2019
SKIN CANCER PREVENTION
PROGRESS REPORT

U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

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Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion
Division of Cancer Prevention and Control

FOREWORD FROM THE SURGEON GENERAL

U.S. Department of Health and Human Services

Skin cancer is far too common, often preventable, and holds a deep personal connection for me and my family. My own wife was diagnosed with and recently completed treatment for melanoma. Unfortunately, my family's situation is far from unique. I believe we can and must do more to reverse the trend of increasing skin cancer diagnoses in our country.

Five years ago, the release of the *Surgeon General's Call to Action to Prevent Skin Cancer* raised awareness of skin cancer as an urgent public health problem. As a roadmap for moving forward, the *Call to Action* reflected the persistent and passionate work of partners from across the country, united by a shared vision of a future without skin cancer.

We know most skin cancers can be prevented through adequate use of sun protection and avoidance of indoor tanning. Since the release of the *Call to Action*, we have made important strides in these areas. Twenty-one states have passed laws to protect those under the age of 18 from the harms of indoor tanning. Meanwhile, data collected from the national Youth Risk Behavior Survey has proven that age restriction laws are working to reduce indoor tanning, particularly among high school girls. Colleges and universities have also taken action, with many pledging to end policies and practices that unintentionally promote indoor tanning among their students.

Twenty-three states now have laws to improve access to sunscreen for children, including 22 states with laws that speak directly to children's ability to carry and self-apply sunscreen at school. Across the country, many organizations have made it easier for visitors of all ages to be sun safe while outdoors, by installing shade structures and free sunscreen dispensers at public parks, playgrounds, pools, and sports fields.

Research has shed light on best practices for skin cancer prevention communication for a variety of target audiences. We've advanced our understanding of the many contexts in which sun protection is needed, beyond the beach and the pool. Continued national surveillance efforts have further allowed us to track progress and identify gaps.

We have come a long way, but skin cancer remains a serious threat to our public's health. Each year, one out of three adults and more than half of high school students get sunburned. An estimated 900,000 high school students and 7.8 million adults continue to put themselves at risk by using indoor tanning devices, which remain available and often unsupervised in many gyms, fitness centers, apartment complexes, and salons. This has resulted in an unfortunate but steady rise in skin cancer incidence rates.

As you review this progress report, I ask that you acknowledge, celebrate, and share the progress we've made to prevent skin cancer. But I also hope you recognize those areas where we are falling short, and where you can commit to a redoubling of our efforts. We can each play a role and make a positive difference. So join me as we continue our quest to make skin cancer prevention a reality.

Jerome M. Adams, M.D., M.P.H.

Vice Admiral, U.S. Public Health Service
Surgeon General
U.S. Department of Health and Human Services

BACKGROUND

In July 2014, the Office of the Surgeon General released *The Surgeon General's Call to Action to Prevent Skin Cancer*, establishing skin cancer prevention as a high priority for our nation.[1] The *Call to Action* described prevention strategies that work and called on all community sectors to play a role in protecting Americans from ultraviolet (UV) radiation from the sun and artificial sources, such as indoor tanning devices.[1]

This year, we celebrate the fifth anniversary of the *Call to Action* and the growing number of partners at the national, state, and local levels working to advance the strategic goals for skin cancer prevention in the United States. This fifth annual Skin Cancer Prevention Progress Report provides a comprehensive summary of the most recent data available and highlights developments and success stories since the release of the 2018 Progress Report. These annual updates to the report provide information to monitor progress, learn from successes, reveal areas that need improvement, and identify opportunities to work collaboratively to reduce the incidence of skin cancer.

Strategic Goals and Partners to Support Skin Cancer Prevention in the United States

Strategic Goals

Goal 1: Increase opportunities for sun protection in outdoor settings.

Goal 2: Provide individuals with the information they need to make informed, healthy choices about UV exposure.

Goal 3: Promote policies that advance the national goal of preventing skin cancer.

Goal 4: Reduce harms from indoor tanning.

Goal 5: Strengthen research, surveillance, monitoring, and evaluation related to skin cancer prevention.

Partners in Prevention

- Federal, state, tribal, local, and territorial governments.
- Businesses, employers, and labor representatives.
- Health care systems, insurers, and clinicians.
- Early learning centers, schools, colleges, and universities.
- Community, nonprofit, and faith-based organizations.
- Individuals and families.

Source: The *Surgeon General's Call to Action to Prevent Skin Cancer.*

WHAT'S NEW THIS YEAR?

Over the past year, CDC researchers have led or collaborated on numerous peer-reviewed scientific publications, bringing continued attention to skin cancer prevention as a public health priority.

Below are some highlights.

High School Girls Half as Likely to Indoor Tan When State Law Prohibits Use

In July 2018, the *American Journal of Public Health* published a paper on the association between state indoor tanning laws and indoor tanning behavior among high school students.[2] Age restriction laws were associated with a 47% lower indoor tanning prevalence among female high school students. Parental permission laws were not found to be associated with indoor tanning prevalence among either female or male high school students.

Low Sunscreen Use Found Among Children Compared to Other Preventive Behaviors

A paper published in *Pediatric Dermatology* in September 2018 examined sunscreen use among a sample of 5,119 fifth grade students and found lower use of sunscreen compared to adherence to other basic preventive behaviors (such as brushing and flossing teeth, helmet use, seat belt use, and well-child examination).[3] Factors associated with lower odds of sunscreen use included being male, being non-Hispanic black or Hispanic, and having lower socioeconomic status.

Skin Cancer Misperceptions Among Black and Hispanic Adults

Data from 18 focus groups on skin cancer knowledge, awareness, beliefs, and preventive behaviors among black and Hispanic men and women were published in *Preventive Medicine Reports* in October 2018.[4] The findings indicated low use of sun protection and highlighted misperceptions about risks and benefits of skin cancer prevention behaviors among black and Hispanic populations.

WHAT'S NEW THIS YEAR?

Shade as an Environmental Design Tool for Skin Cancer Prevention

The *American Journal of Public Health* published an analytic essay on shade as an environmental design tool for skin cancer prevention in December 2018.[5] The essay provided a review of the literature on shade design, use, and policy and highlighted the value of integrating shade planning into community design, planning, and architecture.

Low Use of Shade and Sunscreen Found Among Agricultural and Construction Workers

In February 2019, a paper on use of sun protection and sunburn among agricultural and construction workers was published in *Preventing Chronic Disease*.[6] About one-third of these outdoor workers had been sunburned in the past year. Agricultural workers had a higher prevalence of almost all sun-protection behaviors compared to construction workers. Prevalence of regular shade and sunscreen use was lower among agricultural and construction workers compared to national estimates.

Sunburn Remains Common Among U.S. Adults

Each year, one in three U.S. adults get sunburned. Findings reported in a research letter published in the *Journal of the American Academy of Dermatology* in March 2019 indicate little change in the prevalence of sunburn among U.S. adults in recent years.[7] Evidence-based interventions to reduce UV exposure and increase sun protection are available. However, more efforts are needed to help communities adapt and adopt these strategies and programs to meet their unique needs and maximize the likelihood of sustainability of sun-safety interventions over time.

National Incidence Rates of Merkel Cell Carcinoma Are on the Rise

A research letter published in the *Journal of the American Academy of Dermatology* in April 2019 described Merkel cell carcinoma (MCC) incidence, trends, and survival rates among adults aged 50 years and older from United States Cancer Statistics.[8] An average of just under 2,000 cases of MCC were diagnosed each year. MCC incidence rates increased over time, and the 5-year relative survival rate was 55.1% among men and 67.7% among women.

WHAT'S NEW THIS YEAR?

Each Year, One in Five Sun-Sensitive Older Adults Gets Sunburned

In June 2019, a paper that described sun protection behaviors and sunburn among U.S. older adults was published in *The Gerontologist*.[9] Just over one in eight of all of all older adults (13.2%) and about one in five sun-sensitive older adults (20.4%) had experienced sunburn in the past year. Men, adults between 65 and 69 years old, non-Hispanic whites, and those with skin that burns or freckles after repeated sun exposure were more likely to have been sunburned in the past year compared to the respective comparison groups.

Indoor Tanning Continues to Decline Among U.S. High School Students

A paper published in the *Journal of Community Health* in June 2019 assessed changes in the prevalence of indoor tanning among U.S. high school students over time by sex, age, and race/ethnicity.[10] Indoor tanning has continued to decrease, particularly among white and Hispanic female students. However, continued efforts are needed to further reduce and sustain reductions in adolescent indoor tanning.

