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Implementation of the Wiegand Sun Safety Program into physicians' offices in southern Nevada

Breanne Eddington
University of Nevada Las Vegas

IMPLEMENTATION OF THE WIEGAND SUN SAFETY PROGRAM INTO PHYSICIANS' OFFICES IN SOUTHERN NEVADA

by

Breanne Eddington

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Michelle Chino, Committee Chair

Sheniz Moonie, Committee Member

Timothy J. Bungum, Committee Member

Michele C. Clark, Graduate Faculty Representative

Ronald Smith, Ph. D., Vice President for Research and Graduate Studies
and Dean of the Graduate College

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ABSTRACT

Implementation of the Wiegand Sun Safety Program into Physicians' Offices in Southern Nevada

by

Breanne Eddington

Dr. Michelle Chino, Committee Chair
Associate Professor, Dept. of Environmental and Occupational Health
University of Nevada, Las Vegas

In this study Nevada Cancer Institute's Wiegand Sun Safety Program was implemented in 14 clinics in Southern Nevada as a pilot run to increase awareness in children and their guardians through educational materials in pediatricians' and family physicians' offices. It was hypothesized that the increased display of information regarding sun safety and skin cancer in physicians' offices would increase patient and guardian awareness of the subject and increase the likelihood of patients and/or guardians asking their physician questions about skin cancer and sun safety, resulting in an increase in preventive actions by guardians to protect their children from damaging rays of the sun. Clinics were randomly divided into an experimental and control group, receiving varying amounts of sun safety information. The clinics were given comparative assessments to evaluate the effectiveness of the program, as was measured by the number of topic-specific questions asked of them by patients and guardians.

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CHAPTER 1

INTRODUCTION

Skin cancer is the most prevalent form of cancer in the world, having three times the incidence rate of lung cancer, which is ranked second (Peattie, Peattie, & Clarke, 2001; Armstrong & Kricker, 1995). What was once seen as a disease of older individuals, skin cancer is now becoming more apparent in the youth. Melanoma, the deadliest form of skin cancer, accounts for approximately three percent of pediatric cancers (Ferrari, Bono, Baldi, et al., 2005), with 90 percent of those cases diagnosed in females 10-19 years of age. Between 1973 and 2001, the rate of pediatric melanoma increased 2.9 percent for those under the age of 20 (Lange, Palis, Chang, Soong, & Balch, 2007). These statistics show a definite public health concern for the youth. Due to the prevalent yet preventive nature of this disease, sun safety education is an ideal concentration for public health endeavors.

<u>Specific Aims</u>. Through the Nevada Cancer Institute and a generous grant from the E.L. Wiegand Foundation, the Wiegand Sun Safety Program created and piloted a physician education program that focused on the level of awareness of patients and parents in pediatric and family physicians' offices, on the topic of skin cancer and sun safety behaviors. This project was based on the general constructs of the Health Belief Model (HBM), which is a psychological model originally developed as a means of understanding people's reasoning for not taking part in

disease/illness prevention measures, as well as the behaviors associated with disease diagnosis. The HBM is a value-expectancy theory, where the desire to avoid illness (skin cancer) is the value and better health (sun safe behavior) is the expectancy. The use of this theoretical framework created an applied, inductive approach to the project.

The targeted population for the project was children and parents that seek care from pediatricians and family practice physicians in Southern Nevada. The primary predictor variable in this study was the display of sun safety materials in physicians' offices; the outcome variable was the level of awareness of the patients and parents. An important confounding or intervening variable was that the physicians may address and/or discuss sun safety and skin cancer in differing manners, affecting the dependent and independent variables.

The specific aims of the project were: 1) to educate physicians and staff with updated information on sun safety behaviors and skin cancer and, 2) to display sun safety materials in the offices of the study group. The study sought to answer the following questions: *Does the display of sun safety materials in physicians' offices increase the likelihood of patients and parents asking their doctor about sun safety and therefore increase awareness through physician discussion?* and *What role do seasons play on sun safety awareness, as measured by changes in the occurrence of related questions for physicians?* It was hypothesized that the increased display of information regarding sun safety and skin cancer in physicians' offices would increase patient and parent awareness of the subject, increase the likelihood of patients and/or parents asking their physician questions about skin cancer and sun safety, resulting in an increase in preventive actions, by parents, to protect their children from damaging rays of the sun. This was measured through the increased questions, towards physicians and staff, about skin cancer and sun safe behaviors. It was expected that the clinics displaying the given materials would see a higher increase in questions and awareness than the clinics in the control group.

CHAPTER 2

LITERATURE REVIEW

The sun provides the earth with warmth, light, and energy that is needed for survival. Too much of a good thing, however, can sometimes be bad as is the case with the ultraviolet (UV) radiation the sun emits. UV radiation is listed as a carcinogen by the United States Department of Health and Human Services (American Academy of Dermatology, 2008b). In fact, 90% of skin cancer cases are a product of UV radiation (Grant-Petersson, Dietrich, Sox, Winchell, & Stevens, 1999; Warshaw, 2008). Using proper sun protection methods in childhood greatly reduces the likelihood of skin cancer development later in life (Grant-Petersson, et al., 1999). As a result of the increasing cases of skin cancer, it is important to begin sun safety education at a young age, such as in well-child exams given by pediatricians (Abdulla, Feldman, Williford, Krowchuk, & Kaur, 2005), and in the classroom setting. The Nevada Cancer Institute's Wiegand Sun Safety Program implemented sun safety education in classrooms throughout the state of Nevada, as well as in physicians' offices in southern Nevada.

One in six Americans will develop skin cancer at some point in their life (Grant-Petersson, et al., 1999), making sun safety education a crucial component of health education. A focus on sun protection occurs predominantly in warmer climates, thus proper measures are not commonly taken in states with cooler climates or in the winter months

(Grant-Petersson, et al., 1999). By implementing this program at the beginning of the winter season, it was hoped that this incorrectly perceived notion would be altered as a result of the sun safety information exposure. The program continued throughout the year, and therefore the varying seasons, to maintain consistent access to, and reminders of the necessary precautions of the sun. Prevention and early detection (Balk, O'Connor, & Saraiya, 2004) create a system of minimizing the cases of skin cancer which are diagnosed each year. Though skin cancer affects both genders and all ages, the cases of diagnosed basal cell carcinoma in females under 40, have tripled over the past 30 years, while the rates of squamous cell carcinoma has quadrupled (Warshaw, 2008). Nevada is one of four states in the nation with the highest mortality rate from skin cancer (Abdulla, et al., 2005). This shows the importance of implementing a sun safety education program into physicians' offices to start sun safe practices at an early age.

There are three types of ultraviolet radiation (Food and Drug Administration, 2005), all of which are associated with different wavelengths of light.

