to these types or clinical interventions with physicians (Hillhouse 2007).

Summary of Literature Review

There has been a significant increase in the incidences of all three types of skin cancer basal cell, squamous cell, and melanoma over the past several decades in the US and worldwide. The increase in melanoma incidence is especially pronounced in young women aged 15-29 and it is alarming because melanoma accounts for the vast majority of skin cancer deaths. This increase has been attributed to the rise in ultraviolet exposure among populations. Specifically, use of indoor tanning devices is a main contributor to this increased UV exposure. Indoor tanning has

risen dramatically in popularity over the last few decades and national surveys indicated they are especially popular in non-Hispanic white women in high school and college. These surveys further indicate that about one-third of this demographic are using indoor tanning devices, with an average frequency of about 28 sessions per year. Indoor tanning devices emit UV radiation about 10-15 times stronger than the midday sun and are used primarily for cosmetic purposes to darken the user's skin. Indoor tanning devices have become strongly linked to the onset of all types of skin cancer, as evidenced by the dose response relationship measured in several studies as well as the increase of melanomas arising on the trunks of young women, an area not normally exposed to UV light. Studies support that many skin cancer cases seen today could have been avoided if the individual had never used an indoor tanning device.

The main motivation for using indoor tanning devices is to achieve an "attractive" tan. Other motivations include going for warmth, light, feelings of happiness, to reduce the appearance of acne, and to get a "pre-vacation tan" to prevent burning. It has even been suggested that indoor tanning is addictive in nature. There is a common belief in society that tan skin is more attractive than pale skin. However, this belief is perpetrated by society via the media, pop culture, and the indoor tanning industry. By studying the motivations for indoor tanning and identifying individuals most at-risk to engage in this behavior, certain strategies can be formulated to reduce the use of indoor tanning devices. The use of legislation and mass media campaigns are strategies that have already been employed. They have been shown to be successful in changing social norms about indoor tanning and its reduction. The indoor tanning industry has been perpetrating misinformation about the benefits of indoor tanning which must be dispelled in order for the public to be better informed about their health risks. Finally, colleges and universities provide an untapped resource to reduce the prevalence of indoor tanning among students. Several studies measuring the effectiveness of certain strategies geared toward students have been conducted at colleges. These strategies used fear-based messages combined with positive behavior modifications, appearance-based interventions, and social norms. Studies also suggest that a combination of preventative strategies should be used to target a diverse array of indoor tanners. However, a research gap exists in this area and more work must be done to in order to find which strategies are best in reducing indoor tanning among college students.

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Appendix B: Informed Consent Form

Illinois Wesleyan University

Environmental Studies 480: Senior Seminar--Creating a Sustainable Society

INFORMED CONSENT FORM

You are invited to be a **participant in a research study about environmental issues** in our community. The study is being conducted by fourth-year college students at **Illinois Wesleyan University (IWU),** who are **majoring in Environmental Studies** and enrolled in the **Environmental Studies 480 senior seminar.** Please read this document and ask any questions you have before agreeing to be in the study.

The **purpose of this study** is to *provide students an opportunity to engage in real-life work aimed at advancing environmental and social improvement* in the our community The **potential benefit** associated with your participation in this research is to have an *opportunity to provide your input regarding environmental issues of relevance to our community a*nd to *work with a student who is sincerely interested in working to improve the community* of which you are a member. There are **no anticipated risks** associated with your participation in this research, other than that you are *giving of your time*.

The student with whom you work will **keep all notes taken during interviews and focus groups** with you **confidential**. They will be used in preparation for the student's research paper, which the student will submit to the course instructor for evaluation at the end of the semester and to the community organization that has served as a partner in the student's research. The student will turn in all field notes with the final paper, and the instructor will destroy them within approximately one year.

With your permission (via your signature below), the student may refer to you by name in her/his final research paper and presentation. Without name consent, the information you provide will be referenced anonymously.

Your decision whether or not to participate in this research **will not affect your current or future relations with Illinois Wesleyan University** or any of its representatives. If you decide to participate in this study, you are **free to withdraw** from the study at any time without affecting those relationships.

