

CHAPTER 7

ULTRAVIOLET RADIATION AND SKIN CANCER

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ULTRAVIOLET RADIATION AND SKIN CANCER

Skin cancer is the most commonly occurring cancer in the United States, affecting some one million Americans and accounting for about 2% of all cancer deaths. The most serious form of skin cancer, melanoma, is expected to be diagnosed in 800 Marylanders in 2003.¹ Melanoma, while only accounting for 5% of all skin cancers, is the most deadly form of skin cancer and is responsible for 75% of all deaths from skin cancer.²

While skin cancer is generally associated with populations of advanced age, one in four people who develop melanoma are under the age of 40. It is now the most common cancer in women between the ages of 25 and 29.³ Cutaneous malignant melanoma is the most rapidly increasing cancer in whites⁴ and there has been a 50% increase in the death rate from it over 30 years (from 1969 to 1999). Most of that increase has been seen in men 65 and older, with rates in this group rising over 150%.⁵ The risk of melanoma is about 20 times higher for whites than for African Americans, because skin pigment has a protective effect.⁶ Melanoma develops in the cells of the skin that gives it color (melanocytes) and can spread to other parts of the body if diagnosed late. Survival depends upon the stage of the melanoma at diagnosis.

The three major types of skin cancer are basal cell carcinoma, squamous cell carcinoma, and melanoma. Basal cell carcinomas make up 75% of all skin cancers. Squamous cell carcinomas account for another 20% of all skin cancers. Basal and squamous cell carcinomas are both highly curable if treated early, but can cause considerable damage and disfigurement and occasionally death if treatment is delayed.

The major cause of skin cancer is unprotected exposure to ultraviolet radiation from the sun or tanning lamps in combination with genetic risk factors. Ultraviolet radiation (UVR) is commonly divided into three bands: UVA, UVB, and UVC. UVC is completely absorbed in the stratosphere before reaching the earth's surface. The rays of UVB are shorter and are the primary cause of tanning and sunburn. The longer rays of UVA penetrate the skin more deeply and contribute to wrinkling of the skin as well as tanning. Besides sunburn, skin cancer, and wrinkling, other negative effects of UVR include cataracts, macular degeneration, and immune system depression.⁷

Skin aging and cancer are delayed effects of sun exposure that don't typically emerge until many years after the exposure. Unfortunately, since the injury is not immediately visible, young people are often unaware of the damage caused by tanning. Physicians and scientists are especially concerned that cases of skin cancer will continue to increase as people who are tanning now in their teens and twenties reach middle age. Medical professionals agree that exposure to the sun's ultraviolet rays appears to be the most important factor in the development of skin cancer. In addition, disruption of the earth's ozone layer by pollution may cause rising levels of exposure to UVR. Nationally, the

rate of melanoma has been rising about 3% annually,⁸ although there is evidence that the rate is leveling off.

Risk Factors

Certain risk factors may increase the chance of developing skin cancer. The most significant risk factors for skin cancer are:

Exposure to UVR and Sunburn

Nearly all skin cancers occur in fair-skinned individuals who have been exposed to the sun, X-rays, or ultraviolet light for prolonged periods.⁹ It is thought that chronic, long-term exposure to UVR is the cause of squamous cell carcinomas.¹⁰ This type of cancer frequently occurs in an older population and in areas of the body exposed to the sun, such as the face, arms, and ears. The mechanism for development of basal cell carcinoma is more complex and may involve a combination of chronic and intermittent exposure patterns.¹¹ The relationship between UVR exposure and melanoma has not been clearly defined. Some studies have implicated intermittent sun exposure, which typically occurs on areas of the skin not exposed to the sun regularly.^{12,13} Severe sunburns in childhood and adolescence may be particularly important in the development of melanoma.¹⁴ However, other studies have indicated that sunscreen, which protects against sunburn, may not protect against UVR-associated melanoma.¹⁵ In addition to the risks associated with sun exposure, increased risk of developing skin cancer has been observed in patients treated with psoralen-UV-A (PUVA) therapy, which has been widely used to treat psoriasis and other cutaneous diseases.^{16,17}

Nevi (Moles)

The presence of large numbers of atypical moles increases the risk of melanoma. Individuals with certain types of pigmented lesions (dysplastic or atypical nevus), several large nondysplastic nevi, many small nevi, or moderate freckling have a twofold to threefold risk of developing melanoma. Individuals with familial dysplastic nevus syndrome or with several dysplastic or atypical nevi are at high risk of developing melanoma.¹⁸

Fair Skin, freckling, and light hair

Melanoma risk is about 20 times higher for whites than for African Americans. Whites with red or blond hair and fair skin that freckles or burns easily are at especially high risk of developing melanoma.¹⁹ While melanoma is more prevalent in whites than in blacks, those with darker skin types are not immune.²⁰ In

blacks, melanoma is most commonly found in lighter pigmented areas such as the palms, soles of the feet, and under the nails.

Family history

Risk of melanoma is greater if one or more of a person's first-degree relatives have been diagnosed with melanoma.²¹

Personal history

Persons with non-melanoma skin cancer are at higher risk for developing additional skin cancers.²²

Immune suppression

Patients who have been treated with immune suppressants have an increased risk of developing melanoma.²³

Age

About half of all melanomas occur in people over the age of 50. However, melanoma is one of the most common cancers in people under 30; melanoma that runs in families often occurs at a younger age.²⁴

Xeroderma pigmentosum (XP)

XP is a rare, inherited condition that causes people to be less able to repair DNA damage caused by sunlight and thus have a higher risk for developing melanoma, basal cell carcinoma, and squamous cell carcinoma.²⁵