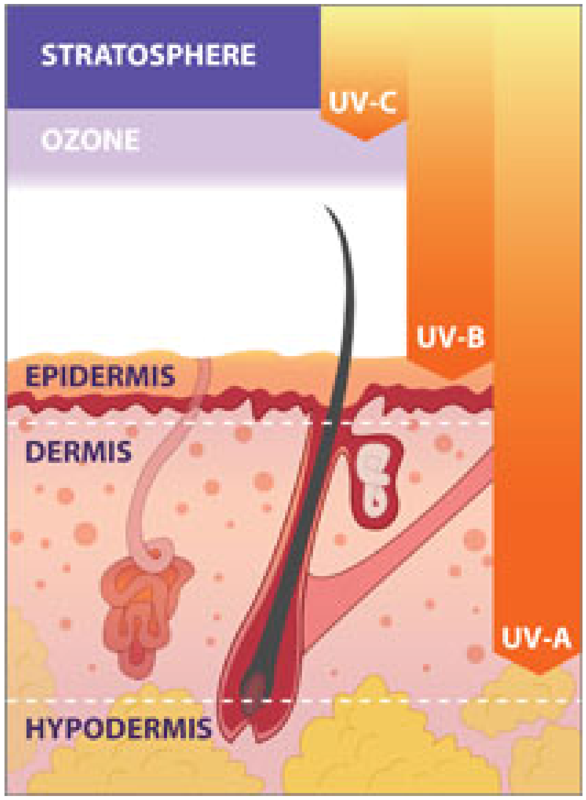

Figure 1. "UV Rays Penetrating Skin." Copyright EWG.

UVC rays have a wavelength of 200 to 280 nm, and are completely absorbed by the ozone layer (Food and Drug Administration, 2005). UVB rays, 280 to 320nm (Abdulla, et al., 2005), are partially absorbed by the ozone layer (Food and Drug Administration, 2005), allowing them to superficially absorb into the epidermis layer of the skin, causing burning and blistering in the sun (American Academy of Dermatology, 2008b). UVA rays comprise the wavelengths of 320 to 400nm (Abdulla, et al., 2005). These types of rays are not absorbed by the ozone layer at all (Food and Drug Administration, 2005), and as a result are able to penetrate deeper into the skin (Refrégier, 2004). This causes some people to take on an aged appearance (American Academy of Dermatology, 2008b). UV radiation can also cause detrimental effects to the immune system (American Academy of Dermatology, 2008b) as the rays can penetrate the skin causing damage to the Langerhans cells. These cells tell the immune system that a foreign substance has entered the body through the skin so that the necessary actions can be taken. More importantly to this project, is that the exposure to ultraviolet radiation is associated with the development of skin cancer.

As a result of absorption of UVB by DNA, Cyclopyrimidine dimers (CPDs) are formed which in turn form thymine dimers. Thymine dimers are correlated with the genes that regulate cellular function. So if left unrepaired, normal cellular function is compromised. Squamous cell carcinoma development is the best understood in comparison to basal cell carcinoma and melanoma. UVB radiation is responsible for tumor initiation, as it causes mutations in the cellular DNA. The damage by UV radiation leaves the body unable to repair the tumor initiation process. CPDs comprise 85% of the cytosine-thymine(C-T) transitions in DNA. The absorption of UVB by DNA results in the development of these CPDs. When a C-T transition is not able to be repaired, the genes regulating cell function are affected. Many genes are affected by this C-T transition including proto-oncogenes. Arguably, of more importance is the accumulation of UVB-induced C-T transitions in the crucial p53 genes by the carcinogenic squamous cells. p53 genes manage many cellular functions that, under normal conditions, prevent mutations from occurring. As a result of excess UVB exposure many genes are comprised, which can lead to the development of skin cancer. The effects of UVA on genes is still controversial, but some studies have shown a direct correlation with thymine to guanine transversions which would lead to a miscommunication in the DNA (Abdulla, et al., 2005). Skin cancer is epidemiologically linked to excessive UV radiation, described above, as a result of solar exposure (Williams & Sagebiel, 1989).

There are three main types of skin cancer. The most common form is basal cell carcinoma and as the name suggests, it originates in the basal cells. It rarely spreads to other organs but it can quickly infiltrate the surrounding tissue and bone structure, causing severe disfigurement if not removed immediately (American Academy of Dermatology, 2003; National Cancer Institute, 2005). The second most common type is squamous cell carcinoma which originates in the squamous cells and can develop on the mucous membranes. This type can spread to other organs in a process known as metastasis, so early detection is also very important (National Cancer Institute, 2005; American Academy of Dermatology, 2005b). The third most common type is melanoma which is a malignant tumor that originates in the melanocytes. This type of cancer is the most deadly form because it causes cellular damage and metastasizes quickly (American Academy of Dermatology, 2005a; National Cancer Institute, 2002). There are more than a million new cases diagnosed each year in the United States, of squamous and basal cell carcinoma. Melanoma, though more commonly seen in adults, is one of the most common types of cancers for young adults (Balk, et al., 2004).

Though anyone can develop skin cancer, there are certain factors that predispose an individual to its initiation. Some of these factors include, blue, green, or hazel eyes; light-colored hair; history of blistering sunburns; family history; many moles; and fair skin (California Dept. of Public Health, 2007). Fair-skinned individuals, especially those with skin types I-III, refer to table below of *Fitzpatrick skin type scale,* are predisposed to developing skin cancer (Grant-Petersson, et al., 1999; Boyett, Davy, Weathers, Campbell, Van Durme, et al., 2002). Those with a skin type of I tend to have a Celtic heritage, genetically predisposing them to fair skin. According to the Fitzpatrick skin type scale, skin type I never tans and burns easily, skin type II tans minimally and usually burns easily, and skin type III tans gradually to a light brown and sometimes burns (American Academy of Dermatology, 2008b).

Table 1. "Skin Type." U.S. Food and Drug Administration

SKIN TYPE	SKIN COLOR	SKIN COLOR
I	Pale white	Always burns – never tans
II	White to light beige	Burns easily - tans minimally
III	Beige	Burns moderately – tans gradually to light brown
IV	Light brown	Burns minimally - tans well to moderately brown
V	Moderate brown	Rarely burns - tans profusely to dark brown
VI	Dark brown or black	Never burns – tans profusely

Tanning salons receive more than a million users daily, with 12 to 24 million people being regular users (Balk, et al., 2004). With these high values, it is important to discuss the harmful effects of indoor tanning. There is a direct correlation between tanning beds and carcinogenic properties in humans (Balk, et al., 2004). Tanning beds emit greater amounts of UVA rays, because they have been mechanically engineered to do so; as a result, the rays penetrate deeper into the skin causing an individual to tan faster (Levine, Sorace, Spencer, & Siegel, 2005). This is obviously appealing to those who use tanning beds. However, the use of tanning beds causes a person's skin to thin, making it less able to heal. As a result, the damage from natural sunlight increases. The use of tanning beds increases one's chances of developing melanoma by eight fold (American Cancer Society, 2000). The use of tanning beds can also cause damage to the eyes, immune system, and can cause photo-drug reactions. One study showed that of the parents who used indoor tanning, 30% of their children did as well (Cokkinides, Weinstock, O'Connell, & Thun, 2002). This is problematic, because parents are considered to be the role models for children in regards to safety.

One of the best ways to educate a child between right and wrong is to educate the parents (Grant-Petersson, 1999). As a result, it is expected that the parent would act accordingly to set a good example for their children. It is the parents' responsibility to protect their children, as children are most likely unable to protect themselves. In doing so, the child learns the proper ways to protect themselves from the sun. Children look up to their parents and often mimic their actions. Research has shown that a parent is more likely to educate their child and take the necessary measures to protect themselves and their child, if they have been educated by a physician (Gritz, Tripp, de Moor, Eicher, Mueller, et al., 2003; Olsen, Dietrich, Sox, Stevens, Winchell, et al., 1997).