If you have any questions about the research or your rights as a participant in the study, you may contact **Dr. Laurine Brown** the professor of the course in which the student researcher is enrolled, in her office at IWU at **309-556-1067 or lbrown@iwu.edu**. You may also contact the Chair of the IWU Institutional Review Board, **Dr. Brian Brennan**, with any questions about your rights as a participant in this research at his office at IWU at **309-556-3972 or bbrenna1@iwu.edu.**

Statement of Consent: You will be given a copy of this form to keep for your records.

The procedures of this study have been explained to me and my questions have been addressed. The information that I provide is confidential and will be used for research purposes only. I understand that my participation is voluntary and that I may withdraw anytime without penalty. I also confirm that I am 18 years or older. If I have any concerns about my experience in this study (e.g., that I was treated unfairly or felt unnecessarily threatened), I may contact the Chair of the Institutional Review Board or Director of the sponsoring Program of this research regarding my concerns.

_____ _____

Participant's Signature Date

_____ _____

Researcher's Signature Date

OPTIONAL CONSENT FOR NAME: I hereby **allow my NAME to be used** in the student researcher's **field notes and the final research paper and presentation** described above.

_____ _____
Participant's Signature Date

(Please see reverse side for additional consent requests)

If AUDIO RECORDINGS ARE USED: I hereby allow the student researcher to **obtain audio recordings of our interview** in order to accurately capture the details. I understand this recording will only be used for the purposes of preparing the students final research paper, and will be destroyed at the completion of the research.

_____ _____
Participant's Signature Date

If PHOTOGRAPHY IS USED: I hereby allow the student researcher to take **photographs of me and/or my work projects or facilities** for use in their research project, including possible inclusion in their final research report or community briefing presentation.

_____ _____
Participant's Signature Date

If VIDEO RECORDING IS USED: I hereby allow the student researcher to take **video recordings of me and/or my work projects or facilities** (e.g. garden, wind farm, golf course) for use in their research project, including for use in their final research report or community briefing presentation.

_____ _____
Participant's Signature Date

Appendix C: Research Timeline

Assessing the Indoor Tanning Behaviors and Risk of Skin Cancer
Among Illinois Wesleyan University Students

MONTH/Week 2013	DATE Completed	DESCRIPTION OF TASKS/ACTIONS
Ongoing		Record in Research Diary
AUGUST		
Week 1: Aug 1-3		**DUE:** Preliminary Research Project Description
Week 2: Aug 4-10		**DUE:** Extended deadline for Preliminary Research Project Description
Week 3: Aug 11-17		
Week 4: Aug 18-24		**DUE:** (If Requested/Updated) Research Preliminary Research Project Description
SEPTEMBER		
Week 1: Sept 1-7	Sep 6	Begin Literature Review Interview with Becky Powell, Community Cancer Center
Week 2: Sept 8-14	Sep 9	**DUE:** Revised Research Project Description & Timeline Attend IWU Skin Cancer Screening
Week 3: Sept 15-21		**DUE:** IRB Research Project Application
Week 4: Sept 22-28	Sep 27	**DUE:** Literature Review – Detailed Outline + Refs Meet with Research Mentor, Dr. Searing, IWU campus
OCTOBER		
Week 1: Sept 29-Oct 5		**DUE:** Research Project Proposal (+ Lit Review)
Week 2: Oct 6-12		**DUE:** Peer Response/Review #1 Res Proposal Conduct Student Interviews
Week 3: Oct 13-19		Conduct Student Interviews Begin formulating IWU Indoor Tanning Survey
Week 4:Oct 20-Oct 26	Oct 22 Oct 23 Oct 25	Interview Angela Crawford, McLean County Health Dept. Observe Indoor Tanning Facility Inspection Meet with Chris Sweet to learn Qualtrics Program
Week 4:Oct 27-Nov 2	Oct 30	Conduct Sorority Focus Group
NOVEMBER		
Week 1: Nov 3-9		**DUE:** Draft Research Project Report Meet with Dr. Searing to revise survey Meet with Dr. Brown to revise survey
Week 2: Nov 10-16	Nov 13 - 16	**DUE:** Peer Response/Review #2 Draft Res Report Distribute IWU Indoor Tanning Survey to IWU students
	Nov 12	**DUE:** PPT Presentation Interview with Dr. Lucy Wisdom, Associates In Dermatology