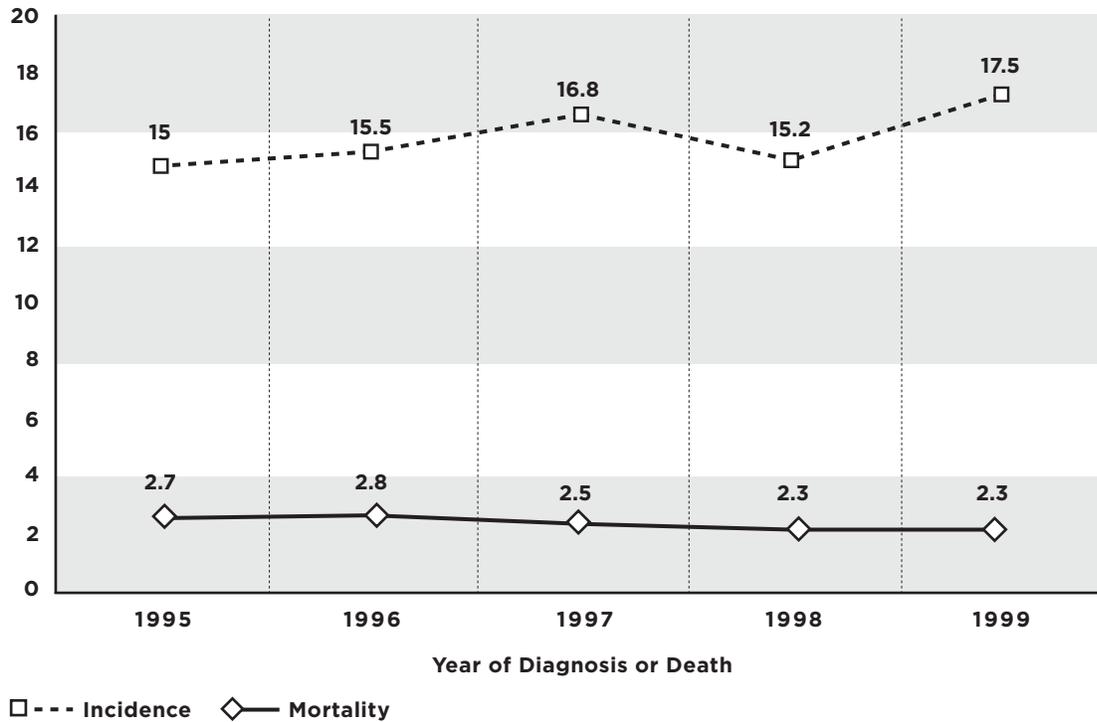
Burden of Melanoma in Maryland

From 1995 to 1999, melanoma incidence rates in Maryland increased an average of 3.9% per year.²⁶ Conversely, melanoma mortality rates in Maryland have been falling during the same time period, dropping an average of 4.2% per year (Figure 7.1).²⁷ Maryland is ranked 42nd for melanoma mortality among the states and the District of Columbia.²⁸

A total of 884 persons in Maryland were diagnosed with melanoma in 1999. In the same year, 112 people died of melanoma in Maryland. Maryland melanoma incidence and mortality rates are similar to national melanoma rates. In 1999, the incidence rate for melanoma in Maryland was 17.5 per 100,000 population, which is very close to the national rate of 17.4 per 100,000 population. Also in 1999, the Maryland mortality rate was 2.3 per 100,000 population, similar to the national rate of 2.7 per 100,000 (Table 7.1).

Melanoma incidence increases with age and Maryland's

Figure 7.1
Melanoma Cancer Incidence and Mortality by Year of Diagnosis and Death in Maryland, 1995-1999



Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.
 Source: Maryland Cancer Registry, 1995-1999; Maryland Division of Health Statistics, 1995-1999.

Table 7.1
Melanoma Cancer Incidence and Mortality Rates by Sex and Race in Maryland and the United States, 1999

Incidence 1999	Total	Males	Females	Whites	Blacks
New Cases (#)	884	487	397	858	16
MD Incidence Rate	17.5	22.1	14.5	23.3	**
U.S. SEER Rate	17.4	21.7	14.2	20.1	1.2
Mortality 1999	Total	Males	Females	Whites	Blacks
MD Deaths (#)	112	67	45	S	<6
MD Mortality Rate	2.3	3.3	1.7	3.0	**
U.S. Mortality Rate	2.7	3.8	1.8	3.0	0.4

Rates are per 100,000 and are age-adjusted to the 2000 U.S. standard population.
 Cells with five or fewer non-zero cases are not presented per DHMH/MCR Data Use Policy.
 **Rates based on cells with 25 or fewer non-zero cases are not presented per DHMH/MCR Data Use Policy.
 S = Suppressed to ensure confidentiality of cell in other column.
 Source: Maryland Cancer Registry, 1999; Maryland Division of Health Statistics, 1999; SEER, National Cancer Institute, 1999.

age-specific incidence rates mirror those in the U.S. (Figure 7.2). Melanoma incidence is much higher among males than females in both the U.S. and Maryland (Figure 7.3). In addition, melanoma mortality rates for Maryland males are much higher than for females. In 1999, the melanoma mortality rate was nearly twice as high for males than for females in Maryland.²⁹

The American Joint Committee on Cancer (AJCC) TMN Staging System is used most often to describe the extent of melanoma. In this system, melanoma is given a T category (primary tumor thickness), an N category (number of involved regional nodes), and an M category (presence of metastasis). Patients are assigned a stage (I–IV) based on the TMN values. Stage I and II indicate primary tumors of increasing thickness, stage III indicates regional lymph node involvement, and stage IV indicates metastatic disease. This staging system divides patients into clinically meaningful prognostic groups.

Based on SEER data for the time period 1992–1997, 82% of all melanoma cancer cases in the U.S. during these years were diagnosed at the local stage, when the cancer is confined, and had not reached the lymphatic system (Figure 7.4). In contrast, only 54.6% of melanoma cases in Maryland were diagnosed at the local stage, when there is a higher chance of survival. However, this proportion may be underrepresented due to the high percent of unstaged melanoma cases in Maryland.³⁰

Survival rates are not available for Maryland diagnoses from the Maryland Cancer Registry, but in the United States, five-year relative survival rates for melanoma have been steadily increasing for whites since 1974, growing from approximately 80% to 90% between 1974 and 1997 (Figure 7.5). Survival rates for blacks in the U.S. have not experienced the same trend. Five-year survival rates of blacks fluctuated between 1974 and 1997, ultimately decreasing from approximately 68% in 1974 to 60% in 1997.

Disparities

- Blacks have lower five-year survival rates than whites after diagnosis of melanoma (U.S. data only).
- The melanoma mortality rate for Maryland males is nearly twice as high than for females.
- The Eastern Shore and Northwest regions in

Maryland have higher incidence rates of melanoma than other regions of Maryland and the U.S. This disparity may be attributable to increased exposure to UVR seen in occupations common in these regions such as watermen and farmers.

