JAMA | US Preventive Services Task Force | RECOMMENDATION STATEMENT

Behavioral Counseling to Prevent Skin Cancer
US Preventive Services Task Force Recommendation Statement

US Preventive Services Task Force

IMPORTANCE Skin cancer is the most common type of cancer in the United States. Although invasive melanoma accounts for only 2% of all skin cancer cases, it is responsible for 80% of skin cancer deaths. Basal and squamous cell carcinoma, the 2 predominant types of nonmelanoma skin cancer, represent the vast majority of skin cancer cases.

OBJECTIVE To update the 2012 US Preventive Services Task Force (USPSTF) recommendation on behavioral counseling for the primary prevention of skin cancer and the 2009 recommendation on screening for skin cancer with skin self-examination.

EVIDENCE REVIEW The USPSTF reviewed the evidence on whether counseling patients about sun protection reduces intermediate outcomes (eg, sunburn or precursor skin lesions) or skin cancer; the link between counseling and behavior change, the link between behavior change and skin cancer incidence, and the harms of counseling or changes in sun protection behavior; and the link between counseling patients to perform skin self-examination and skin cancer outcomes, as well as the harms of skin self-examination.

FINDINGS The USPSTF determined that behavioral counseling interventions are of moderate benefit in increasing sun protection behaviors in children, adolescents, and young adults with fair skin types. The USPSTF found adequate evidence that behavioral counseling interventions result in a small increase in sun protection behaviors in adults older than 24 years with fair skin types. The USPSTF found inadequate evidence on the benefits and harms of counseling adults about skin self-examination to prevent skin cancer.

CONCLUSIONS AND RECOMMENDATION The USPSTF recommends counseling young adults, adolescents, children, and parents of young children about minimizing exposure to UV radiation for persons aged 6 months to 24 years with fair skin types to reduce their risk of skin cancer. (B recommendation) The USPSTF recommends that clinicians selectively offer counseling to adults older than 24 years with fair skin types about minimizing their exposure to UV radiation to reduce risk of skin cancer. Existing evidence indicates that the net benefit of counseling all adults older than 24 years is small. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the presence of risk factors for skin cancer. (C recommendation) The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of counseling adults about skin self-examination to prevent skin cancer. (I statement)

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The US Preventive Services Task Force (USPSTF) makes recommendations about the effectiveness of specific clinical preventive services for patients without obvious 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 young adults, adolescents, children, and parents of young children about minimizing exposure to UV radiation for persons aged 6 months to 24 years with fair skin types to reduce their risk of skin cancer (B recommendation) (**Figure 1**).

The USPSTF recommends that clinicians selectively offer counseling to adults older than 24 years with fair skin types about minimizing their exposure to UV radiation to reduce risk of skin cancer. Existing evidence indicates that the net benefit of counseling all adults older than 24 years is small. In determining whether counseling is appropriate in individual cases, patients and clinicians should consider the presence of risk factors for skin cancer. (C recommendation)

See the Clinical Considerations section for information on risk assessment.

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of counseling adults about skin self-examination to prevent skin cancer. (I statement)

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

Rationale

Importance

Skin cancer is the most common type of cancer in the United States and is generally categorized as melanoma or nonmelanoma skin cancer. Melanoma is the fifth-leading type of incident cancer, and 2.2% of adults will be diagnosed with it in their lifetime.[1] Although invasive melanoma accounts for only 2% of all skin cancer cases, it is responsible for 80% of skin cancer deaths.[1] Basal and squamous cell carcinoma, the 2 predominant types of nonmelanoma skin cancer, represent the vast majority of skin cancer cases. There were an estimated 3.3 million new cases of nonmelanoma skin cancer in 2012 and an estimated 91 270 new cases of melanoma skin cancer in 2018.[1]