Week 3: Nov 17-23		Practice Presentations (+ another session TBA)
Week 4: Nov 24-30		**DUE:** Revised PPT Presentation
		DUE: Final Research Project Report
DECEMBER		
Week 1: Dec 1-7	Dec 6	Formal Community Briefing #1 Debrief with Becky Powell, community partner
Week 2: Dec 8-14		Formal Community Briefing #2
		DUE: Research Diary + Consent Forms (earlier submission recommended)

Appendix D: Key Informant Interview Question Guides

Becky Powell, Community Cancer Center

- What is the role of the Community Cancer Center in McLean County? What is your role at the Community Cancer Center?
- How severe is the growing incidence of skin cancer, especially among the youth?
- How can my research contribute to your organization?
- What has the Community Cancer Center done in the past to reduce the rates of skin cancer in McLean County and at Illinois Wesleyan?

Dr. Lucy Wisdom, Associates in Dermatology

- Describe your specialties and your role as a dermatologist.
- In your practice, how severe is the growing incidence of skin cancer, especially among the youth?
- In your practice, what constitutes the biggest risk for the development of skin cancer?
- Have you ever recommend to patients the use of an indoor tanning device?
- Is using indoor tanning devices in moderation safe?
- Is it ever safe to use an indoor tanning device?
- How do you convince a patient to stop using indoor tanning devices?
- How often do you recommend using sunscreen in consultations with patients? What about other sun-protective habits like wearing hats or other clothing? Do you document this?
- Do you find your patients generally heed you're advice regarding indoor tanning devices and sun safety?
- In your professional opinion, what do you think needs to be done to reduce the risk of skin cancer, especially among young people?

Angela Crawford, McLean County Health Department

- Describe the indoor tanning inspection process.
- Currently, indoor tanners aged 14-17 need parental consent. What does this consent entail?
- Have you seen a decrease in the number of indoor tanning salons since the legislation passed this summer banning indoor tanning use for minors aged 18 and under?
- What does the warning statement that indoor tanning facilities are required to have their customers sign actually say?
- How do you plan to enforce the 18 and over ban on indoor tanning devices?
- In your opinion, what needs to be done to reduce the prevalence of indoor tanning?

Appendix E: Individual Student Interview Question Guide

Practice

- Do you use indoor tanning devices?
- How many times per year do you use indoor tanning devices?
- How old were you when you first used an indoor tanning device and why did you use it?

Experience of indoor tanning devices

- How do you feel when use an indoor tanning device?
- How would you describe indoor tanning salons? i.e. The atmosphere? The staff?
- Do you notice any health warnings in the indoor tanning salon and in the individual rooms?
- Do you consider tanning to be a luxury? If you were pressed for money, would you give up going shopping or going to the tanning salon?
- Have you ever been burnt from an indoor tanning device?

Motivations

- Why do you use indoor tanning devices?
- Do you use spray tan?
- Do you prefer spray tan or indoor tanning devices? Why?
- Why did you stop using indoor tanning devices?
- Where do you place tanned skin in terms of what your value most about your appearance?
- Do you ever think you use indoor tanning devices too much or not enough? Have you ever tried to cut back? What stopped you?

Perceptions

- What do you consider to be the health benefits and health risks of indoor tanning devices?
- Does the new 18 and over law for indoor tanning device use change your perception of them in any way? What about the federal tax of 10%?
- What do you think are your peer's perceptions of indoor tanning devices?
- Did your family approve of your using indoor tanning devices?

Appendix F: Focus Group Question Guide

Conducted on October 30th, 2013 at a sorority chapter house at Illinois Wesleyan University

- Introductions: Say name, age, and if you indoor tan.
- How much do you know about the health risks of indoor tanning?
- What are your motivations for indoor tanning?
- Do you ever feel guilty when indoor tanning?
- What are your perceptions of indoor tanning?
- What are your peer's perceptions of indoor tanning?
- What are your perceptions towards tan people such as celebrities?
- Does the new 18 and under age ban on indoor tanning devices change your perceptions of them?

