Targeting children through school-based education and policy strategies: Comprehensive cancer control activities in melanoma prevention

Julie S. Townsend, MS,a Beth Pinkerton, BS,b Sharon A. McKenna, BA,c Sue M. Higgins, MPH,d Eric Tai, MD, MS,a C. Brooke Steele, DO,a Susan R. Derrick, BA,a and Christine Brown, MSb
Atlanta, Georgia; Albuquerque, New Mexico; Phoenix, Arizona; and Tallahassee, Florida

Learning Objectives
After completing this learning activity, participants should be able to describe recent trends in the epidemiologic patterns of melanoma, including ethnic disparities in melanoma mortality; identify when a private practice dermatologist is required to report melanoma cases to a cancer registry; locate and access central cancer reporting registries (http://apps.ncdc.cdc.gov/cancercontacts/npcr/contacts.asp); and recognize and access national and state-based sources on surveillance systems for sun protection behaviors.

Date of release: November 2011
Expiration date: November 2014
© 2011 by the American Academy of Dermatology, Inc.
doi:10.1016/j.jaad.2011.06.036

Technical requirements:
American Academy of Dermatology:
- Supported browsers: Firefox (3 and higher), Google Chrome (5 and higher), Internet Explorer (7 and higher), Safari (5 and higher), Opera (10 and higher)
- JavaScript needs to be enabled.

Elsevier:
Technical Requirements
This website can be viewed on a PC or Mac. We recommend a minimum of:
- PC: Windows NT, Windows 2000, Windows ME, or Windows XP
- Mac: OS X
- 128MB RAM
- Processor speed of 500MHz or higher
- 800x600 color monitor
- Video or graphics card
- Sound card and speakers

Provider Contact Information:
American Academy of Dermatology
Phone: Toll-free: (866) 905-3827 (7546), International: (847) 240-1280
Fax: (847) 240-1859
Mail: P.O. Box 4014; Schaumburg, IL 60168

Confidentiality Statement:
American Academy of Dermatology: POLICY ON PRIVACY AND CONFIDENTIALITY

Privacy Policy - The American Academy of Dermatology (the Academy) is committed to maintaining the privacy of the personal information of visitors to its sites. Our policies are designed to disclose the information collected and how it will be used. This policy applies solely to the information provided while visiting this website. The terms of the privacy policy do not govern personal information furnished through any means other than this website (such as by telephone or mail).

E-mail Addresses and Other Personal Information - Personal information such as postal and e-mail address may be used internally for maintaining member records, marketing purposes, and alerting customers or members of additional services available. Phone numbers may also be used by the Academy when questions about products or services ordered arise. The Academy will not reveal any information about an individual user to third parties except to comply with applicable laws or valid legal processes.

Cookies - A cookie is a small file stored on the site user’s computer or Web server and is used to aid Web navigation. Session cookies are temporary files created when a user signs in on the website or uses the personalized features (such as keeping track of items in the shopping cart). Session cookies are removed when a user logs off or when the browser is closed. Persistent cookies are permanent files

CME INSTRUCTIONS
Please note this is one article that is part of a 16-article CME supplement. CME credit should only be claimed after reading the entire supplement which can be accessed via the “Melanoma Supplement” tab under the “Collections By Type” pull-down menu on http://www.jaad.org.

This journal supplement is a CME activity (enduring material) co-sponsored by the American Academy of Dermatology and the Centers for Disease Control and Prevention and is made up of four phases:
1. Reading of the CME Information (delineated below)
2. Reading all the articles in this supplement
3. Achievement of a 70% or higher on the online Post Test
4. Completion of the CME Evaluation

CME INFORMATION AND DISCLOSURES
Statement of Need:
Healthcare providers continue to underreport melanoma even though cancer reporting requirements mandate such reporting. Additionally, providers may be unaware of recent trends and descriptive epidemiology regarding melanoma which includes the fact that nonwhites have a higher mortality rate from melanoma than do whites.

Target Audience:
Dermatologists, dermatopathologists, general physicians, and public health professionals.

Accreditation
The American Academy of Dermatology is accredited by the Accreditation Council for Continuing Medical Education to provide continuing medical education for physicians.

AMA PRA Credit Designation
The American Academy of Dermatology designates this enduring material for a maximum of 7 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

AAD Recognized Credit
This CME activity is recognized by the American Academy of Dermatology for 7 AAD Recognized Credits and may be used toward the American Academy of Dermatology’s Continuing Medical Education Award.