Recognition of Risk Status

Exposure to UV radiation during childhood and adolescence increases the risk of skin cancer later in life, especially when more severe damage occurs, such as with severe sunburns. Persons with fair skin types (ivory or pale skin, light hair and eye color, freckles, or those who sunburn easily) are at increased risk of skin cancer. Persons who use tanning beds and those with a history of sunburns or previous skin cancer are also at substantially increased risk of skin cancer. Other factors that further increase risk include an increased number of nevi (moles) and atypical nevi, family history of skin cancer, HIV infection, and history of receiving an organ transplant. Most studies of interventions to increase sun protection behaviors have been limited to persons with fair skin types.[2-4]

Benefits of Behavioral Counseling Interventions

Behavioral counseling interventions target sun protection behaviors to reduce UV radiation exposure. UV radiation is a known carcinogen[5] that damages DNA and causes most skin cancer cases.[6] A substantial body of observational evidence demonstrates that the strongest connection between UV radiation exposure and skin cancer results from exposure in childhood and adolescence. Sun protection behaviors include the use of broad-spectrum sunscreen with a sun-protection factor of 15 or greater; wearing hats, sunglasses, or sun-protective clothing; avoiding sun exposure; seeking shade during midday hours (10 AM to 4 PM); and avoiding indoor tanning bed use.

The USPSTF found adequate evidence that behavioral counseling interventions available in or referable from a primary care setting result in a moderate increase in the use of sun protection behaviors for persons aged 6 months to 24 years with fair skin types.

The USPSTF found adequate evidence that behavioral counseling interventions available in or referable from a primary care setting result in a small increase in the use of sun protection behaviors for persons older than 24 years with fair skin types.

The USPSTF found insufficient evidence regarding the benefits of counseling adults about skin self-examination to prevent skin cancer.

Harms of Behavioral Counseling Interventions

The USPSTF found adequate evidence that the harms related to behavioral counseling interventions and sun protection behaviors in young persons or adults are small. The USPSTF found inadequate evidence regarding the harms of counseling adults about skin self-examination.

USPSTF Assessment

The USPSTF concludes with moderate certainty that behavioral counseling interventions have a moderate net benefit for young adults, adolescents, and children aged 6 months to 24 years with fair skin types.

The USPSTF concludes with moderate certainty that behavioral counseling interventions have a small benefit in adults older than 24 years with fair skin types.

The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of counseling adults about skin self-examination.

Clinical Considerations

Patient Population Under Consideration

This recommendation applies to asymptomatic persons without a history of skin cancer (**Figure 2**). Because most trials of skin cancer

Figure 1. US Preventive Services Task Force (USPSTF) Grades and Levels of Certainty

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	The USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small.	Offer or provide this service for selected patients depending on individual circumstances.
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.

USPSTF 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. 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.	

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counseling predominantly include persons with fair skin types, the USPSTF limited its recommendation to this population.

Assessment of Risk

Persons with fair skin types (ivory or pale skin, light eye color, red or blond hair, freckles, those who sunburn easily) are at increased risk of skin cancer and should be counseled. Other factors that further increase risk include a history of sunburns, previous use of indoor tanning beds, and a family or personal history of skin cancer. Persons with an increased number of nevi and atypical nevi are at increased risk of melanoma. Persons with a compromised immune system (eg, persons living with HIV, persons who have received an organ transplant) are at increased risk of skin cancer.

Behavioral Counseling Interventions

All studies conducted in children and adolescents focused on sun protection behaviors; most were directed at parents, and some provided child-specific materials or messages. Half of the interventions included face-to-face counseling, and all included

Figure 2. Clinical Summary: Behavioral Counseling to Prevent Skin Cancer

Population	Young adults, adolescents, children, and parents of young children with fair skin type	Adults older than 24 years with fair skin type	Skin self-examination in adults
Recommendation	Counsel about minimizing exposure to UV radiation. Grade: B	Selectively offer counseling about minimizing exposure to UV radiation. Grade: C	No recommendation. Grade: I (insufficient evidence)

