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## USPSTF Recommendations for Behavioral Counseling for Skin Cancer Prevention:

### Throwing Shade on UV Radiation

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**In this week's issue of *JAMA***, the US Preventive Services Task Force (USPSTF) discusses their recommendations on behavioral counseling for skin cancer prevention,<sup>1</sup> supported by an evidence report and systematic review.<sup>2</sup> Based on the available studies conducted in primary care settings between 2009 and 2017, the review concluded that “behavioral interventions can increase sun protection behavior, but there is no consistent evidence that interventions are associated with a reduction in the frequency of sunburn in children or adults and minimal evidence on skin cancer outcomes.”<sup>2</sup> The Task Force recommended that clinicians should counsel children and young adults with fair skin types about minimizing exposure to UV radiation (grade B recommendation). In addition, for the first time, the USPSTF concluded that there may be a small benefit of counseling adults at high risk for skin cancer about minimizing UV exposure (grade C recommendation). Skin self-examinations were assigned an I statement, meaning that insufficient evidence is available to recommend for or against this intervention.

### What Do the Recommendations Mean for Clinicians?

The USPSTF recommendation and evidence report and systematic review focused on interventions linked to primary care settings in internal medicine, pediatrics, and family medicine.<sup>1,2</sup> Convincing evidence links indoor tanning, excessive UV exposure, and sunburns in early life to skin cancer. Clinicians should therefore advise young adults and children with fair skin types to avoid tanning beds; and when outdoors, to seek shade, avoid midday sun, wear sun-protective clothing, a hat, sunglasses, and apply (and reapply) a broad-spectrum sunscreen. In addition, the USPSTF recommended that clinicians should consider giving similar advice to adults older than 24 years who are at high-risk for skin cancer.

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## Who Is at High Risk for Skin Cancer?

Redheads, who carry a mutation in the melanocortin-1 receptor (*MC1R*) gene, are twice as likely as those who do not carry this mutation to develop melanoma, even after adjusting for UV exposure.<sup>3</sup> Solid-organ transplant recipients are 3 times more likely to develop malignant melanoma and over 60 times more likely to develop cutaneous squamous cell carcinoma compared with the general population.<sup>4</sup> Human immunodeficiency virus (HIV)-positive individuals are twice as likely to develop nonmelanoma skin cancer as HIV-negative individuals.<sup>5</sup> Tanning bed users, and those who had multiple sunburns in youth, are at high risk for all types of skin cancer.<sup>6</sup> In addition, patients who have a strong family history of melanoma, or a recent personal history of skin cancer are at higher risk of developing additional skin cancers.<sup>7</sup> Emerging evidence suggests that sexual minorities may be an understudied high-risk group: gay men report 6-fold higher rates of tanning bed use and over double the rates of skin cancer compared with heterosexual men.<sup>8</sup> Finally, physically active individuals have elevated risk for melanoma, even though they have lower risk for many other cancers, possibly due to increased UV exposure incurred while exercising and/or body image concerns that drive both physical activity and tanning behavior.<sup>9</sup> These otherwise healthy lifestyles of such individuals might also result in their being overlooked for prevention efforts.

## What Prevention Messages Work?

The USPSTF evidence report and systematic review showed that appearance-based messaging was effective<sup>2</sup>; this finding underscores the role that physical appearance plays in patients' decision to use sun protection. In young adults, the fear of cancer might be too distant and uncertain to affect behavior. Threats to physical appearance, however, may resonate more, especially as early signs of aging and photodamage to skin begin to appear. Appearance-based messages typically focus on the detrimental effects of UV exposure (eg, wrinkles, uneven skin tone, seborrheic keratoses) and often show graphic pictures of sun-damaged skin. Such messages may encourage the use of alternative appearance-enhancing strategies including sunless tanning creams and sprays, bronzing makeup, and clothing that accentuate natural skin tone. The promotion of tanning alternatives may be important for patients who continue to intentionally tan despite full awareness of the risks.