Appendix G: IWU Indoor Tanning Survey

Entitled: Health Behavior Survey

Q0 Hello! My name is Ellen Cornelius. I am a senior at Illinois Wesleyan University and for my Environmental Studies 480 Senior Seminar class I am interested in learning some of the health habits of Illinois Wesleyan students. My contact information is ecorneli@iwu.edu. My research has been approved by the University's Institutional Review Board. This survey should take about 5-10 minutes. If you are able to fill it out, your help would be greatly appreciated! Any information you share will be anonymous and confidential; there will be no way to connect the information you have shared back to you. If you feel uncomfortable at any time you may refuse to answer questions or stop at any moment. If you have any questions, you may contact the professor of the course, Dr. Laurine Brown at 309-556-1067 or lbrown@iwu.edu. You may also contact the Chair of the IWU Institutional Review Board, Dr. Brian Brennan, at 309-556-3972 or bbrenna1@iwu.edu. Thank you for your time. Do you consent?

- ❍ Yes
- ❍ No

If No Is Selected, Then Skip To End of Survey

(Page Break)

Q1 What is your age?

- ❍ 17
- ❍ 18
- ❍ 19
- ❍ 20
- ❍ 21
- ❍ 22
- ❍ 23

Q2 What is your gender?

- ❍ Male
- ❍ Female
- ❍ Other

Q3 What is your race?

- ❍ Hispanic or Latino
- ❍ American Indian or Alaskan Native
- ❍ Asian
- ❍ Black or African American
- ❍ Native Hawaiian or Other Pacific Islander
- ❍ White
- ❍ Other

Q4 What types of organizations are you involved in at Illinois Wesleyan? Mark all that apply.

- ❑ Academic
- ❑ Athletic Team
- ❑ Cultural
- ❑ Fine Arts
- ❑ Greek Life
- ❑ Media
- ❑ Musical
- ❑ Political or Activist
- ❑ Residential Life
- ❑ Spiritual
- ❑ Student Government
- ❑ Volunteer
- ❑ Other: _____

(Page Break)

The following set of questions is a federal standard that will be used to determine your skin type.

Q5 What is the color of your eyes?

- ❍ Light blue, green, or gray
- ❍ Blue, gray, or green
- ❍ Blue
- ❍ Dark brown
- ❍ Brownish black

Q6 What is the color of your hair?

- ❍ Sandy red
- ❍ Blond
- ❍ Chesnut/dark blond
- ❍ Dark brown
- ❍ Black

Q7 What is the color of your unradiated skin?

- ❍ Reddish
- ❍ Very pale
- ❍ Pale with beige tint
- ❍ Light brown
- ❍ Dark brown

Q8 Are there freckles on your unradiated skin?

- ❍ Many
- ❍ Several
- ❍ Few
- ❍ Incidental
- ❍ None

Q9 What happens when you stay long in the sun?
- ❍ Painful redness, peeling, blistering
- ❍ Burns regularly with peeling
- ❍ Burns sometimes with peeling
- ❍ Burns rarely
- ❍ Never burns

Q10 To what degree do you turn brown?
- ❍ Hardly or not at all brown
- ❍ Tans a little, a light color
- ❍ Tans reasonably
- ❍ Tans very easily
- ❍ Quickly turns dark brown

Q11 Do you turn gray-brown directly after (within several hours) sunbathing?
- ❍ Never
- ❍ Hardly
- ❍ Sometimes
- ❍ Often
- ❍ All of the Time

Q12 How does your face react to the sun?
- ❍ Very sensitive
- ❍ Sensitive
- ❍ Normal
- ❍ Very resistant
- ❍ Never a problem(Page Break)

13 When outside for more than one hour, do you wear sunscreen SPF 30 or higher?
- ❍ Never
- ❍ Rarely
- ❍ Sometimes
- ❍ Most of the Time
- ❍ Always

Q14 Have you ever used an indoor tanning device, such as a sun lamp, sunbed, or tanning booth (does NOT include getting a spray-on tan)?
- ❍ Yes
- ❍ No

If No Is Selected, Then Skip To Why have you not used a tanning bed i...

(Page Break)

Q15 What grade were you in when you first used an indoor tanning device?
- ❍ Younger than elementary school
- ❍ Elementary school (grades 1st through 5th)
- ❍ Middle school (grades 6th through 8th)
- ❍ High school (grades 9th through 12th)
- ❍ College

Q16 What were your reasons for using an indoor tanning device? (Check all that apply)

- ❑ I wanted to look good for a special occasion
- ❑ I did not want to burn before I went on vacation
- ❑ It gave me confidence
- ❑ It made me feel happier
- ❑ I think my pale skin is unattractive
- ❑ It helped to clear my acne
- ❑ It was recommended to me by my physician
- ❑ Other: _____

Q17 During the past 12 months, how many times did you use an indoor tanning device?