Risk Assessment	Ultraviolet radiation exposure during childhood and adolescence increases risk of skin cancer later in life, especially when more severe damage occurs. Persons with fair skin type (light hair and eye color, freckles, those who sunburn easily) are at increased risk of skin cancer. Persons who use tanning beds and those with a history of sunburns or previous skin cancer are also at greatly increased risk of skin cancer. Other factors that increase risk include an increased number of nevi (moles) and atypical nevi, family history of skin cancer, HIV infection, and history of receiving an organ transplant.
Behavioral Counseling Interventions	Behavioral counseling interventions target sun protection behaviors to reduce UV radiation exposure, including use of broad-spectrum sunscreen with a sun-protection factor of 15 or greater; wearing hats, sunglasses, or sun-protective clothing; avoiding sun exposure; seeking shade during midday hours (10 AM to 4 PM); and avoiding indoor tanning use.
Other Relevant USPSTF Recommendations	The USPSTF has issued a recommendation on screening for skin cancer in adults.

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

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print materials. Three studies provided the intervention in conjunction with well-child visits. The majority of studies conducted in young adults and adults focused on improving sun protection behaviors, and 2 studies used "appearance-focused" messages. The mode of delivery varied and included mail-based, face-to-face or telephone counseling, and technology-based (text messages, online programs and modules, personal UV facial photographs) interventions.[2]

Suggestions for Practice Regarding the I Statement

Potential Preventable Burden

Counseling adults about performing skin self-examination appears to result in an increase of such examinations. The potential benefit of behavioral counseling about skin self-examination is uncertain because of the lack of evidence on the link between behavior change and skin cancer or other health outcomes. In addition, there is no evidence about the incremental benefit that might occur with skin self-examination above the benefit from counseling for sun protection behaviors and from current levels of skin examinations being performed by clinicians.

Potential Harms

Skin self-examination is performed by the patient and is noninvasive. Psychosocial harms, such as anxiety or cancer worry, are possible. If skin self-examination leads to biopsy, procedural harms such as pain, bleeding, scarring, or infection could occur.[7]

Current Practice

The frequency of behavioral counseling for skin self-examination in the asymptomatic population is not well known.

Additional Approaches to Prevention

The Community Preventive Services Task Force recommends child care center–based, primary and middle school–based, and multicomponent community-wide interventions for the prevention of skin cancer.[8] These interventions combine school- and community-based communications and policy to increase preventive behaviors (eg, covering up, using shade, or avoiding the sun during peak UV hours) among certain populations in specific settings.

The US Food and Drug Administration (FDA) provides information to help guide patients and clinicians regarding sun protection and the use and effectiveness of broad-spectrum sunscreen.[9] The FDA has determined that broad-spectrum sunscreens with a sun-protection factor of 15 or greater, reapplied at least every 2 hours, protect against both UVA and UVB radiation and reduce the risk of skin cancer and early skin aging. The FDA also provides consumer education materials on the dangers of indoor tanning.[10]

The Environmental Protection Agency provides a variety of educational tools regarding sun safety, including state-specific information, and interactive widgets and smartphone applications that forecast UV exposure by zip code or city. It also provides sun safety fact sheets and handouts, including age-appropriate materials.[11]

Useful Resources

The USPSTF has issued a recommendation on screening for skin cancer in adults.[12]

Other Considerations

Implementation

Interventions included tailored mailings, print materials, and in-person counseling by health professionals. Interventions for children were directed mostly toward parents; some materials were child-specific. Counseling interventions for children, their parents, or both provided messages focused on increasing sun protection behaviors (eg, using sunscreen, avoiding midday sun, wearing sun-protective clothing). Some print-based interventions included materials tailored to the child's risk level, barriers to change, self-efficacy, or other factors. Health professionals providing in-person counseling included primary care clinicians and health educators.

