

CDC PUBLIC HEALTH GRAND ROUNDS

Prevention and Control of Skin Cancer



April 21, 2015



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

Skin Cancer: Common and Preventable



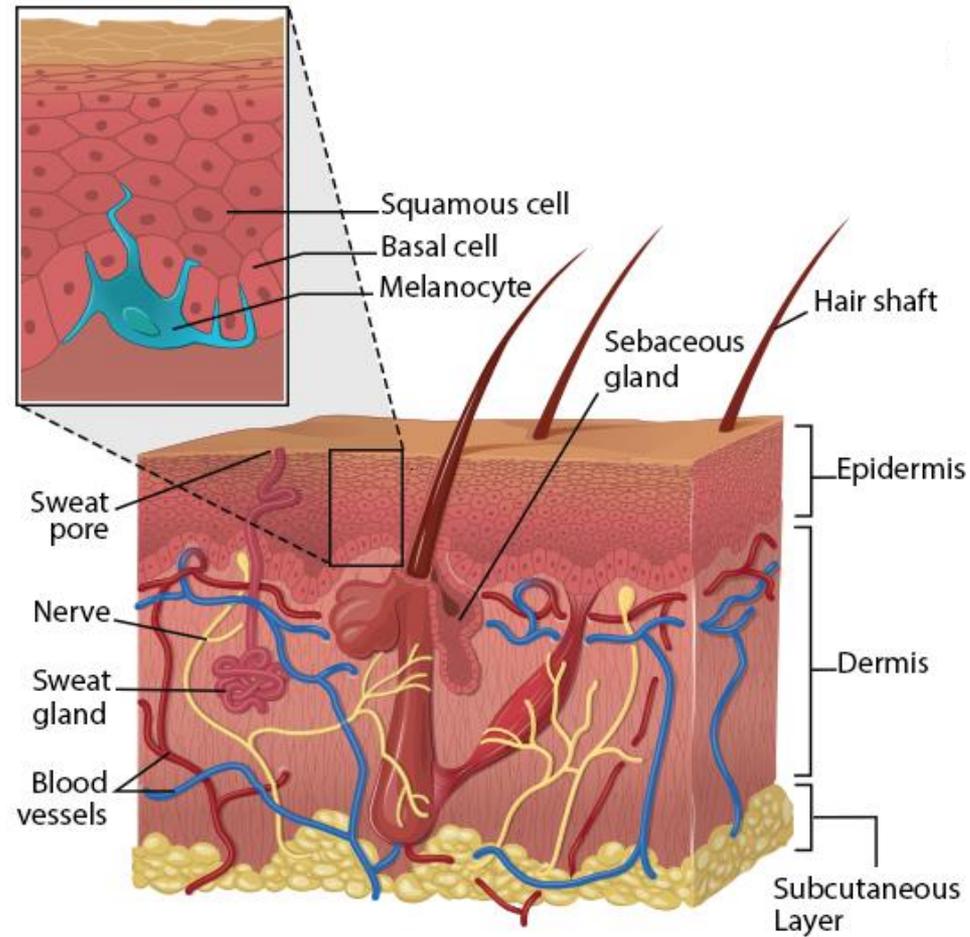
Meg Watson, MPH

Epidemiologist, Epidemiology and Applied Research Branch
Division of Cancer Prevention and Control
National Center for Chronic Disease Prevention
and Health Promotion



U.S. Department of
Health and Human Services
Centers for Disease
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Skin Cancer Background



Public Health Burden of Skin Cancer

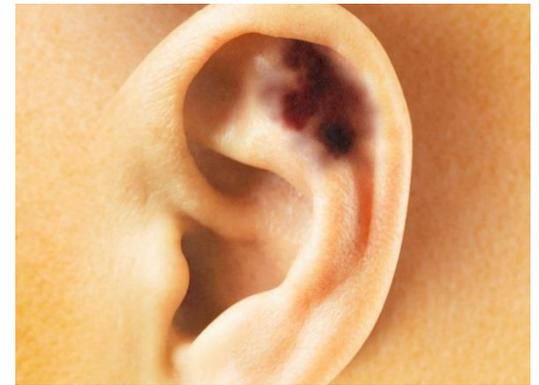
- ❑ Nearly 5 million cases treated each year in the US
- ❑ About 65,000 invasive melanomas diagnosed, 9,000 deaths in 2011
- ❑ Cancer registries collect info on melanomas, not basal and squamous cell skin cancers