Lack of Time Is an Important Barrier to Clinical Counseling on Skin Cancer Prevention

The U.S. Preventive Services Task Force recommends that clinicians counsel fair-skinned patients aged 6 months to 24 years on skin cancer prevention and selectively counsel fair-skinned adults older than 24 years. A paper published in *Preventive Medicine* in July 2019 described self-reported skin cancer prevention counseling practices among family practitioners, internists, pediatricians, and nurse practitioners.[11] Lack of time, more urgent health concerns, and patient disinterest were identified as important barriers to clinical counseling.

Young Women's Beliefs About Quitting Indoor Tanning

In the United States, the highest prevalence of indoor tanning is among young non-Hispanic white women, with 20% of those aged 18 to 21 years and 14% of those aged 22 to 25 years reporting having indoor tanned in the past year. To inform effective communication about reducing or quitting indoor tanning for this demographic group, CDC provided funds to the University of Pennsylvania, Prevention Research Center to assess attitudes and beliefs related to indoor tanning and develop and test messages about quitting or cutting back on indoor tanning.

Over the past year, results from this work have been published in the peer reviewed literature.[12,13]

Below are some key findings:

Among non-Hispanic white female indoor tanners aged 18 to 25 years, beliefs positively associated with intention to quit indoor tanning included

- The belief that quitting would reduce damage to skin.
- The belief that key people (such as one's mother, friends, and/or romantic partner) would approve of quitting.

Among frequent indoor tanners

- Reasons for indoor tanning included
  - Improving physical appearance.
  - Social acceptance.
  - Increased confidence.
  - Happiness.
- Perceived advantages of cutting back or quitting indoor tanning included
  - Decreased skin cancer risk.
  - Saved money.
- Perceived disadvantages of cutting back or quitting indoor tanning included
  - Concerns about being pale.
  - A decline in self-confidence.

Financial support: This research is a product of a Prevention Research Center and was supported by funding through Cooperative Agreement Number 1U48DP005053 to University of Pennsylvania from the Centers for Disease Control and Prevention.

SUCCESS STORIES FROM THE FIELD

Reducing Sun Exposure Through a Community-Wide Approach

Photo courtesy of Elizabeth Caballero.

Cancer prevention and control is a cornerstone of The University of Texas MD Anderson Cancer Center's mission to eliminate cancer. Aligned with that mission, MD Anderson established Be Well Communities™, a place-based strategy for cancer prevention and control, working with communities to promote wellness and reduce cancer risks. Baytown, Texas was selected as the inaugural Be Well Community. The Be Well™ Baytown initiative focuses on five target health areas, one of which is sun safety. In line with the evidence-based skin cancer prevention recommendations included in The Guide to Community Preventive Services[14], Be Well Baytown uses a multi-component community-wide approach to improve sun protection in a variety of settings. The following section highlights key successes carried out in partnership with four local organizations in Baytown including child care centers; primary, middle and high schools; and outdoor recreational and tourism settings.

Notable Successes from the Be Well Baytown Initiative

Center-based child care settings

Harris County Public Health:

- Identified three child care centers that will implement Outdoor Learning Environment (OLE!), a statewide initiative in Texas to improve outdoor spaces at child care settings.

Primary, middle, and high school settings

Goose Creek Consolidated Independent School District:

- Created and implemented a school district-wide sun safety policy to reduce sun exposure and increase sun-safety behaviors among teachers, staff, and students.
- Delivered sun safety educational programming spanning multiple grade levels:
  - Kindergarten and first grade: Ray and the Sunbeatables®, a sun-safety program developed by MD Anderson
  - Second through fifth grade: Be Sunbeatable™, co-developed by MD Anderson and Scholastic, Inc.
  - Sixth through eighth grade: The Sunwise Program
  - Ninth through twelfth grade: Sun safety education (SunSmart America) targeted to athletics and band departments
- Installed sun shades at one Baytown primary school with more efforts planned in future years.

Outdoor recreational and tourism settings

- Enhanced outdoor environments throughout the city of Baytown, including the installation of 10 sunscreen dispensers, 5 sun shades in city parks and 10 sunscreen dispensers at Lee College, a public community college.
- Conducted annual skin cancer prevention trainings for City of Baytown Parks and Recreation employees.
- Provided sun-protective clothing and wide-brimmed hats to all City of Baytown Parks and Recreation employees when working outdoors.
- Delivered educational forums to Lee College faculty, staff, and students to increase knowledge on sun safety and skin cancer risks.

Since its inception, Be Well Baytown has made notable progress in its skin cancer prevention efforts with more coordinated efforts planned in future years of the initiative. Collaboration with multiple key stakeholders in Baytown, Texas has been a vital component in addressing MD Anderson's long-standing goal of reducing the incidence of skin cancer and melanoma. Be Well Communities is an initiative of the cancer prevention and control platform, part of MD Anderson's Moon Shots Program™.

For more information about Be Well Communities and Be Well Baytown, please visit www.mdanderson.org/BeWellCommunities.

A Community Approach to Skin Cancer Prevention in Arizona

Photo courtesy of the University of Arizona Skin Cancer Institute.

The University of Arizona Skin Cancer Institute (SCI) has been a valuable resource for Southern Arizonans since 2006. The SCI brings together innovative research, visionary clinical care, and life-changing education and outreach. Health educators aim to raise community awareness of skin cancer and educate the public on skin cancer prevention and early detection strategies through presentations, teacher trainings, and material development. As early efforts of the SCI expanded, it became apparent that the small staff could not meet requests for services.

"We couldn't possibly meet the needs of our community with our limited staff, so we decided to use a resource the University has plenty of: students," said Dr. Robin Harris, SCI Director. The SCI piloted Project SASS (Students Are Sun Safe) in 2010. Project SASS trains University of Arizona undergraduate and graduate students in health sciences to become peer and community educators for skin cancer risk reduction. These students teach lessons on sun safety and skin cancer prevention in middle and high school classrooms throughout the area. To date, 315 University of Arizona students have been trained in skin cancer prevention strategies and have delivered lessons to more than 5,700 middle and high school students with enthusiasm and success. Evaluation of the program in 2014 indicated that Project SASS resulted in changed perceptions of susceptibility and tanning appeal, gained knowledge across participants, and altered intentions to change behavior.

Project SASS is just one of the programs at the SCI that align with the strategic goals set forth in the *Surgeon General's Call to Action to Prevent Skin Cancer*. Through the Protect Your Skin program, the SCI created mobile sunscreen stations that can be rented for use at outdoor community events, and low-cost sunscreen kits that can be placed more permanently in outdoor settings. These kits include a gallon of sunscreen, two dispensers, and signage with reminders on how to use and apply sunscreen effectively. Over 75 of these kits have been distributed to organizations such as recreation centers, police departments, roofing companies, and schools.

Through the Baby Hats Program, the SCI provides a line of sun-safe hats for infants and young children. The hats are available at local retailers for a low cost and come with printed sun-safety materials for parents.

The SCI hosts annual community events, including a Melanoma Walk and a luncheon with guest speakers on skin cancer research and patient care. The SCI also maintains an active presence on Facebook along with a comprehensive web page and quarterly newsletters.

More information on The University of Arizona Skin Cancer Institute can be found at www.azskincancerinstitute.org.

Surveillance Data to Inform Community Prevention Efforts

State-level behavior and disease surveillance efforts often provide critical data to help community leaders make decisions regarding how to prioritize community public health efforts. The skin cancer prevention efforts in the state of New Hampshire are one example of using surveillance data to inform community action.

Melanoma incidence rates in New Hampshire are consistently some of the highest in the country. For example, in 2015, New Hampshire had the third highest melanoma incidence rates compared to all other U.S. states. Additionally, approximately 12% of Hispanic and 9% of non-Hispanic white high school girls in New Hampshire reported indoor tanning in the past 12 months on the 2015 New Hampshire Youth Risk Behavior Survey. (PDF-378 KB)

Realizing the critical need to reduce UV exposure among state residents and reduce tanning behaviors among adolescents, the New Hampshire Comprehensive Cancer Collaboration supported a number of skin cancer prevention efforts. High school forums were held to raise awareness of the dangers of tanning. A partnership with IMPACT Melanoma led to the implementation of the "Your Skin Is In" program and "Teens on Tanning" forums at high-risk high schools. A new law to prohibit use of indoor tanning among minors in New Hampshire went into effect January 1, 2016.

New Hampshire will continue to monitor the use of indoor tanning and the prevalence of sunburn among youth and adults in the state and support prevention activities through the Comprehensive Cancer Collaboration and various local initiatives.

More information about the New Hampshire Comprehensive Cancer Collaboration is available at www.nhcancerplan.org.

