Behavioral Counseling to Prevent Skin Cancer: U.S. Preventive Services Task Force Recommendation Statement

Summary of Recommendations and Evidence

The U.S. Preventive Services Task Force (USPSTF) recommends counseling children, adolescents, and young adults ages 10 to 24 years who have fair skin about minimizing their exposure to ultraviolet radiation to reduce risk for and prevent incidence of skin cancer. This is a grade B recommendation.

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of counseling adults older than age 24 years about minimizing risks to prevent skin cancer. This is an I statement.

See Clinical Considerations section for suggestions for practice regarding the I statement.

Rationale

Importance
Skin cancer is the most common malignancy in American populations, and is diagnosed in more than 2 million Americans each year. Most cases are basal cell or squamous cell cancer. While basal cell cancer cannot metastasize and is not associated with cancer deaths, squamous cell cancer has metastatic potential and does account for a small percent of all cancer deaths (1). Melanoma, while less common, is more deadly. There were approximately 70,000 cases of melanoma in 2011 and nearly 8,800 deaths. The incidence of melanoma has been increasing among white Americans (from 8.7 per 100,000 persons in 1975 to 27.6 per 100,000 in 2008) (2).

Link of Behavior Change to Cancer Outcomes
Behavior change interventions are aimed at techniques shown to be effective in reducing ultraviolet (UV) radiation exposure. Ultraviolet radiation comes from outdoors exposure to the sun during midday hours, and the use of artificial sources of UV light (e.g., indoor tanning) to achieve cosmetic darkening of the skin. Sun-protective behaviors include the use of effective sunscreen, wearing hats or other shade-protective clothing, avoiding the outdoors during midday hours, and avoiding the use of indoor tanning.

Ultraviolet radiation exposure is linked with incidence of all three skin malignancies through epidemiologic evidence (3). Convincing evidence relates UV radiation exposure during childhood and youth to a moderately increased risk of skin cancer later in life; for adults, adequate evidence links UV radiation exposure to a small increase in the subsequent risk of skin cancer.

Recognition of Risk Status
Individuals with a fair skin type are at greatly increased risk of skin malignancy (1). In addition to light pigmentation, individuals at increased risk have light hair and eye color,
have freckles, and sunburn easily. Most studies of interventions to increase sun-protective behaviors have been limited to populations with a fair skin type.

**Benefits of Behavioral Counseling Interventions**
For children, adolescents, and young adults ages 10 to 24 years, adequate evidence suggests that counseling interventions that are available in a primary care setting or are referable from primary care can increase the use of sun-protective behaviors by a moderate amount.

For adults older than age 24 years, there is inadequate evidence to determine the impact of counseling on the use of sun-protective behaviors.

**Harms of Behavioral Counseling Interventions**
There is adequate evidence that there are no appreciable harms related to counseling or sun-protective behaviors in youth or adults. Theoretical concerns about sun-protective behaviors include the risk of vitamin D deficiency in adults living in northern latitudes who avoid sun exposure, but there is little evidence to support this hypothesis.

**USPSTF Assessment**
The USPSTF concludes that for children, adolescents, and young adults ages 10 to 24 years with fair skin, there is moderate certainty that there is a moderate net benefit of counseling.

The USPSTF concludes that for adults older than age 24 years, evidence is sparse, with unknown clinical significance; therefore, the balance of benefits and harms cannot be determined.

**Clinical Considerations**

**Patient Population Under Consideration**
This recommendation applies to all asymptomatic persons without a history of skin malignancy. As most trials of skin cancer counseling only include people with a fair skin type, the recommendation for counseling of children, adolescents, and young adults ages 10 to 24 years is limited to this population.

**Suggestions for Practice Regarding the I Statement**

*Potential preventable burden.* Counseling adults is of uncertain potential benefit due to the unknown effectiveness of counseling interventions to change behavior and also because of the less secure link between behavior change in adulthood and skin cancer risk. It is possible that UV exposure experienced after age 35 years contributes much less to one’s lifetime skin cancer risk compared with exposure at younger ages.