Disclaimer:
The American Academy of Dermatology is not responsible for statements made by the author(s). Statement or opinions expressed in this activity reflect the views of the author(s) and do not reflect the official policy of the American Academy of Dermatology. The information provided in this CME activity is for continuing education purposes only and is not meant to substitute for independent medical judgment of a health provider relative to the diagnostic, management and treatment options of a specific patient’s medical condition.

Disclosures
Editors
The editors involved with this CME activity and all content validation/peer reviewers of the CME activity have reported no relevant financial relationships with commercial interests.

Authors
The authors of this CME activity have reported no relevant financial relationships with commercial interests.

Planners
The planners involved with this CME activity have reported no relevant financial relationships with commercial interests. The editorial and education staff involved with this CME activity have reported no relevant financial relationships with commercial interests.

Resolutions of Conflicts of Interest
In accordance with the ACCME Standards for Commercial Support of CME, the American Academy of Dermatology has implemented mechanisms, prior to the planning and implementation of this CME activity, to identify and mitigate conflicts of interest for all individuals in a position to control the content of this CME activity.

Sound card and speakers
Video or graphics card
800x600 color monitor
Processor speed of 500MHz or higher
Mac: OS X
PC: Windows NT, Windows 2000, Windows ME, or Windows XP
128MB RAM
Session cookies are removed when a user logs off or when the browser is closed. Persistent cookies are permanent files

E-mail Addresses and Other Personal Information - Personal information such as postal and e-mail address may be used internally for maintaining member records, marketing purposes, and alerting customers or members of additional services available. Phone numbers may also be used by the Academy when questions about products or services ordered arise. The Academy will not reveal any information about an individual user to third parties except to comply with applicable laws or valid legal processes.

Cookies - A cookie is a small file stored on the site user’s computer or Web server and is used to aid Web navigation. Session cookies are temporary files created when a user signs in on the website or uses the personalized features (such as keeping track of items in the shopping cart). Session cookies are removed when a user logs off or when the browser is closed. Persistent cookies are permanent files

S104.e1
Background: Primary school-based educational strategies are proven interventions to raise children’s awareness and knowledge about sun safety.

Objective: We highlight barriers and facilitators to implementing interventions across multiple populations in 3 state comprehensive cancer control programs/partnerships that implemented primary school-based sun-safety educational programs.

Methods: Using a case study approach, we collected semistructured program information and evaluation results from New Mexico’s Raising Awareness in Youth about Sun Safety Project, the Sun Protection in Florida Project, and the Arizona SunWise Program.

Results: Each program used different strategies for implementing school-based educational programs in their respective state based on local needs, funding constraints, and unique characteristics of their populations. Barriers to implementation included difficulties reaching schools and school administrators and changes in staff workload. Facilitators to implementation included using innovative recruitment approaches (mini grants, school assemblies), having community partners, reaching out to educators in various settings, and having program advocates within schools. Each program placed emphasis on supplementing educational programs with sun-safety policies.

Limitations: We only present a case study from 3 comprehensive cancer control programs/partnerships. Rigorous evaluation methods are needed to test the effectiveness of the various strategies that were used to implement these programs on a population-based level.

Conclusion: Partnerships and program advocates are important for successfully implementing and sustaining sun-safety programs. Innovative strategies for reaching school administrators are likely needed to effectively implement sun-safety programs and policies. School policy and environmental change are important and valued components of sun-safety programs. (J Am Acad Dermatol 2011;65:S104.e1-11.)

Key words: children; educational interventions; evidence-based practice; melanoma; public health; school-age populations; skin cancer.

Melanoma is one of the deadliest forms of skin cancer. Incidence rates are increasing in the United States. Intense, intermittent exposure to ultraviolet (UV) light is strongly linked with melanoma.

Childhood sunburn is an important risk factor for melanoma, and may increase risk by nearly 2-fold. Although findings in migrant and residential studies vary, many indicate that residing in a sunny location...
during childhood may increase the risk for melanoma in adulthood. In addition, youth indoor tanning is increasingly becoming an important risk factor for melanoma, and may increase risk by 75%. An estimated 25% of melanomas may be attributable to indoor tanning use.

Few data on sunscreen use and sun-safety behaviors are available for children, but the available data indicate many children are inadequately protected from sun exposure. A 1998 US survey conducted with parents of white children found that 43% of these children experienced a sunburn during the previous year. In all, 62% of parents reported using sunscreen on their children and 26.5% sought shade for their children to protect them from sun exposure. A 2006 assessment of fourth-grade students’ sun-protection behaviors in Hillsborough County, Florida, found that use of wide-brimmed hats and long sleeves was low. Another survey of elementary school (third to fifth grade) students in Palm Beach County, Florida, found that only about half of students reported seeking shade most of the time or always. Approximately 20% each of non-Hispanic white and non-Hispanic black students reported most of the time or always wearing a hat, whereas prevalence was higher for Hispanic (25.0%) students. Only about 36% of non-Hispanic white students reported using sun screen most of the time or always.