Prevalence of Sun-Safe Behaviors in Maryland

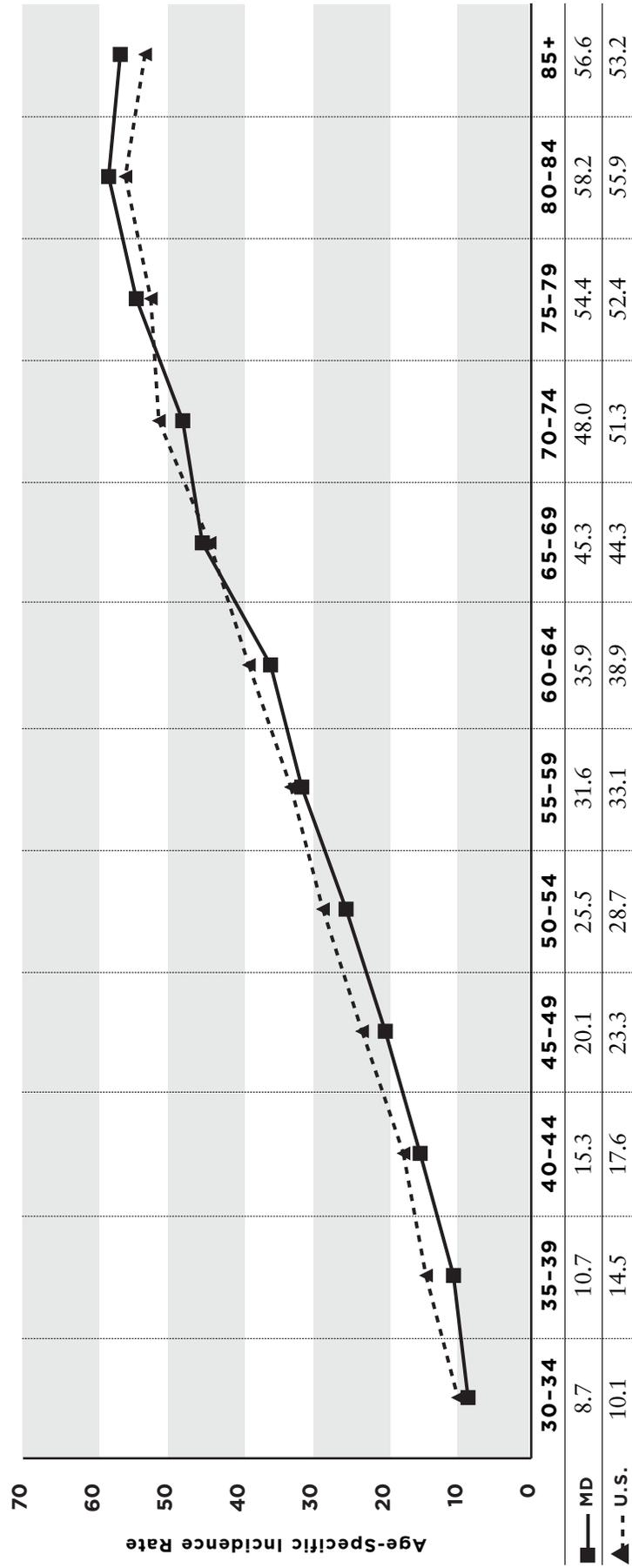
There is considerable room for improvement for Marylanders to adopt behaviors to protect themselves from the harmful effects of UVR. Unless otherwise stated, statistics regarding sun-safe behaviors among Marylanders are from the Maryland Behavioral Risk Factor Surveillance System.³¹ In 1998, 59% of adults used at least one of the following measures to protect themselves from UVR: avoiding the sun between 10:00 a.m. and 4:00 p.m., wearing sun-protective clothing, or wearing sunscreen. However, 45.6% of adults reported that they never use sunscreen with an SPF of 15 or higher when outdoors for an hour or more (Figure 7.6). In 1999, 37.3% of adults reported having a severe sunburn before the age of 18. These factors combined illustrate the inconsistency of sun-safe practices by Maryland adults.

Unfortunately, inconsistency in sun-safe behaviors among Maryland adults appears to be translating to somewhat low rates of sun-safe practices for Maryland children. In 1998, only 41.4% of adults reported always taking measures to protect their child's skin from UVR when the child is outdoors on a sunny day for an hour or more (Figure 7.7). In two years, this percentage only increased slightly, to 42.1%. In addition, a 1999 survey of 2,775 Maryland adolescents demonstrated a low level of knowledge about skin cancer prevention and less than optimal sun-safety behaviors. The study concluded that favorable attitudes toward sun protection should be nurtured, as they were found to correlate with positive behaviors.³²

Primary Prevention

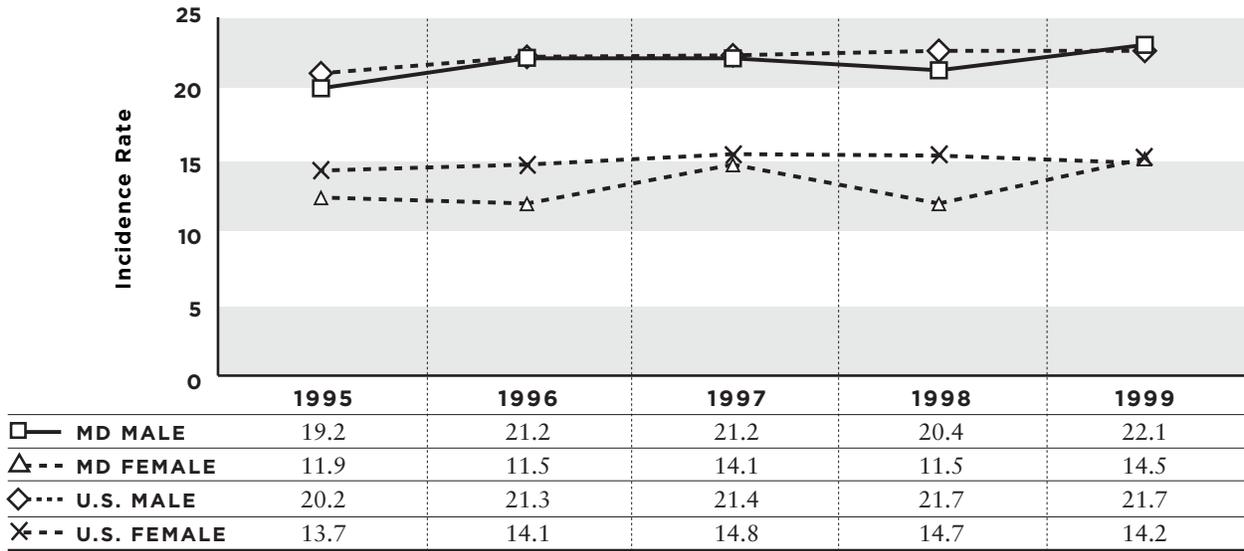
Given the role of sun exposure in the development of many skin cancers including melanoma, sun avoidance and sun protection are strongly recommended by the American Academy of Dermatology³³ and the American Cancer Society.³⁴ In addition, the National Cancer Institute states that the avoidance of sunburns, especially in childhood and adolescence, may reduce the incidence of cutaneous melanoma.³⁵