**Assessment of Risk**
Visual assessment of skin type can be performed by primary care clinicians. Fair skin type can be defined by eye and hair color and freckling, along with historical factors.
such as usual reaction to sun exposure (i.e., always or usually burning, infrequently tanning).

**Effective Counseling Interventions**

Effective interventions were generally of low intensity, and almost entirely accomplished within the primary care interaction or visit. Successful counseling interventions used cancer prevention messages or appearance-focused messages to reach specific audiences. In particular, to reach late-adolescent females (i.e., the population most likely to pursue indoor tanning), appearance-focused messages were successful at reducing intent to pursue this behavior. Appearance-focused interventions used a variety of methods, including self-guided booklets, a video on photoaging, and 30-minute peer counseling sessions. One study used UV facial photography as an adjunct to the appearance-focused video (4). The UV camera can be used to demonstrate to patients the extent of skin damage from UV exposure.

**Other Approaches to Prevention**

The Community Preventive Services Task Force recommends education and policy interventions for the prevention of skin cancer. These interventions combine community-based communications and policy and regulation to increase preventive behaviors (e.g., covering up, using shade, avoiding sun during peak UV hours) among populations in specific settings, including primary school and outdoor recreational settings (5).

Although outside the scope of this recommendation, community-based interventions to promote and support sun safety, such as direct peer-to-peer support, social marketing initiatives, workplace initiatives, and public policy actions, may offer additional sizeable benefits.

**Useful Resources**

The USPSTF recommendation on screening for skin cancer is available at [www.uspreventiveservicestaskforce.org](http://www.uspreventiveservicestaskforce.org).

**Other Considerations**

**Implementation**

A range of education materials, using different media, was found to be effective in counseling children, adolescents, and young adults. Primary care practices may consider which materials are likely to be easily implemented in their particular setting and with their particular population. One interesting aspect of implementation, given the positive recommendations from the Community Task Force, is the potential to link community-based efforts and local policy efforts with consistent messages delivered by clinicians through brief counseling.

**Costs**

Some clinicians may be required to invest in materials or technologies such as professionally produced booklets, computer-based interventions, or a UV camera for use in appearance-based counseling. The time required by the clinician to provide brief counseling is the main element of the cost of most evidence-based effective services.
**Research Needs and Gaps**
Further randomized, controlled trials (RCTs) are needed to develop effective interventions for infants and small children. In addition, a better understanding of the impact of UV exposure during adulthood, in terms of risk of skin malignancies, would be valuable to address the key evidence gap around counseling for that age group. Research is also needed to further develop technologies and vehicles for administering relevant interventions for behavior change.

**Discussion**

**Burden of Disease**
Skin cancer is the most common malignancy, affecting more than 2 million Americans each year. The exact number of cases is difficult to estimate since most non-melanoma skin cancer cases are not reported to registries (6). The most common types are basal cell and squamous cell cancer; melanoma is much less common, with an incidence of about 27.6 cases per 100,000 white Americans in 2008. Melanoma is over 20 times more common in whites than in African Americans, but can occur in all racial and ethnic groups (2). Although less common, melanoma is responsible for 75% of skin cancer deaths, and age-adjusted incidence rates have increased over the last 35 years (1). It is important to note that basal cell and squamous cell malignancies can also be associated with significant morbidity and costs; in the case of older adults or immunosuppressed persons, squamous cell cancer can result in death (3).

**Scope of Review**
The USPSTF requested a review of the evidence in order to update its 2003 recommendation (1). The scope of the literature review included a search for direct evidence that counseling patients about sun protection reduces intermediate outcomes (e.g., sunburns) or skin cancer. Other key questions addressed the link between counseling and behavior change, the link between behavior change and incidence of skin cancer, and the adverse effects of counseling or sun-protective behavior changes.

**Effectiveness of Counseling Interventions to Change Behavior**
Both traditional cancer prevention and appearance-focused messages (i.e., stressing the aging effect of UV radiation on the skin) were effective in certain populations. In young adults, one RCT used a video intervention with or without a UV facial photograph. This intervention produced a decrease in objectively measured skin pigment 12 months after the intervention (4).

