Recommendations to Prevent Skin Cancer by Reducing Exposure to Ultraviolet Radiation

Task Force on Community Preventive Services

Introduction

As the most common type of cancer in the United States, skin cancer is a significant public health issue.[1] It is estimated that in 2004 more than 1 million people will be diagnosed as having basal cell carcinoma and squamous cell carcinoma, and 2300 will die. Melanoma, predicted to affect 55,100 individuals, has a much higher mortality rate and will result in 7900 deaths.[2] Furthermore, although rates of most other cancers in the United States have been declining, the incidence of melanoma is increasing,[3] likely due in part to increased exposure to ultraviolet (UV) radiation.

The relationship between skin cancer and UV radiation is considered well established. Several self-protective behaviors can provide protection from UV radiation exposure, such as seeking shade, avoiding the sun during peak hours of UV radiation, wearing protective clothing, or composite behaviors that include more than one of these. Although sunscreen is thought to be an important adjunct to other types of protection against UV exposure, recent research suggests that it is not adequate when used alone. None of these protective behaviors is highly prevalent in the United States; in 1992 only 53% of adults were "very likely" to protect themselves from the sun by practicing at least one protective behavior.[4]

This report provides recommendations on community interventions to prevent skin cancer by reducing exposure to ultraviolet radiation. Interventions that were reviewed targeted various population groups in a range of settings.

The recommendations in this report represent the work of the independent, nonfederal Task Force on Community Preventive Services (the Task Force). The Task Force is developing the *Guide to Community Preventive Services* (the *Community Guide*) with the support of the U.S. Department of Health and Human Services in collaboration with public and private partners. The Centers for Disease Control and Prevention (CDC) provides staff support to the Task Force for the development of the *Community Guide*. The Task Force recommendations are primarily based on the effectiveness of the intervention as determined by the systematic literature review process (described in the accompanying review article).[5] In making its recommendations, the Task Force balances the information about effectiveness with information about other potential benefits and the potential harms of the intervention itself. The Task Force also considers the applicability of the intervention to various settings and populations in determining the scope of the intervention. Finally, the Task Force reviews economic analyses about effective interventions. Economic information is provided to assist the reader with decision making, but does not affect the Task Force's recommendation. The specific methods for and results of the reviews of evidence on which these recommendations are based are provided in the accompanying article. General methods employed in evidence reviews for the *Community Guide* have been published previously.[6]

The interventions reviewed in this article may be useful in reaching the objectives set in *Healthy People 2010*[7]:

1. Increase to 75% the proportion of people who use at least one of the following protective measures that may reduce the risk of skin cancer: avoid the sun between 10 A.M. and 4 P.M., wear sun-protective clothing when exposed to the sun, use sunscreen with a sun-protection factor (SPF) of ≥15, and avoid artificial sources of ultraviolet light.
2. Reduce melanoma deaths to <2.5 per 100,000.

Recommendations for use of sunscreen, including recommended public health strategies, also are available from the International Agency for Research on Cancer (IARC).[8] The CDC recommends that schools engage in skin cancer prevention activities.[9] The U.S. Preventive Services Task Force has reviewed the evidence that sun exposure is related to melanoma, but found insufficient evidence to determine whether clinician counseling was effective in changing patient behaviors to reduce skin cancer risk.[10]

Intervention Recommendations

Interventions to Decrease UV Exposure and Promote UV Protection in Specific Settings

Educational and policy approaches in child care centers: insufficient evidence to determine effectiveness. A large proportion of lifetime sun exposure occurs in child-

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hood,[11,12] and greater numbers of children are being cared for in child care centers.[13] Therefore, targeting child care providers could be an effective means of reducing UV exposure. In particular, many child care centers conduct outdoor activities and free play during peak UV hours, with only one third providing shade in the play area.[14]

However, the Task Force found insufficient evidence to determine the effectiveness of educational and policy interventions in child care centers to reduce children's adverse health effects or change children's behavior related to sun exposure; change caregivers' behavior related to sun exposure; change policies and practices in child care centers; or change children's or caregivers' knowledge or attitudes related to sun exposure and sun protection. The finding of insufficient evidence to determine effectiveness was based on (1) limitations in the design and execution of interventions evaluated, (2) small numbers of qualifying reports, (3) variability in interventions evaluated, (4) very short follow-up times, and (5) little substantial or statistically significant improvement in outcomes other than knowledge and attitudes.