Keeping Student Athletes Sun-Safe on and off the Field

Photo courtesy of the Colette Coyne Melanoma Awareness Campaign.

The Colette Coyne Melanoma Awareness Campaign (CCMAC) was launched in 1998 in response to the death of Colette Marie Brigid Coyne at 30 years of age from metastatic melanoma. Colette's family and friends were inspired to raise awareness in their Long Island communities about the dangers and causes of skin cancer. Colette's mother said, "We believe she guides us. Her death has saved lives."

CCMAC began its work by reaching out to administrators at local schools to identify opportunities to educate the students and increase the availability of shade in outdoor recreational spaces and sports fields. Sun-safe habits develop at an early age, and schools can have a powerful influence on youth. This outreach led to the installation of 14 shade structures to create dugouts for baseball fields in Nassau and Suffolk counties.

Recently, CCMAC partnered with Carle Place High School and Oyster Bay High School to provide both permanent and portable shade structures for the schools' athletic fields. The hope is that visiting sports teams from other schools will see the shade structures and think, "Why can't we have those at our school?" The shade structures often have banners across them that read, "Be Sun Smart®" to ensure the young athletes see the sun-safe message every time they play. Some of the shade structures are on wheels, which allows for easy relocation as needed for various sporting events and activities.

In addition to providing shade, CCMAC provides sun-safety education to the high school students. CCMAC encourages students to take the message home, thus educating family and friends. One mom called to express thanks after her son encouraged her to see a dermatologist. During her visit, she was diagnosed with an early stage melanoma. CCMAC staff have been impressed by the enthusiasm of the high school students and their willingness to be involved in community activities to promote skin cancer awareness. Much of the financial support for the shade structures and other work done by CCMAC comes from the various CCMAC community events, such as the Miles for Melanoma, Steps to Stop Skin Cancer 5K.

More information about CCMAC is available at http://ccmac.org.

Sunscreen Access in "The Sun City"

Affectionately referred to as "The Sun City," El Paso, Texas is a city in which the sun fails to shine only a few days out of each year. This sunny climate puts El Paso residents at risk for high levels of UV exposure throughout the year and makes sun safety a critical public health priority for the city.

In an effort to support and encourage sun-safe behaviors, the Rio Grande Cancer Foundation (the Foundation) created an initiative to provide free sunscreen in convenient and attractive dispensers throughout the community. "We are delighted to be in partnership with the City of El Paso to provide the dispensers for our young people and families who gather under the El Paso sun," remarked Patty Tiscareño, Executive Director for the Foundation. "It simply makes sense that the Sun City be the first in the state of Texas to provide protection from powerful UV rays that can ultimately lead to a skin cancer diagnosis," she added.

The following section outlines the community partners the Foundation has worked with and the placement of the corresponding sunscreen dispensers.

Partners and Placement of the Corresponding Sunscreen Dispensers In El Paso, Texas

The City of El Paso Parks and Recreation

- 8 spray parks
- San Jacinto Plaza
- Multi-use sports complexes that cater to young teams and players

The Convention and Visitors Bureau of El Paso

- Concerts and other outdoor events

Paso del Norte Health Foundation

- Along the 3.4-mile Playa Drain Trail

Ysleta del Sur Pueblo (Tigua Indians)

- Portable dispensers for use at Pueblo events and one installed at the main park for the Pueblo

Local schools

- Outdoor spaces on school campus

Local auto dealerships

- Outdoor auto sales lots

Three major radio stations

- Portable dispensers for use at their outdoor remotes throughout the city

Photo courtesy of Brenda Maxon.

The Foundation's efforts to provide sunscreen in outdoor community spaces have yielded some important insights regarding potential challenges and solutions which may be of practical value to similar initiatives in other communities. One challenge has been vandalism to some of the sunscreen dispensers. In light of this problem, the Foundation allocates funds for occasional replacement of dispensers or their parts and makes adjustments to the installation of new dispensers to provide more security.

A second challenge has been extreme heat. In the summer of 2018, El Paso experienced 46 days of triple-digit temperatures. Although the sunscreen does not lose its chemical integrity at these higher temperatures, it will dispense in a more liquid form and, in some cases, ooze out of the dispenser when not in use. The Foundation will move some of the existing dispensers to more shaded areas or provide shade structures to cover them and plans to be more strategic with future installations.

Efforts to provide sunscreen dispensers to local schools have introduced additional challenges. Although students are legally permitted to carry and self-apply sunscreen on school campuses in the state of Texas, public schools are hesitant to provide sunscreen to students. Furthermore, in neighboring New Mexico schools, students are required to provide a doctor's note before using sunscreen on school campus. The Foundation supports sun-safety education through the provision of the Ray and the Sunbeatables®: A Sun Safety Curriculum to local preschools. However, additional efforts may be needed to facilitate access to sunscreen on school campuses.

More information about the Rio Grande Cancer Foundation is available at https://rgcf.org/.

OUTCOME INDICATORS

Healthy People 2020 Objectives

Table 1 presents the skin cancer-related objectives included in Healthy People 2020, the national agenda for improving the health of all Americans.

Table 1. Progress Toward the Healthy People 2020 Skin Cancer-Related Objectives

Objective for 2020	Target	Baseline	Current Data	Data Source
C-8 Reduce the melanoma cancer death rate.	2.4 deaths per 100,000 population	2007: 2.7 deaths per 100,000 population	2016: 2.5 deaths per 100,000 population	National Vital Statistics System-Mortality
C-20.1 Reduce the proportion of adolescents in grades 9 through 12 who report sunburn.	Not Available	2015: 55.8%	2017: 57.2%	Youth Risk Behavior Surveillance System
C-20.2 Reduce the proportion of adults aged 18 years or older who report sunburn.	33.8%	2010: 37.5%	2015: 35.3%	National Health Interview Survey
C-20.3 Reduce the proportion of adolescents in grades 9 through 12 who report using artificial sources of ultraviolet light for tanning.	14.0%	2009: 15.6%	2017: 5.6%	Youth Risk Behavior Surveillance System
C-20.4 Reduce the proportion of adults aged 18 or older who report using artificial sources of ultraviolet light for tanning.	3.6%	2010: 5.6%	2015: 3.6%	National Health Interview Survey
C-20.5 Increase the proportion of adolescents in grades 9 through 12 who follow protective measures that may reduce the risk of skin cancer.[a]	11.2%	2009: 9.3%	2013: 10.1%	Youth Risk Behavior Surveillance System
C-20.6 Increase the proportion of adults aged 18 years or older who follow protective measures that may reduce the risk of skin cancer.	73.7%	2008: 67.0%	2015: 70.8%	National Health Interview Survey
ECBP-4.4 Increase the proportion of elementary, middle, and senior high schools that provide school health education in sun safety or skin cancer prevention to promote personal health and wellness.	79.6%	2006: 72.4%	2014: 66.0%	School Health Policies and Practices Study

Note: Highlighted rows indicate Healthy People 2020 objectives that have been met or exceeded.
Source: Healthy People 2020.[15]
[a]Current data for this objective refers to answers of "always" or "most of the time" to the question, "When you are outside for more than 1 hour on a sunny day, how often do you wear sunscreen with an SPF of 15 or higher?"

Disease Surveillance Indicators

Basal and squamous cell carcinomas are the most common forms of skin cancer. These types of skin cancer are not reported to central cancer registries, so data on trends is limited. However, research from medical claims data suggest that incidence rates for these skin cancers are increasing, particularly among adults over the age of 65 years.[16]

Melanoma is the third most common form of skin cancer, and health care providers and pathologists who diagnose or treat melanomas are required to report those cases to a central cancer registry in all 50 states, the District of Columbia, and Puerto Rico. These melanoma surveillance data allow for long-term evaluation of skin cancer prevention efforts. Because melanomas often develop after years of exposure to UV radiation, it will likely be decades before melanoma incidence rates reflect the impact of current prevention efforts.

Table 2 shows invasive melanoma incidence rates by sex and race/ethnicity. The highest rates are among non-Hispanic white males (34.9 per 100,000) and lowest are among black (1.0 per 100,000) and Asian/Pacific Islander individuals (1.3 per 100,000). As shown in Table 3, non-Hispanic white males also have the highest death rates (4.7 per 100,000).

