

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

Virginia A. Moyer, MD, MPH, on behalf of the U.S. Preventive Services Task Force*

Description: Update of the 2003 U.S. Preventive Services Task Force (USPSTF) recommendation statement on counseling to prevent skin cancer.

Methods: The USPSTF performed a targeted literature search for new evidence that counseling patients about sun protection reduces intermediate outcomes (such as sunburn) 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.

Recommendations: The USPSTF recommends counseling children, adolescents, and young adults aged 10 to 24 years who have fair

skin about minimizing their exposure to ultraviolet radiation to reduce risk for skin cancer (B recommendation).

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

Ann Intern Med. 2012;157:59-65.

www.annals.org

For author affiliation, see end of text.

* For a list of the members of the USPSTF, see the **Appendix** (available at www.annals.org).

This article was published at www.annals.org on 8 May 2012.

The U.S. Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific clinical preventive services for patients without related signs or symptoms.

It bases its recommendations on the evidence of both the benefits and harms of the service and an assessment of the balance. The USPSTF does not consider the costs of providing a service in this assessment.

The USPSTF recognizes that clinical decisions involve more considerations than evidence alone. Clinicians should understand the evidence but individualize decision making to the specific patient or situation. Similarly, the USPSTF notes that policy and coverage decisions involve considerations in addition to the evidence of clinical benefits and harms.

SUMMARY OF RECOMMENDATIONS AND EVIDENCE

The USPSTF recommends counseling children, adolescents, and young adults aged 10 to 24 years who have fair skin about minimizing their exposure to ultraviolet radiation to reduce risk for skin cancer (B recommendation).

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

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

See the **Figure** for a summary of the recommendation and suggestions for clinical practice.

Table 1 describes the USPSTF grades, and **Table 2** describes the USPSTF classification of levels of certainty about net benefit.

RATIONALE Importance

Skin cancer is the most common type of cancer in the United States and is diagnosed in more than 2 million Americans each year. Most cases are basal cell or squamous cell cancer. Whereas basal cell cancer rarely metastasizes and is not associated with cancer deaths, squamous cell cancer has metastatic potential and does account for a small percentage of all cancer deaths (1). Melanoma, although less common, is more deadly. Approximately 70 000 cases of melanoma occurred in 2011 and nearly 8800 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).

See also:

Print

Summary for Patients. I-36

Web-Only

CME quiz (preview on page I-25)



Figure. Behavioral counseling to prevent skin cancer: clinical summary of U.S. Preventive Services Task Force recommendation.

Annals of Internal Medicine



BEHAVIORAL COUNSELING TO PREVENT SKIN CANCER

CLINICAL SUMMARY OF U.S. PREVENTIVE SERVICES TASK FORCE RECOMMENDATION

Population	Children, Adolescents, and Young Adults Aged 10 to 24 Years With Fair Skin	Adults Older Than 24 Years
Recommendation	Provide counseling about minimizing exposure to ultraviolet radiation to reduce risk for skin cancer.	No recommendation.
	Grade: B	Grade: I (Insufficient Evidence)
Risk Assessment	Individuals with a fair skin type are at greatly increased risk for skin cancer. Fair skin type can be defined by eye and hair color; freckling; and historical factors, such as usual reaction to sun exposure (always or usually burning or infrequently tanning).	
Behavioral Counseling	Effective counseling interventions were generally of low intensity and almost entirely accomplished within the primary care visit. Successful counseling interventions used cancer prevention or appearance-focused messages (such as stressing the aging effect of ultraviolet radiation on the skin) to reach specific audiences.	
Interventions	Behavior change interventions are aimed at reducing ultraviolet radiation exposure. Sun-protective behaviors include the use of a broad-spectrum sunscreen with a sun protection factor ≥ 15 , wearing hats or other shade-protective clothing, avoiding the outdoors during midday hours (10 a.m. to 3 p.m.), and avoiding the use of indoor tanning.	
Balance of Harms and Benefits	For children, adolescents, and young adults aged 10 to 24 years with fair skin, primary care counseling interventions can increase the use of sun-protective behaviors by a moderate amount, with no appreciable harms.	For adults older than 24 years, there is inadequate evidence to determine the effect of counseling on the use of sun-protective behaviors.
Other Relevant USPSTF Recommendations	The USPSTF has made recommendations on screening for skin cancer. These recommendations are available at www.uspreventiveservicestaskforce.org .	