Although the majority of pediatricians agree that sun protection is important in combating skin cancer, the numbers of physicians educating their patients varies greatly (Balk, et al., 2004; Geller, Robinson, Silverman, Wyatt, Shifrin, et al., 1998). Many physicians have noted in past research, that there isn't enough time to educate their patients about sun safety (Balk, et al., 2004). By having sun safety materials in physicians' offices, we hope to see an increase in the number of questions asked by patients and parents, to their physician. Physicians are more likely to educate if they are asked about the issue. Many physicians have expressed a desire for more information on sun safety (Balk, et al., 2004), so it is perceived to be an effective means of informing physicians, patients, and parents. Furthermore, research has shown that physicians with educational materials were more likely to recommend the necessary sun safe behaviors. In a joint conference between the American Academy of Dermatology and the Centers for Disease Control and Prevention, an agenda was created to address skin cancer prevention and detection. As a result, one of the 6 main points was that pediatricians and their staff need to begin implementing sun protection education into well-child visits (Geller, et al., 1998). Also, by incorporating sun safety education into patient exams, physicians will be helping to fulfill the Healthy People 2010 objectives which include using protective measures to decrease the number of skin cancer cases, as well as to reduce the deaths from melanoma (Johnson, Davy, Boyett, Weathers, & Roetzheim, 2001). From personal experience in speaking with pediatricians, some don't make the connection between skin cancer and the youth because of their age. Therefore it is necessary to educate physicians through the Wiegand Sun Safety Program and other similar programs, about this subject matter.

The Wiegand Sun Safety Program is based out of the Nevada Cancer Institute, in Las Vegas, NV, and is funded through a grant from the E.L.

Wiegand Foundation, a non-profit organization focused on programs geared towards fields of education, health and medical research, public affairs, civic and community affairs, and arts and cultural affairs. The program was piloted in Roman Catholic schools in Nevada, and has now extended into frontier and independent schools. Its goal is to promote sun safe behaviors starting in the youth. The program expanded with the creation and implementation of a similar program in physicians' offices in Southern Nevada, developed and executed by a Community Health Educator who targeted pediatricians and family practice physicians. The intent of the program was to provide patients and parents with more information regarding the risks of sun exposure, and ways to protect themselves from further damage.

Theoretical Framework. The theoretical model supporting this study is the Health Belief Model. This model (HBM) is a psychological model originally developed as a means of understanding people's reasoning for not taking part in disease/illness prevention measures. It was later extended to include the behaviors associated with disease diagnosis. The HBM is a value-expectancy theory, where the desire to avoid illness is the value and better health is the expectancy. This widely accepted model is composed of the ideas of the Stimulus-Response theory and cognitive theories (Glanz, Rimer, & Lewis, 2002), which can be seen with the use of expectancy as a reward for good behavior.

Individual perceptions are the basis for many components of the HBM. People's response to and participation in the HBM is based on 6 key variables which include perceived susceptibility, perceived benefits, perceived severity, perceived barriers, cues to action, and self-efficacy (Glanz et al., 2002). When people understand the ramifications of their actions, and the likelihood of being effected, there is a higher probability that preventive measures will be taken.

Due to the increased levels of skin cancer incidence in adolescents and young adults, the need for proper sun safe behaviors and activities has escalated. Providing information regarding proper habits contributes to a greater awareness of the susceptibility of skin cancer development.

Skin cancer is a serious disease that can have life-threatening results. Many individuals, especially children, are unaware of the severity of the diagnosis and the damage caused by the sun. Supplying educational information to patients and their parents can provide a more realistic sense of severity so that proper actions can be taken to protect skin from the sun, and therefore decrease the risk of developing skin cancer.

Defining actions that can be taken to reduce the susceptibility of developing skin cancer would, ideally, provide the target audience with belief in the efficacy of the program, and therefore trust in the advised actions for reducing the risk of disease incidence. Including preventive measures in educational materials, such as seeking shade, applying sunscreen, and covering up, creates easy ways for providing protection from the sun's ultraviolet rays.

Explaining the probable outcomes of overexposure to ultraviolet radiation from the sun, people gain an awareness of the seriousness of a skin cancer diagnosis and may begin to understand the financial and medical implications associated with the disease. It is less of a financial burden to protect the skin starting at a young age, than it would be to diagnose and treat skin cancer. It is also more difficult, mentally and physically, to be diagnosed with and treated for skin cancer, than it is to continually take part in sun safe behaviors.

Educational displays provided to physicians' offices allow parents and patients to be exposed to "how to" information, awareness-promotion materials, and helpful reminders regarding sun safety and skin cancer. These cues provide readers with important information to start, or continue, healthy sun safe habits.

It can be difficult to create a sense of confidence in individuals through educational materials. However, providing this information in a medical setting may increase one's self-efficacy if they are able to speak with their physician about the information. In regards to one's child, a parent is more likely to take the necessary actions to protect their child, as well as their self.

CHAPTER 3

METHODOLOGY

The Wiegand Sun Safety Program was designed to encourage proper sun safe behaviors directly through the youth, and indirectly through parents and health care workers. The focus of the study and the data that were collected from the target population will be used for further development and implementation of the program throughout Nevada, as well as display the need for more educational emphasis on sun safety in the youth. This randomized control trial evaluated the level of awareness in patients and parents, as measured through questions received by pediatricians and family practice physicians about sun safety and skin cancer. The program's goal and objectives include:

Goal:

- Increase parents'/guardians' awareness of sun safety, sun safe practices, and skin cancer, through dialogue with medical providers, based on information and displayed materials provided by the Wiegand Sun Safety Program in medical offices

Objectives:

- Provide informational materials to pediatric and family practice offices for disbursement to patients/clients
- Provide physicians' offices with sunscreen and lip balm samples for dissemination to patients/clients

- Conduct one sun safety "Lunch and Learn" presentation for physicians' staff
- Maintain on-going contact with physicians' offices through designated interval follow-ups
- Evaluate the number of requests for sun safety and skin cancer information and referrals to dermatologists or specialists, throughout the duration of the program
- Maintain an on-going database to track evaluations and disbursement of materials and supplies

It is hypothesized that the increased display of information regarding sun safety and skin cancer in physicians' offices would increase patient and parent awareness of the subject, increase the likelihood of patients and/or parents asking their physician questions about skin cancer and sun safety, and therefore result in an increase in preventive actions, by parents, to protect their children from damaging rays of the sun. This increase was measured through the increased number of questions directed towards physicians and staff, about skin cancer and sun safe behaviors. It was expected that the clinics displaying the given materials, would see a higher increase in questions and awareness than the clinics in the control group. Additionally, it was expected that warmer temperatures, as commonly seen in the summer, would also promote an increase in questions and awareness in clinics.

H_0: The increased amount of information in offices will have no affect on the level of patient and parent awareness about skin cancer and sun safety.

H_A: The increased amount of information in offices will increase the level of patient and parent awareness about skin cancer and sun safety.

H_0: Seasonal variations will have no affect on the level of patient and parent awareness about skin cancer and sun safety.

H_A: Seasonal variations will affect the level of patient and parent awareness about skin cancer and sun safety.

The predictor variable in this study was the display of sun safety materials in physicians' offices. The outcome variable was the level of awareness of the patients and parents, which was expected to show an increased trend. An important confounding or intervening variable in this study was that the physicians may address and/or discuss sun safety and skin cancer in differing manners, affecting the predictor and outcome variables.