Table 2. Average Annual Number and Rate[a] of Invasive Melanoma Cases by Sex and Race/Ethnicity, United States, 2012–2016

Race/Ethnicity	US Count	Rate	Male Count	Rate	Female Count	Rate
All Races[b]	77,698	21.8	45,854	27.9	31,845	17.2
White	73,395	24.9	43,561	31.4	29,834	20.0
White, Hispanic	1,591	4.6	733	5.0	858	4.5
White, non-Hispanic	71,801	28.0	42,826	34.9	28,975	22.8
Black	372	1.0	179	1.1	193	0.9
American Indian/ Alaska Native	190	5.6	104	7.1	886	4.6
Asian/Pacific Islander	239	1.3	120	1.5	120	1.2
Hispanic[b]	1,725	4.6	794	5.0	931	4.4

Source: Data are from population-based registries that participate in CDC's National Program of Cancer Registries and/or the National Cancer Institute's Surveillance, Epidemiology, and End Results Program and meet high-quality data for the November 2018 data submission, covering 100% of the U.S. population.[17]
[a]Rates are per 100,000 population and are age adjusted to the 2000 U.S. Standard Population.
[b]Race and ethnicity are not mutually exclusive, except for "White, Hispanic" and "White, non-Hispanic." Counts may not always sum to the total because of rounding and because cases with other and unknown race are included in totals.

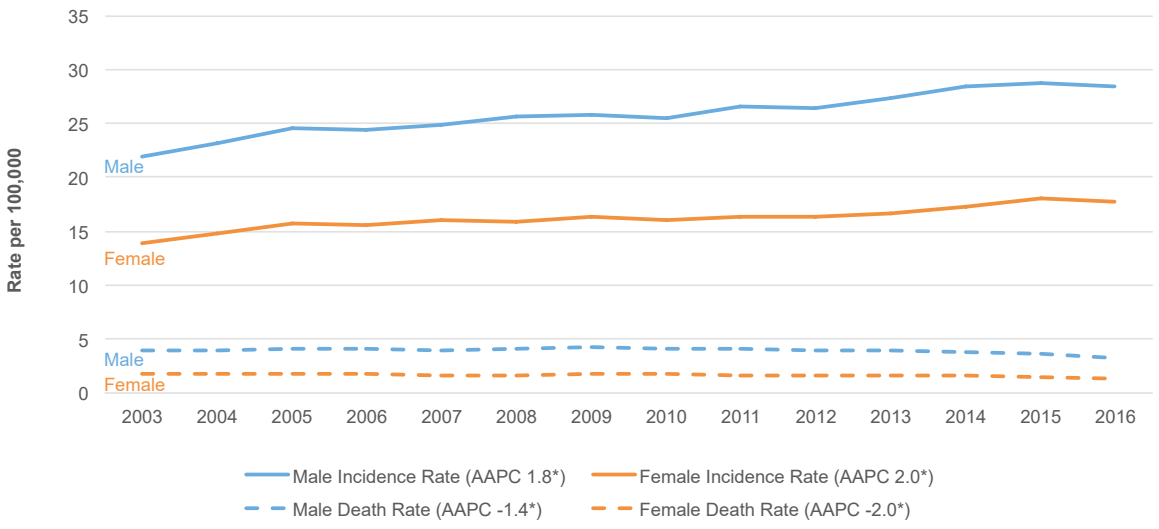
Table 3. Average Annual Number and Rate[a] of Melanoma Deaths by Sex and Race/Ethnicity, United States, 2012–2016

Race/Ethnicity	US Count	Rate	Male Count	Rate	Female Count	Rate
All Races[b]	9,008	2.5	5,930	3.7	3,079	1.5
White	8,805	2.9	5,826	4.3	2,979	1.8
White, Hispanic	233	0.8	138	1.0	95	0.6
White, non-Hispanic	8,556	3.2	5,677	4.7	2,879	2.0
Black	131	0.4	67	0.4	63	0.3
American Indian/ Alaska Native	15	0.5	8	0.7	7	0.4
Asian/Pacific Islander	58	0.3	28	0.4	30	0.3
Hispanic[b]	237	0.7	140	0.9	97	0.5

Source: Data are from CDC's National Center for Health Statistics National Vital Statistics System and cover 100% of the U.S. population.[17]
[a]Rates are per 100,000 population and are age-adjusted to the 2000 U.S. Standard Population.
[b]Race and ethnicity are not mutually exclusive, except for "White, Hispanic" and "White, non-Hispanic." Counts may not always sum to the total because of rounding and because cases with other and unknown race are included in totals.

Among both males and females, incidence rates for melanoma have continued to increase over time, whereas death rates have declined (Figure 1). During the most recent five years (2012–2016), death rates decreased 4.9% per year on average among males and 5.0% per year on average among females. Since 2011, the U.S. Food and Drug Administration has approved new treatments for advanced metastatic melanoma.[18] The gender gap in overall melanoma incidence and death rates has persisted.

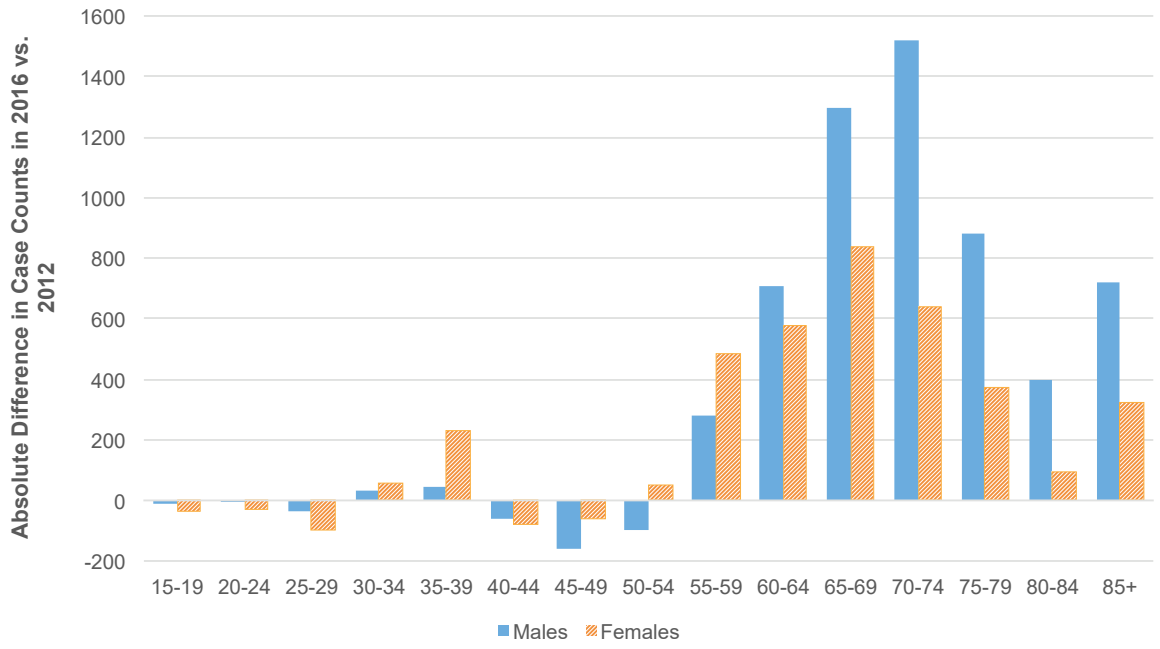
Figure 1. Age-Adjusted Melanoma Incidence and Death Rates[a] by Sex, United States, 2003–2016



Abbreviation: AAPC, average annual percentage change. AAPCs shown in the figure are during 2003–2016.
Sources: Melanoma incidence data are from population-based registries that participate in CDC's National Program of Cancer Registries and/or the National Cancer Institute's Surveillance, Epidemiology, and End Results Program and meet high-quality data for the November 2018 data submission, covering 100% of the U.S. population. Melanoma death data are from CDC's National Center for Health Statistics National Vital Statistics System and cover 100% of the U.S. population.[17]
[a]Rates are per 100,000 population and are age-adjusted to the 2000 U.S. Standard Population.
*Denotes statistical significance ($P < .05$).

Increases in melanoma incidence rates over time have been driven largely by changes in incidence rates among non-Hispanic whites because this is the demographic group with the highest overall incidence rates. During the most recent five years of data (2012 through 2016), melanoma incidence rates increased significantly among non-Hispanic white males aged 60 to 64 years and 70 to 74 years and non-Hispanic white females aged 50 to 54 years, 60 to 64 years, 65 to 69 years, and 70 to 74 years. Incidence rates did not change significantly during that time period for other age groups among non-Hispanic whites. Figure 2 shows the absolute difference in melanoma case counts in 2016 versus 2012 among non-Hispanic whites by sex and 5-year age groups. There were nearly 9,000 more melanoma cases diagnosed among non-Hispanic whites in 2016 compared to 2012 (5,511 more cases among non-Hispanic white men and 3,375 more cases among non-Hispanic white women). The increases in absolute case counts were mostly among ages 55 years and older.