One trial of an intervention involving children 3 years and younger used clinician counseling and print materials for parents promoting child sun protection with sun protection aids (sunscreen samples and hat).[13] Several trials in children aged 3 to 10 years used standard or tailored mailings over 1 to 36 months.[14-17] One study also included a DVD in addition to a standard mailing promoting sun protection. One trial used a 1-day, in-person parent education session with a children's video, print materials, and sun protection aids (shirt, hat, and sunscreen). For the single study in adolescents, clinicians directly counseled participants, with 4 follow-up telephone counseling sessions by a health educator over 18 months; mailed materials and sunscreen samples were also used.

In the 16 trials among adults, interventions included a variety of messages and components, conducted in a range of settings.[2,4] Technology-based interventions included an interactive web program and tailored text messages on sun protection, as well as appearance-focused print materials. The web program study reported reduced sunburns after the intervention, which provided information on topics such as indoor tanning, UV radiation exposure and health, skin cancer, sunscreen, and skin examination. Each module took about 10 minutes to complete and included a goal-setting section. Other interventions that increased sun protection behaviors in adults included mailed print materials containing personalized risk feedback and recommendations, self-monitoring aids for UV exposure, and skin cancer prevention and detection information; individualized computer reports; and an interactive educational computer program on skin cancer prevention that provided individual feedback on personal risk of skin cancer.

Research Needs and Gaps

A better understanding of the effectiveness of counseling on the use of sun protection behaviors in adults 25 years and older is needed to address the key evidence gap on counseling for this age group. Research that evaluates the association between UV exposure during adulthood and skin cancer risk would also be valuable.

In addition, studies regarding the effectiveness of counseling persons without a fair skin type are lacking. Ideally, research studies would provide measurements of sun exposure, sunburn, precursor skin lesions, and cancer among large trial populations, with an emphasis on behaviors and health outcomes among persons who receive an intervention focused on sun protection behaviors. Such studies would also assess whether these behaviors continue after trial completion. These cohorts should include populations with diverse skin colors and should include adolescents, young adults, and preschool-aged children and their parents. These studies may be used to further develop technologies and vehicles for administering relevant interventions for behavior change in the primary care setting, especially among nonwhite persons, young adults, and persons who practice indoor or outdoor tanning. Further evidence is needed to assess the balance of benefits and harms of counseling adults about skin self-examination to prevent skin cancer and premature death.

Discussion

Burden of Disease

Skin cancer is the most common type of cancer. Melanoma is less common than basal or squamous cell carcinoma but has a much higher death rate. In 2018, an estimated 91 270 new cases of melanoma are expected, representing 5.2% of all new cancer cases.[1] An estimated 9730 persons will die of the disease, representing 1.6% of all cancer deaths.[18] Although age-adjusted incidence rates have increased from 1989 to 2014 (from 13.7 to 25.2 cases per 100 000 persons), the death rate has remained fairly stable over the same period (from 2.7 to 2.6 deaths per 100 000 persons).[18] Adults older than 50 years; men; and persons with fair skin types are at increased risk. Melanoma is most frequently diagnosed among adults aged 65 to 74 years; death rates are highest among the middle-aged and elderly. Melanoma is 5 times more common among Hispanic adults and 25 times more common among white than African American adults.[18]

Nonmelanoma skin cancer, of which most cases are basal and squamous cell skin cancer, is associated with a substantial burden to the patient but rarely results in death. Basal cell skin cancer constitutes about 80% of nonmelanoma skin cancer cases, and squamous cell skin cancer constitutes about 20%.[6] In general, nonmelanoma skin cancer accounts for a small percentage of all cancer deaths, mostly in older adults or persons with a compromised immune system. An estimated 2000 persons die from nonmelanoma skin cancer each year.[6] The true prevalence of nonmelanoma skin cancer is difficult to estimate because it is not a required cancer for registry entry; an estimated 5.4 million cases were diagnosed in 3.3 million persons in 2012.[6]

Scope of Review

The USPSTF commissioned a systematic evidence review to update its 2012 recommendation on behavioral counseling for the primary prevention of skin cancer[19] and its 2009 recommendation on screening for skin cancer with skin self-examination.[20] The review[2,4] focused on direct evidence that counseling patients about sun protection reduces intermediate outcomes (eg, sunburn or precursor skin lesions) or skin cancer. The review also sought evidence on the link between counseling and behavior change, the link between behavior change and skin cancer incidence, and the harms of counseling or changes in sun protection behavior. In addition, the review

examined evidence regarding counseling patients to perform skin self-examination and skin cancer outcomes and the harms of skin self-examination.