The targeted population for the project included children and parents that sought care from pediatricians and family practice physicians in Southern Nevada. The population used to evaluate the target population, however, were the physicians who see the children as patients. This was done to create an on-going relationship with physicians and clinics, as well as to educate the maximum amount of patients at each clinic through the use of the educational materials provided to the clinics. A list of pediatricians and family practice physicians in Southern Nevada was developed through the use of the internet and major Nevada medical groups. This approach allowed for a randomized sample of geographic distribution.

A letter describing the program and its objectives was sent to physicians in 15 clinics in Southern Nevada. Each of the clinics was visited by a Community Health Educator to arrange for the implementation of the program into their office. To provide staff members with up to date information regarding sun safe behaviors and activities, as well as skin cancer signs and symptoms, a “Lunch and Learn” presentation was given to each clinic, with optional participation and involvement by the physicians. Fourteen clinics agreed to participate, and a list was created from which every 2nd clinic was chosen to be in the control group.

Evaluations obtained from participants were kept anonymous to eliminate any bias. The only recognizable factor was the clinic in which each comparison assessment originated.

To create an effective program, it was essential to provide the medical staff with accurate information for educating patients. To fulfill this idea, a presentation was developed for the participating staff members which provided a reminder of the program as well as introduced and enhanced perceptions and knowledge associated with skin cancer development and treatment, UV radiation, and proper and effective sun safe behaviors.

Each participant received a bound copy of the presentation for reference including a Frequently Asked Questions sheet and a Skin Cancer Fact Sheet, providing additional information for easy reference.

To determine the effectiveness of the program and the effects of seasonal influences, comparative evaluation tool was created for all participants. A pre-comparison assessment was completed prior to the presentation, to provide preliminary data of each clinic's observations and experiences regarding the number of patient questions relating to skin cancer and sun safety, as well as educational materials dispensed on a regular basis. These assessments provided a baseline for determining the initial level of awareness about skin cancer and sun safety observed with their patients and parents. Mid-comparison assessments were conducted at the beginning of summer to determine whether there were seasonal influences on sun safety awareness. These assessments also questioned whether the provided sun safety materials were displayed in the clinics. This helped to determine the influence of educational materials on patient inquiries. At the conclusion of the study, a similar assessment was given to determine the effectiveness of the program and provide an association for the implications of seasonal exposures. To determine the influence of educational materials on community awareness, the participating clinics were randomly chosen as either a control group or study group. This was done by choosing every other clinic on the list as the study group. The clinics chosen to participate in the study group, received the full Wiegand Sun Safety Program supplemental materials packet, which included an 18x24 framed "What to Ask Your Physician" poster for each waiting room, an 11x14 version of the poster for each exam room, Sun Safety brochures, Skin Cancer Self-Exam door hangers, copies of the presentation for each exam room, lip balms, and sunscreen samples. The clinics in the control group received the 18x24 framed "What to Ask Your Physician" poster for each waiting room.

Upon completion of the mid-comparison assessments, the study group clinics received more samples for patient distribution. Upon conclusion of the study and post-comparison assessments, the clinics in the study group were provided with additional samples for patients. The clinics in the control group received the full Wiegand Sun Safety Program supplemental materials packet, so that they may properly educate their patients and parents/guardians.

To track the dissemination of materials and the data comparison assessment responses, a database was created using Microsoft Access. This database provided a secure and organized means of tracking the data received from each participant, throughout the course of the program.

The sampling frame of the study was 14 pediatric and family practice clinics, 7 of which were used as control clinics. By incorporating clinics throughout North Las Vegas, Las Vegas, and Henderson, Nevada, the study strived for a representative sample of the greater population. Outside variables may affect the construct validity, creating other predictor-outcome relationships not easily measured by the questions addressed in the study. There may also be issues with respondent bias, seeing as how it may be difficult for physicians to accurately recall how many questions they receive a week about sun safety and skin cancer.

All participating clinics were given pre-, mid-, and post-comparison assessments for each physician and staff member. The respondents' answers were entered into a database for analysis using SPSS software. The sun safety and skin cancer questions were analyzed as quantitative outcomes, ranging from 0 to 6. The average score was calculated for each center and each time point, for which the means were then calculated for the control and experimental groups' pre, mid, and post-time points. Using repeated measures analysis of variance techniques, a statistical comparison was made by calculating the responses within each group, across the study. A p-value and F-value were calculated for each group.

The answers from the question regarding dispensed materials were converted into numerical values 1(never) through 4(always). The response frequency (and corresponding proportion) was calculated for each outcome category, control group and time point. A McNemar test was weighted by frequency, and was conducted with a Bonferroni adjustment to compare the frequencies at each time point and for each group. A p-value was obtained and multiplied by 3, to account for the 3 time points.

Respondents were asked how many patients, on average, were seen in their clinic per month, and how many of those were for follow-ups. Responses were averaged for each clinic and totaled for each group to determine whether the number of patients exposed to the Wiegand Sun Safety Program was normally distributed. The results showed a normal distribution of patients in each group.

A major limitation of the study is the sample size. A greater sample may have eliminated any threats to validity and/or error. This project relied heavily on the physicians' and staff's ability to accurately recall the number of questions received by patients and parents. This may have created a respondent bias that would create a significant threat to validity and correctly depicting the larger population's characteristics. Ideally each physician and staff member would have been tracked through each time point to eliminate any possible differences in perceptions by colleagues. Though the clinic of employment was tracked, the assessments were not traced to an individual level, creating a study limitation. It is also important to note that one clinic was under new management for the post-comparison assessment, so that clinic was eliminated from the study.

CHAPTER 4

RESULTS

Physicians and staff were asked how many times a week they were asked about sun safety. They were given a scale of 0 to 6 as possible answers. The response frequencies were averaged for the control group and experimental group, at each time point, as seen below in Table 2. Using repeated measures ANOVA, the F-value and p-value were calculated.

Table 2. Sun safety results at each time point.

Group	Time	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Control	Pre	1.962	0.400	1.162	2.762
	Mid	1.923	0.341	1.241	2.605
	Post	1.808	0.422	0.966	2.650
Experimental	Pre	1.550	0.323	0.905	2.195
	Mid	1.050	0.275	0.500	1.600
	Post	2.600	0.340	1.921	3.279

F-value	3.450
p-value	0.035

The data were then graphed to show the relationship between the mean values at each time point (see Figure 2). The F-value (3.450) and p-value

(0.035) were calculated as a comparison of the two groups. The p-value is statistically significant, indicating that the level of awareness is increasing.

