

# Considering Sun Safety Policies in the United States

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As they are collectively the most common malignancies, the personal and systemic burden of skin cancers represent a significant public health concern in the United States. Ultraviolet radiation from the sun as well as from artificial sources such as tanning beds is a carcinogen well-known to increase the risk of developing skin cancer in individuals. Public health policies can help mitigate these risks. In this perspectives article, we review sunscreen and sunglasses standards, tanning bed utilization, and workplace sun protection guidelines in the US and provide focused examples for improvement from Australia and the United Kingdom where skin cancer is a well-documented public health concern. These comparative examples can inform interventions in the US that have the potential to modify exposure to risk factors associated with skin cancer.

## INTRODUCTION

Skin cancers are among the most common malignancies in the United States [1]. Their incidence is rising and represent a significant healthcare and economic burden [1-3]. Ozone and climate change are intricately linked and have been postulated to increase the risk for skin cancer [4,5]. Public health strategies addressing protection from environmental exposures may be instrumental in the prevention of skin cancer [6]. In this perspectives article, we provide a focused, narrative review of the current federal policies that influence sun-protective practices in the US. Further, we supplement our review of current US policies with brief and relevant examples of successful sun-protection policy interventions in two other devel-

oped nations, Australia and the United Kingdom. Skin cancer rates were initially observed to increase in both of these nations during the late 20<sup>th</sup> century, but the incidence of melanoma in younger individuals has stabilized due to a combination of public awareness and revision of policies impacting younger generations since the early 2000s [7,8]. These types of policies may be instructive for skin cancer reduction in the US. We focus on current US legislation regarding sunscreen standards, tanning bed use, sunglasses, and sun protection in the workplace, and we highlight successful examples of policies in the UK and Australia. We further outline the importance of a call-to-action in improving public health policy on skin cancer prevention in the US.

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Abbreviations: UVA/UVB, ultraviolet A/B; SPF, sun protection factor; FDA, Food and Drug Administration; OTC, over-the-counter; CARES, Coronavirus Aid, Relief, and Economic Security Act; CDC, Centers for Disease Control; OSHA, Occupational Safety and Health Administration; SIA, Sunscreen Innovation Act.

Keywords: skin cancer, sun safety

## CURRENT US POLICIES AND COMPARISON WITH GLOBAL EFFORTS

### Sunscreen

The use of broad-spectrum sunscreen is a critical component of a skin cancer prevention strategy. Currently, the US lags behind other countries in terms of available approved compounds for sunscreen development, sunscreen labeling, and protection standards for broad spectrum ultraviolet A/B (UVA/UVB) protection. In Australia, sunscreens are classified as therapeutic products. Labels are not permitted to include a claim of a sun protection factor (SPF) greater than 50. Instead, any products with an SPF greater than 50 must be labeled as “SPF 50+”, a practice known as “capping” SPF labels. These products are also required to convey broad-spectrum protection. It is important to note that UVA protection ratings are separate from SPF ratings which measure protection against UVB radiation alone. UVA protection is rated using different systems depending on the country. Persistent pigment darkening (PPD) and UVA protection factor methods are the most commonly used. In addition, while recent studies have demonstrated measurable plasma concentrations of active ingredients in sunscreen after topical application, its impact on health has not been determined and the findings do not indicate that individuals should refrain from sunscreen use [9].

In 2009, the UK adopted Regulation N° 1223/2009 of the European Parliament requiring that sunscreen provide UVA and UVB protection and that UVA protection be at least one-third the level of UVB protection. In addition, the regulation required standardization regarding claims of UVA protection and limiting of label claims. Specifically, the advertised numerical sun protection factor could be no more than an SPF of 50 to limit the possibility of providing consumers with a false sense of security with respect to the *de facto* sun protection [10].

In contrast, in the US, many compounds used for UVA filtering have not been approved by the US Food and Drug Administration (FDA) for use in sunscreens and are therefore not available. This results in sunscreens that on average offer one-third the broad-spectrum protection found in other parts of the world [11]. In 2014, the US Sunscreen Innovation Act (SIA) established an expedited process for review and approval of ingredients, resulting in improvement in UVA protection capability. However there remains a dearth of compounds available for sunscreen development within the US. This is thought to be related to FDA regulatory requirements and ostensibly the emerging concern about the potential for adverse impact of sunscreen active ingredients on ecosystems, including coral reefs. Despite recent attempts to consider UV-protection label caps, SPF labels remain uncapped with no limit for labeled SPF values. Further, in the US,

manufacturers have the option of producing UVB-only sunscreen formulations and claims of “broad-spectrum coverage” require a minimum ability to filter a mean critical wavelength of 370 nm without a specified ratio of UVA:UVB protection [12]. It is important to note that this does not necessarily mean that these sunscreens are not protective: UVB and UVA are adjacent on the ultraviolet spectrum, so compounds that are protective against UVB will at least in part protect against UVA.

