Community Preventive Services Task Force

Preventing Skin Cancer: Interventions in Outdoor Recreational and Tourism Settings

Task Force Finding and Rationale Statement

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Task Force Finding and Rationale Statement

Context

Visitors to outdoor recreational and tourism settings may have an increased risk of excessive UV radiation exposure for several reasons, including:

- Spending an extensive amount of time outdoors
- Unfamiliarity with the settings, which may have high UV radiation intensity due to factors such as latitude, altitude, and light reflective surfaces (e.g., water, sand, snow)
- Desire among vacationers to be carefree

Operators of outdoor recreational and tourist facilities can play an important role in helping to address the heightened risk of sunburns and ultimately skin cancer due to these factors by ensuring that visitors are aware of the risks and are able to effectively mitigate them.

Intervention Definition

Interventions to promote sun-protective behaviors among visitors to outdoor recreational and tourism settings include at least one of the following:

- Educational approaches (e.g., providing informational messages about sun protection to visitors through instruction, small media such as posters or brochures, or both)
- Activities designed to influence knowledge, attitudes, or behavior of visitors (e.g., modeling or demonstrating behaviors)
- Environmental approaches to encourage sun protection (e.g., providing sunscreen or shade)
- Policies to support sun protection practices (e.g., requiring sun protective clothing)

These interventions may be directed at adults, children, or both. They may also have components directed at improving sun protection behavior among employees.

Task Force Finding (April 2014)

The Community Preventive Services Task Force recommends interventions in outdoor recreational and tourism settings that include skin cancer prevention messages or educational activities for visitors, and may also provide free sunscreen of SPF 15 or greater. This recommendation is based on strong evidence of effectiveness for increasing sunscreen use and avoidance of sun exposure, and decreasing incidence of sunburns.

Rationale

Basis of Finding

This Task Force finding is based on evidence from a Community Guide systematic review published in 2004 (Saraiya et al., 9 studies on behavioral outcomes; search period January 1966 – June 2000) combined with more recent evidence (8 studies, search period June 2000 – April 2013). Based on the combined evidence from original review and the updated period, the Task Force recommendation was changed from sufficient evidence to strong evidence of effectiveness.

Results presented in this statement are primarily based on evidence from the updated search period. The included studies (8 studies and 13 study arms) assessed intervention effects on various measures of sun protection and physiological outcomes of UV radiation exposure.

Five studies with eight study arms generally indicated that these interventions led to increased use of sunscreen. One randomized control trial found that provision of readily available sunscreen in amateur golfers' locker rooms resulted in an average of 1.13 more days per week of sunscreen use, after adjusting for baseline use (p=0.01). In addition, players with ready access to sunscreen during competitions increased their reapplication by 22.0 percentage points (95% CI: 0.9, 43.1), but reapplication during practice did not change for either group. An educational intervention for children enrolled in ski and snowboard classes at high altitude resorts and their parents resulted in an estimated 20.0 percentage point increase in children using sunscreen during ski classes (95% CI:10.1, 29.9) and a non-significant 4.0 percentage point increase in lip balm use (95% CI: -6.2, 14.2). The remaining 3 studies and 6 study arms, which used various measures of sunscreen use, also generally found that the intervention increased sunscreen use, particularly during activities other than intentional sunbathing.

Fewer studies assessed other sun protective behaviors, such as use of sunglasses or ski goggles (1 study), avoidance of sun exposure (4 studies, 8 study arms), and combined sun protective behaviors (3 studies, 5 study arms). Results were also generally favorable for these outcomes.

One study with three study arms showed a minimal and non-significant decrease in skin darkening due to UV exposure among beach goers at two month follow up of an intervention focusing on the effects of excessive UV exposure on appearance (i.e., photoaging). Two included studies, with three study arms, assessed intervention effects on sunburns; one found a non-significant decrease in the number of red and painful sunburns among female beach goers in the intervention group (p=0.8), and the other found that the proportion of tourists presenting with at least one sunburn during their stay at a beach resort decreased among both an intervention group that received free sunscreen (-16.9 percentage points; 95% CI: -28.9, -4.9), and one that received free sunscreen and information on sun protection (-25.6 percentage points; 95% CI: -36.9, -14.2).

Follow-up periods varied substantially across studies; the majority of studies had relatively short follow-up periods, and those that took place at ski or beach resorts often limited follow-up periods to the time during which participants were in the specific recreational setting.

Applicability and Generalizability Issues

Because the majority of the evidence for this update came from the U.S. (6 studies), and results were consistent across the other countries represented in the review (Canada and France), the reported results are applicable to the U.S. context.

These interventions took place in diverse outdoor recreational and tourism settings (e.g., beaches, ski resorts, golf courses) and generally delivered messages targeted to the specific setting. For example, many interventions at beaches included appearance-based messages to persuade participants to reduce intentional sun tanning. In contrast, interventions at golf courses or ski resorts, where excessive UV exposure was usually incidental to recreational activity or sporting activity, usually emphasized messages about the importance of sun protection (e.g., use of sunscreen, protective clothing, hat/helmet, sunglasses/ski goggles) while engaged in outdoor activity. Despite these differences in context, the consistently favorable results suggest that these interventions are likely to be broadly applicable across settings, with appropriate targeting to the visitors and activities at these settings.