Three additional studies in young adults used appearance-based interventions (7-9). The interventions ranged from a self-guided booklet to a 30-minute counseling session with a peer counselor. In these studies, the intervention reduced indoor tanning behavior by up to 35%. Lesser magnitude, though still significant, improvements in composite scores of sun-protective behaviors were seen in a trial of young adolescents who were given brief clinician counseling with computer-assisted feedback (10).
A cluster RCT that provided counseling to parents of newborns in a series of four well child visits showed statistically significant improvement in composite scores in the intervention group. However, the small changes were clinically indeterminate, and most were statistically insignificant (11).

In adults, four out of five intervention studies using telephone counseling sessions packaged with tailored risk feedback or a self-directed computer-based intervention found significant improvements in a composite sun protection score, but the differences were small and of uncertain clinical significance (12-15).

**Potential Harms of Counseling Interventions**

The USPSTF looked for evidence of a paradoxical decrease in sun protective behaviors in 10 RCTs of interventions designed to increase protective behaviors, and found none. The USPSTF also looked for evidence that children receiving counseling to avoid the outdoors would be less physically active as a result; two studies, one of which was conducted in a primary care setting, found neither a decrease in outdoor activity time nor an increase in body mass in young people who received a skin cancer prevention intervention (16-17).

The hypothetical impact of a decrease in vitamin D as a result of sun-protective behavior, mostly a concern in adulthood, continues to be investigated. The limited body of epidemiologic evidence now available suggests that some cancer may be linked inversely to sun exposure in persons with lighter pigmentation, but the available studies did not assess or control for vitamin D levels.

**Link Between Behavior Change and Risk of Cancer**

*Sun exposure.* The USPSTF assessed 12 observational studies that demonstrated increased risk of both squamous cell and basal cell carcinoma with intermittent sun exposure in childhood. Intermittent sun exposure during childhood, especially sunbathing, was also associated with an increased risk of melanoma in 14 observational studies. Studies that measured chronic or total sun exposure did not reveal an association between increased exposure and skin cancer risk (1).

*Indoor tanning.* There was limited evidence to evaluate the association between indoor tanning bed use and the risk of squamous cell or basal cell carcinoma. Four of five observational studies showed no statistically significant association. One larger study did show an increased risk but did not adjust for sun exposure. Twelve observational studies evaluated the association between indoor tanning and melanoma incidence. One cohort study found an association between regular solarium use over two to three decades and an increased risk of melanoma (risk ratio, 2.37). Of the 11 case-control studies, most with negative results did not adjust for skin phenotype, while three of the four studies with positive results did adjust for skin phenotype. These studies found an association between increased use of tanning beds and increased risk of melanoma (1).

*Sunscreen use.* One RCT found that persons who regularly used sunscreen had a decreased risk for squamous cell but not basal cell carcinoma. The Nambour Skin
Cancer Prevention Trial (18) reported a risk ratio of 0.65 for squamous cell carcinoma and 1.02 for basal cell carcinoma. Two cohort studies did not show a protective effect of sunscreen on risk of basal cell or squamous cell carcinoma. In addition, two case-control studies showed a harmful effect from sunscreen use. However, all of the four observational studies used only crude measures of sunscreen use and did not adjust for sun exposure. Five observational studies showed mixed protective and harmful associations between sunscreen use and melanoma risk. Two found no association, one found a protective effect, and two found harmful effects (1).

**Estimate of Magnitude of Net Benefit**
The USPSTF determined that the interventions studied were of moderate benefit in changing risky behaviors in young people. The link of behavior change to outcomes is supported by a body of evidence comprising a small number of trials and a substantial body of observational evidence that shows the strongest connection between UV radiation exposure and skin cancer stems from UV exposure in youth. The interventions themselves are not associated with any known risks or harms. The USPSTF assessed the range of likely harms to be no greater than small. For children, adolescents, and young adults ages 10 to 24 years, the USPSTF concluded with moderate certainty that the net benefits are moderate for counseling to decrease UV exposure and reduce the risk of skin cancer.