In recent years, there have been several attempts to improve US sunscreen regulations. In 2019, the FDA issued a proposed rule on sunscreens, following which the 2020 Coronavirus Aid, Relief, and Economic Security Act (CARES) reformed FDA regulation of certain over-the-counter (OTC) products, including sunscreens.

This resulted in an initial proposed order in September 2021, and a subsequent final order in December 2021. While the September 2021 proposal included a maximum SPF labeling cap of 60+, the final order removed this cap, so there remains no maximum limit on SPF labeling. The proposal also suggested that all sunscreens labeled above SPF 15 must satisfy broad spectrum requirements and meet a UVA I/UV ratio of 0.7. However, this requirement was also removed from the final order. The proposed changes to sunscreen labeling are intended to allow consumers to better understand “SPF,” “broad spectrum,” and “water resistance” claims. While a very technical issue, guidelines for sunscreen formulation testing record-keeping were also not implemented. The 2019 proposed rule on sunscreens issued by the FDA did not result in implementation of any of these improvements, and US OTC sunscreen requirements remain largely as they were in 2011. In our view, stasis regarding current sunscreen regulation may be the result of political and industry influence. In addition, FDA regulation is a lengthy and complex process that reflects the diverse interests of the federal government and other parties. Achieving change requires advocates, consumers, and other interested parties willing to invest substantial time, effort, and other resources.

When contrasted with requirements in Australia and the UK, US policies lag in critical areas, and there is a demonstrated need for implementation of legislation requiring standardized levels of UVA and UVB protection from sunscreens, and for further evaluation of ingredients offering broad-spectrum filtering ability. We propose that new policies facilitate the process for approving sunscreen active ingredients including a maximum SPF labeling cap and detailing broad spectrum requirements. These improvements would likely improve the availability of higher quality sunscreen products that meet more rigorous standards.

### *Tanning Bed Utilization*

Tanning beds are linked to skin cancer, with risk of melanoma doubling with exposure prior to age 35 [13]. Unfortunately, though tanning bed use has been decreasing, approximately 7.8 million US adults engage in indoor UV exposure for cosmetic purposes. Rates amongst minors are less well characterized. Efforts to restrict tanning bed use has occurred at the state level without a concerted national policy [14]. The World Health Organization (WHO) classifies tanning beds as a group 1 carcinogen. The UK's Sunbeds Act of 2010 restricted the use of tanning beds to adults, and Australia banned solariums altogether in 2016. However, in the same time frame in the US, only 11 states banned sunbeds for minors and another five implemented age restrictions for minors. Currently, 44 states have bans or regulations on the use of artificial tanning methods, such as tanning beds for minors. However, 28 of these states allow adult consent to override age-based limitations. Thus, it is our view that there remains a need for uniform national regulation of tanning bed use, particularly for minors. Interestingly, in 2015, the FDA proposed a restriction to allow only those above 18 years of age to use tanning beds, but this proposal has yet to be finalized. The kinetics of the biology of ultraviolet radiation-induced carcinogenic mutation suggests that policies that limit the use of tanning beds by minors in the US could impact the incidence of skin cancer.

### *Sunglasses*

Ocular exposure to UV radiation may increase the risk for malignant melanoma of the eye and basal or squamous cell carcinoma of the eyelid [15]. Currently, the US does not require specific labeling regarding SPF protection and does not require a minimum level of UV protection in sunglasses. The Council of Standards Australia makes a distinction between "fashion spectacles" and "sunglasses," requiring the latter to confer a minimum level of UV protection. The key requirements include protection from UV at 280 to 400 nm, testing procedures for specific performance, and labeling requirements of lens category numbers. Lens category numbers range from category 0 for fashion spectacles with limited-to-no UV protection to category 4 for sunglasses with a high level of UV protection [16]. Australia has the only sunglasses standard that includes surveillance to assess products in the market to ensure adherence to labeling guidelines. The British Standards Institution (BSI) Kitemark also ensures UV protection by providing a filter category of 0 (light tint sunglasses) to 4 (very dark special purpose sunglasses) with requirements for maximum values of solar UVA, UVB, luminous, and solar infrared transmittance [17]. In the US, while sunglasses do undergo auditing

based on claims, including labeling for features such as UV protection, there is no minimum level of protection. Minimum sunglasses UV protection standards and clear labeling requirements to alert consumers to the level of sun protection provided by the sunglasses may be beneficial.

### *The Workplace*

Outdoor workers suffer from a higher incidence of skin cancer due to chronic solar-UV exposure [18]. The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) mandates a UV risk-management process for outdoor workers [19]. The radiation protection guidelines define both employers' and employees' duties, including managing risk of occupational UVR exposure, provision of information about UV risk to employees, post-incident exposure management, and exposure limits. Associated addenda provide the rationale for limits, a description of the health effects of UVR, and guidance on limiting exposure to UVR in the workplace, among other details. Also included are example measures like providing personal protective equipment, display of appropriate warning signs, and health surveillance for workers who are overexposed.