For a summary of the evidence systematically reviewed in making this recommendation, the full recommendation statement, and supporting documents, please go to www.uspreventiveservicestaskforce.org.

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 exposure to the sun during midday hours and from artificial sources of UV light (such as indoor tanning). Sun-protective behaviors include the use of broad-spectrum sunscreen with a sun-protection factor of 15 or greater, wearing hats or other shade-protective clothing, avoiding the outdoors during midday hours (10 a.m. to 3 p.m.), and avoiding indoor tanning. Utilizing all behaviors is important to minimizing risk.

Epidemiologic evidence (3) links ultraviolet radiation exposure with incidence of all 3 types of skin cancer. The USPSTF found convincing evidence linking UV radiation exposure during childhood and youth to a moderately increased risk for skin cancer later in life; for adults, adequate evidence links UV radiation exposure to a small increase in risk for skin cancer.

Recognition of Risk Status

Persons with fair skin, light hair and eye color, or freckles or who sunburn easily are at increased risk for skin cancer (1). 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 (persons aged 10 to 24 years), the USPSTF found adequate evidence that counseling interventions that are available in a primary care setting or are referable from primary care can moderately increase the use of sun-protective behaviors.

For adults older than 24 years, the USPSTF found inadequate evidence to determine the effect of counseling on the use of sun-protective behaviors.

Harms of Behavioral Counseling Interventions

The USPSTF found adequate evidence that no appreciable harms are related to counseling or sun-protective behaviors in young persons or adults. Theoretical concerns about sun-protective behaviors include the risk for vitamin D deficiency in adults living in northern latitudes, but little evidence supports this hypothesis.

USPSTF Assessment

The USPSTF concludes that for children, adolescents, and young adults aged 10 to 24 years with fair skin, there

Table 1. What the USPSTF Grades Mean and Suggestions for Practice

Grade	Definition	Suggestions for Practice
A	The USPSTF recommends the service. There is high certainty that the net benefit is substantial.	Offer or provide this service.
B	The USPSTF recommends the service. There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.	Offer or provide this service.
C	<i>Note: The following statement is undergoing revision.</i> Clinicians may provide this service to selected patients depending on individual circumstances. However, for most persons without signs or symptoms there is likely to be only a small benefit from this service.	Offer or provide this service only if other considerations support offering or providing the service in an individual patient.
D	The USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits.	Discourage the use of this service.
I statement	The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.	Read the clinical considerations section of the USPSTF Recommendation Statement. If the service is offered, patients should understand the uncertainty about the balance of benefits and harms.

is moderate certainty that counseling has a moderate net benefit.

The USPSTF concludes that for adults older than 24 years, evidence of the benefits of counseling is sparse and of 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 with no history of skin cancer. Because most trials of skin cancer counseling include only people with a fair skin type, the recommendation for counseling of children, adolescents, and young adults aged 10 to 24 years is limited to this population. Few trials were available to determine the effectiveness of counseling parents or guardians to prevent UV exposure in children younger than 10 years; therefore, the recommendation does not address this population.

Suggestions for Practice Regarding the I Statement

Potential Preventable Burden

Counseling adults is of uncertain potential benefit because of the unknown effectiveness of counseling interventions in changing behavior and because of the less secure link between behavior change in adulthood and risk for skin cancer. Ultraviolet radiation exposure after age 35 years may contribute less to one's lifetime risk for skin cancer than exposure at a younger age.

Assessment of Risk

Skin type can be visually assessed by primary care clinicians. Fair skin type can be defined by eye and hair color; freckling; and historical factors, such as usual reaction to sun exposure (always or usually burning or infrequently tanning).

Effective Counseling Interventions

Effective interventions were generally of low intensity and almost entirely done during the primary care interac-

tion or visit. Successful counseling interventions used cancer prevention or appearance-focused messages to reach specific audiences. The latter types of messages were successful at reducing intent to pursue indoor tanning among late-adolescent women (the population most likely to do so). Appearance-focused interventions used various methods, in-

Table 2. Levels of Certainty Regarding Net Benefit*

Level of Certainty	Description
High	The available evidence usually includes consistent results from well-designed, well-conducted studies in representative primary care populations. These studies assess the effects of the preventive service on health outcomes. This conclusion is therefore unlikely to be strongly affected by the results of future studies.
Moderate	The available evidence is sufficient to determine the effects of the preventive service on health outcomes, but confidence in the estimate is constrained by such factors as: the number, size, or quality of individual studies; inconsistency of findings across individual studies; limited generalizability of findings to routine primary care practice; and lack of coherence in the chain of evidence. As more information becomes available, the magnitude or direction of the observed effect could change, and this change may be large enough to alter the conclusion.
Low	The available evidence is insufficient to assess effects on health outcomes. Evidence is insufficient because of: the limited number or size of studies; important flaws in study design or methods; inconsistency of findings across individual studies; gaps in the chain of evidence; findings not generalizable to routine primary care practice; lack of information on important health outcomes. More information may allow estimation of effects on health outcomes.