Figure 7.2
Melanoma Cancer Age-Specific Incidence Rates in Maryland and the United States, 1995-1999



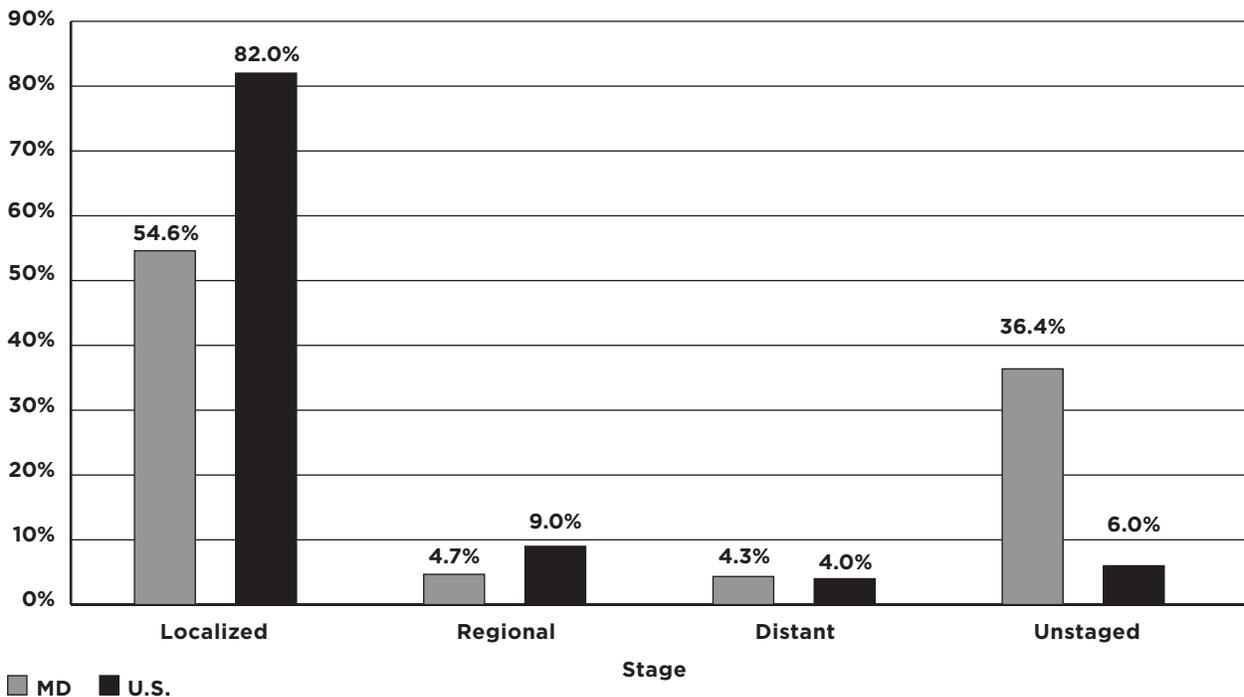
Rates are per 100,000 and age-adjusted to the 2000 population.
 Source: Maryland Cancer Registry, 1995-1999; SEER, National Cancer Institute, 1995-1999.

Figure 7.3
Melanoma Cancer Incidence by Sex in Maryland and the United States, 1995-1999



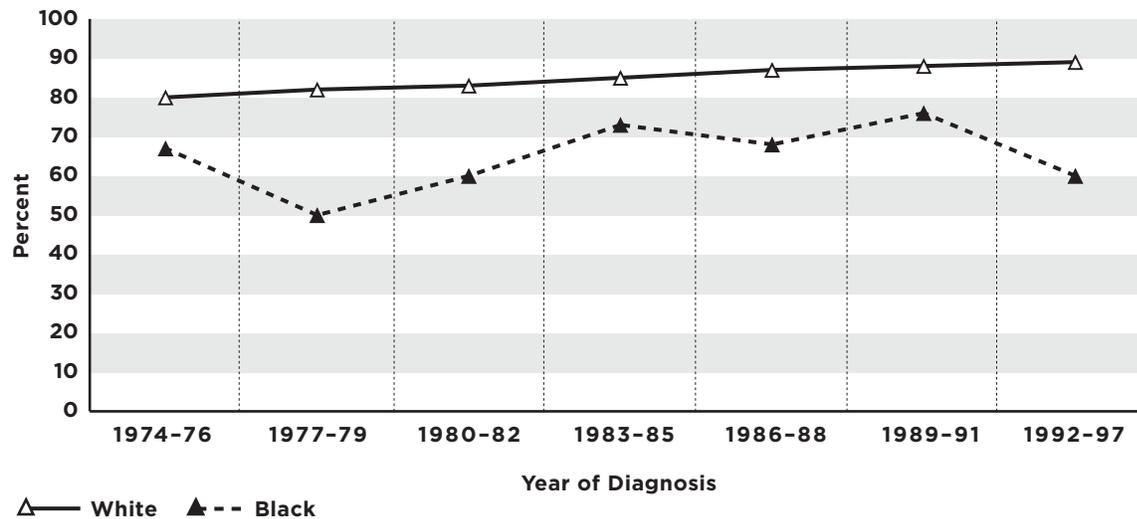
Rates are per 100,000 and age-adjusted to the 2000 U.S. standard population.
 Source: Maryland Cancer Registry, 1995-1999; Maryland Division of Health Statistics, 1995-1999.