- ❍ 0 times
- ❍ 1 or 2 times
- ❍ 3 to 9 times
- ❍ 10 to 19 times
- ❍ 20 to 39 times
- ❍ 40 or more times

If 1 or 2 times Is Selected, Then Skip To Do you have siblings that have ever u...If 3 to 9 times Is Selected, Then Skip To Do you have siblings that have ever u...If 10 to 19 times Is Selected, Then Skip To Do you have siblings that have ever u...If 20 to 39 times Is Selected, Then Skip To Do you have siblings that have ever u...If 40 or more times Is Selected, Then Skip To Do you have siblings that have ever u...

(Page Break)

Q18 Why do you not currently use indoor tanning devices? (Mark all that apply)

- ❑ I am concerned about the health risks associated with them
- ❑ Pressure from my friends and/or family has influenced me to not use tanning beds
- ❑ Tanning beds are too expensive
- ❑ I do not have the desire to have tan skin
- ❑ Other: _____

Q19 Do you have siblings that have ever used an indoor tanning device?

- ❍ Yes
- ❍ No
- ❍ Do not know

Q20 Do you have parents or guardians that have ever used an indoor tanning device?

- ❍ Yes
- ❍ No
- ❍ Do not know

(Page Break)

The International Agency for Research on Cancer categorizes ultraviolet tanning devices in Group 1, a list of the most dangerous cancer-causing substances. Group 1 also includes agents such as plutonium, cigarettes, and solar UV radiation. Additionally, research has found that people who first use an indoor tanning device before age 35 increase their risk for melanoma by 75 percent. (Melanoma is the most serious form of skin cancer and can be deadly.)

Q21 Were you aware of most of this information?

- ❍ Yes
- ❍ Somewhat
- ❍ No

Answer If Have you ever used an indoor tanning device, such as a sun lamp, sunbed, or tanning booth (does N... Yes Is Selected

Q22 How likely are you to reduce your indoor tanning in light of this information?

- ❍ Unlikely
- ❍ Somewhat Unlikely
- ❍ Undecided
- ❍ Somewhat Likely
- ❍ Likely
- ❍ I do not currently indoor tan

Answer If Have you ever used an indoor tanning device, such as a sun lamp, sunbed, or tanning booth (does N... Yes Is Selected

Q23 Please explain briefly why or why not:

Appendix H: IWU Indoor Tanning Survey Results: Selected Charts

Question #16: "What were your reasons for using an indoor tanning device?"(Mark all that apply)

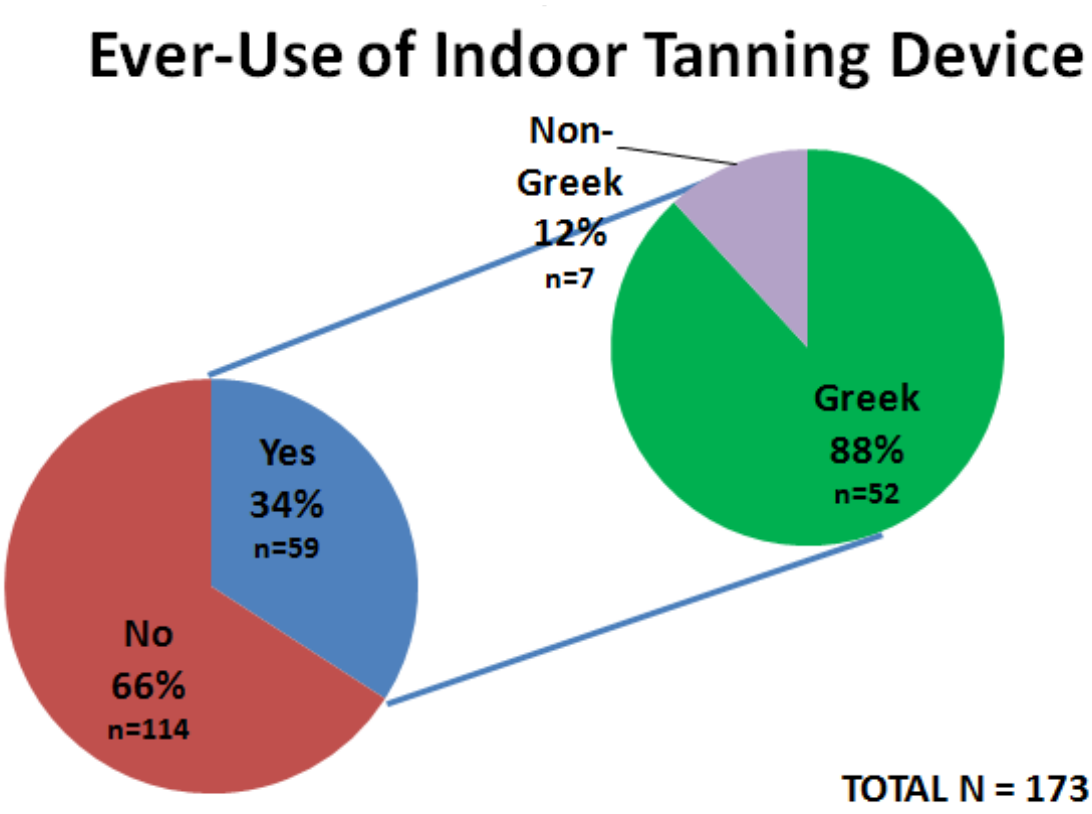
#	Answer	Response	%
1	I wanted to look good for a special occasion	49	83%
2	I did not want to burn before I went on vacation	24	41%
3	It gave me confidence	25	42%
4	It made me feel happier	19	32%
5	I think my pale skin is unattractive	19	32%
6	It helped to clear my acne	18	31%
7	It was recommended to me by my physician	2	3%
8	Other:	4	7%
	(n=59)		