## What About Skin Self-examinations?

The USPSTF found insufficient evidence to recommend for or against counseling patients to perform self-examinations.<sup>1</sup> Although at present, this makes sense, advances in machine learning have the potential to transform this recommendation in the future. The accuracy of computer algorithms that analyze photographs to automatically detect melanoma is rapidly improving.<sup>10</sup> A 2017 systematic review of about 50 different machine learning techniques and 29 000 skin lesions<sup>11</sup> found that the mean sensitivity of these algorithms for diagnosis of melanoma was 87.6% (95% CI, 73%–100%). The mean specificity was 83.54% (95% CI, 61%–100%). The sensitivity and specificity are analogous to the accuracy of experienced dermatologists with dermoscopy, the examination of skin lesions with magnification and polarized light.<sup>11</sup> Although dozens of software application programs that a patient could use

at home are associated with claims that individuals can use them to diagnose melanoma, caution is essential.

False-negative readings by these self-screening tests may have potentially devastating consequences if they delay appropriate treatment of a true melanoma. In addition, these computer algorithms may exacerbate the problem of melanoma overdiagnosis: the diagnosis of a lesion that would otherwise not go on to cause symptoms or death. Overdiagnosis of melanoma is suspected due to the rapid rise in incidence without a parallel rise in mortality, and the downstream consequences of melanoma overdiagnosis include anxiety and unnecessary procedures. Therefore, evidence of high diagnostic accuracy is necessary but not sufficient for a self-screening test to be helpful. To recommend that patients use such applications, clinicians would need evidence from randomized trials showing that automated self-screening can lead to earlier diagnosis of melanoma and reductions in morbidity and mortality, as well as evidence that the benefits of such a test outweigh the potential harms.

### **Beyond the Physician's Office**

The USPSTF evidence report and systematic review<sup>2</sup> examined interventions linked to primary care clinics and excluded interventions conducted in recreational settings, since these are covered by the Community Preventive Services Task Force,<sup>12</sup> which grades the evidence for community-based interventions. Some aspects of community-based interventions could be leveraged in primary care settings, for example UV reflectance photography, which highlights sun damage on the skin that is not visible to the naked eye. The photographs increase the saliency of the negative effects of the sun to the patient. In our experience, patients are curious to have their UV photograph taken when offered the opportunity. Two studies found that interventions using UV reflectance photography were more effective in shifting sun-protective behaviors than education alone.<sup>13,14</sup> Studies that preceded the review period also support the efficacy of UV reflectance photography.<sup>14</sup>

The USPSTF also noted that skin cancer prevention interventions that reinforce messages repeatedly over time were most likely to produce an effect.<sup>2</sup> Studies that leverage social media marketing principles are ongoing and are being conducted by our research group and others. Patients are increasingly using social media for information about health and beauty, creating opportunities to broadcast relevant prevention messages about the importance of sun protection and the risks of tanning. The promotion of skin cancer prevention behaviors could also be embedded into other prevention messaging campaigns, such as those related to tobacco, physical activity, or alcohol use, given the research showing links between tanning and these activities. In addition to behavioral interventions, policy changes focused on reducing indoor tanning are essential to skin cancer prevention efforts. These policies include age restrictions for minors, taxation (the Affordable Care Act included a 10% excise tax on indoor tanning), warning labels, and prohibition of false advertising by the indoor-tanning industry.

## Conclusions

A 2018 report on melanoma incidence in the United States from 2005 to 2014 showed slight declines in younger adults but increases in men older than 54 years and women older than 44 years.<sup>15</sup> This report noted that the declines in melanoma incidence in younger adults coincided with declines in the use of tanning beds. Despite the encouraging trends, primary prevention efforts are needed throughout adulthood because the incidence of melanoma in middle to older age groups continues to climb. Clinicians are in a unique position to identify and counsel high-risk patients to avoid excessive UV exposure to prevent skin cancer.

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