The pediatric population is an important target group for melanoma prevention activities because adult health behaviors are often established in childhood. Schools are important intervention sites because children may engage in outdoor activities during peak sunlight hours in this setting. Interventions in primary school settings and recreational sites are two strategies recommended by the Task Force on Community Preventive Services Guide to Community Preventive Services (Community Guide) to increase awareness of sun-protection behaviors and decrease UV exposure through covering-up behavior. To assist schools in addressing skin cancer prevention, the Centers for Disease Control and Prevention (CDC) published guidelines that schools can follow to develop comprehensive skin cancer prevention programs that include policy establishment, environmental change, and educational programs. The CDC has recently developed the Sun Safety for America’s Youth Toolkit to aid planners in developing comprehensive programs to promote sun safety. In addition, the research-tested intervention programs located through Cancer Control P.L.A.N.E.T. can aid cancer control planners in locating effective interventions for skin cancer prevention.

CDC funds a total of 65 programs (states, territories, Pacific Island jurisdictions, and tribes/tribal organizations) through the National Comprehensive Cancer Control (CCC) Program (NCCCP) to establish broad-based CCC coalitions, assess the burden of cancer, and develop and implement CCC plans to reduce cancer incidence and mortality. Each program uses cancer incidence data to help identify which cancers should be prioritized. Some CCC plans identify melanoma as a problem in their communities and have objectives that address skin cancer prevention.

We present case studies from 3 CCC programs/partnerships that were implementing evidence-based youth sun-safety educational programs. Qualitative case study is a useful method for assessing program implementation, because it adds depth of understanding and ascertainment of context that cannot be obtained from strictly quantitative methods. The featured projects are the New Mexico Raising Awareness in Youth about Sun Safety (RAYS) Project, the Sun Protection in Florida (SPF) Project, and the Arizona SunWise Skin Cancer Prevention School Program. Each of these 3 programs

CAPSULE SUMMARY

- Implementing evidence-based sun-safety educational programs at the population level can be challenging.
- Strategies used by comprehensive cancer control programs to effectively reach elementary schools include offering mini grants and school assemblies, and using community partners.
- Opportunities exist for dermatologists to be involved with comprehensive cancer control coalitions. Coalitions can be influential in advocating for effective policies to address sun safety in school and child-care settings and youth indoor tanning.
represents a single case. These case studies were conducted through semistructured narrative summaries provided by the CCC program director overseeing the sun-safety program, and in the case of Arizona, the program manager for the Arizona SunWise Skin Cancer Prevention School Program.

To identify skin cancer intervention programs to include as case studies, we conducted a document review to identify CCC programs and partnerships that were implementing interventions around skin cancer prevention that used evidence-based strategies from the Community Guide. We also reviewed interim progress reports submitted to CDC by 9 NCCCP grantees receiving skin cancer prevention additional funds and abstracts submitted to the 2008 and 2009 NCCCP Program Directors’ Meeting Poster Sessions. This document review helped guide the development of a semistructured questionnaire to collect narrative program summaries.

We collected the following information from 3 CCC programs/partnerships through a narrative summary: (1) rationale for implementing a school-based educational intervention for melanoma/skin cancer; (2) description of the program including objectives, theoretical framework, and the source or evidence base for the program; (3) implementation of the program including relevant partners, how schools were selected to receive the program, and implementation barriers; and (4) description of the evaluation process and notable evaluation results.

We supplemented the narrative summaries to triangulate the data with program interim and annual progress reports, evaluation reports, melanoma incidence data, program World Wide Web sites, state cancer plans, and fact sheets. We reviewed and hand-coded the narrative summaries to identify common themes around program implementation strategies, barriers and facilitators of implementation, environmental factors, external partnerships, program champions/advocates, training/support, evaluation, and school policy/environmental change. Because this case study only involved 3 cases, no formal analyses using qualitative software were conducted.

To compare and contrast melanoma incidence rates and trends, we obtained each state’s 2003 to 2007 5-year melanoma incidence rates available through State Cancer Profiles. These data are from each state’s population-based central cancer registry. We obtained each state’s average UV index in September (to coincide with the beginning of the school year) from the Environmental Protection Agency (EPA) SunWise Program.

## RESULTS

We found that age-adjusted melanoma incidence rates for both sexes, all ages, and all races/ethnicities were similar across the 3 states (Table I). Arizona and New Mexico both had nonstatistically significant declines in melanoma incidence over the 2003 to 2007 time period, whereas Florida experienced a nonstatistically significant increase in rates. The average UV index in September was similar across the 3 states.