Most of the evidence for update period came from studies of adults. The one included study that assessed intervention effectiveness among children found a 22.0 percentage point increase in sunscreen use (95% CI: 0.9, 43.1). Considered along with the median 9.8% increase in children's sunscreen use and composite sun-protective behaviors reported in the original review (from 4 studies with 5 study arms), the evidence supports a conclusion that the intervention is effective for both adults and children. There was limited information in the included studies to assess differential effects by other demographic factors such as race/ethnicity or socioeconomic status. Although only a small number of studies reported on educational attainment of the groups studied, the available data indicate that participants in the included studies may have tended to be of higher than average socioeconomic status, with a median of 91% of adult participants having at least some college education (3 studies).

Seven of the eight studies included in this update involved education about sun protection and its importance; these educational programs were often accompanied by provision of free sunscreen to visitors (4 studies). None of the interventions had policy components, making it difficult to draw any conclusions whether they increased intervention effectiveness. Finally, there was no clear difference in effectiveness between the five interventions that provided sun safety messages at a single time or place, versus those for which visitors were repeatedly exposed to such messages (3 studies)). One multi-site study, however, found that the intervention was more effective at improving sun protection outcomes among visitors to ski resorts when signs were posted in several places.

Data Quality Issues

Internal validity of the included studies was good, with seven of eight studies being randomized control trials. Lack of consistency in outcome measures and metrics for reporting them, however, made it more difficult to derive summary effect estimates and assess effect magnitudes. Follow up periods tended to be short, ranging from assessing outcomes on the same day as exposure to one year after the intervention; five of the eight studies had follow-up periods of two months or less. Extended follow-up assessments would be valuable for evaluation of long term effects of the intervention on behavior. Nonetheless, even short-term improvements in behavior in these settings can improve health outcomes, due to the increased risk of serious sunburns in many recreational settings and the link between small numbers of such sunburns and increased skin cancer risk (Whiteman & Green, 1994).

Other Benefits and Harms

These interventions may have beneficial consequences beyond those related to their direct effects on individuals' sun-protective behaviors. For example, these programs may lead to decreased risk of overexposure to heat by encouraging avoidance of peak sun exposure or covering up. In addition, outdoor recreation has many physical and mental health benefits, and sun-protection interventions can help participants guard against excessive sun exposure that may interfere with these healthy pursuits.

One potential harm of interventions to prevent skin cancer is reduced levels of vitamin D, particularly among people with darker skin. According to WHO, 5 to 15 minutes of casual sun exposure for 2-3 days a week is adequate to meet the vitamin D requirements of most people. Given that sun exposure in outdoor recreational and tourism settings usually substantially exceeds these thresholds, interventions in these settings to reduce UV radiation exposure are unlikely to cause detrimental effects on Vitamin D production.

Considerations for Implementation

Sun protection interventions for visitors to recreational and tourism settings need to be adapted to the small amount of extra time that visitors are likely to be willing to devote to participation in sun protection interventions, and to the wide dispersion of people in many of these settings.

In the included studies, several strategies were used to address these challenges. These included displaying signage with key messages at a large numbers of locations; using multiple channels to disseminate sun safety messages (e.g., brochures, posters, interactive activities); incorporating sun safety messages into existing activities (e.g., swimming lessons; ski schools); and disseminating information at strategic locations, such as waiting areas for tickets or events.(e.g., Walkosz et al., 2007; Walkosz et al., 2008).

Providing free sunscreen and ensuring adequate availability of shade may reduce barriers related to inaccessibility and inconvenience (Dubas & Adams, 2012; Hamant & Adams, 2005). Providing free sunscreen also removes cost considerations that may cause people to use sunscreen less frequently than they should (Nicol et al., 2007).

Sun protection policies that are appropriate to the specific setting may complement other intervention components that are focused on educating people about sun safety and making sun protection more accessible. For example, scheduling outdoor activities in shaded areas or outside peak UV intensity periods lowers risks for participants with little effort on their part. Unfortunately, few of the interventions studied included any such policy components. Policy development can also play an important role in sustaining and helping to ensure consistent delivery of educational and environmental intervention components. For example, policies may require provision of sunscreen at the pool or incorporate sun safety instruction into curricula for swimming, skiing, or other lessons.

The heightened risk for sunburn among visitors to many outdoor recreational settings, along with their potential lack of awareness of the risks associated with any particular setting, make sun safety programs in outdoor recreational and tourism settings an attractive option. One ongoing barrier to widespread implementation of these interventions is the belief among some operators of recreational facilities that implementing a sun safety program might adversely affect their business, or that they have no responsibility for their visitors' sun safety.

Evidence Gaps

Several questions remained unanswered about the effectiveness of interventions to promote sun-protective behaviors among visitors to outdoor recreational and tourism settings. First, most of the available evidence comes from studies of predominantly white people with sun-sensitive skin. Future research should attempt to include understudied groups such as other racial/ethnic groups, people with less sun-sensitive skin, and people of lower socioeconomic status.

To allow for better understanding of the maximally effective mixture of intervention components, it would also be helpful for future research to assess how intervention effectiveness varies based on variations in the specific mixture of components. Furthermore, it would be helpful if more studies evaluated interventions that included sun protection policies.

Most included studies followed up participants for short periods of time after the intervention (≤2 months). Studies that follow participants for longer time periods would provide useful information about whether behavior changes are sustained over time and in different contexts. Finally, the large number of sun protection outcomes of interest for assessing intervention effectiveness, combined with the large number of ways of measuring those outcomes, make it difficult to synthesize results and identify factors that may influence intervention effectiveness. To improve our ability to build on existing research, it would be helpful for skin cancer researchers to adopt a set of standardized and readily interpretable outcome measures to evaluate the effectiveness of these interventions.

The data presented here are preliminary and are subject to change as the systematic review goes through the scientific peer review process.

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