Educational and policy approaches in primary schools: recommended. Children are in school during peak hours of UV radiation, and may often be outdoors for play or recess. They are more receptive than adolescents to practicing self-protective behaviors, and are more amenable to instruction received from adults, including teachers and parents. On the basis of sufficient evidence of effectiveness, the Task Force recommends interventions in primary schools to improve covering-up behavior.

Evidence was insufficient to determine effectiveness in improving other sun-protective behaviors (e.g., avoiding the sun) because of inconsistent findings. Evidence was also insufficient to determine effectiveness in decreasing sunburns because only a single study, with limitations in design and execution, reported on this behavior.

Educational and policy approaches in secondary schools and colleges: insufficient evidence to determine effectiveness. Interventions in secondary schools and colleges target adolescents and young adults. These interventions are important because young people in these age groups are likely to be exposed to more UV radiation than younger children who are in the care of parents and other caretakers. However, health educators face a unique challenge in working with this population, which is experiencing changes in attitudes and social norms that may be associated with increased high-risk health behavior.[15–17]

The Task Force found that evidence was insufficient to determine the effectiveness of interventions in secondary schools or colleges to reduce adverse health effects or to change behavior related to UV exposure. Evidence was considered insufficient because of (1) limitations in the design and execution of available studies, (2) small numbers of admissible studies, (3) variability in interventions and evaluated outcomes, and (4) short follow-up times.

Educational and policy approaches in recreational or tourism settings: recommended. Many Americans spend significant amounts of time pursuing outdoor recreation or traveling to regions with high UV levels within the United States and abroad. Increases in recreational sun exposure appear to be associated with increased risk of melanoma.[18] Therefore, recreational and tourism sites constitute potential points of intervention for sun-protection programs targeting adults as well as children and their parents.

The Task Force found sufficient evidence of effectiveness of interventions in recreational or tourism settings to change adult behaviors, based on improvements in the adult sun-protective behavior of covering up, and recommends these interventions. Available reports provide insufficient evidence to determine the effectiveness of the intervention in reducing sunburn in adults and children, because results were inconsistent (adult sunburn) or too few studies reported on this outcome (children's sunburn). Although available reports also demonstrate evidence of effectiveness of educational and policy interventions in recreational settings in improving children's sun-protective behaviors—including sunscreen use and composite sun-protective behaviors—these are not recommendation outcomes.

Educational and policy approaches in occupational settings: insufficient evidence to determine effectiveness. In 1991, more than 8% of the U.S. workforce primarily worked outdoors, making outdoor workers a crucial audience for sun-protection programs. Occupational groups that work outdoors have been found to have high rates of nonmelanoma skin cancer, and outdoor workers may receive up to six to eight times the dose of UV radiation that indoor workers receive.[19,20] They have also been found to have low levels of sun protection.[21]

The Task Force found insufficient evidence to determine the effectiveness of interventions in occupational settings in increasing the sun-protective behaviors of covering up or seeking shade, or in decreasing the incidence of sunburn and UV exposure, because the limited number of available reports showed inconsistent findings.

Interventions oriented to healthcare settings and providers: insufficient evidence to determine effectiveness. Individuals in the United States make an average of 1.7 visits to a primary care provider annually,[22] making healthcare settings a unique opportunity for providing preventive services to the general population.

This review considered activities for providers as well as for healthcare systems.

The Task Force found insufficient evidence to determine the effectiveness of interventions in healthcare settings or for healthcare providers in reducing UV exposure or increasing sun-protective behaviors. Too few articles of sufficient design and execution quality evaluated the effectiveness of these interventions in changing recommendation outcomes.

Interventions to Decrease UV Radiation and Increase UV Protective Behaviors in Cross-Cutting Settings

Media campaigns without other activities: insufficient evidence to determine effectiveness. Mass media campaigns are directed toward the entire community, and have been used to promote skin cancer prevention by a number of private and governmental entities. Interventions in this category included some component of a mass media approach, such as radio or television, and may also have included small media, such as newsletters and posters.

The Task Force found insufficient evidence to determine the effectiveness of mass media interventions alone in changing sun exposure behaviors because of (1) limitations in study design and execution of available studies, (2) the small number of qualifying studies, and (3) variability in interventions and outcomes evaluated.