Question # 17: "During the past 12 months, how many times did you use an indoor tanning device?"

#	Answer	Response	%
1	0 times	26	44%
2	1 or 2 times	7	12%
3	3 to 9 times	12	20%
4	10 to 19 times	8	14%
5	20 to 39 times	3	5%
6	40 or more times	3	5%
	(n=59)		

Question #18: "Why do you not currently use indoor tanning devices? (Mark all that apply)

#	Answer	Response	%
1	I am concerned about the health risks associated with them	111	80%
2	Pressure from my friends and/or family has influenced me to not use tanning beds	23	17%
3	Tanning beds are too expensive	52	37%
4	I do not have the desire to have tan skin	71	51%
5	Other:	11	8%
	(n=139)		



***Total N equals 173 because one user did not complete the survey**

Appendix I: Indoor Tanning Inspection Form

Page _____ of _____

ILLINOIS DEPARTMENT OF PUBLIC HEALTH
DIVISION OF FOOD, DRUGS AND DAIRIES
525 W. JEFFERSON ST., SPRINGFIELD, IL 62761
PHONE 217-785-2439 FAX 217-782-0943

Permit #_____
Local Health Dept ID#_____
Inspector ID#_____
Total # of Units _____

TANNING FACILITY INSPECTION FORM

Name of establishment _____ Telephone _____

Street address _____

City_____, Illinois Zip code+4 _____

Owner _____ Operator _____

Primary operation: □Tanning facility □Hotel/Motel □ Health club □Beauty salon □Residence □Other _____

Type of Inspection: □Initial □Routine/Renewal □Follow-up □2nd follow-up □No permit

□Out of business □Change of ownership □Complaint □Other _____

Based on an inspection this day, the items circled below identify violations of the Tanning Facility Permit Act and rules promulgated under this Act. The inspector's observation(s) and corrective action date(s) are described below. Failure to correct these violations within the time specified may result in prosecution and/or fines under the enforcement provisions of this Act. A short description of each item number, and its citation in the Act and/or the code appears on the reverse side of this inspection form. "Bold italic" item numbers represent critical violations that must be corrected immediately. "Underlined" item numbers, unless otherwise noted, represent serious violations that must be corrected within five days.