Although each state used similar educational models, including EPA SunWise program across all 3 states, there were considerable differences in programmatic reach and strategies for implementing these programs (Table I). Through a state mandate, Arizona’s SunWise program has 100% coverage of children attending public school in kindergarten through eighth grade (K-8). Florida’s SPF Project has the least reach, but is targeted to counties based on melanoma incidence rates and the size of the youth population. Programs also varied in maturity, with Florida having the newest program.

Detailed below are descriptions of how each CCC program/partnership implemented their program.

### New Mexico

New Mexico’s approach for implementing the RAYS Project includes issuing mini grants to schools and community organizations to support sun-safety educational programs. Schools are encouraged but not required to implement policy and environmental changes to promote sun safety. Evaluation is an important component of the RAYS Project, and grantees are expected to conduct an evaluation with both students and teachers.

New Mexico’s climate, altitude, location, and abundance of outdoor activities contribute to the high rate of melanoma in the state, particularly among non-Hispanic whites. Since 1996, the New Mexico Cancer Plan has included objectives to

### Abbreviations used:

- ADHS: Arizona Department of Health Services
- CCC: comprehensive cancer control
- CDC: Centers for Disease Control and Prevention
- DOH: Department of Health
- EPA: Environmental Protection Agency
- HCHPP: Healthy Communities, Healthy People Program
- K-8: kindergarten through eighth grade
- NCCCP: National Comprehensive Cancer Control Program
- RAYS: Raising Awareness in Youth about Sun Safety
- SPF: Sun Protection in Florida
- UV: ultraviolet
reduce the risk for developing skin cancer. In 2001
the New Mexico Department of Health (DOH) Comprehensive Cancer Program, after consultation
with the Public Education Department, launched the
RAYS Project.

The RAYS Project is guided by the socioecological model, which recognizes the importance of community- and policy-level actions to support individual behavior change. The educational program consisted of 3 evidence-based curricula that schools could choose from: (1) Sunny Days, Healthy Ways (Klein Buendel Inc, Golden, CO), (2) SunSmart Project (Norris Cotton Cancer Center, Dartmouth Hitchcock Medical Center, Lebanon, NH), and (3) the EPA SunWise Program. A toolkit containing these educational materials, lists of available resources, and evaluation instruments was developed. The program purchased and distributed classroom kits of the Sunny Days, Healthy Ways curriculum for kindergarten through fifth grade.

### Table I. Comparison of 3 comprehensive cancer control programs and partnerships implementing school-based sun-safety programs

<table>
<thead>
<tr>
<th></th>
<th>New Mexico RAYS Project</th>
<th>Florida SPF Project</th>
<th>Arizona SunWise Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007 State melanoma incidence rate/100,000*</td>
<td>14.4</td>
<td>18.6</td>
<td>14.4</td>
</tr>
<tr>
<td>State melanoma incidence rate 5-y trend (2003-2007), APC</td>
<td>-5.5</td>
<td>1.5</td>
<td>-7.9</td>
</tr>
<tr>
<td>Average UV index (September)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implementation year</td>
<td>2001</td>
<td>2007</td>
<td>2003</td>
</tr>
<tr>
<td>Implementation coverage</td>
<td>Each quadrant of state represented</td>
<td>5 Counties</td>
<td>Statewide</td>
</tr>
<tr>
<td>Implementation strategy</td>
<td>Schools apply for mini grants to implement sun-safety curricula</td>
<td>Healthy Communities, Healthy People Program Coordinators at local health departments contact schools in their counties</td>
<td>Schools are offered free assemblies on SunWise Program</td>
</tr>
<tr>
<td>No. of schools reached each year</td>
<td>Approximately 10</td>
<td>5</td>
<td>1100 Public schools, plus 264 private, tribal, and home schools</td>
</tr>
<tr>
<td>Barriers</td>
<td>Centralized structure of largest metropolitan school district in state</td>
<td>Local health department staff with increased workload</td>
<td>Initial implementation barriers with contacting district superintendents</td>
</tr>
<tr>
<td>Educational model</td>
<td>Sunny Days, Healthy Ways SunSmart Project EPA SunWise Program</td>
<td>EPA SunWise Program</td>
<td>EPA SunWise Program (modified)</td>
</tr>
<tr>
<td>Duration and intensity of educational session</td>
<td>20-50 min/session; at least 2 sessions per student per year</td>
<td>1-2 h per student per year</td>
<td>Generally 3 h per student per year</td>
</tr>
<tr>
<td>School grades targeted</td>
<td>Kindergarten to fifth or sixth grade</td>
<td>Kindergarten to eighth grade</td>
<td>Kindergarten to eighth grade</td>
</tr>
<tr>
<td>No. of students reached per school year</td>
<td>Approximately 2000</td>
<td>Approximately 1000</td>
<td>707,329</td>
</tr>
<tr>
<td>Evaluation strategy</td>
<td>• Pretest and posttests completed by students each year • Teacher survey</td>
<td>• Pretest and posttests completed by students each year • School policy survey</td>
<td>• One randomized year-long control study with 3 school districts that tracked 1455 students through presurvey and postsurvey data • Teacher survey</td>
</tr>
</tbody>
</table>