Effectiveness of Behavioral Counseling Interventions to Change Behavior

Many counseling interventions were found to be moderately effective in modifying sun protection behaviors among children, adolescents, and young adults but less effective in adults. Both traditional cancer prevention and appearance-focused messages (ie, stressing the aging effects of UV radiation on the skin) increased sun protection behaviors compared with control groups.

Of the 6 trials that evaluated the effect of interventions on sun protection behaviors among children and adolescents, 5 reported a statistically significant improvement in parent-reported composite scores of child sun protection behaviors compared with control groups.[13,15,17,21,22] Four of the 6 trials specifically targeted children aged 3 to 10 years, 1 trial focused on children from birth to 3 years, and 1 trial focused on adolescents aged 11 to 15 years. Among the 4 trials in children aged 3 to 10 years, 3 showed statistically significant differences in changes in sun protection behavior and sunscreen use at 3 months to 3 years of follow-up.[14-16]

A cluster randomized clinical trial[13] 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 not statistically significant, and it was difficult to determine the clinical relevance of the small improvements. An in-person counseling intervention targeting adolescents and involving clinicians and health educators showed that sun protection scores were higher in the intervention group than in the control group at 2 years of follow-up.[21]

Adequate evidence of the effectiveness of counseling interventions was found in 2 of the 3 fair-quality trials conducted among young adults. In a web-based study of 18- to 25-year olds, participants viewed an interactive 12-module web program featuring 10-minute topics such as indoor tanning, UV exposure and health, skin cancer, and skin examination.[22] At 3 months of follow-up, there was a significant improvement in past-month UV exposure and sun protection behaviors, sunscreen use, outdoor tanning, and skin self-examination. Another study (a randomized clinical trial) used a video intervention, with or without UV facial photography; the intervention showed no effect on composite sun protection scores.[23] In the third young adult study, women who used indoor tanning were given a 24-page booklet that detailed the effects of UV radiation and indoor tanning and appearance-enhancing alternatives to indoor tanning. At 6 months of follow-up, there was a significantly smaller increase in indoor tanning sessions in the past 3 months in the intervention group than in the control group.[24]

Evidence of the effectiveness of counseling interventions in adults older than 24 years is mixed. Six of 12 trials that addressed sun protection behavior composite scores in adults found an increase in such behaviors compared with control groups.[2,4] Three of these interventions promoted sun protection with tailored mailings, 2 used interactive online programs, and 1 used tailored text messages. Four of 7 trials assessing sunscreen use found an increase in this outcome. Of 3 trials of self-reported indoor tanning behavior, only 1 trial using an appearance-focused intervention among young female adults noted a significant improvement compared with the control group.[24] Effective interventions were more often of longer duration or had more frequent contacts with participants during the study period.

Trials of counseling interventions that focused on counseling patients to perform skin self-examination as a means of reducing skin cancer risk were inconclusive. A trial with more than 1300 participants showed that those who received a skin self-examination counseling intervention did not have significant differences in the incidence of skin cancer cases or atypical nevi compared with those in the control group at 12 months of follow-up.[25] Several studies showed that skin self-examination interventions increase the likelihood of participants reporting that they perform skin self-examination.[2,4] Additional studies are needed to determine the direct effect of skin self-examination on skin cancer risk.