ITEM:

1	*2*	*3*	4	5	6	7	8	*9*	*10*	11	12	13	14	15	16	17	18	*19*
20	21	22	**23**	*24*	*25*	**26**	**27**	28	*29*	**30**	**31**	**32**	33	34	**35**	**36**	*37*	*38*
39	40	41	42	43	*44*	**45**	46	47	48	49	50	51	52	53	54	55	56	

Item	Observations	Check if Repeat violation	Correct by

INSPECTOR: List and describe "critical" violations first, followed by "serious" violations. Then list and describe remaining violations. Additional violations can be listed on "supplemental inspection remarks" form (IL 482-0203).

ection report form received by _____ Date _____

Inspector's signature _____ Time in _____

Inspector's printed name _____ Time out _____

IL 482-0848 (Rev. 08/10)

The following chart lists items from the Tanning Facility Permit Act [210 ILCS 145] (Ill. Rev. Stat., ch. 111 1/2, pars. 8351 et seq.) and the Tanning Facility Code (77 Ill. Adm. Code 795) that are subject to inspection. Each item is accompanied by its applicable citation and a brief description. Refer to your copy of the act and the code for the complete statutory and regulatory language.

"**SHADED**" items represent "critical" violations that must be corrected immediately.
"**DOUBLE-LINED**" items, unless otherwise noted, represent "serious" violations that must be corrected within five days.

ITEM	77 Ill. Adm. Code Sec. 795	210 ILCS 145/	DESCRIPTION
1.	.130g		Failure to allow inspection
2.	.70(d)	10(h)	Failure to obtain permit before operations
3.	.60(b)		New owner's failure to obtain provisional permit
4.	.70(e)	10(g)	Permit not displayed conspicuously
5.	.100(a)		Failure to report application info changes
6.	.120(a)		Reference to Department permit approval
7.	.120(b)		Claims of safety or freedom from risk
8.	.180(f)		Emergency numbers not posted
9.	.180(g)		List of photosensitizing agents not made available to consumer
10.	.100(b)		Failure to maintain lamp certification
11.	.100(c)		Failure to maintain bulb replacement log
12.	.190(a)	25(f)	Consumer warning statement not provided and signed annually
13.	.190(b)	25(a)	Medicine, cosmetics declaration insufficient
14.	.190(d)		Exposure records insufficient
15.	.190(e)		Computer records not maintained
16.	.200		Failure to submit completed injury report within 10 days
17.	.180(b)		Training records insufficient or not available
18.	.180(a)	25	Operator not adequately trained
19.	.180(c)		No operator present but facility open
20.	.180(h)		Token units accessible without operator
21.	.180(i)		Tokens sold in quantity greater than 24 hour supply
22.	.180(d)	25(c)	Operator does not instruct consumer about unit instructions
23.	.180(e)		Exposure time not properly determined
24.	.180(e)		Repeated use in 24 hours allowed
25.	.190(b)		Medicine, cosmetics declaration not confidential
26.	.190(c)		Use by minors under age 14
27.	.190(c)		Use by minors 14-17 without consent
28.	.190(c)		Consent taken by minor
29.	.170(a)	20(e)	Eyewear not available
30.	.170(f)	25(b)	Eyewear use not enforced
31.	.170(b)	20(e)	Eyewear not in compliance with 21 CFR 1040.20(c)(4)
32.	.170(c)	20(e), 25(g)	Eyewear not properly sanitized
33.	.170(d)		Eyewear test kit not available or not used
34.	.150(a)	25(f)	IDPH warning sign not posted near each tanning unit
35.	.150(b)(1)	20(a)	Equipment not in compliance with 21 CFR 1040.20
36.	.150(b)(2)	20(c)	Timers not in compliance with 21 CFR 1040.20
37.	.150(b)(3)	20(d)	Non-compliant manual termination control
38.	.150(b)(6)	20(f)	Lamps not shielded with physical barrier
39.	.150(b)(8)		Non-compliant lamps installed in units
40.	.160(a)		Exposure distance not marked in stand up booth
41.	.160(b)		Booth construction insufficient
42.	.160(c)	20(g)	Lack of hand rails or non-slip floors
43.	.210(i)		Fixtures not in compliance with codes
44.	.20(b)(1)		Unauthorized videotaping or photography
45.	.210(d)	25(g)	Surface disinfecting not properly conducted
46.	.150(b)(7)	20(i)	Ambient temperature greater than 100F
47.	.150(b)(9)		Floors not easily cleanable
48.	.210(f)		Floors not dry
49.	.210(e)		Ventilation insufficient
50.	.210(c)		Clean towels not provided
51.	.210(h)		General sanitation insufficient
52.	.210(a)		Toilet facilities non compliant
53.	.210(b)		No access to drinking water
54.	.210(g)		Shower area non-compliant
55.	.210(j)		Animals on premises
56.	.20		Non-compliance with other law, rule or code