**APC**, Annual percentage change; **EPA**, Environmental Protection Agency; **RAYS**, Raising Awareness in Youth about Sun Safety; **SPF**, Sun Protection in Florida; **UV**, ultraviolet.

*Age-adjusted rate to 2000 US standard population (19 age groups—Census P25-1130). Both sexes, all age groups, and all race/ethnic groups are included.
In its first year, the RAYS Project provided educational materials and funding to the largest metropolitan school system in the state. However, because of the school district’s centralized structure, RAYS Project staff had limited access to teachers and no ability to ensure that toolkits were delivered to specific schools as intended. In its second year, RAYS was augmented by mini grants throughout the state to schools and community organizations serving elementary school-age children. RAYS was advertised at conferences for educators and school nurses using a flyer that included information on available funds, a description of the project’s focus and components, and a listing of content standards and benchmarks of the state’s Public Education Department addressed by the approved curricula. Mini grants ranging from less than $1000 to $10,000 were offered for complementary sun-safety incentives and educational materials consistent with the RAYS Project to reinforce classroom instruction. Mini grants were awarded to schools and organizations in each quadrant of the state; approximately 10 projects were funded each year. Because almost half of the population (44.5%) reports being of Hispanic origin and Spanish is the most common non-English language spoken, materials were made available in both English and Spanish.

RAYS requires that participating schools provide two or more presentations per year on skin cancer prevention education using one or more of the approved curricula. To ensure consistency across all funded programs, the following sun-safety messages are stressed: avoid the sun between 10 AM and 4 PM, wear sun-protective clothing when exposed to sunlight, and use sunscreen with a sun-protection factor of 15 or higher. Students in second through sixth grades are queried on 4 sun-safe behaviors through self-administered pretests and posttests: playing in the shade, wearing a hat, using sunscreen, and wearing sunglasses.

In 2005, the program contracted with the Prevention Research Center at the University of New Mexico to assess and fine-tune evaluation of RAYS activities. With input from participating teachers, student pretests and posttests were modified to reduce the time necessary for completion and to reflect the program’s core sun-safety messages. Between 2006 and 2009, more than 3600 children in 69 classrooms completed pretests and posttests about changes in knowledge, beliefs, and behavior. Overall, posttests demonstrate behavior change in a positive direction. Pretest to posttest differences indicate increases in “always/sometimes” (ie, desirable) responses for playing in the shade, wearing a hat, using sunscreen, and wearing sunglasses among the majority of classrooms.

RAYS Project planners recognize the importance of role models as an effective tool for positive behavior change. The RAYS evaluation surveys teachers about changes in their own sun-safe behaviors as a result of their participation in this project. Of the 128 teachers surveyed from 2006 to 2009, nearly half reported changes in their own behavior either to a great extent or somewhat. Although RAYS funding is designated for educational materials, schools are encouraged to implement policy changes. Between 2006 and 2009, RAYS contractors reported 55 changes to school-based sun-safety policy including modifying recess times to avoid peak UV exposure, allowing students to wear hats outside, and providing shade structures or planting trees.

One of the most important lessons learned with the RAYS Project to date is the importance of program champions. Many program champions are educators who have personal or family histories of skin cancer. Through the provision of evidence-based curricula and funding for materials, these individuals are able to focus the message of the importance of practicing sun-safe behaviors to reduce the risk for developing skin cancer.

**Florida**

Similar to New Mexico, Florida’s SPF Project is implemented in a select number of schools. Florida’s implementation model involves working with community-based health and wellness programs at local health departments in Florida and their community partners to approach schools with the largest student populations. Changing the school environment to support sun-safety behavior is an important component of the SPF Project, and shade structures are provided to participating schools. Detailed below is a narrative description of how Florida implemented the SPF Project.