Figure 7.4
Melanoma Cancer Distribution by Stage at Diagnosis in Maryland and the United States, 1992-1997



Source: Maryland Cancer Registry, 1992-1997; SEER, National Cancer Institute, 1992-1997.

Figure 7.5
Five-Year Relative Survival Rates Following Diagnosis for Melanoma Cancer in the United States, by Race, 1974-1997



Source: SEER, National Cancer Institute, 1974-1997.

Education and Public Policy

Educational efforts and policy changes are vital for the successful prevention of skin cancer among Marylanders. At a minimum, educational efforts directed toward the general public should include sun-safety information including the importance of wearing sun-protective clothing, the use of sunscreen, avoidance of sun exposure from the hours of 10:00 a.m. to 4:00 p.m., the use of shade structures, and the avoidance of artificial tanning sources. In addition, advice regarding sunscreen should include: (1) use sunscreen with SPF 15 or higher, (2) apply it 20 minutes prior to exposure, (3) use 1 ounce of sunscreen per application, and (4) reapply sunscreen every two hours or after swimming or excessive sweating.

Several population groups warrant special consideration for educational efforts. Persons in occupations that require them to work outdoors should be encouraged to take special precautions and practice sun-safety behavior to protect themselves from skin cancer. In addition, persons who routinely see the skin of their clients, such as barbers, hairdressers, cosmetologists, manicurists, and massage therapists, may provide a nontraditional avenue for skin cancer awareness. Educating these non-traditional service providers about the signs of skin cancer would enhance community awareness of skin cancer and promote sun-safe behaviors.

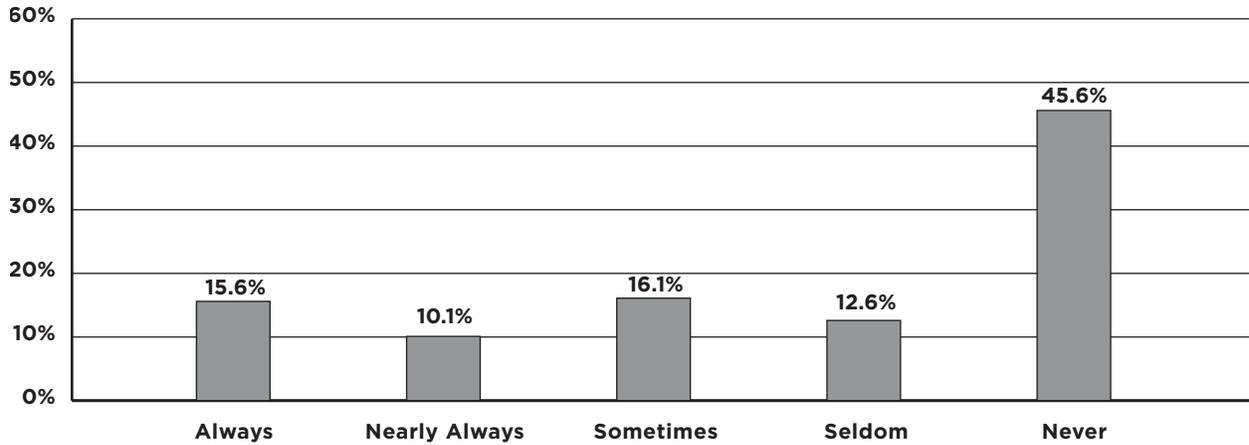
Given the link of sunburn (particularly before the age

of 18) to melanoma and other skin cancers, there is a significant need to target children and youth with interventions designed to increase their sun-safe behaviors and prevent damaging sun exposure. Because schools are a primary source of information for children and adolescents, educators can play a critical role in providing students with valuable messages in the classroom on proper sun-safe behaviors and the damaging effects of UVR. Schools may also make an impact by providing shade structures for students during outdoor playtime or physical education. Of course, funding is required for schools to ensure that proper shade structures are in place.

In 2001, the Maryland State Department of Education (MSDE) developed “Guidelines for Protecting Students and Staff from Overexposure to the Sun.”³⁶ These guidelines encourage and provide resources for school health services supervisors to perform a school environment assessment and develop sun-safety policies for their schools. The guidelines specifically indicate that sunscreen is not considered a medication and that students should be allowed to use sunscreen brought to school. These guidelines serve as a standard of care for school nurses and are not recorded in Maryland statutory law.

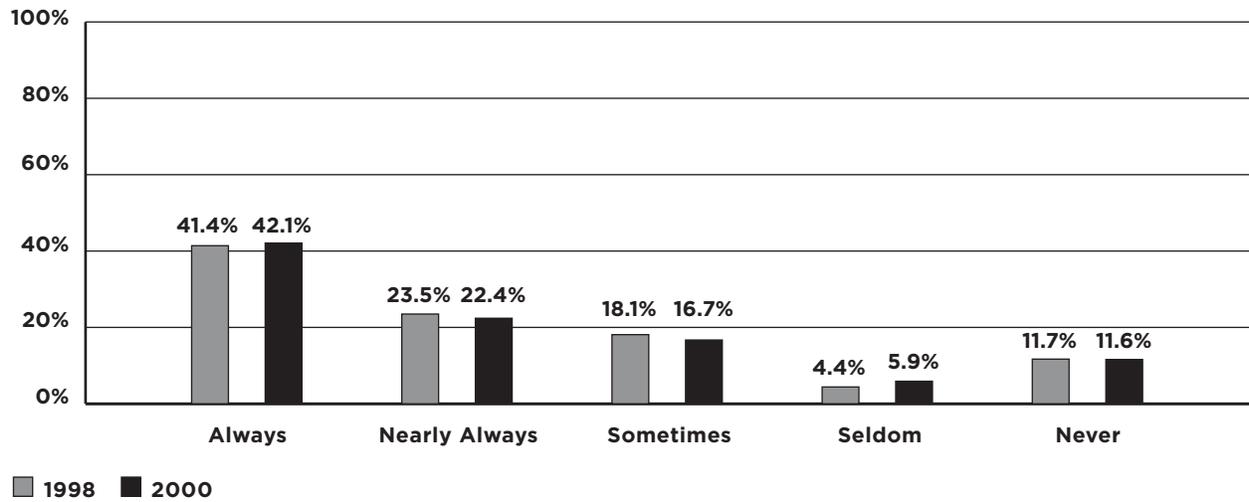
In 2002, the Centers for Disease Control and Prevention (CDC) published guidelines that included seven broad strategies that school programs can use to reduce the risk for skin cancer among students:³⁷

Figure 7.6
Maryland Adults Who Use Sunscreen with a Rating of 15 or Higher
When Outdoors for an Hour or More, 1998



Percentages reflect weighted values.
 Source: Maryland BRFSS.