For adults, there was inadequate evidence on the efficacy of counseling to change behavior. While counseling was found to have negligible harms, evidence on the harms of sun-protective behaviors in adults was inadequate. Finally, the USPSTF assessed the data supporting a link between decreased UV radiation in adulthood and risk of skin cancer and determined there was evidence of a small benefit. As a result, and particularly due to the inadequacy of evidence about the efficacy of counseling in adults, the USPSTF concluded that the balance of benefits and harms could not be assessed for this population.

**How Does Evidence Fit With Biological Understanding?**
Epidemiologic evidence suggests that the impact of UV radiation exposure from sunlight in typical doses varies over the life span, with some evidence of a window of biological vulnerability in early life that translates into risk of skin neoplasms decades later in life. Most of the evidence available concerns the most common lesions: non-malignant neoplasms and basal cell and squamous cell malignancies. It is not clear whether the same mechanisms or schedules apply to risk for melanoma, the most lethal of the skin cancer types. For all three skin cancer types, increasing intermittent, or recreational, sun exposure is linked by fair-quality evidence to increased cancer risk, while chronic or total sun exposure is not (1).

**Update of Previous USPSTF Recommendation**
This recommendation replaces the USPSTF’s 2003 recommendation on counseling about skin cancer prevention at any age (I statement, or insufficient evidence) (19). In the current review, the USPSTF notes the significant studies done in young people which, though using different approaches, describe a consistent picture of moderate
behavior change in persons at the age of greatest vulnerability to UV radiation exposure.

**Recommendations of Others**

The American Cancer Society advises the importance of protecting children from the sun because of the increased risk of cancer resulting from severe sunburns in childhood (6). Previous statements by the American Academy of Family Physicians about counseling to prevent skin cancer have been consistent with those of the USPSTF, and it is currently updating its recommendations. The American Academy of Pediatrics has an extensive set of recommendations to protect children from the hazards of UV radiation exposure (20). It recommends pediatricians incorporate sun safety advice into health maintenance visits at least once per year.

**Appendix: U.S. Preventive Services Task Force**

Members of the U.S. Preventive Services Task Force* at the time this recommendation was drafted are Virginia A. Moyer, MD, MPH, Chair (Baylor College of Medicine, Houston, Texas); Michael L. LeFevre, MD, MSPH, Co-Vice Chair (University of Missouri School of Medicine, Columbia, Missouri); Albert L. Siu, MD, MSPH, Co-Vice Chair (Mount Sinai School of Medicine, New York, New York); Kirsten Bibbins-Domingo, PhD, MD (University of California, San Francisco, California); Susan J. Curry, PhD (University of Iowa College of Public Health, Iowa City, Iowa); Glenn Flores, MD (University of Texas Southwestern, Dallas, Texas); Adelita Gonzales Cantu, RN, PhD (University of Texas Health Science Center, San Antonio, Texas); David C. Grossman, MD, MPH (Group Health Cooperative, Seattle, Washington); George J. Isham, MD, MS (HealthPartners, Minneapolis, Minnesota); Rosanne M. Leipzig, MD, PhD (Mount Sinai School of Medicine, New York, New York); Joy Melnikow, MD, MPH (University of California Davis, Sacramento, California); Bernadette Melnyk, PhD, RN (Ohio State University College of Nursing, Columbus, Ohio); Wanda K. Nicholson, MD, MPH, MBA (University of North Carolina School of Medicine, Chapel Hill, North Carolina); Carolina Reyes, MD, MPH (Virginia Hospital Center, Arlington, Virginia); J. Sanford Schwartz, MD, MBA (University of Pennsylvania Medical School and the Wharton School, Philadelphia, Pennsylvania); and Timothy J. Wilt, MD, MPH (University of Minnesota Department of Medicine and Minneapolis Veteran Affairs Medical Center, Minneapolis, Minnesota). Allen Dietrich, MD, and Lucy Marion, RN, PhD, previous Task Force members, also made significant contributions to this recommendation.

* For a list of current Task Force members, go to [http://www.uspreventiveservicestaskforce.org/members.htm](http://www.uspreventiveservicestaskforce.org/members.htm).

**References**