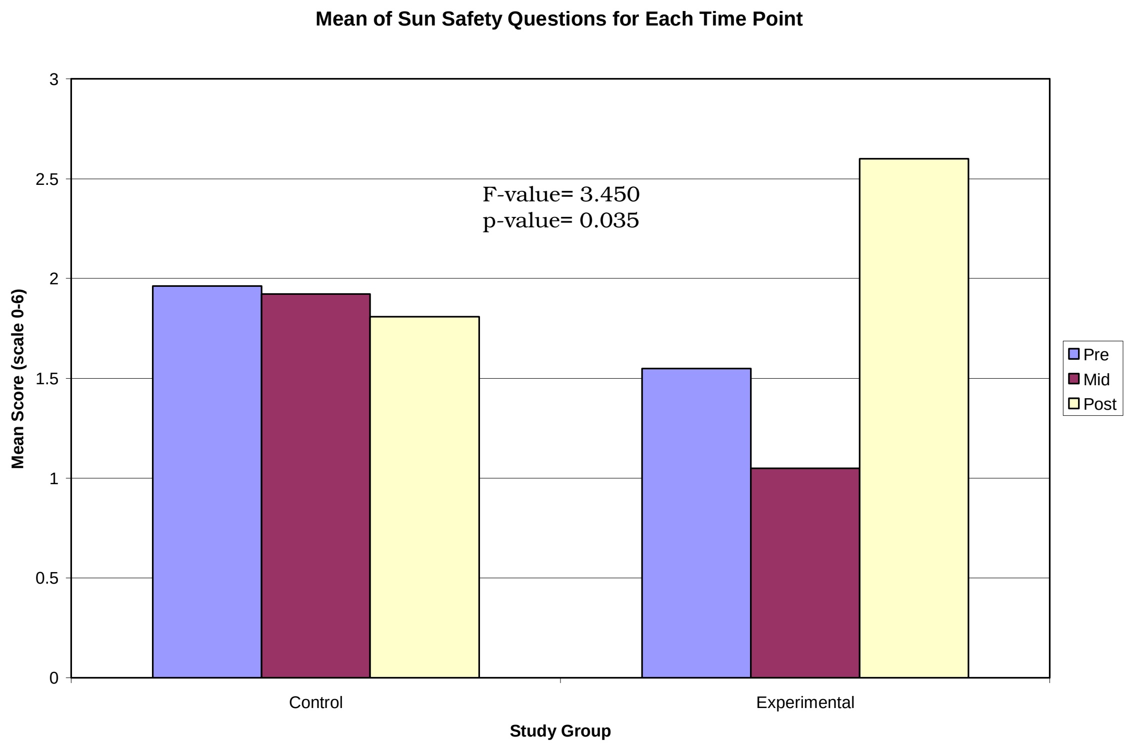

Figure 2. Mean of sun safety questions for each time point.

The graph depicts the distribution of the means throughout the program. The control group mean from the pre-comparison assessment was 1.962, but dropped to 1.808 at the post-comparison assessment. This decrease across time supports the idea that people do not commonly think about this topic. In the experimental group the mean for the pre-comparison assessment was 1.550 and increased to 2.600 at the post-comparison assessment. Displayed information is more likely to increase curiosity and promote questions for patients' and their guardians' physicians.

Using the same statistical techniques, the mean response frequencies were calculated (Table 3), for how many times a week the physicians are asked about skin cancer, by their patients and/or the patients' guardians. The p-value and F-value were again calculated as well as the standard error of the means and a 95% confidence interval.

Table 3. Skin cancer results at each time point.

Group	Time	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Control	Pre	1.308	0.292	0.724	1.891
	Mid	1.385	0.316	0.754	2.015
	Post	1.308	0.424	0.461	2.155
Experimental	Pre	1.200	0.235	0.730	1.670
	Mid	0.825	0.255	0.316	1.334
	Post	2.600	0.342	1.917	3.283

F-value	5.168
p-value	0.007

The data were then graphed (Figure 3) to show the relationship between the mean values at each time point. The F-value (5.168) and p-value (0.007) were calculated, using repeated measures ANOVA, as a comparison of the two groups. The statistically significant p-value indicates the validity of the difference in the mean scores between clinic groups.

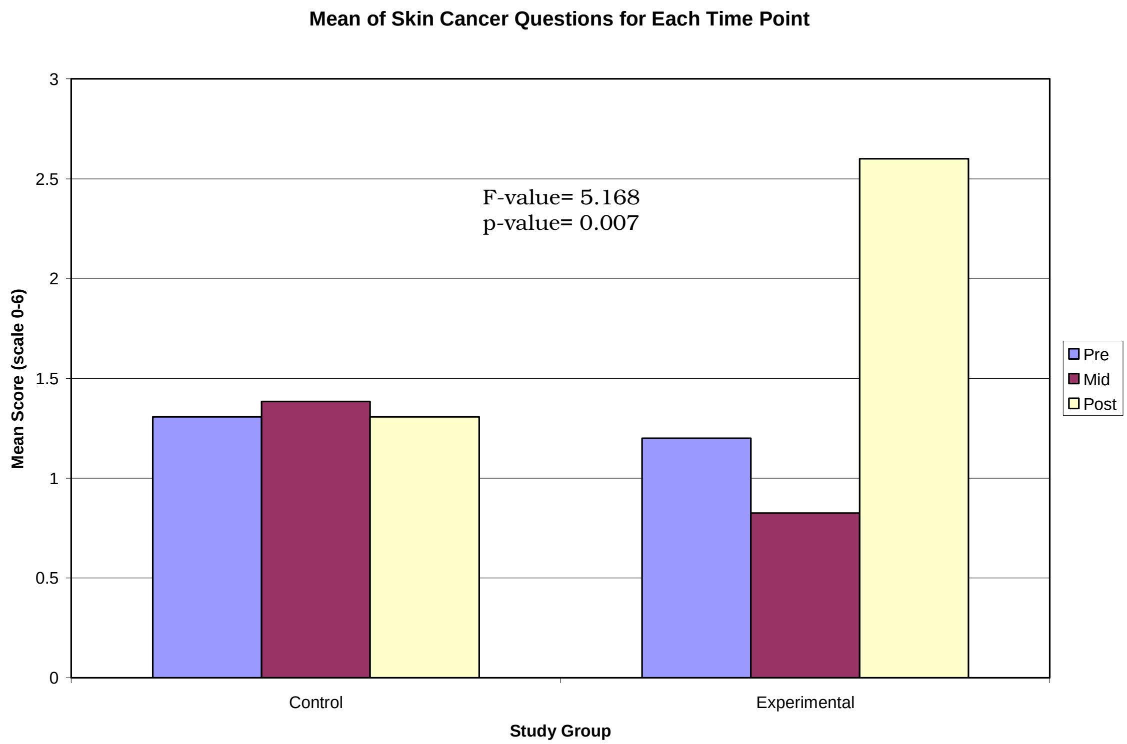

Figure 3. Mean of skin cancer questions for each time point.

This graph depicts the distribution of the mean number of questions asked by patients and their guardians, of their physician, regarding skin cancer. The control group's mean at the pre-comparison assessment and post-comparison assessment was 1.308, with a minor increase to 1.385 at the mid-comparison assessment. The experimental group showed a larger increase between time points. The pre-comparison assessment had a mean score of 1.200 and resulted in a mean of 2.600 at the post-comparison assessment. This increase resulted in a statistically significant p-value of 0.007, suggesting that the intervention of providing clinics with educational information is an effective means of increasing awareness about a topic.

To determine whether the materials were distributed to patients, physicians and staff were asked how often they dispensed the materials. The response frequencies were determined (Figure 4), as well as the percentage of each response. A McNemar test was weighted by frequency, and was conducted with a Bonferroni adjustment, to compare the frequencies at each time point and for each group. A p-value was obtained and multiplied by 3, to account for the 3 time points. The results are listed below for each group at each time point comparison assessment.

Table 4. Frequency of dispensed materials results.