Figure 7.7
When the Youngest Child Under Age 13 is Outdoors on a Sunny Day for an Hour or More,
How Often is His or Her Skin Protected From the Sun? 1998, 2000



Percentages reflect weighted values.
 Source: Maryland BRFSS.

- Establish policies that reduce exposure to UV radiation.
- Provide and maintain physical and social environments that support sun safety and that are consistent with the development of other healthful habits.
- Provide health education to teach students the knowledge, attitudes, and behavioral skills they need to prevent skin cancer. The education should be age-appropriate and linked to opportunities for practicing sun-safety behaviors.
- Involve family members in skin cancer prevention efforts.
- Include skin cancer prevention knowledge and skills in preservice and inservice education for school administrators, teachers, physical education teachers, coaches, school nurses, and others who work with students.
- Complement and support skin cancer prevention education and sun-safety environments and policies with school health services.
- Periodically evaluate whether schools are implementing the guidelines on policies, environmental change, education, families, professional development, and health services.

Both the MSDE and CDC guidelines are referenced in a joint resolution on skin cancer prevention signed by the Maryland State Superintendent of Schools and representatives from several other organizations in May 2003.

Continued promotion of these guidelines among school officials is necessary, as is representation of skin cancer awareness and sun-safety behavior in the health curricula of Maryland schools. In addition, state policy changes may be needed to further provide for sun-safety practices among Maryland schoolchildren. Several states, including California and Hawaii, have enacted legislation regarding sun-safety practices in schools. California law SB 310 provides pupils with the right to wear protective articles of sun-protective clothing while outdoors, including, but not limited to, hats. California law SB 1632 allows pupils to use sunscreen during the school day.

In addition to school-based education and policies, youth organizations such as the Girl Scouts, Boy Scouts, 4H, and other sports and recreation organizations should also be targeted for skin cancer awareness and education about sun safety. Day-care centers and

preschools should strive to implement sun-safe programs and policies as well.

Artificial UVR and Tanning Booths

Teenagers in particular should be educated on the importance of skin cancer awareness and sun-safety behaviors. The tanning salon industry has made considerable marketing efforts targeting teenagers, boasting that tanning beds may be used as a safe alternative to sun exposure. These claims are false; exposure to tanning lamps, booths, and stands is even more dangerous than being out in the sun. UVA and UVB exposure from tanning machines is more concentrated and is not a safe alternative to sun exposure. Regulations should be enacted in Maryland to restrict youth access to tanning salons.

In 2002, the state of Texas enacted statute HB 663, a bill that should be used as a model in Maryland for regulating tanning facilities. Texas law HB 663 states that tanning facilities shall give each customer a written statement warning of the dangers of using the tanning device that will include notice that usage increases the risks for skin cancer, in addition to skin burns and premature aging (HB 663, section 145.005a). The statute also calls for a sign with warning statements about ultraviolet radiation and the possible effects (HB 663, section 145.006a) to be placed at each tanning device in a conspicuous location. The law also specifies certain age restrictions. Youth ages 13 and younger are not allowed to use the tanning devices unless under the direction and written permission of a physician and the parent/guardian must remain at the facility during time of usage; youth aged 14 and 15 must be accompanied by a parent/guardian who must remain at the tanning facility during the tanning session; and youth aged 16 and 17 must have a written informed consent statement signed and dated by the person's parent or guardian stating that they have read and understood the warnings given by the tanning facility.

Screening for Skin Cancer

A noninvasive visual inspection of the skin for skin cancer can be performed by patients or by health care providers. The American Academy of Dermatology (AAD) recommends regular skin self-examination and provides instructions for a thorough self-exam.³⁸ If there are any changes in the size, color, shape, or tex-

ture of a mole, the development of a new mole, or any other unusual skin changes, the AAD recommends that people see a physician immediately.

Patient self-exams, however, are not a substitute for yearly skin exams by a dermatologist. In one study, melanomas detected by physicians were significantly thinner than those detected either by a patient or by a patient's spouse.³⁹ A recent publication on results of the AAD skin cancer screening programs from 1985 to 1999 found that nearly 30% of screened subjects had a skin lesion noted that was suspicious for a skin cancer or pre-cancer.⁴⁰ In addition, melanomas that were biopsied as a result of the skin cancer screening had a greater likelihood of being less than 1.50 mm in thickness as compared with population-based registries.⁴¹ The Skin Cancer Foundation recommends monthly skin self-exams and yearly skin screening by a dermatologist. The American Cancer Society recommends a yearly cancer-related checkup, which should include examination of the skin and counseling regarding signs and symptoms of skin cancer.⁴²

Despite these findings and guidelines, several national organizations do not recommend routine skin screening by health care providers for the early detection of melanoma. The U.S. Preventive Services Task Force concluded that “the evidence is insufficient to recommend for or against routine screening for skin cancer using a total-body skin examination for the early detection of cutaneous melanoma, basal cell cancer, or squamous cell skin cancer.”⁴³ In addition, the National Cancer Institute indicates that “there is insufficient evidence to establish whether a decrease in mortality occurs with routine examination of the skin. There is also insufficient evidence to establish whether other theoretical benefits (such as decreased morbidity from less aggressive treatments) or harms associated with incorrect diagnosis occur.”⁴⁴ However, the National Cancer Institute also reports that several observational studies have provided some evidence that screening for skin cancer may be effective. “For example, an educational campaign in Western Scotland, promoting awareness of the signs of suspicious skin lesions and encouraging early self-referral, has been reported. There was a decrease in mortality rates associated with the campaign. No randomized controlled trials have been performed, however, to assess screening efficacy. A case-control study of skin self-examination by 650 cases (and 549 controls) diagnosed in Connecticut has been reported. The intervention was associated with reduced melanoma incidence, and the authors estimat-

ed that monthly skin self-examination might decrease disease-specific mortality by 63%. It has been suggested, however, that the observed incidence effects may have been the result of study biases, which frequently affect case-control study designs.”⁴⁵

Despite this lack of evidence, the UVR and Skin Cancer Committee encourages health care providers, especially primary care physicians, to perform routine skin exams and educate patients on skin self-exams. In addition, health insurers should be encouraged to adequately reimburse dermatologists and other health care providers for time-consuming full-skin exams.