Figure 2. Absolute Difference in Melanoma Case Counts in 2016 versus 2012 Among Non-Hispanic White Males and Females Aged ≥ 15 Years, by Sex and Age Group, United States



Source: Data are from population-based registries that participate in CDC's National Program of Cancer Registries and/or The National Cancer Institute's Surveillance, Epidemiology, and End Results Program and meet high-quality data for the November 2018 data submission, covering 100% of the U.S. population.[17]

Looking for More Data on Melanoma?

USCS
U.S. Cancer Statistics
The Official Federal Cancer Statistics

Data Visualizations Tool

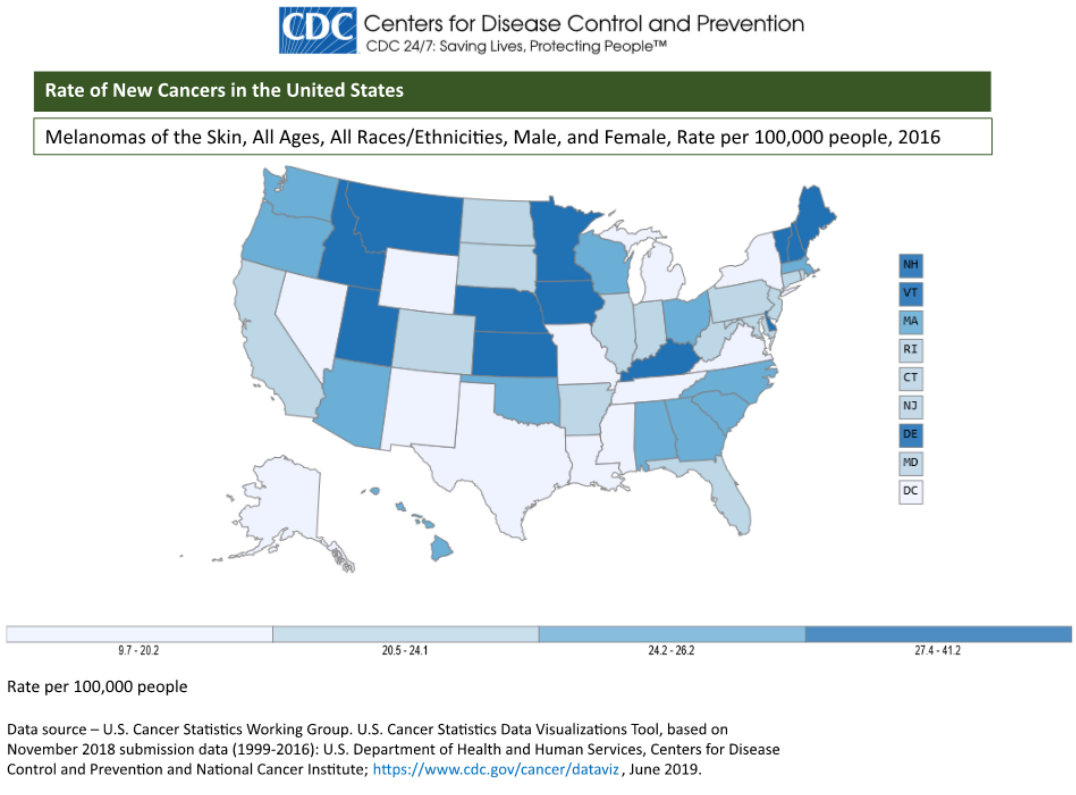
The **U.S. Cancer Statistics Data Visualizations tool** is an easy way to find and explore the latest data on melanoma. Using this resource, you can create maps and tables by state, county, and demographic characteristics. Data come from CDC's National Program of Cancer Registries and NCI's Surveillance, Epidemiology, and End Results Program combined, providing the latest statistics on melanoma covering the entire U.S. population. New cancer cases and cancer deaths data are updated annually. The tool also provides trends over time, prevalence, survival, and county-level data, and data interpretation to provide plain explanations of what the data mean.

Public Use Database

The U.S. Cancer Statistics Public Use Database includes melanoma incidence and population data for all 50 states, the District of Columbia, and Puerto Rico. The de-identified data are available online, at no cost, for researchers to conduct scientific inquiries into rare cancers and cancer trends.

You can learn about and access the Data Visualizations tool and Public Use Database at CDC's U.S. Cancer Statistics landing page: www.cdc.gov/uscs.

For an accessible version of the map below, go to: https://gis.cdc.gov/Cancer/USCS/DataViz.html



BEHAVIORAL SURVEILLANCE INDICATORS

Increasing the use of sun protection and decreasing the prevalence of sunburn and indoor tanning are critical to preventing future cases of skin cancer. These behavioral surveillance indicators can provide timely information about our progress in reducing exposure to harmful UV radiation.

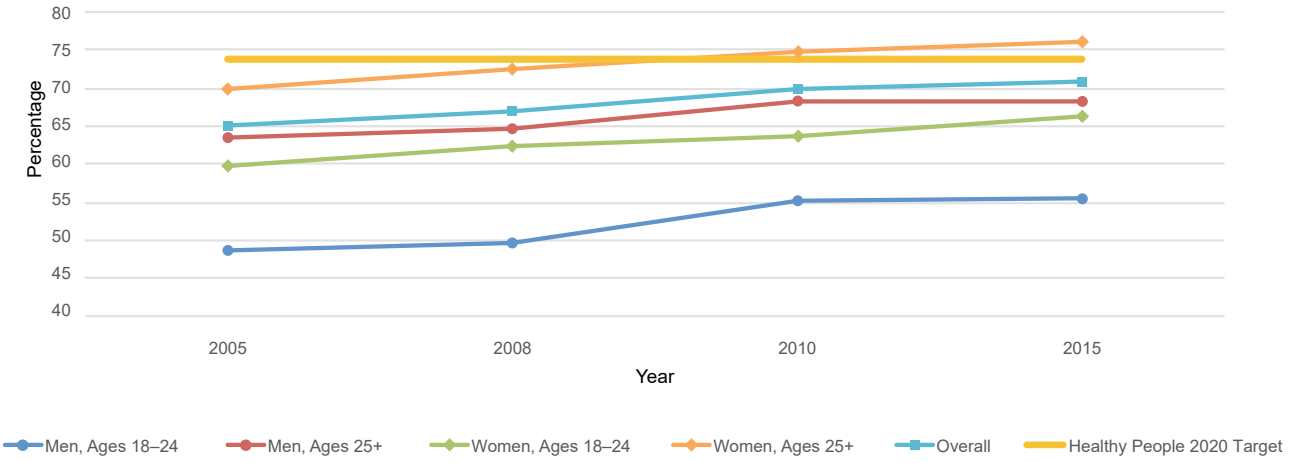
The latest data on use of sun protection (shade, clothing, wide-brimmed hats, and sunscreen), indoor tanning, and sunburn among U.S. adults are available from the Cancer Control Supplement of the 2015 National Health Interview Survey (NHIS). The most recent data on sunscreen use, indoor tanning, and sunburn among U.S. high school students are available from the 2013, 2015, and 2017 national Youth Risk Behavior Survey (YRBS).

Sun Protection

According to the 2013 YRBS (the latest year for which these data are available), 10.1% of high school students use sunscreen with an SPF of 15 or higher when outside for more than 1 hour on a sunny day.[19] Sunscreen use was higher among girls (13.2%) than boys (6.9%). The prevalence of sunscreen use among high school students did not change significantly from 2005 to 2013.