	Control				Experimental		
	Pre	Mid	Post		Pre	Mid	Post
Never	7 23.33	12 41.38	11 42.31	Never	22 39.29	9 20.45	2 5.26
Sometimes	15 50.00	10 34.48	8 30.77	Sometimes	26 46.43	20 45.45	18 47.37
Usually	5 16.67	3 10.34	5 19.23	Usually	5 8.93	7 15.91	10 26.32
Always	3 10.00	4 13.79	2 7.69	Always	3 5.36	8 18.18	8 21.05
Total	30	29	26	Total	56	44	38

Pre vs. Mid	p= 0.003
Pre vs. Post	p= 0.0003
Mid vs. Post	p= 0.0003

The p-values calculated for each time comparison were statistically significant. An evaluation of the two groups between each time point was made to determine the effectiveness at each comparison assessment. The response frequencies for the control group was graphed (Figure 4), as comparisons of each time point.

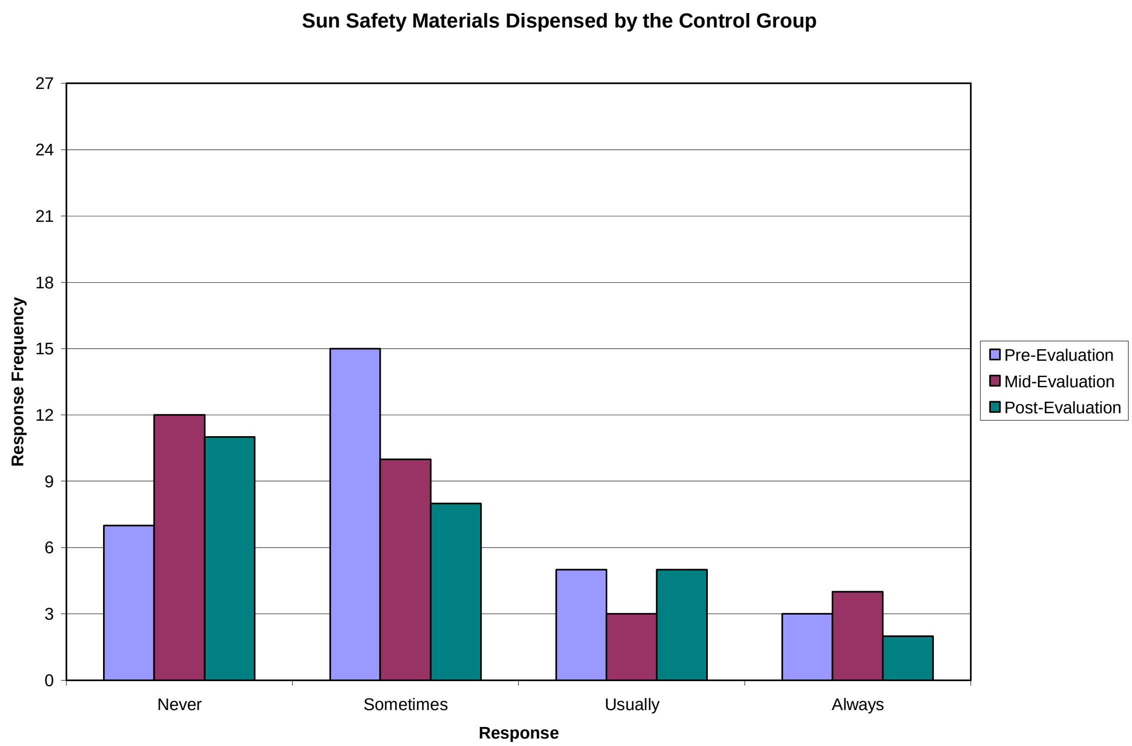

Figure 4. Frequency of material dispersion by the control group.

This graph shows the shift in response frequencies, across time, in the control group. The frequency of "never" responses increased from the pre- to the post-comparison assessments; in addition, the majority of the responses at each time point were "never" and "sometimes" indicating that the related materials are not normally distributed to patients.

The results from the experimental group (Figure 5) were graphed in the same manner. The frequency of material distribution by the experimental group shows a more effective trend across time.

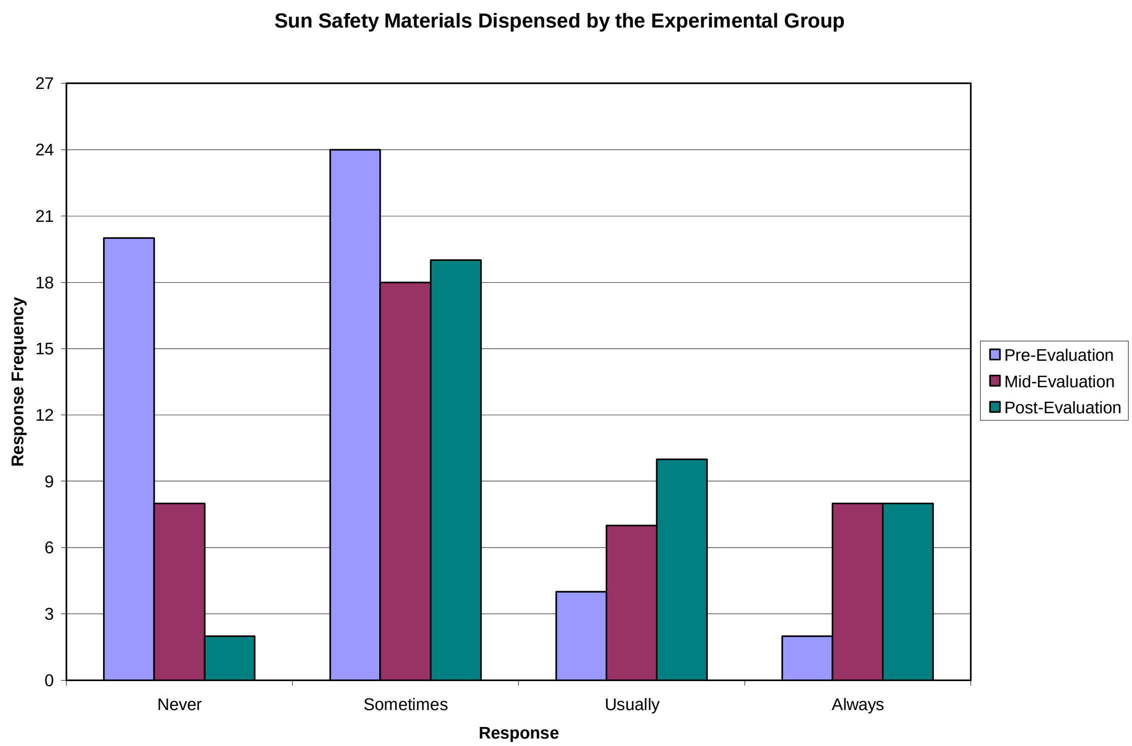

Figure 5. Frequency of material dispersion by the experimental group.

This graph shows the shift in response frequencies, across time, in the experimental group. In the pre-comparison assessments the response frequency for "never" and "sometimes" was higher than the other response options. The mid- and post-comparison assessments showed a decrease in the frequency of “never” responses, while the number of “usually” and “always” responses increased. This rise in frequency suggests that providing clinics with materials for their patients is an effective way to release information.

CHAPTER 5

CONCLUSIONS

Discussion of Results. The purposes of this study were to educate physicians and staff with updated information on sun safety behaviors and skin cancer and to display sun safety materials in the offices of the study group. Drawing from the findings from other studies it was expected that many physicians were not actively educating patients about sun safety and skin cancer. By incorporating sun safety and skin cancer information into pediatricians' and family physicians' offices, it was hypothesized that there would be an increase in the level of awareness of patients and/or their guardian regarding sun safety and skin cancer, as measured by the number of questions asked of physicians and their staff each week, in the experimental group. This study randomly divided the participating clinics into an experimental group and a control group. The experimental group received the full Wiegand Sun Safety Program supplemental materials packet for clinics to display. The physicians and staff of each participating clinic were given a pre-, mid-, and post-comparison assessment to measure the effectiveness of the program.