* The USPSTF defines *certainty* as "likelihood that the USPSTF assessment of the net benefit of a preventive service is correct." The net benefit is defined as benefit minus harm of the preventive service as implemented in a general primary care population. The USPSTF assigns a certainty level based on the nature of the overall evidence available to assess the net benefit of a preventive service.

cluding self-guided booklets, a video on photoaging, and 30-minute peer counseling sessions. One study (4) used UV facial photography as an adjunct to the appearance-focused video. 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 (5). These interventions combine community-based communications and policy and regulation to increase preventive behaviors (such as covering up, using shade, or avoiding the sun during peak UV hours) among populations in specific settings, including primary school and outdoor recreational settings.

The U.S. Food and Drug Administration has information to help guide patients and clinicians on the use and effectiveness of broad-spectrum sunscreens (www.fda.gov/sunscreen). It has determined that, if used as directed, broad-spectrum sunscreens with a sun-protection factor of 15 or greater protect against both UV-A and UV-B radiation and reduce the risk for skin cancer and early skin aging. It also has consumer education materials on the dangers of indoor tanning.

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.

OTHER CONSIDERATIONS

Implementation

Various education materials using different media were found to be effective in counseling children, adolescents, and young adults. Several organizations that focus on sun safety or skin cancer prevention have created age-appropriate educational materials, many of which include appearance-based messages. (Examples from the National Cancer Institute can be found at <http://rtips.cancer.gov/rtips>.) Primary care practitioners may consider which materials can be easily implemented in their setting and for their population. The time required by the clinician to provide brief counseling is the main cost of these services.

Some practices may incur additional costs for materials or technologies, such as professionally produced booklets, computer-based interventions, or UV imaging devices. Commercial products are available that allow patients and clinicians to see the damaging effects of UV radiation on the skin. Some of these products use a black light (such as a Wood lamp) to produce UV light; a camera can also be outfitted to filter visible light and reveal only the UV image. These techniques highlight the pigmented or freckled areas of the skin resulting from skin damage.

One interesting aspect of implementation, given the positive recommendations from the Community Preventive Services Task Force, is the potential to link community-based and local policy efforts with consistent messages delivered by clinicians through brief counseling.

Research Needs and Gaps

Further randomized, controlled trials are needed to develop effective interventions for children. A better understanding of the effectiveness of counseling on the use of sun-protective behaviors in adults and the effect of UV exposure during adulthood, in terms of risk for skin cancer, would be valuable to address the key evidence gap about 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 type of cancer, affecting more than 2 million Americans each year. The exact number of cases is difficult to estimate because most cases of nonmelanoma skin cancer are not reported to registries (6). The most common types are basal cell and squamous cell cancer. Melanoma is much less common—the incidence among white Americans in 2008 was about 27.6 cases per 100 000 persons. It is more than 20 times more common in white than in African American persons, but it 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 past 35 years (1). Of note, basal cell and squamous cell cancer can also be associated with substantial 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 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 (such as sunburn) 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 (that stress the aging effect of UV radiation on the skin) were effective in certain populations. In young adults, 1 randomized, controlled trial (4) used a video intervention with or without UV facial photography. This intervention resulted in a decrease in objectively measured skin pigment 12 months after the intervention. Three additional studies in young adults (7–9) used appearance-based interventions. 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%. Smaller albeit significant improvements were seen in composite scores of sun-protective behaviors in a trial of young adolescents (10) who were given brief clinician counseling with computer-assisted feedback.

Evidence of the effectiveness of counseling interventions in adults older than 24 years or in parents of young children is limited. A cluster randomized, controlled trial (11) that provided counseling to parents of newborns in a series of 4 well-child visits showed statistically significant improvement in composite sun-protection scores in the intervention group. However, most individual measures were statistically insignificant, and overall it was difficult to determine the clinical relevance of the small improvements. In adults, 4 of 5 intervention studies (12–15) that used 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.