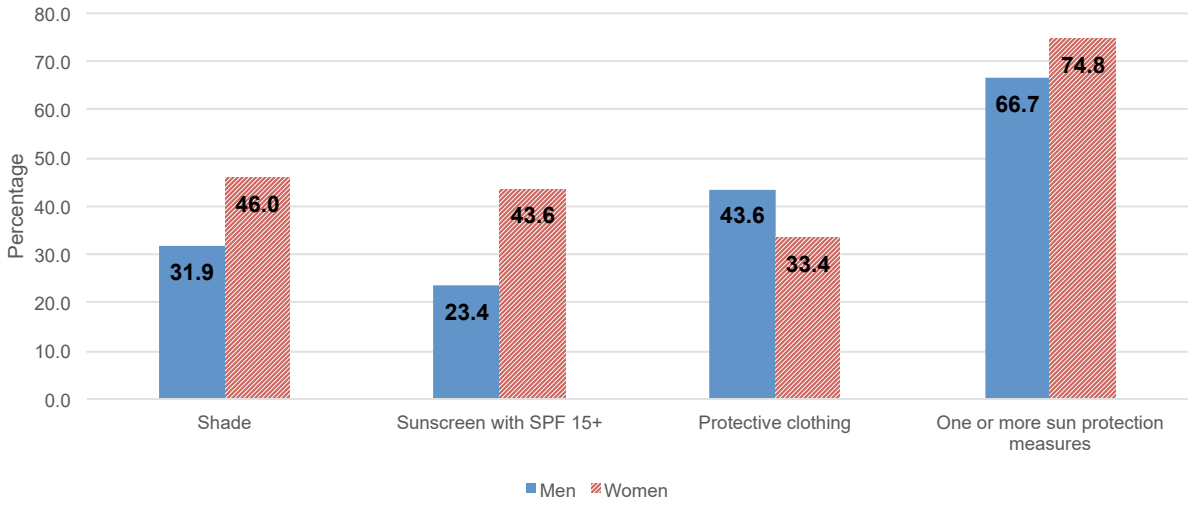
Although use of sun protection appears to be increasing slightly among adults (Figure 3), there is still room for improvement. Sun protection strategies differ by sex, and more than one-quarter of women and one-third of men do not consistently use any form of sun protection (Figure 4).

Figure 3. Percentage of U.S. Adults Who Protect Themselves from the Sun Always or Most of the Time, by Sex and Age, 2005, 2008, 2010, 2015



Source: National Health Interview Survey.[20]
Note: Data are age-adjusted to the 2000 U.S. Standard Population. Ages 18–24 are age-adjusted using age groups 18–19 and 20–24. Ages ≥25 are age-adjusted using age groups 25–34, 35–44, 45–64, and ≥65.

Figure 4. Percentage of U.S. Adults Who Use Sun Protection Always or Most of the Time When Outdoors on a Warm Sunny Day for More Than 1 Hour, 2015

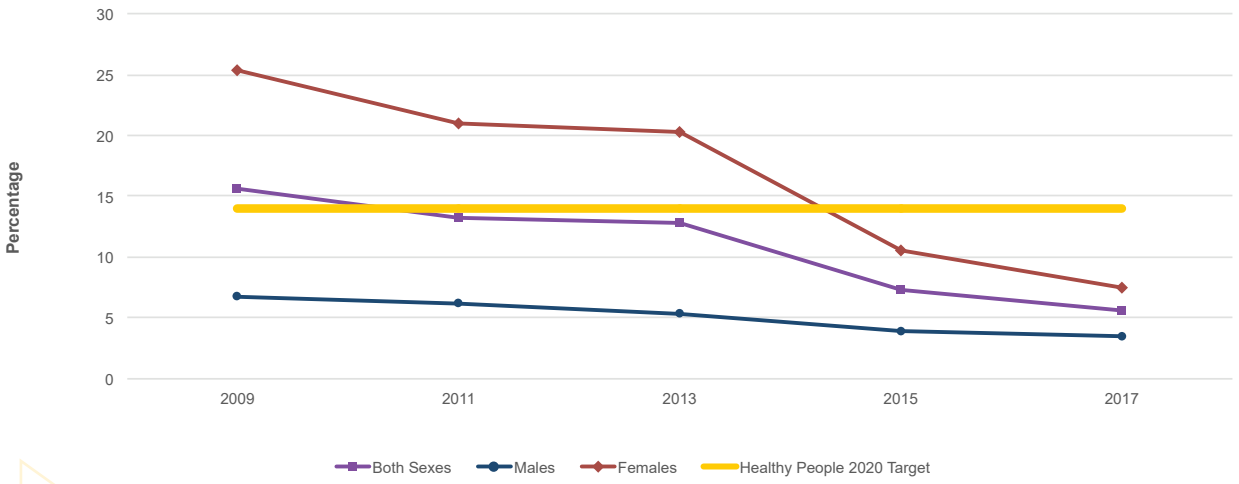


Source: National Health Interview Survey.[20]
Note: Data are age-adjusted to the 2000 U.S. Standard Population.

Indoor Tanning

Data from the national YRBS and NHIS show that indoor tanning has decreased among high school students[21] (Figure 5) and adults[22] (Table 4). An estimated 900,000 U.S. high school students reported using an indoor tanning device in 2017, a notable reduction from the estimated 1.2 million in 2015 and 2.5 million in 2009. Decreases among high school students may be caused, in part, to increased state restrictions on the use of indoor tanning among minors.[2,23] Among adults, the number of indoor tanners dropped from an estimated 11.7 million in 2010 to an estimated 7.8 million in 2015.[22] Indoor tanning remains highest among young, non-Hispanic white females.[21,22]

Figure 5. Percentage of U.S. High School Students Who Used an Indoor Tanning Device in the Past Year, by Sex, 2009, 2011, 2013, 2015, 2017



Source: National High School Youth Risk Behavior Survey.[21]
Note: Indoor tanning is defined as using an indoor tanning device (such as a sunlamp, sunbed, or tanning booth) one or more times during the 12 months before the survey. It does not include getting a spray-on tan.

Table 4. Prevalence of Indoor Tanning[a] Among Adults, 2010, 2013, and 2015

Characteristic	2010, %	2013, %	2015, %	*P* value[b]
All Races	5.5	4.2	3.5	<.001
Sex	**2010, %**	**2013, %**	**2015, %**	***P* value[b]**
Male	2.2	1.7	1.6	.004
Female	8.6	6.5	5.2	<.001
Age in Years	**2010, %**	**2013, %**	**2015, %**	***P* value[b]**
18–29	11.3	8.6	6.0	<.001
30–39	5.9	5.5	4.4	.004
40–49	5.9	4.3	3.8	<.001
≥50	2.1	1.5	1.8	.287
Racial/Ethnic Group	**2010, %**	**2013, %**	**2015, %**	***P* value[b]**
Non-Hispanic white	7.4	5.7	4.9	<.001
Black	0.3[c]	0.2[c]	0.2[c]	.507
Hispanic	1.8	1.7	1.2	.063
Other	2.0	1.2	0.8	.033
Non-Hispanic White Females by Age in Years	**2010, %**	**2013, %**	**2015, %**	***P* value[b]**
18–21	31.8	21.6	20.4	.011
22–25	29.6	27.0	13.9	<.001
26–29	22.1	17.3	13.8	.009

Source: National Health Interview Survey; table adapted from Guy GP Jr, et al., 2017.[22]

[a] Indoor tanning defined as using an indoor tanning device (such as a sunlamp, sunbed, or tanning booth) one or more times during the 12 months before the survey. It does not include getting a spray-on tan. Estimates are based on weighted data. Sample sizes are unweighted and may not add to the total because of missing data. Percentages are based on weighted population estimates.

[b] P value based on linear contrast for trend among the estimates over the 3 years. $P < .05$ is defined as statistically significant.

[c] Estimates based on fewer than 30 observations or with a relative standard error >.30 are considered unreliable by the standards of the National Center for Health Statistics.

Sunburn

Sunburn is an indicator of both the intensity of a person's UV exposure and the person's sun sensitivity, making it a useful measure of progress toward reducing skin cancer incidence rates. Although use of sun protection has increased slightly in recent years, sunburn prevalence remains high, with about one-third of U.S. adults and over half of U.S. high school students getting sunburned each year.[7,21] Table 5 describes sunburn among high school students by sex, race/ethnicity, and grade in school. Table 6 describes sunburn among adults in 2005, 2010, and 2015 by sex, age, and race/ethnicity. Comparison of the sunburn prevalence among U.S. adults in 2015 versus 2005 indicates that sunburn prevalence increased significantly over time overall and among females, ages 50 to 59 years, ages 60 to 69 years, non-Hispanic whites, and those living in the South (Figure 6).