Link Between Behavior Change and Cancer Risk

Sun Exposure

Total and recreational sun exposure during childhood is associated with increased melanoma risk. Studies that measured long-term or total sun exposure showed mixed association between increased sun exposure and skin cancer risk. Several fair- to good-quality studies demonstrated a link between adult recreational exposure to UV radiation and increased melanoma risk.[3] One large population-based study showed increased risk of both melanoma incidence and melanoma death with higher quartiles of UV exposure.[26] Two recent meta-analyses and 2 cohort studies also showed an increased risk of nonmelanoma skin cancer in persons with increased exposure to ambient UV radiation.[2]

Indoor Tanning

Indoor tanning is associated with increased melanoma risk, and younger age at first indoor tanning exposure increases this risk.[27] A meta-analysis provided evidence of a dose-response relationship between melanoma risk and indoor tanning in women younger than 50 years.[28] Four studies found that increasing indoor tanning frequency was associated with increased melanoma risk. Two systematic reviews, 1 cohort study, and 1 case-control study found evidence that having ever used indoor tanning was associated with increased risk of squamous cell and basal cell carcinoma compared with never having used indoor tanning.[29-32]

Sunscreen Use

Two studies in adults provided new evidence of a protective effect of sunscreen use. One study, which was considered by the USPSTF for its previous recommendation statement, analyzed long-term follow-up data from a randomized clinical trial. In this study, intervention group participants applied sunscreen daily, while control group participants continued their usual behavior. At 4.5 years, the intervention group had a decreased risk of squamous cell carcinoma.[33] Ten years after conclusion of the trial, the intervention group had half as many incident melanomas as the control group. Overall, melanoma risk was reduced in the intervention group compared with the control group and was most pronounced for invasive melanoma compared with in situ melanoma.[34] A large US case-control study also demonstrated a lower likelihood of melanoma in persons routinely using sunscreen compared with those who do not.[29]

Skin Self-Examination and Health Outcomes

Evidence on the effectiveness of skin self-examination in reducing death or illness is lacking. One 20-year follow-up study showed no association between skin self-examination and skin cancer death.[35]

Potential Harms of Behavioral Counseling Interventions

Potential harms of interventions promoting sun protection behaviors include skin reactions to sunscreen lotion, vitamin D deficiency, reduced physical activity due to avoiding the outdoors, and a paradoxical increase in sun exposure from a false reassurance of protection from sunscreen use. Sunscreen use can be associated with numerous transient skin reactions, including allergic, irritant, and photoallergic contact dermatitis. Although vitamin D deficiency is a hypothetical harm of sun avoidance, recent studies have not shown an association between sunscreen use and decreased vitamin D levels. Among the sparse evidence available, 1 study suggested that sun protection behaviors do not lead to decreased physical activity or increased body mass index.[36] Older studies reported that sunscreen use did not result in an intentional increase in sun exposure, but 2 recent studies showed that sunscreen use was associated with higher likelihood of multiple sunburns.[37,38]

Persons who performed skin self-examination were more likely to subsequently undergo a skin procedure compared with those who did not, as evidenced by 1 trial, indicating a potential harm of skin self-examination. Although melanoma death rates have remained stable, the increasing number of skin biopsies and rising melanoma incidence over recent decades provide evidence for overdiagnosis.[39]

Estimate of Magnitude of Net Benefit

The USPSTF determined that behavioral counseling interventions are of moderate benefit in increasing sun protection behaviors in children, adolescents, and young adults with fair skin types. The link of behavior change to outcomes is supported by several trials and a substantial body of observational evidence showing that the strongest connection between UV radiation exposure and skin cancer stems from exposure in childhood and adolescence. Evidence of a connection between sun exposure in adulthood and melanoma is less robust than in childhood. The USPSTF found adequate evidence that the harms related to counseling or sun protection behaviors are small. The USPSTF concludes with moderate certainty that the net benefit of counseling to decrease UV exposure and reduce skin cancer risk is moderate in children, adolescents, and young adults aged 6 months to 24 years.