TANFORM.FD/FD-1
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PO #5210337 10M 08/10

Appendix J: Indoor Tanning Warning Statement

PRINT NAME Name_____ Age_____ Birthdate_____ Address_____ City_____ St_____ Zip_____ E-mail _____ Home Phone_____	Any person under 18 years of age must have the written consent, signed by the parent or legal guardian. I have read the above information provided and give consent for: _____ (Name of Minor to use the Suntan Equipment) _____ Parent or Guardian Signature _____ Operators Signature

Determination of Skin Types

Determination based on your hereditary disposition.	**0**	**1**	**2**	**3**	**4**	**Your points**
1.What is the color of your eyes?	Lt. Blue, Gray or Green	Blue, Gray or Green	Blue	Dark Brown	Brownish Black	
2.What is the color of your hair?	Sandy Red	Blonde	Chestnut Brown	Dark Brown	Black	
3.What is the color of your untanned skin?	Redish	Very Pale	Pale with Beige tint	Light Brown	Dark Brown	
4.Are there freckles on your untanned skin?	Many	Several	Few	Incidental	None	
Determination based on your experience with sunbathing to the unexposed skin.	**0**	**1**	**2**	**3**	**4**	
1.What happens to you when you stay long in the sun?	Painful redness, peeling, blistering	Burn regularly w/peeling	Burns sometimes w/ppeling	Rarely Burns	Never Burns	
2.To what degree do you turn brown?	Hardly or not at all brown	Tans a little, a light color	Tans Reasonably	Tans very easily	Quickly turns dark brown	
3.How does your face react to the sun?	Very Sensitive	Sensitive	Normal	Very Resistant	Never a problem	
Your tanning habits	**0**	**1**	**2**	**3**	**4**	
1.When sunbathing, do you try to tan your whole body?	Never	Hardly Ever	Sometimes	Often	Always	
2.When did you last sunbathe (even with sunlamp)?	More than 3 months ago	2-3 months ago	1-2 months ago	Less than a month ago	Less than 16 days ago	
					TOTAL	

List medications and cosmetics

1._____
2._____
3._____
4._____
5._____
6._____
7._____
8._____
9._____
10._____

Total Score	Skin Sensitivity	Skin Type	Sun Sensitivity	Pigmentary Response
0-6	Very Sensitive	I	Always burns easily	Little or no tan
7-14	Sensitive	II	Always burns	Minimal tan
15-22	Normal	III	Sensitive, burns moderately	Tans gradually
>23	Very Resistant	IV	Moderately sensitive, burns initially	Tans easily, light brown
		V	Minimally sensitive, burns rarely	Tans darkly, dark brown
		VI	Insensitive, does not burn	Darkly pigmented

Signature_____ Date_____

******Please turn over and read back side of this form and then sign and date.**

DANGER ULTRAVIOLET RADIATION

- Follow instructions.
- Avoid too frequent or lengthy exposure. As with natural sunlight, exposure to a sunlamp may cause eye and skin injury, sunburn and allergic reactions. Repeated overexposure may cause chronic damage characterized by wrinkling, dryness, premature aging of the skin, and skin cancer.
- Wear protective eyewear.
- FAILURE TO USE PROTECTIVE EYEWEAR MAY RESULT IN SEVERE BURNS OR LONG TERM INJURY TO EYES.
- Ultraviolet radiation from sunlamps enhances the effects of the sun. Do not sunbathe before or after exposure to ultraviolet radiation.
- Abnormal or increased skin sensitivity or burning may be caused by certain foods, medications (including, but not limited to tranquilizers, diuretics, antibiotics, high blood pressure medication, birth control pills, and skin creams), cosmetics, or toiletries. Consult a physician or pharmacist before using a sunlamp if you are using prescription or nonprescription medications, have a history of skin problems, or believe yourself especially sensitive to sunlight. Pregnant women and women on birth control pills who use a tanning device may develop discolored skin.
- If you do not tan in the sun, you are unlikely to tan from the use of this product.
- Use of a tanning device may not provide a protective base in regard to sun exposure.

I have read the above information provided and understand the risks I am taking in choosing to tan at Xtreme Tan.

Printed Name:_____

Signature:_____

Today's Date:_____