Table 5. Prevalence of Sunburn[a] Among High School Students, 2017

Racial/Ethnic Group	Total, %	Female, %	Male, %
All	57.2	61.6	52.8
Non-Hispanic white	74.8	78.8	70.5
Non-Hispanic black	13.0	15.5	10.4
Hispanic	45.0	50.1	40.3
Grade Level	**Total, %**	**Female, %**	**Male, %**
Grade 9	57.7	61.5	53.6
Grade 10	57.2	61.2	52.9
Grade 11	55.6	59.9	51.2
Grade 12	58.7	63.9	53.2

[a] ≥1 sunburns in the 12 months before the survey.
Source: National High School Youth Risk Behavior Survey; table adapted from Kann et al.[21]

Table 6. Prevalence of Sunburn[a] Among Adults, 2005, 2010, 2015

Demographic Group	2005, %	2010, %	2015, %
Total	34.2	37.1	34.1

Sex	2005, %	2010, %	2015, %
Male	36.2	38.6	34.8
Female	32.4	35.7	33.5

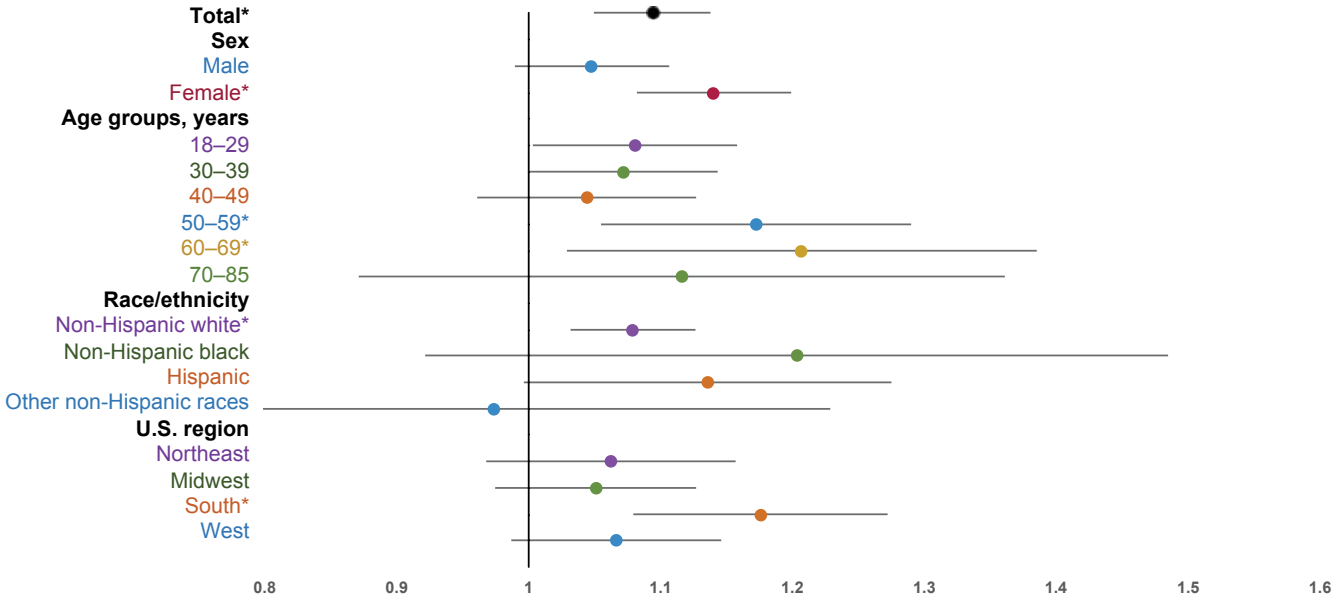
Age in Years	2005, %	2010, %	2015, %
18–29	45.6	50.1	47.2
30–39	43.6	45.8	44.2
40–49	40.2	42.7	38.5
50–59	28.6	33.7	31.7
60–69	19.4	22.1	22.5
70–85	9.2	11.5	10.0

Racial/Ethnic Group	2005, %	2010, %	2015, %
Non-Hispanic white	41.2	44.8	42.4
Non-Hispanic black	8.2	11.0	9.7
Hispanic	22.4	27.0	24.5
Other non-Hispanic races[b]	19.5	21.1	18.2

Region	2005, %	2010, %	2015, %
Northeast	34.3	36.5	33.0
Midwest	42.6	43.6	41.0
South	27.7	32.7	29.8
West	35.4	37.7	35.1

[a] ≥1 sunburns in the 12 months before the survey.
[b] Includes non-Hispanic respondents who were American Indian, Alaska Native, Asian, or multiple races.
Source: National Health Interview Survey; table adapted from Holman et al, 2019.[7]

Figure 6. Adjusted Prevalence Ratios[a] for ≥1 Sunburns Among U.S. Adults in 2015 Versus 2005 Overall and by Sex, Age, Race/Ethnicity, and U.S. Region



Source: National Health Interview Survey; figure adapted from Holman et al, 2019.[7]
[a] Adjusted Prevalence Ratios (APRs) were adjusted for demographic characteristics by using logistic regression models with predicted marginal probabilities. The APR for total was adjusted for sex, age groups, race/ethnicity, and U.S. region in the model. The APRs for male and female were adjusted for age groups, race/ethnicity, and U.S. region in the model. The APRs for the 6 age groups were adjusted for sex, race/ethnicity, and U.S. region in the model. The APRs for the racial/ethnic groups were adjusted for sex, age groups, and U.S. region in the model. The APRs for the U.S. regions were adjusted for sex, age groups, and race/ethnicity. The category "other non-Hispanic races" included non-Hispanic respondents who were American Indian, Alaska Native, Asian, or multiple races.
*APR is statistically significant ($P < 0.01$).

Vitamin D

Vitamin D is needed for health and to maintain strong bones.[24,25] The body makes vitamin D when skin is directly exposed to the sun.[24,25] Vitamin D is also found in some foods.[24,25] Recommended dietary intakes of vitamin D are set on the assumption of little sun exposure because of public health concerns about skin cancer.[25] However, improving sun protection across the population could potentially lead to reduced vitamin D concentrations for some people if they do not increase their vitamin D intake from diet or supplements.

The National Health and Nutrition Examination Survey regularly collects data on serum vitamin D concentrations in the U.S. population.[24] These data can be used to monitor vitamin D levels and document potential unintended consequences of skin cancer prevention interventions, such as increases in vitamin D deficiency.[26]

According to the National Academy of Medicine (formerly the Institute of Medicine), people with serum vitamin D levels less than 40 nmol/L are at increased risk for adverse health outcomes, and levels greater than 125 nmol/L may also be reason for concern.[25] Analyses of the prevalence of low serum vitamin D concentrations among the U.S. population aged 12 years or older from 1988 to 2010, the most recent years for which data are available, indicated that the prevalence of low serum vitamin D concentrations has not changed significantly in recent decades.[26] During 1988–1994, 16% of the U.S. population had serum vitamin D concentrations below 40 nmol/L; during 2009–2010, the prevalence was 15%.[26]

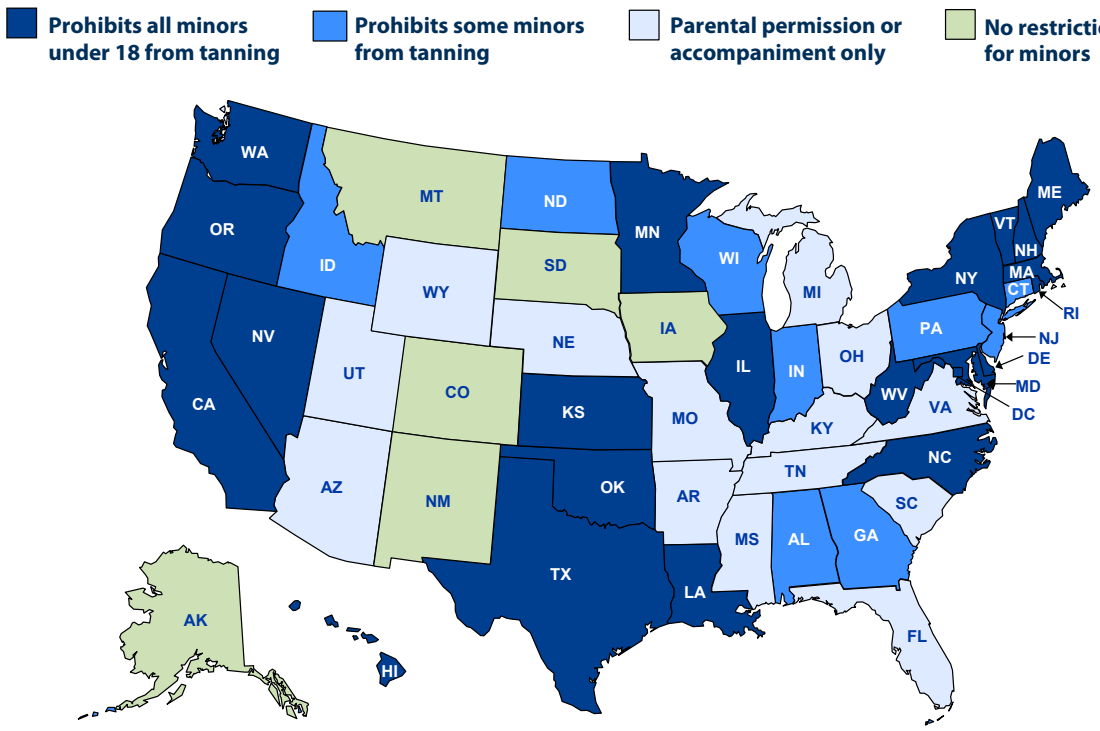
POLICY AND PROGRAM INDICATORS

Certain environmental and policy interventions can decrease overexposure to UV radiation and increase use of sun protection by making it easier for people to make healthy choices.