The USPSTF found adequate evidence that behavioral counseling interventions result in a small increase in sun protection behaviors in adults older than 24 years. The harms of counseling are small. The USPSTF determined that the evidence supporting a link between decreased UV exposure in adulthood and skin cancer risk is adequate. The USPSTF concludes with moderate certainty that the net benefit of counseling to decrease UV exposure and reduce skin cancer risk is small in adults older than 24 years.

The USPSTF found inadequate evidence on the benefits and harms of counseling adults about skin self-examination to prevent skin cancer. Therefore, the USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of counseling adults about skin self-examination to prevent skin cancer.

How Does Evidence Fit With Biological Understanding?

UV radiation from both solar and artificial sources has been classified as a human carcinogen by national and international organizations. 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 childhood and adolescence that translates into increased skin cancer risk later in life. Much of the available evidence concerns the most common skin lesions, nonmalignant neoplasia and basal cell and squamous cell cancer. It remains unclear whether the same mechanisms apply to melanoma risk. For all 3 types of cancer, increasing intermittent or recreational sun exposure and total sun exposure are linked to increased risk. Artificial UV radiation, specifically indoor tanning, is also associated with an increased risk of skin cancer. Indoor tanning before age 35 years, for more than 10 tanning sessions over a lifetime, and for longer than 1 year have been linked to increased cancer risk.

Response to Public Comments

A draft version of this recommendation statement was posted for public comment on the USPSTF website from October 10 to November 6, 2017. In response to public comments, the USPSTF clarified the definition of fair skin type for the purposes of this recommendation. Comments requested more details about the behavioral counseling interventions, and the USPSTF provided additional information on implementation strategies. Several comments requested clarification about why skin self-examination is included in this recommendation; the USPSTF clarified that this recommendation addresses several preventive counseling interventions, including evidence about primary care clinicians counseling patients to perform skin self-examination. The USPSTF also added suggestions for practice regarding the I statement, information on newer technologies, and further information on the evidence for the different age ranges in the recommendations.

Update of Previous USPSTF Recommendation

This recommendation replaces the 2012 USPSTF recommendation on counseling about skin cancer prevention[19] and the skin self-examination portion of the 2009 USPSTF recommendation on screening for skin cancer.[20] In this updated recommendation, the USPSTF expanded the age range for behavioral counseling interventions to include persons aged 6 months to 24 years with fair skin types (the previous recommendation applied to persons aged 10 to 24 years, based on the evidence available at that time). Recent studies in children younger than 10 years resulted in the USPSTF extending the lower end of the age range to 6 months, the minimum age recommended for sunscreen use. Based on additional evidence since the prior recommendation, the USPSTF now also recommends that clinicians consider selectively offering counseling to adults older than 24 years with fair skin types. As in 2012, the evidence on persons without a fair skin type remains insufficient for this population to be included in the recommendation statement. The evidence continues to be insufficient to assess the balance of benefits and harms of counseling adults about skin self-examination to prevent skin cancer, as it was in 2009.

Recommendations of Others

The US Surgeon General,[40] American Cancer Society,[41] American College of Obstetricians and Gynecologists,[42] American Academy of Pediatrics,[43] Royal Australian College of General Practitioners,[44] and the World Health Organization's International Agency for Research on Cancer[45] endorse the involvement of clinicians in counseling patients about skin cancer prevention.

The Community Preventive Services Task Force recommends education and policy approaches to encourage sun protection behaviors in child care centers, schools, recreational sites, and occupational settings. In addition, it recommends community-wide interventions that may or may not involve health care settings to increase protection behavior from UV radiation. Interventions include mass media campaigns and environmental and policy changes across multiple settings within a defined geographic area or an entire community.[8]

The American Academy of Dermatology encourages everyone to perform skin self-examination to check for signs of skin cancer.[46] The American Cancer Society[47] and the Skin Cancer Foundation[48] recommend monthly skin self-examination.

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