Skin cancer is one of 9 cancers identified in the Florida Cancer Plan. Florida generally maintains a UV index that is higher than most of the continental United States. The Florida DOH Bureau of Chronic Disease Prevention and Health Promotion CCC Program receives funding through a grant from the CDC to implement the SPF Project in 5 Florida counties. The SPF Project uses the EPA SunWise curriculum to address skin cancer and sun-safe measures for children in K-8. The SPF Project uses both educational and environmental strategies to address behavior change. Schools that participate receive a permanent, year-round shade shelter structure. The CCC program collaborates with the
Florida DOH Healthy Communities, Healthy People Program (HCHPP) to implement the SPF Project. The HCHPP is a community-based health promotion and wellness program that is administered in each of the 67 Florida counties by a HCHPP coordinator.

At the initiation of the project, the CCC program manager, together with the cancer epidemiologist and the DOH environmental health representative, reviewed melanoma incidence data and youth census population data to identify and select 5 communities for the SPF Project. The 5 selected HCHPP coordinators worked with their community partners to identify the appropriate schools to implement the project, with an emphasis on the school’s ability to reach the largest target population to maximize the impact of educating the largest number of youth on sun safety and healthy behaviors. Each HCHPP coordinator is required to reach a minimum of 150 youth per school through the SPF Project. The HCHPP coordinators conduct the SPF educational sessions, provide materials to the students and schools, and conduct pretest and posttest evaluations.

Several barriers have affected the implementation of the SPF Project, including Florida’s recent economic challenges. Two of 5 HCHPP coordinators were unable to complete their commitment because of changes in their workload at the county health departments. In addition, there were concerns with some schools regarding the dissemination of sunscreen because it is considered medication in some districts. After the first year of implementation, the CCC program realized that an assessment of current sun-safety policies at the participating schools was needed. In the 2009 to 2010 school year, the HCHPP coordinators were required to meet with school staff to discuss school sun-safety policies before conducting educational sessions and to follow up with principals and partners to strengthen these policies.

The CCC program is creating a database to collect the pretest and posttest results from the 5 project areas. Individual evaluation results from the 5 counties show an increase in sun-safety knowledge after the education session, particularly for use of protective clothing, ability to sunburn on a cloudy day, and correct minimum sun protection factor number to use for sunscreen.

In the second year of the project, a second evaluation component was introduced via an electronic survey to assess participating schools’ policies regarding sun-protective items allowed for students (hats, sunscreen), availability of shade on campus, inclusion of sun-safety education in the school curriculum, and future sun-safety initiatives. More than 80% of schools completing the survey allowed students to wear hats or sunglasses outdoors, and 66% reported a need for more shade protection. To ensure that the SPF Project remains as a programmatic resource for health educators in the state, each of the SPF Project HCHPP coordinators agreed to submit their project as a success story to the HCHPP SharePoint World Wide Web site. This tool serves as a resource for all HCHPP coordinators statewide and provides the opportunity for any coordinator or DOH staff that may be interested in replicating the SPF Project in their area.

Arizona

Of the 3 CCC programs/partnerships featured in this case study, Arizona is the only state that has a statewide sun-safety program. Detailed below is how this program evolved to become a state mandate and the implementation strategies used to approach schools. Arizona’s approach is comprehensive, and includes partners in after-school and parks and recreation programs that teach the SunWise program. In addition, implementation is supported by providing emailed toolkits, conducting school assemblies, and training educators to teach the curriculum and conduct supporting activities. Partners and program advocates have key roles in sustaining this program.

Arizona’s intense sun puts residents at risk for developing a potentially fatal skin cancer such as melanoma. In 2003, the Arizona DOH Services (ADHS) received funding through CDC to address the state’s melanoma and overall skin cancer incidence rates. One third of Arizona neighborhoods exceed the national average of 16 per 100,000 cases of melanoma, with some areas reporting as many as 45 cases per 100,000 residents. ADHS convened a panel of experts from the fields of dermatology, cancer prevention, public health, school nursing, and education, along with parents, survivors, and the media, to review guideline data from professional and government organizations and to formulate a strategy to address the state’s melanoma incidence rate. ADHS created the Arizona SunWise Skin Cancer Prevention School Program, focusing on school and recreational settings. When Arizona received funding to create the state’s first CCC plan in 2005, the SunWise program manager chaired the plan’s prevention committee and skin cancer prevention was incorporated into the CCC plan. Inclusion of skin cancer in the CCC plan attracted additional experts who provided input on how to address Arizona’s melanoma rates.

Educating children in grades K-8 in a school setting was viewed as crucial in reducing skin cancer
rates in Arizona. ADHS adopted the EPA SunWise\textsuperscript{21} school curriculum, added Arizona-specific information, created a physical activity module, adopted animal-themed activity sheets, and launched the program through a statewide sun-safety poster drawing contest. The goal of the Arizona SunWise Program is to teach Arizona children in grades K-8 how to reduce daily sun exposure, avoid sunburns, and prevent skin cancer. In 2004, Arizona became the first state to legislatively mandate sun-safety education, specifically adopting ADHS Arizona SunWise Program. Before the state mandate, more than half of Arizona’s public K-8 schools were voluntarily using the program.