Potential Harms of Counseling Interventions

The USPSTF looked for evidence of a paradoxical decrease in sun-protective behaviors in 10 randomized, controlled trials of interventions designed to increase protective behaviors and found none. It also looked for evidence that children receiving counseling to avoid the outdoors would be less physically active as a result; 2 studies (16, 17), 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 persons who received an intervention for skin cancer prevention.

The hypothetical effect of a decrease in vitamin D level as a result of sun-protective behavior, which is mostly a concern in adulthood, continues to be investigated. The limited body of available epidemiologic evidence suggests that some types of cancer may be inversely linked 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 for Cancer

Sun Exposure

The USPSTF assessed 12 observational studies that found increased risk for both squamous cell and basal cell cancer from intermittent sun exposure in childhood. Intermittent sun exposure during childhood, especially sunbathing, was also associated with an increased risk for melanoma in 14 observational studies. Studies that measured long-term or total sun exposure found no association between increased exposure and risk for skin cancer (1).

Indoor Tanning

There was limited evidence to evaluate the association between use of indoor tanning beds and the risk for squa-

mous cell or basal cell cancer. Four of 5 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 2 to 3 decades and an increased risk for melanoma (risk ratio [RR], 2.37). Of the 11 case-control studies, most of those with negative results did not adjust for skin phenotype, whereas 3 of 4 studies with positive results did adjust for skin phenotype. These studies found an association between increased use of tanning beds and increased risk for melanoma (1).

Sunscreen Use

One randomized, controlled trial found that persons who regularly used sunscreen had a decreased risk for squamous cell but not basal cell cancer. The Nambour Skin Cancer Prevention Trial (18) reported RRs of 0.65 (95% CI, 0.45 to 0.94) for squamous cell cancer and 1.02 (CI, 0.78 to 1.35) for basal cell cancer. Ten-year follow-up of secondary study outcomes revealed a decreased risk for invasive melanoma (RR, 0.27 [CI, 0.08 to 0.97]) but not preinvasive melanoma (RR, 0.73 [CI, 0.29 to 1.81]) in the intervention group (19). Two cohort studies showed no protective effect of sunscreen on risk for basal cell or squamous cell cancer. In addition, 2 case-control studies showed a harmful effect from sunscreen use. However, these 4 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, 1 found a protective effect, and 2 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 persons. The link of behavior change to outcomes is supported by a body of evidence comprising a few trials and a substantial body of observational evidence showing that 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 probable harms to be no greater than small. For children, adolescents, and young adults aged 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 for skin cancer.

For adults, there was inadequate evidence on the efficacy of counseling to change behavior. Although 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

for skin cancer and determined that there was evidence of a small benefit. As a result, and particularly because of 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?

Ultraviolet radiation from both solar and artificial sources has been classified as a human carcinogen by national and international organizations (20). Epidemiologic evidence suggests that the effect of UV radiation exposure from typical doses of sunlight varies over the life span, with some evidence of a window of biological vulnerability in early life that translates into risk for skin cancer decades later. Most of the available evidence concerns the most common lesions: nonmalignant neoplasia and basal cell and squamous cell cancer. It is not clear whether the same mechanisms or schedules apply to risk for melanoma, the most lethal type of skin cancer. For all 3 types, increasing intermittent, or recreational, sun exposure is linked by fair-quality evidence to increased cancer risk, whereas long-term or total sun exposure is not (1).

Response to Public Comments

A draft version of this recommendation statement was posted for public comment on the USPSTF Web site from 8 November to 6 December 2011. The Task Force received 19 comments on the draft recommendation statement. In response to these comments, language describing the evidence gaps for adults and newborns was clarified. More detailed information was added in the Implementation section, and another Web site for relevant resources was added in the Other Approaches to Prevention section. Additional information was added on the basis of recently updated studies and policies or recommendations of other organizations.

UPDATE OF PREVIOUS USPSTF RECOMMENDATION

This recommendation replaces the USPSTF's 2003 recommendation on counseling about skin cancer prevention at any age (I statement) (21). In the current review, the USPSTF notes the significant studies done in young persons that, although 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 for cancer resulting from severe sunburns in childhood (6). The American Academy of Pediatrics has an extensive set of recommendations to protect children from the hazards of UV radiation exposure (22). It recommends that pediatricians incorporate sun safety advice into health maintenance visits at least once per year. The American Congress of Obstetricians and Gynecologists recommends providing guidance to parents to encourage adolescents to

regularly use sunscreen and to avoid artificial tanning (23). The American Academy of Family Physicians has endorsed the USPSTF's recommendations on behavioral counseling to prevent skin cancer (24).