Provider Education

Because thin melanomas have a greater than 95% survival rate, physician education and awareness regarding skin cancer detection is a key factor in patient survival. Currently, many physicians do not receive sufficient education on skin cancer screening to feel competent in this area. A survey conducted at the Boston University School of Medicine found that in 1996 and 1997, 52% of fourth-year students rated themselves as unskilled in skin cancer examinations.⁴⁶ Another study evaluated readiness of primary care physicians to triage suspicious skin lesions. In this study, 50% of primary care residents failed to diagnose correctly nonmelanoma skin cancer and malignant melanoma.⁴⁷ This deficit of skin cancer knowledge was also apparent in a survey of family practitioners; more than 50% of those surveyed stated that they lacked the confidence to recognize melanoma.⁴⁸

Skin cancer screening and education occur at a lower rate in primary care physicians' offices than other types of cancer education or screening. A retrospective database study, utilizing the National Ambulatory Medical Care Survey from 1997, found skin examination was reported in 15.8% of all primary care office visits and skin cancer education and counseling occurred during only 2.3% of visits.⁴⁹ In another survey, 52% of family physicians and internists rated skin cancer screening as “extremely important,” but only 37% reported performing total body skin exams on 81% to 100% of patients.⁵⁰

Educational interventions and curriculum enhancement for physicians and medical students can be effective. A two-hour multifaceted educational intervention on skin cancer control has been designed for primary care providers. This curriculum resulted in significant increases in provider skin cancer control practices and

attitude toward total-body skin examination.⁵¹

Dermatologist Availability

The state of Maryland has 263 licensed dermatologists. Availability of dermatology appointments is variable depending on geographic location. Areas that may be considered underserved include western Maryland, southern Maryland, Harford County, and the Eastern Shore. Methods to increase access to dermatologists in these areas should be developed.

Diagnosis of dermatologic conditions using telemedicine has been found to be an acceptable means for diagnosing skin conditions. Telemedicine can be defined as the practice of medicine remotely, primarily by exchanging images, sometimes accompanied by text and audio, over a communications network.⁵² Complete agreement was obtained on 78% of dermatologic telemedicine diagnoses versus local evaluations in a study evaluating 68 dermatological conditions. Partial agreement was reached on another 21% of evaluations.⁵³

Current Efforts in Maryland

There are several community and governmental organizations in Maryland that are involved in educating the public and providing programs in skin cancer prevention and sun-safety behavior. These organizations are involved in public education programs, provide school curricula, offer additional resources via websites and other materials, and provide local assistance with policy changes.

Coalition for Skin Cancer Prevention in Maryland

The Coalition for Skin Cancer Prevention in Maryland is a collaborative effort to raise awareness about the importance of skin cancer prevention and to provide sun-safety information, resources, and support statewide. The coalition is in its sixth year, having been established in 1997 through a grant from the U.S. Centers for Disease Control and Prevention (CDC). As of March 2001, the coalition is funded by a grant from the Maryland Department of Health & Mental Hygiene. The coalition is comprised of concerned citizens and representatives from forty organizations, including state and local governmental agencies, not-for-profit organizations, for-profit companies, and professional medical societies.

The coalition has designed “SunGuard Your Skin,” a two-lesson middle school curriculum, taught to over 30,000 students in more than 100 public and private schools in the state. The program, consisting of a teacher’s guide, student booklet, parent letter, and video, has demonstrated significant positive changes in knowledge, attitudes, and behaviors. The SunGuard Your Skin program is available to educators free of charge on their website, SunGuardMan Online, <http://www.sunguardman.org>. SunGuardMan Online is a multi-media, interactive experience for both children and adults, which contains games, contests, activities, and the four-episode cartoon, *The Adventures of SunGuard Man*. In addition, the website offers information about the dangers of ultraviolet radiation, types of skin cancer, risk factors for skin cancer, protective measures, and how to perform a skin self-exam, along with links to many related sites.

The coalition’s mascot, SunGuard Man, appears in a variety of venues to disseminate the coalition’s skin cancer prevention message to children and adults. There are currently five SunGuard Man costumes placed with coalition member organizations throughout the state. The coalition has adopted the American Cancer Society’s Sun Safe Community program, which is a five-channel approach to skin cancer prevention. Through this model, the coalition is working with schools, child-care centers, parks and recreation areas, primary care physicians’ offices, and the media to bring its sun-safety message to all Marylanders. Every year, on Melanoma Monday, the coalition holds a press conference, during which a governor’s proclamation is read, declaring the month of May Skin Cancer Prevention and Detection Month in Maryland. At this event prizes are awarded to winners of the coalition’s annual, statewide “SunGuard Your Skin” poster contest.

American Cancer Society

The American Cancer Society (ACS) is involved in providing public education on all aspects of early detection and prevention of cancer. In addition to providing educational programs and presentations and materials to local communities, ACS has designed a multi-channel program that targets children aged 18 and younger with skin cancer prevention and sun-safety education. “Sun Safe Community” is a program in which schools, day care centers, media, primary care providers, and parks and recreation programs come together to educate parents and children in their community. Community members, health organizations, governmental officials, and media representatives have

formed committees to design a local plan and work together to make their community a “Sun Safe Community.” The program includes a pre-school curriculum with songs, activities, and lessons; media releases and public service announcements; a primary care office manual; and informational materials and posters. Since 2001, the Sun Safe Community has been implemented in four counties in Maryland and has been successful in promoting skin cancer prevention education, sun-safety behaviors, and in some cases, policy changes in schools, day care centers and preschools, and recreational areas.