In 2014 in the US, The Surgeon General's Call to Action to Prevent Skin Cancer [20] outlined a roadmap to encourage all Americans to implement practices that may help decrease their risk of skin cancer. This included a call for business-owners and employers to provide increased availability of sun protection for those working outdoors, and to modify work environments to reduce UV exposure when possible. While this call-to-action is encouraging, it is not mandatory for employers. Furthermore, the US Occupational Safety and Health Administration (OSHA) guidelines on ionizing radiation do not include specifications regarding worker exposure to UV radiation. The Centers for Disease Control and Prevention (CDC) and The National Institute for Occupational Safety and Health (NIOSH) have published recommendations suggesting protective clothing, gloves, face shields, and goggles for outdoor workers, but these are not enforced. Only recently has research on sun-safe workplaces begun to enter the national discourse, which in our view represents progress.

## **BRINGING IT ALL TOGETHER**

UV radiation is a major environmental hazard that has been directly linked to the development of skin cancer. Although melanoma incidence in younger individuals appears to have stabilized, further reduction is a critical public health goal. From a longitudinal demographic perspective, it is possible that the stabilization of melanoma incidence in younger generations could lead to an eventual stabilization or decline in prevalence overall. Still,

**Table 1. Recommendations for US Sun Safety Practices as Informed by International Examples**

Recommendation	
1	Establishing federal regulations on minor tanning bed use. This recommendation is in line with the position of the American Academy of Dermatology (AAD) and the American Cancer Society (ACS). At present, many states have such regulations but enforcement is limited.
2	Mandating broad-spectrum sunscreen formulations with a balance of UVA and UVB protection. This, along with continued enforcement of the SIA that establishes timeframes to facilitate technological advances, may allow for more effective products sooner.
3	Implementing mandatory UV protection for sunglasses, or creation of a distinction between fashion eyewear and sunglasses.
4	Including UV as a form of ionizing radiation in OSHA guidelines, thereby codifying the responsibilities of employers to protect outdoor workers.

older individuals will benefit from improvement in sun protection policies. Both Australia and the UK have federally-supported public health interventions with credible, strong, and centralized policies and programs (eg, the Anti-Cancer Council in Australia and Cancer Research UK's SunSmart program). In contrast, efforts in the US have not been centralized but rather distributed across federal agencies (eg, the Environmental Protection Agency (EPA), CDC). While efforts at the state level have been initiated, there remains a lack of coordination nationwide. Furthermore, many guidelines provide recommendations for sun-protective practices, but do not suggest enforceable rules for manufacturers of commercial goods (such as sunscreens and sunglasses), tanning bed businesses, or employers of outdoor workers. Fragmented US healthcare coverage may further hinder implementation of standardized sun protection policies through inconsistent sunscreen coverage, lack of preventative focused care, and variable access to healthcare and health education.

Just as the effort to curb cigarette smoking proved effective when the federal government assumed leadership, we propose that similar results can be achieved for sun safety. Despite structural challenges, the burden of disease highlights the opportunity to adapt strategies proven effective in other countries. We outline proposed recommendations in Table 1. There is a need for a coordinated and longitudinal effort in the US that leverages the strength of a country with strong federal and state leadership. The variation in specific aspects of sun safety, such as tanning bed laws across states, demonstrates the importance of developing a national approach to address this issue. By learning from the successful example of smoking prevention, a comprehensive and unified sun protection policy can be developed to significantly reduce the risks associated with excessive sun exposure.

It is important to implement practical solutions that complement proven preventative sun safety practices deployed in other countries with similar demographics, with a focus on public education and the specific solutions outlined earlier. There are clear hurdles for the

implementation of such policies in the US compared to Australia and the UK which extend beyond their nationalized healthcare systems. Implementing unified public health policy measures in a landscape of a fragmented healthcare market presents a unique set of challenges but also provides an opportunity for innovative solutions. The current limits on sun safety measures may reflect a lack of political will, prioritization of other important public health concerns, and the role that lobbyists and industry play in influencing policy decisions. It is important to recognize that the UK, with its lower UV exposure and different climate, has distinct skin cancer incidence rates compared to Australia and the US. However, despite these differences, the impact of skin cancer in our aging population grows, and preventative measures can play a pivotal role in providing much-needed reduction in the burden of disease. By considering the nuances of early exposure to carcinogens, such as tanning beds, and acknowledging that preventative measures may still benefit older populations, we can focus on targeted interventions that achieve long-term reductions in skin cancer rates.

**Funding:** none.

**Conflict of Interest:** Dr. Leffell is a board member of a sunscreen research and development company.

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