From the U.S. Preventive Services Task Force, Rockville, Maryland.

Disclaimer: Recommendations made by the USPSTF are independent of the U.S. government. They should not be construed as an official position of the Agency for Healthcare Research and Quality or the U.S. Department of Health and Human Services.

Financial Support: The USPSTF is an independent, voluntary body. The U.S. Congress mandates that the Agency for Healthcare Research and Quality support the operations of the USPSTF.

Potential Conflicts of Interest: Disclosure forms from USPSTF members can be viewed at www.acponline.org/authors/icmje/ConflictOfInterestForms.do?msNum=M12-0798.

Requests for Single Reprints: Reprints are available from the USPSTF Web site (www.uspreventiveservicestaskforce.org).

References

1. Lin JS, Eder M, Weinmann S. Behavioral counseling to prevent skin cancer: a systematic review for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2011;154:190-201. [PMID: 21282699]
2. Howlander N, Noone AM, Krapcho M, Neyman N, Aminou R, Waldron W, et al, eds. SEER Cancer Statistics Review, 1975–2008. Bethesda, MD: National Cancer Institute; 2011. Accessed at http://seer.cancer.gov/csr/1975_2008/ on 4 April 2012.
3. Lin JS, Eder M, Weinmann S, Zuber SP, Beil TL, Plaut D, et al. Behavioral Counseling to Prevent Skin Cancer: Systematic Evidence Review to Update the 2003 U.S. Preventive Services Task Force Recommendation. Evidence Synthesis No. 82. AHRQ Publication No. 11-05152-EF-1. Rockville, MD: Agency for Healthcare Research and Quality; February 2011. Accessed at www.ncbi.nlm.nih.gov/books/NBK53508/ on 4 April 2012.
4. Mahler HI, Kulik JA, Gerrard M, Gibbons FX. Long-term effects of appearance-based interventions on sun protection behaviors. *Health Psychol.* 2007;26:350-60. [PMID: 17500622]
5. Community Preventive Services Task Force. Preventing Skin Cancer: Education & Policy. Atlanta: Centers for Disease Control and Prevention; 2011. Accessed at www.thecommunityguide.org/cancer/skin/education-policy/index.html on 4 April 2012.
6. American Cancer Society. Cancer Facts & Figure 2011. Atlanta: American Cancer Society; 2011. Accessed at www.cancer.org/Research/CancerFactsFigures/CancerFactsFigures/cancer-facts-figures-2011 on 4 April 2012.
7. Hillhouse J, Turrisi R, Stapleton J, Robinson J. A randomized controlled trial of an appearance-focused intervention to prevent skin cancer. *Cancer.* 2008;113:3257-66. [PMID: 18937268]
8. Stapleton J, Turrisi R, Hillhouse J, Robinson JK, Abar B. A comparison of the efficacy of an appearance-focused skin cancer intervention within indoor tanner subgroups identified by latent profile analysis. *J Behav Med.* 2010;33:181-90. [PMID: 20058183]
9. Turrisi R, Mastroleo NR, Stapleton J, Mallett K. A comparison of 2 brief intervention approaches to reduce indoor tanning behavior in young women who indoor tan very frequently [Letter]. *Arch Dermatol.* 2008;144:1521-4. [PMID: 19015434]
10. Norman GJ, Adams MA, Calfas KJ, Covin J, Sallis JF, Rossi JS, et al. A randomized trial of a multicomponent intervention for adolescent sun protection behaviors. *Arch Pediatr Adolesc Med.* 2007;161:146-52. [PMID: 17283299]
11. Crane LA, Deas A, Mokrohisky ST, Ehram G, Jones RH, Dellavalle R, et al. A randomized intervention study of sun protection promotion in well-child care. *Prev Med.* 2006;42:162-70. [PMID: 16376977]
12. Glanz K, Schoenfeld ER, Steffen A. A randomized trial of tailored skin cancer prevention messages for adults: Project SCAPE. *Am J Public Health.* 2010;100:735-41. [PMID: 20167900]