Arizona educators were initially mailed a free toolkit that included 60 available curriculum activities, the physical activity module, tip sheet, and animal activity flyers. Upon passage of the state mandate, every K-8 principal was mailed a toolkit. During initial program implementation in 2003, district superintendents were contacted by an introductory letter. However, low response rates led to a change in implementation strategy in which individual schools were contacted and offered a free SunWise Sun Safety Assembly. Assemblies enabled the program to educate the entire student body and faculty in a fun, interactive setting. Faculty workshops were provided to train key advocates in each school.

The SunWise curriculum is supplemented with additional sun-safety activities. ADHS conducts an annual educator conference, performs school assemblies each week, and gives monthly district workshops to teachers to give them confidence in carrying out their mandate requirements. Presentations to partners such as television meteorologists, local zoo staff, and after-school and aquatics programs expand and reinforce the sun-safety message to children and parents in recreational settings. In addition, the ADHS annual student poster contest receives over 6000 sun-safety drawings that demonstrate participants’ sun-safety knowledge after participating in the program, and a new video contest targeted to middle school students recently was launched.

Arizona SunWise has over 100 key partners who support and promote sun safety by teaching the program in their after-school, aquatic, and parks and recreation programs; summer camps; and outreach events. Partners include teaching colleges, pediatricians, public parks, power companies, professional sports teams, and the state's offices of childcare licensure, border health, and the immunization program.

Process evaluation data are collected by the Arizona SunWise Program online teacher survey. This statewide evaluation tool tracks teacher feedback including curriculum activities performed, implementation satisfaction, and resource needs (eg, UV index tools, policy assistance, fact sheets on the dangers of indoor tanning). Evaluation data also track student attitudes toward sun-safety interventions such as wearing a hat, sunscreen use, covering up with clothing, seeking shaded play areas, and awareness of the UV index to determine change in behaviors and sustainability. Impact evaluation is determined by the number of public schools teaching the SunWise Program (n = 1100) and the number of nonmandated private schools, home-school networks, tribal schools, and juvenile detention centers teaching the program (n = 264).

Outcome evaluation of the SunWise Program was calculated through a randomized year-long control study with 3 school districts that tracked 1455 students through presurvey and postsurvey data to determine the effectiveness of the program and school policies. Evaluation showed marked outcome improvement, 75% in some areas, of student willingness and commitment to protect skin by using sun-safety strategies.

The SunWise program tracks trends in sun-safety behaviors through the Behavioral Risk Factor Surveillance System, which identifies sunburn trends among Arizona adults. These data provide insight as to the socioeconomic characteristics of families at highest risk for sunburn and skin cancer and how that trend may change. Trends are also tracked through Community Health Analysis Area maps, which identify Arizona’s melanoma rates by age and geographic location. The SunWise Program uses these data to help identify high-risk areas that need enhanced assistance. An active college internship program enables graduate students to assist ADHS with data collection on the program’s effectiveness at no cost to the SunWise Program.

A small grass-roots program has evolved into a state mandate that affects more than 707,329 children in 1100 public schools, with 264 private, tribal, and home schools currently using the program. Program success has hinged on dedicated partners and volunteers, excellent customer service, finding sun-safety advocates within schools, and ensuring easy program implementation.

**DISCUSSION**

Melanoma incidence rates are similar among New Mexico, Florida, and Arizona, but because of local needs and context, each state used different strategies for implementing their youth sun-safety educational programs. As evidenced by the case studies,
partnerships must be developed within the educational community and program advocates within schools play a significant role in successful implementation and sustainability. Melanoma incidence data must be used strategically when resources are limited to effectively implement sustainable programs. Creative approaches for reaching busy school administrators and navigating through centralized school district structures may be needed to overcome barriers in working with schools. Although various evidence-based sun-safety programs are widely available to schools and many schools have registered for EPA SunWise Program, it can be challenging to establish a routine population-based sun-safety program that can reach a sufficient number of students each year to make any meaningful impact on sun-safety knowledge and behavior. Longer duration and more frequent exposure to sun-safety education has been shown to be more successful, and these factors need to be considered in the development of population-based sun-safety programs.