Interventions oriented to children's parents or caregivers: insufficient evidence to determine effectiveness. These activities focus primarily on supporting parents and caregivers in changing the sun-protective behavior of the children in their care. Caregivers for children may include nannies, other family members, lifeguards, and teachers and coaches. Such individuals play an important role in protecting children from UV radiation, including reducing children's UV exposure, incorporating sun-protective behaviors into routines, and modeling healthy behavior. They may be amenable to the provision of information; to activities to change knowledge, attitudes, and intentions; and to environmental or policy approaches, such as scheduling outdoor activities to avoid peak UV hours.

The reviewed reports provided insufficient evidence to determine the effectiveness of interventions for parents or caregivers because there were too few reports and findings were inconsistent. Although not recommendation outcomes, the reports demonstrate that the intervention did lead to improvements in children's attitudes or beliefs, as well as sun-safety measures and environmental supports at outdoor recreational centers and swimming pools.

Community-wide multicomponent interventions: insufficient to determine effectiveness. Community-wide multicomponent sun-protection programs use combinations of approaches to affect the behavior of groups of people in a defined geographic area. These programs may range from combining a setting-specific program with a mass media campaign to a complex, multilevel effort involving entire communities, schools, workplaces, healthcare settings, and recreation settings. Multilevel interventions that address a substantial portion of the population in an area and last more than one year are considered to be **comprehensive**. They may combine education with significant efforts to institute sun-protection policies and structural supports.

The Task Force found insufficient evidence to determine the effectiveness of multicomponent programs to reduce UV exposure or increase sun-protective behaviors because of inconsistent results. Evidence was insufficient to determine the effectiveness of comprehensive community-wide programs to reduce UV exposure or increase sun-protective behaviors because of small numbers of studies with limitations in their study design and execution.

Interpreting and Using the Recommendations

Primary Schools

Interventions in primary schools can promote sun-protective behaviors among children in kindergarten through eighth grade by providing information; conducting activities to influence children's behavior or to change the knowledge, attitudes, or behavior of caregivers; or by implementing environmental or policy approaches. Most sun-safety programs have taken place in formal educational settings, such as primary schools, where skin cancer education programs can be integrated into existing learning situations and support policy and environmental interventions.

Virtually any primary school can be an appropriate environment in which to carry out sun-protection programs. The studies examined for this review were conducted in diverse geographic locations, including Arizona, North Carolina, Australia, Canada, and France. Most studies in which race/ethnicity was reported focused on a predominantly white population. There is no reason to believe that the programs would be ineffective in a nonwhite population, but given the lower risk of skin cancer among nonwhites and competing public health priorities, one might expect lower adherence to consistent lifestyle (behavior) changes that are recommended for primary prevention of skin cancer.

The Task Force recommendations can be used by parents and communities to advocate for the integration of sun-protection programs into primary school curricula. They can be used by school systems to focus such programs on the primary school setting. To increase UV protection it is essential that interventions be well matched to local needs and capabilities. Schools and communities should consider, along with *Community Guide* recommendations, local information such as skin cancer incidence, skin cancer mortality, prevalence of sun-protective behaviors, latitude, UV index

averages, resource availability, administrative structures, and economic and social environments of organizations and practitioners.

Recreational and Tourism Settings

Interventions can be implemented in a variety of recreational and tourism settings in diverse geographic locations. Approaches include the provision of information; activities to change knowledge, attitudes, and beliefs; activities to influence behavior and environmental or policy approaches that reflect particular settings, such as using poolside activities to educate parents.

The team's review did identify some barriers to implementation, but none was considered insurmountable. First, recreational staff may have only limited time to implement the special activity component of an intervention, and swimming class schedules may limit intervention activities at swimming pools. Additionally, some in the tourism trade might worry that sun-safety concerns could adversely affect their business and hence might be unwilling to partner in these efforts. On the other hand, the review team suggests that as public awareness of the risks associated with UV exposure increases, promoting safer sun practices could help the tourism trade encourage continued travel by vacationers who might be wary of exposing their families to increased risk of future skin cancer. Tourist locations taking an active interest in helping to ensure safe sun-protection practices may be considered socially responsible and increase client appreciation.

Organized recreational programs, vacation sites, and communities concerned about the public health effects of excessive UV exposure can assess the priorities, place, population, and current practices to find ways to surmount any existing barriers and successfully launch preventive programs in recreational and tourism settings.

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