Environmental Protection Agency

The U.S. Environmental Protection Agency has designed an education program for schools that targets children in grades K–8. The SunWise School Program designs activities and materials to be used by teachers and administrators to better educate students in skin cancer prevention and sun safety behaviors. The Tool Kit contains cross-curricular classroom activities for grades K–2, 3–5, and 6–8. Materials, storybooks, comic books, and activity books reinforce the sun-safety lessons. The SunWise School Tool Kit is available through the EPA’s website (<http://www.epa.gov/sunwise/>) and is available at no cost to interested schools. The EPA’s website also includes information for parents and has a variety of games and activities for children. Storybooks and an activity book are also available on the website.

Ulman Cancer Fund for Young Adults

The Ulman Cancer Fund for Young Adults provides support services, local cancer resource information, and assistance to young adults, families, and others affected by cancer. The Ulman Fund also promotes skin cancer awareness and prevention education through local programs and their website (<http://www.ulmanfund.org>).

There are many other national and governmental organizations that promote and support skin cancer awareness and sun-safety education such as the American Academy of Dermatology, the National Cancer Institute, and the National Institutes of Health.

Healthy People 2010 Objectives

The following are the Healthy People 2010 objectives⁵⁴ related to skin cancer:

Objective:

Reduce the rate of melanoma cancer deaths to 2.5 deaths per 100,000 population.

The U.S. baseline was 2.8 melanoma cancer deaths per 100,000 population in 1998 (age-adjusted to the year 2000 standard population).

Objective:

Increase the proportion of persons who use at least one of the following protective measures that may reduce the risk of skin cancer to 75%: avoid the sun between 10 a.m. and 4 p.m., wear sun-protective clothing when exposed to sunlight, use sunscreen with a sun-protective factor (SPF) of 15 or higher, and avoid artificial sources of ultraviolet light.

The U.S. baseline was 47% of adults aged 18 years and older regularly used at least one protective measure in 1998.



Ultraviolet Radiation and Skin Cancer Goals, Objectives, and Strategies

Goals:

Prevent increases in mortality from melanoma cancer.

Increase utilization of sun-safe behaviors.

Targets for Change

By 2008, maintain the mortality rate from melanoma of the skin at a rate of no more than 2.7 per 100,000 persons in Maryland.

The Maryland baseline was 2.7 per 100,000 in 2000 (age-adjusted to the 2000 U.S. standard population).

Source: Maryland Division of Health Statistics.

By 2008, increase the percent of Maryland adults to 71% who use at least one of the following sun protective measures: avoid sun from 10am–4pm, wear sun protective clothing, or wear sunscreen.

The Maryland baseline was 59% in 1998.

Source: BRFSS.

Objective 1:

Increase public awareness about sun safety and skin cancer.

Strategies:

1. Formulate and disseminate an appropriate educational message for the general public about melanoma and skin cancer prevention. The message should include a recommendation about sun-safe behaviors including:
 - proper use of a sunscreen that is SPF 15 or higher, including the need for 1 ounce per application, application 20 minutes before exposure, and reapplication every 2 hours or after swimming or excessive sweating.
 - avoidance of the sun during peak hours and wearing protective clothing, hats, and sunglasses.
 - avoidance of artificial UV light sources such as tanning beds.
2. Form partnerships with youth service providers and organizations, including preschools, child care providers and facilities, Girl Scouts, Boy Scouts, 4H, and other youth recreation and sports organizations.
3. Form partnerships with occupational organizations to address sun-safety behavior and skin cancer awareness among persons whose occupations require them to work outdoors.
4. Form partnerships with organizations and individuals who routinely see and care for their clients' skin (such as barbers, hairdressers, cosmetologists, manicurists, and massage therapists) to promote non-traditional avenues for sun safety and skin cancer education.



5. Inform the general public about the Maryland State Department of Education Guidelines that:
 - allow use of sunscreen by students.
 - state that sunscreen is not considered a medication and therefore students may keep it with them during the day.
 - advocate use of sun-safe clothing, including the use of wide-brimmed hats (for all ages).
 - advocate placement of play equipment in shaded areas when possible.
 - recommend use of safety sunglasses that provide 100% protection from the sun (for all ages).

Objective 2:

Increase physician awareness about sun safety and skin cancer.

Strategies:

1. Increase educational opportunities for health care providers, especially pediatricians, regarding the need for skin cancer prevention and early detection.
2. Develop CME programs to teach skin cancer recognition and how to educate patients about skin self-exams and sun protection.
3. Educate health care providers that melanoma may occur in African Americans, particularly on the palms, soles of feet, and under nails.
4. Encourage health care providers to perform skin exams during each routine physical exam.
5. Develop a Medical Advisory Committee and Minimal Clinical Elements guidelines to address melanoma in local public health programs.
6. Explore the possibility of using telemedicine to supplement the low availability of dermatologists within rural and underserved areas.
7. Encourage dermatologists to participate in annual public skin screenings.
8. Develop and fund a pilot program including the development of a medical school curriculum component such as “How to perform a skin cancer screening exam and what to look for.”
9. Encourage health insurers to adequately reimburse health care providers for full skin exams.

**Objective 3:**

Increase the number of melanoma cancers diagnosed at an early stage.

Strategies:

1. Increase performance of skin exams during routine physical exams.
2. Educate the public about the need for regular skin self-exams.

Objective 4:

Develop improved data to document the prevalence of skin cancer examinations and appropriate diagnosis and follow-up of melanoma and other skin cancers in Maryland.

Strategies:

1. Increase data collection relating to basal and squamous cell skin cancers and melanoma in Maryland.
2. Implement steps to document survival rates for melanoma and skin cancers in Maryland.
3. Improve reporting of diagnostic results to the Maryland Cancer Registry to reduce the number of unstaged cases of melanoma in Maryland.
4. Expand data collection related to skin cancer prevention and screening practices.

Objective 5:

Implement policy changes to increase the use of sun-safe behaviors, particularly among youth in Maryland.

Strategies:

1. Model legislation in Maryland based on Texas law HB 663 which requires the posting of warning signs in tanning salons, and regulates their use by those under the age of 18, as follows:
 - children under the age of 13—not allowed to use unless prescribed by physician.
 - children age 13 to 15—must be accompanied by parent/guardian.
 - children age 16 and 17—written consent by parent/guardian is required.
2. Explore the need for policy changes to allow for the use of sun-protective clothing, including hats, by students while at school.
3. Provide funding for provision of shade structures at Maryland schools and other facilities serving youth organizations.

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