The first question asked on the assessments was regarding how many times a week they were asked about sun safety. Repeated measures ANOVA was used to compute the F-value and p-value for this data (see Table 2) and the mean score for each group was calculated for each time point. The control group stayed relatively consistent throughout each time point, which was expected to occur without the intervention materials. The mean scores in the experimental group waivered between each time point, with a decrease seen in the mid-comparison assessments. Though not seen in the control group, this may support the hypothesis that seasonal effects influence the level of interest and awareness about the topic. Due to the retrospective view point of the assessments, the mid time point, though not explicitly stated, was referring to the recollection of the winter months, when children and parents tend to be less concerned about sun safety. The post-comparison assessment showed a marked increase in contrast with the pre- and mid-comparison assessments, showing an increased level of awareness and curiosity among patients and their guardians.

The second question on the comparison assessments asked respondents to indicate how many times a week they were asked about skin cancer, on a scale of 0 to 6. Repeated measures ANOVA was used to compute the F-value and p-value for this data (see Table 3) and the mean score for each group was calculated for each time point. Once again there was no change seen in the control group's mean scores at each time point, which was expected since no intervention was given to this group. The clinics in the experimental group showed a decrease in the mean score at the mid-comparison assessment. This may be due to environmental/seasonal influences. The mean score for the post-comparison assessment was higher than that of the pre- and mid-comparison assessments. Overall, there was an increase in the mean score, suggesting an increase in the level of awareness of the patients and their guardians.

The third question asked physicians and their staff how often they dispensed sun safety-related materials. They were given the choices to respond as 'never', 'sometimes', 'usually', and 'always'. These answers were then converted into numerical format, 1-4, to be calculated in SPSS using a McNemar test, which was weighted by frequency, and was conducted with a Bonferroni adjustment, to compare the frequencies at each time point and for each group. To account for the 3 time points, the p-values were calculated and multiplied by 3. A shift in responses was seen throughout the study, in both groups, though this shift differed. The response frequencies in the control study favored "never" and "sometimes" responses. This group did not receive materials from the Wiegand Sun Safety Program, so responses were dependent upon clinics having their own sun safety materials to dispense. As a result, the lower values were expected. The number of "never" responses increased between the pre- and mid-comparison assessments and decreased by one on the post-comparison assessment. Though the number of "sometimes" responses decreased at each time point, the number of "never" responses were still higher at the mid and post time points, suggesting that physicians do not have access to many sun safe materials.

The experimental group initially showed a much larger rate of "never" and "sometimes" responses in the pre-comparison assessment, in contrast to the control group. The number of "never" responses decreased significantly across the study. Arguably of more importance, was the increase in the frequency of "usually" and "always" responses. This shift suggests that physicians are willing to disseminate materials, but perhaps they do not have access to them.

<u>Conclusions.</u> The basis of the Wiegand Sun Safety Program was to educate children, and their guardians, about sun safe practices. There were many successes throughout the study, as well as some limitations. These, when applied together, provide important information for future program development and implementation.

Overall, the study was a successful endeavor. According to estimates provided by the clinics, approximately 9,500 patients each month were exposed to sun safety information. This, along with the increase seen in the number of questions asked of physicians, suggests that an elevation of awareness was created.

Providing clinics with educational materials is a positive attempt at educating a large number of patients. Many physicians have stated that there is not enough time to incorporate sun safety in well-child exams. By arming patients with the necessary information, or questions to ask their physician, patients and guardians can insist that they receive the knowledge they need to be prepared for sun exposure. Posters given to all clinics displayed questions that are important for patients to ask their physician.

This study relied on the physicians and staff to relay the number of questions a week they received by patients and their guardians. A major limitation in this design is that patients may not feel the need to ask questions after reviewing the materials given to them in the experimental group clinics. Brochures and handouts were available to patients, supplying them with the core issues regarding sun safety. If the patients felt empowered to act on their own, without physician guidance, these individuals' success would not be reflected in the comparison assessments. As a result, more individuals may have been influenced by the program, without researchers' ability to track them.

Recommendations for Further Studies. The Wiegand Sun Safety Program was a pilot study in pediatricians' and family practice physicians' offices in Southern Nevada. As a result, the number of participating clinics was restricted. This study had its limitations, as previously discussed, but the framework for successfully educating children and working with physicians was created. Researchers must recognize the time and financial constraints physicians and clinics bare and attempt to facilitate a program that generates limited burdens for the participants.

It would be beneficial for future studies to more heavily address the myth of skin color and skin cancer. Many individuals with darker skin believe they will not develop a sunburn or skin cancer because of their skin color. It is important to correct this belief as a child, so that they may begin to protect their skin and develop sun safe habits at a young and vulnerable age. It was noted by multiple physicians that they were unaware of the skin cancer risk in their patients with darker skin. This shows that it is important to provide the physicians and staff with updated information so that patients and guardians are receiving factual information.

This study did not provide information in Spanish, and as a result may have created a barrier patients and guardians. This limitation may have influenced the number of questions asked of physicians and staff, therefore influencing the effectiveness of the study. Translated information was given to clinics at the end of the study, when both groups could receive bilingual information.

Tanning beds have become a prominent luxury for many adolescents and young adults. In 2009, the World Health Organization announced the addition of Ultraviolet radiation to their list of carcinogens. Tanning bed usage before the age of 30 increases one's risk of developing melanoma by 75% (IARC, 2006). This finding warrants the need for further education to be given to children to deter them from tanning bed usage. Many individuals using indoor tanning facilities are unaware of the magnitude of damage they are exposing their bodies to. It is important that this information is released and acted upon.

If children are educated at a young age about the importance of sun safe behaviors, they are more likely to begin acting upon the message. Habits are difficult to break, but by developing positive habits as a child, it will be easier to maintain them as they mature. By implementing sun safe education in the pediatrician's or family practice physician's office, educators are able to target the child as well as the guardian. If public health professionals work together and implement creative programs, educational information will seep through the communities and help save individuals from the pain and suffering resulting from skin cancer and melanoma development.

APPENDIX 1

IRB APPROVAL

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

UNLV IRB
Approved
OCT 29 2009
Expires

Social/Behavioral IRB – Exempt Review
Approved as Exempt

DATE:	November 9, 2009
TO:	**Dr. Michelle Chino,** School of Community Health Sciences
FROM:	Office for the Protection of Research Subjects
RE:	Notification of IRB Action by Dr. Paul Jones, Chair Protocol Title: **Implementation of the Wiegand Sun Safety Program** OPRS# 0910-3247

This memorandum is notification that the project referenced above has been reviewed by the UNLV Social/Behavioral Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45CFR46.

The protocol has been reviewed and deemed exempt from IRB review. It is not in need of further review or approval by the IRB.

Any changes to the exempt protocol may cause this project to require a different level of IRB review. Should any changes need to be made, please submit a **Modification Form**.

If you have questions or require any assistance, please contact the Office for the Protection of Research Subjects at OPRSHumanSubjects@unlv.edu or call 895-2794.