Evidence-based research is increasingly being used to guide public health policy and practice, but practice-based evidence is needed to address this gap from research to implementation because information is likely needed to address issues around external validity and the distinctive characteristics of local settings. Resources such as program implementation manuals and toolkits are increasingly becoming available to support effective programs, and are featured on the research-tested intervention programs and EPA SunWise Program World Wide Web sites. More research is needed to identify effective strategies for implementing sustainable sun-safety programs on a population-based level and standardizing the reporting of how effective interventions are disseminated and implemented because there is a dearth of knowledge on this topic. In one study addressing this issue, World Wide Web–based strategies for disseminating and implementing the Sunny Days, Healthy Ways curriculum were assessed in 4 states. Response to this strategy was low among school and child-care administrators, and the authors concluded that more personal approaches were likely needed to supplement this strategy. A recent study assessing individual- and setting-level predictors of the implementation of the Pool Cool sun-safety intervention at swimming pools found that characteristics of both lifeguards (educational level, sun exposure, sun-protective behaviors) and pools (smaller number of weekly pool visitors, sun-safety environments and policies, intervention intensity) predicted the degree of implementation of the Pool Cool program. The authors conclude that more active, theory-based intervention strategies may lead to higher levels of implementation.

In these case studies, New Mexico, Florida, and Arizona all reported that school policies and environmental changes to provide more shade were important avenues for supplementing sun-safety education, and were highly valued by all 3 programs. A 2002 study assessing sun-protection policies in schools found that very few schools had these policies in place, even though they reported children spent time outdoors during peak hours of sun exposure. Many administrators reported that they would consider sun-safety policies, but reported potential implementation barriers because of lack of awareness of skin cancer risk and organizational structure. Although most schools had shade structures, very few structures covered more than one fifth of the school grounds.

Legislative support led to mandated sun-safety education in Arizona’s public schools, which vastly improves the reach of Arizona’s SunWise program to include nearly all students in grades K-8. Other states may consider similar policy changes, including a proposed “No Hat, No Shirt, No Play” policy in Hawaii. Sustainable population-based approaches enacted through state and local policy may be needed to influence future melanoma incidence rates. Comprehensive approaches are needed to address melanoma incidence rates, as has been demonstrated in Australia to influence behavioral change. Policy change is one avenue in which nongovernmental CCC coalition members are well suited to play an advocacy role, particularly for effective youth indoor tanning policies. In other public health areas, coalitions have been powerful forces for influencing policy and organizational change at the community level. There is potential for CCC coalitions to assist with educating the public about the risks of indoor tanning on melanoma incidence rates, and advocating, where possible, for enforceable policy changes that address youth indoor tanning and sun safety in educational settings. Dermatologists can play an important role in CCC coalitions by providing an entry into the dermatology community, advocating for the importance of collecting sun-safety surveillance data, sharing new research with program partners, and advocating for policy changes to address risky behavior such as youth indoor tanning.

We only highlight the experiences of 3 sun-safety programs, but many more CCC programs and partnerships are implementing similar sun-safety programs. Our intent was to gain more in-depth knowledge of how CCC programs and partnerships
were implementing proven sun-safety programs, therefore no quantitative analysis was conducted. Future studies in this area should focus on conducting a rigorous evaluation using randomized control or quasi-experimental methods to test the implementation strategies used by the 3 CCC programs/partnerships featured in this case study.

CONCLUSION

These case studies indicate that innovative strategies are likely needed to implement population-based sun-safety programs, and dedicated program staff and partners are fundamental to sustaining these programs. School-based educational strategies are just one strategy to address sun safety, and ideally should be a part of a comprehensive approach to prevent skin cancer that addresses multiple settings (eg, health care, worksites, and recreational sites), addresses family and caregivers, and includes policy changes (eg, tanning bed legislation). More research is needed to identify effective strategies for reaching the pediatric and adolescent population and their caregivers, because sun-safety behaviors practiced at school (eg, wearing hats) may be ignored in other settings.8 Evidence-based school sun-safety educational programs should be scaled to the state-/tribal-/territory-wide level to reach all children. More population-based data sources are needed to assess sunburn prevalence in children and monitor the use of sun-safety practices and risky behavior such as indoor tanning to target interventions and provide data to evaluate sun-safety initiatives. Future studies should formally evaluate how effective sun-safety programs are disseminated and implemented at the population-based level to identify best practices that practitioners can follow.

We would like to thank the Arizona Cancer Registry, New Mexico Tumor Registry, and Florida Cancer Data System for providing melanoma incidence data. James Schwar, PhD, at the University of New Mexico Health Sciences Center provided statistical support to the New Mexico RAYS Project. Elizabeth Rohan, PhD, MSW, at the Centers for Disease Control and Prevention provided guidance on conducting qualitative case studies.

REFERENCES