Indoor Tanning Restrictions for Minors

The U.S. Food and Drug Administration (FDA) states that indoor tanning devices should not be used by minors younger than 18 years.[27] CDC research suggests that indoor tanning laws that include age restrictions may be effective in reducing indoor tanning, particularly among high school girls.[2,23] As of July 2019, 21 states and the District of Columbia have prohibited indoor tanning among minors younger than 18 years of age (Figure 7). In December 2015, the FDA proposed a nationwide rule to restrict tanning bed use to adults aged 18 or older and require that they sign a risk acknowledgement certification before use.[28]

Figure 7. State Indoor Tanning Restrictions for Minors Younger than 18 Years, as of July 2019

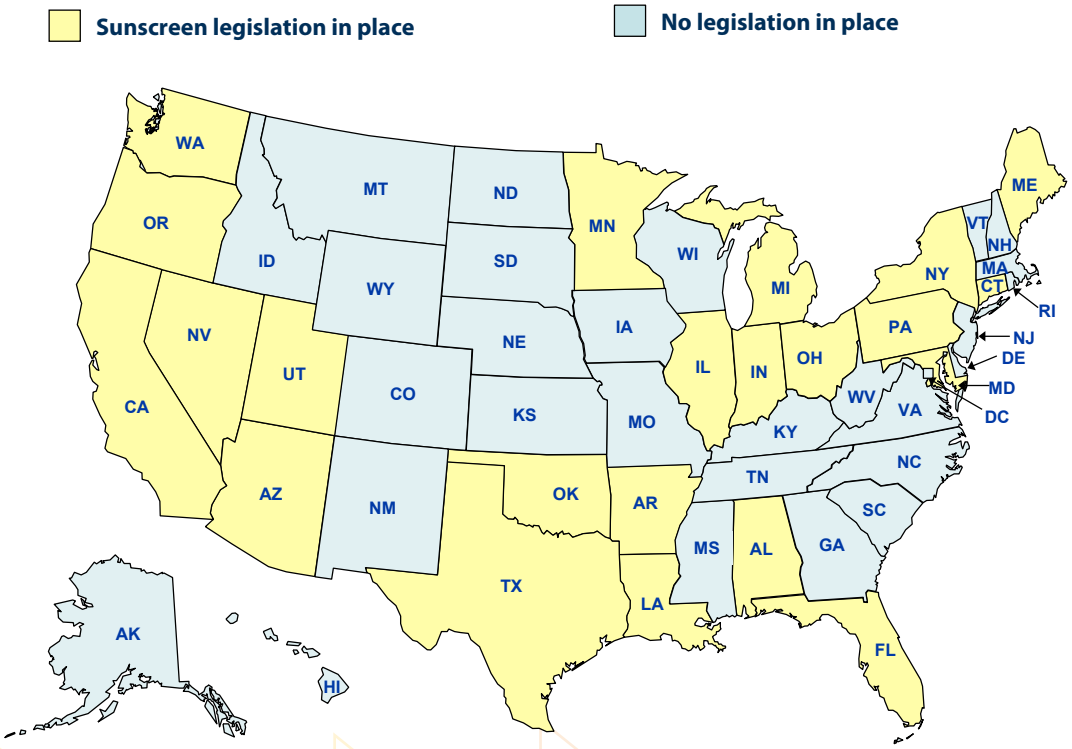


Source: National Conference of State Legislatures.[29]
"Prohibits some minors from tanning" is defined as restrictions for any other age group, including for minors younger than 17, 16, 15, or 14.

Sunscreen Access in Schools

The FDA regulates sunscreen as an over-the-counter (OTC) drug product. In many school districts, students' ability to carry or use FDA-regulated OTC drug products of any kind while on school property is restricted, unintentionally creating barriers to adequate sun protection for students. Realizing this concern, some states have passed legislation permitting students to carry and self-apply sunscreen while at school. As of July 2019, 22 states have passed legislation allowing students to carry and self-apply sunscreen during school (Figure 8).[30, 31]

Figure 8. State Laws for Sunscreen Use in Schools, as of July 2019



Source: Adapted from Patel & Holman, 2018[31] and information on the American Society for Dermatologic Surgery Association website.[30]

Skin Cancer Prevention Policies in Schools

Schools are an important setting for addressing skin cancer prevention among youth. Students are typically at school during midday hours, when UV radiation from the sun is strongest. Recess and other outdoor activities during midday can put students at risk if they are not protected. School policies can promote skin cancer prevention for students and encourage behaviors that will help them avoid skin cancer later in life.

Table 7 shows the percentage of school districts that require or recommend specific sun-safety practices in 2016, based on data from CDC's 2016 School Health Policies and Practices Study. Although requirements regarding sun-safety practices are rare, almost half of school districts recommend that schools allow (46.9%) or encourage (44.3%) students to apply sunscreen while at school.[32] Slightly less than 40% of school districts recommended that schools encourage use of hats, visors, or protective clothing when in the sun during the school day. Even fewer districts recommended encouraging scheduling outdoor activities to avoid peak sun intensity (33.2%) or wearing sunglasses (24.1%). About 20% of school districts provided funding for professional development or offered professional development for school faculty and staff on how to implement school-wide policies and programs related to sun safety.[32]

Table 7. Percentage of School Districts that Require or Recommend that Schools Implement Specific Sun-Safety Practices, 2016 (N=544 school districts)

Practice	Require, %	Recommend, %
Allow students to apply sunscreen while at school.	2.6	46.9
Encourage students to apply sunscreen while at school.	1.5	44.3
Encourage students to wear protective clothing (such as long-sleeved shirts or long pants) when in the sun during the school day.	1.3	39.3
Encourage students to wear hats or visors when in the sun during the school day.	0.5	38.5
Schedule outdoor activities to avoid times when the sun is at peak intensity during the school day.	3.9	33.2
Encourage students to wear sunglasses when in the sun during the school day.	0.5	24.1

Source: School Health Policies and Practices Study, 2016.[32]

Comprehensive Cancer Control Programs

Comprehensive cancer control (CCC) is a strategic approach to preventing or minimizing the impact of cancer among communities. It involves state and local health departments; state, local, and community organizations; researchers; health care providers; decision makers; cancer survivors and their families; and many others, all coming together to find and agree upon ways to address cancer concerns among their communities. CDC funds CCC programs in all 50 states, the District of Columbia, U.S. Associated Pacific Islands and Puerto Rico, and tribes or tribal organizations. Table 8 shows the number and percentage of CCC programs reporting implementation of evidence-based interventions to address skin cancer prevention during 2018-2019.

Table 8. National Comprehensive Cancer Control Program Recipients Reporting Interventions to Address Skin Cancer Prevention, 2018–2019 (N=70)

Evidence-based Intervention	Number of Programs, %
Organizational policies to promote sun protection behaviors	11 (15.7)
Environmental approaches in recreational and tourism settings to promote UV protection	8 (11.4)
Educational interventions targeting children	7 (10.0)
Multi-component community-wide interventions	6 (8.6)
Addition of UV-protective features to the outdoor environment	3 (4.3)
Appearance-focused interventions to reduce UV exposure	3 (4.3)
Increased availability of UV-protective items	3 (4.3)
Clinical counseling of fair-skinned patients aged 10 to 24 years to reduce UV exposure	1 (1.4)
Organizational policies to reduce harms from indoor tanning	1 (1.4)

Conclusion

Although we have seen measurable progress since The *Call to Action* was released, much more work still needs to be done. Recent successes include a reduction in the prevalence of indoor tanning among adults and high school students, including demographic subgroups with the highest use of indoor tanning, and the implementation of policies to reduce harms from indoor tanning and increase access to sunscreen in schools. However, we have yet to achieve progress on increasing the use of sun protection or reducing sunburn, and over half of high school students and one-third of adults get sunburned each year.

The percentage of schools providing education on sun safety or skin cancer prevention has decreased in recent years. In addition, melanoma incidence rates have continued to increase steadily among older non-Hispanic white adults. The overall burden of skin cancer in the United States remains a public health problem that warrants continued prevention efforts across community sectors. Working together, we can translate what we know into action and protect more Americans from the harms of UV radiation.

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