Office for the Protection of Research Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047

APPENDIX 2

COPYRIGHT APPROVAL

Breanne Eddington
Las Vegas, Nevada

February 2010

Dee Pearlstein
Environmental Working Group
1436 U Street, NW, Ste. 100
Washington, DC 20009

Dear Dee:

This letter will confirm our email conversation. I am completing a master's thesis at the University of Nevada, Las Vegas entitled "Implementation of the Wiegand Sun Safety Program into Physicians' Offices in Southern Nevada." I would like your permission to reprint in my thesis an image found on your company's website.

The image to be reproduced is "UV Rays Penetrating Skin" and is attached to this document for clarification.

The requested permission extends to any future revisions and editions of my thesis, including non-exclusive world rights in all languages, and to the prospective publication of my thesis by UNLV. These rights will in no way restrict republication of the material in any other form by you or by others authorized by you. Your signing of this letter will also confirm that your company owns the copyright to the above-described material.

If these arrangements meet with your approval, please sign this letter where indicated below and return it to me as soon as possible. Thank you very much.

Sincerely,

Breanne Eddington

Breanne Eddington

PERMISSION GRANTED FOR THE USE REQUESTED ABOVE:

Environmental Working Group

Name Printed: Debra Pearlstein Title: Administrative assistant

Signature: D Pearlstein Date: 2/29/10

BIBLIOGRAPHY

Abdulla, F.R.; Feldman, S.R.; Williford, P.M.; Krowchuk, D.; Kaur, M. (2005) "Tanning and Skin Cancer." Pediatric Dermatology. 22(6):501-512.

American Academy of Dermatology. (2003) "Basal Cell Carcinoma." http://www.aad.org/public/publications/pamphlets/sun_basal.html

American Academy of Dermatology. (2005a) "Malignant Melanoma." http://www.aad.org/public/publications/pamphlets/sun_malignant.html

American Academy of Dermatology. (2005b) "Squamous Cell Carcinoma." http://www.aad.org/public/publications/pamphlets/sun_squamous.html

American Academy of Dermatology. (2008a) "Aging Skin Net: UV Photography Reveals Sun Damage" http://www.skincarephysicians.com/agingskinnet/uv_photography.html

American Academy of Dermatology. (2008b) "Facts About Sunscreens." http://www.aad.org/media/background/factsheets/fact_sunscreen.htm

American Cancer Society. (2000) "Tanning Beds May Increase Skin Cancer Risk." ACS News Center. http://www.cancer.org/docroot/NWS/content/NWS_1_1x_Tanning_Beds_May_Increase_Skin_Cancer_Risk.asp

Armstrong, B.K., Kricker, A. (1995) "Skin Cancer." Dermatoepidemiology. 13(3):583-594.

Balk, S.J.; O'Connor, K.G.; Saraiya, M. (2004) "Counseling Parents and children on Sun Protection: A National Survey of Pediatricians." Pediatrics. 114(4):1056-1064.

Boyett, T.; Davy, L.; Weathers, L.; Campbell, R.; Van Durme, D.; Roetzheim, R.G. (2002) "Sun Protection of Children at the Beach." J Am Board Fam Pract. 15:112-117.

California Department of Public Health. (2007) "Skin Cancer>Background Information."

http://www.cdph.ca.gov/programs/SkinCancer/Pages/BackgroundInformation.aspx

Cokkinides, V.E.; Weinstock, M.A.; O'Connell, M.C.; Thun, M.J. (2002) "Use of Indoor Tanning Sunlamps by US Youth, Ages 11-18 Years, and by Their Parent or Guardian Caregivers: Prevalence and Correlates." Pediatrics. 109(6):1124-1130.

Ferrari, A., Bono, A., Baldi, M., et al. (2005) "Does Melanoma Behave Differently in Younger Children Than in Adults? A Retrospective Study of 33 Cases of Childhood Melanoma From a Single Institution." Pediatrics. 115:649-657.

Food and Drug Administration. (2005) "The Truth About Tanning: What You Need to Know to Protect Your Skin." FDA & You, News for Health Educators and Students. 7:1-6.

Geller, A.C.; Robinson, J.; Silverman, S.; Wyatt, S.A.; Shifrin, D.; Koh, H.K. (1998) "Do Pediatricians Counsel Families About Sun Protection?: A Massachusetts Survey." Arch Pediatr Adolesc Med. 152:372-376.

Glanz, K., Rimer, B.K., & Lewis, F.M. (2002). Health Behavior and Health Education (3rd ed.). California: Jossey-Bass.

Grant-Petersson, J.; Dietrich, A.J.; Sox, C.H.; Winchell, C.W.; Stevens, M.M. (1999) "Promoting Sun Protection in Elementary Schools and Child Care Settings: The *SunSafe* Project." Journal of School Health. 69(3):100-106.

Gritz, E.R.; Tripp, M.K.; de Moor, C.A.; Eicher, S.A.; Mueller, N.H.; Spedale, J.H. (2003) "Skin Cancer Prevention Counseling and Clinical Practices of Pediatricians." Pediatric Dermatology. 20(1):16-24.

IARC Working Group. (2006) "The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers: a systematic review." Int J Cancer. 120:1116-22.

Johnson, K.; Davy, L.; Boyett, T.; Weathers, L.; Roetzheim, R.G. (2001) "Sun Protection Practices for Children." Arch Pediatr Adolesc Med. 155:891-896.

Lange, J.R., Palis, B.E., Chang, D.C., Soong, S., Balch, CM. (2007) "Melanoma in Children and Teenagers: An Analysis of Patients

From the National Cancer Data Base." J. Clin. Oncol. 25:1363-1368.

Levine, J.A.; Sorace, M.; Spencer, J.; Siegel, D.M. (2005) "The indoor UV tanning industry: A review of skin cancer risk, health benefit claims, and regulation." Journal of the American Academy of Dermatology. 53(6):1038-1044.

National Cancer Institute. (2002) "What You Need to Know About Melanoma." NIH Publication, Bethesda, MD.

National Cancer Institute. (2005) "What You Need to Know About Skin Cancer." NIH Publication, Rockville, MD.

Olsen, A.L.; Dietrich, A.J.; Sox, C.H.; Stevens, M.M.; Winchell, C.W.; Ahles, T.A. (1997) "Solar Protection of Children at the Beach." Pediatrics. 99(6):e1-5.

Peattie, K.; Peattie, S.; Clarke, P. (2001) "Skin Cancer Prevention: Reevaluating the Public Policy Implications." Journal of Public Policy & Marketing. 20(2):268-279.

Refrégier, M.J. (2004) "Relationship between UVA protection and skin response to UV light: proposal for labeling UVA protection." International Journal of Cosmetic Science. 26:197-206.

Warshaw, R. (2008) "Sunscreen Smarts for Every Body." National Women's Health Resource Center. http://www.healthywomen.org/take10/june2008/feature.htm

Williams, M.L.; Sagebiel, R.W. (1989) "Sunburns, Melanoma, and the Pediatrician." Pediatrics. 84(2):381-382.

VITA

Graduate College
University of Nevada, Las Vegas

Breanne Eddington

Degree:
Bachelor of Science, Biology 2008
Westminster College

Thesis Title: Implementation of the Wiegand Sun Safety Program into Physicians' Offices in Southern Nevada

Thesis Examination Committee:
Chairperson, Michelle Chino, Ph.D.
Committee Member, Sheniz Moonie, Ph.D.
Committee Member, Timothy J. Bungum, DrPH
Graduate Faculty Representative, Michele C. Clark, RN, Ph.D.