13. Prochaska JO, Velicer WF, Redding C, Rossi JS, Goldstein M, DePue J, et al. Stage-based expert systems to guide a population of primary care patients to quit smoking, eat healthier, prevent skin cancer, and receive regular mammograms. *Prev Med.* 2005;41:406-16. [PMID: 15896835]
14. Prochaska JO, Velicer WF, Rossi JS, Redding CA, Greene GW, Rossi SR, et al. Multiple risk expert systems interventions: impact of simultaneous stage-matched expert system interventions for smoking, high-fat diet, and sun exposure in a population of parents. *Health Psychol.* 2004;23:503-16. [PMID: 15367070]
15. Geller AC, Emmons KM, Brooks DR, Powers C, Zhang Z, Koh HK, et al. A randomized trial to improve early detection and prevention practices among siblings of melanoma patients. *Cancer.* 2006;107:806-14. [PMID: 16832795]
16. Patrick K, Calfas KJ, Norman GJ, Zabinski MF, Sallis JF, Rupp J, et al. Randomized controlled trial of a primary care and home-based intervention for physical activity and nutrition behaviors: PACE+ for adolescents. *Arch Pediatr Adolesc Med.* 2006;160:128-36. [PMID: 16461867]
17. Milne E, Simpson JA, Johnston R, Giles-Corti B, English DR. Time spent outdoors at midday and children's body mass index. *Am J Public Health.* 2007;97:306-10. [PMID: 17194858]
18. van der Pols JC, Williams GM, Pandeya N, Logan V, Green AC. Prolonged prevention of squamous cell carcinoma of the skin by regular sunscreen use. *Cancer Epidemiol Biomarkers Prev.* 2006;15:2546-8. [PMID: 17132769]
19. Green AC, Williams GM, Logan V, Strutton GM. Reduced melanoma after regular sunscreen use: randomized trial follow-up. *J Clin Oncol.* 2011;29:257-63. [PMID: 21135266]
20. El Ghissassi F, Baan R, Straif K, Grosse Y, Secretan B, Bouvard V, et al; WHO International Agency for Research on Cancer Monograph Working Group. A review of human carcinogens—part D: radiation. *Lancet Oncol.* 2009;10:751-2. [PMID: 19655431]
21. U.S. Preventive Services Task Force. *Counseling to Prevent Skin Cancer: Recommendations and Rationale.* Rockville, MD: Agency for Healthcare Research and Quality; 2003.
22. Section on Dermatology, Balk SJ; Council on Environmental Health. Ultraviolet radiation: a hazard to children and adolescents. *Pediatrics.* 2011;127:588-97. [PMID: 21357336]
23. American Congress of Obstetricians and Gynecologists. *Guidelines for Adolescent Health Care.* 2nd ed. Washington, DC: American Congress of Obstetricians and Gynecologists; 2011.
24. American Academy of Family Physicians. *Clinical Preventive Services—Skin Cancer.* Leawood, KS: American Academy of Family Physicians; 2011. Accessed at www.aafp.org/online/en/home/clinical/exam/skincancer.html on 4 April 2012.



ACPSM
AMERICAN COLLEGE OF PHYSICIANS
INTERNAL MEDICINE | *Doctors for Adults*

Annals
Podcasts

Listen at www.annals.org/podcast
or at iTunes

APPENDIX: U.S. PREVENTIVE SERVICES TASK FORCE

Members of the U.S. Preventive Services Task Force† at the time this recommendation was finalized 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); James J. Peters Veterans Affairs Medical Center, Bronx, New York); Kirsten Bibbins-Domingo, PhD, MD (University of California, San Francisco, San Francisco, California); Linda Ciofu Baumann, PhD, RN (University of Wisconsin, Madison, Wisconsin); Susan J. Curry, PhD (University of Iowa College of Public Health, Iowa City, Iowa); Mark Ebell, MD, MS (University of Georgia, Athens, Georgia); 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); Jessica Herzstein, MD, MPH (Air Products, Allentown, Pennsylvania); Joy Melnikow, MD, MPH (University of California, Davis, Sacramento, California); Wanda K. Nicholson, MD, MPH, MBA (University of North Carolina School of Medicine, Chapel Hill, North Carolina); Douglas K. Owens, MD, MS (Stanford University, Stanford, California); Carolina Reyes, MD, MPH (Virginia Hospital Center, Arlington, Virginia); and Timothy J. Wilt, MD, MPH (University of Minnesota Department of Medicine and Minneapolis Veterans Affairs Medical Center, Minneapolis, Minnesota). Former USPSTF members who contributed to the development of this recommendation include Allen Dietrich, MD; Lucy Marion, PhD, RN; and Bernadette Melnyk, PhD, RN.

† For a list of current Task Force members, go to www.uspreventiveservicestaskforce.org/members.htm.