Basal cell carcinoma

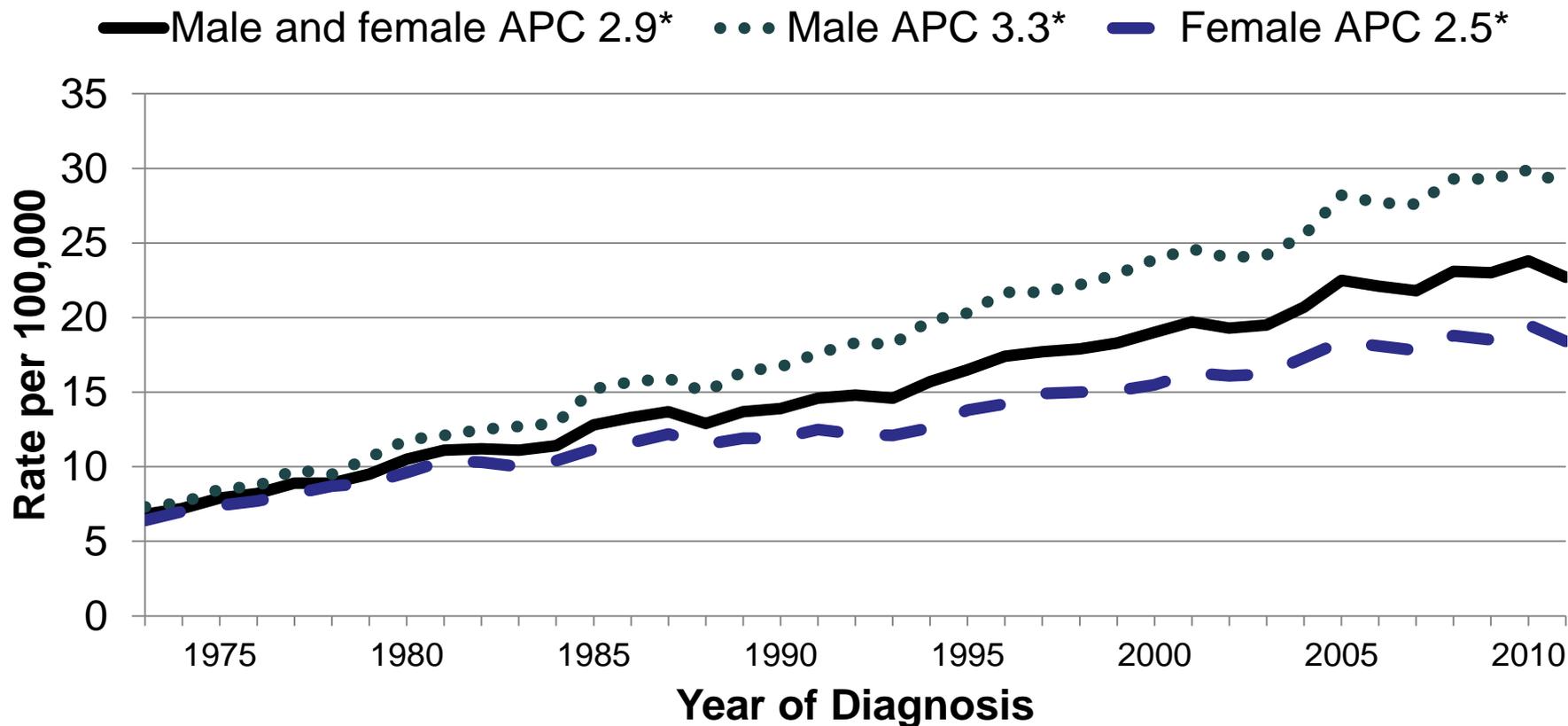


Squamous cell carcinoma



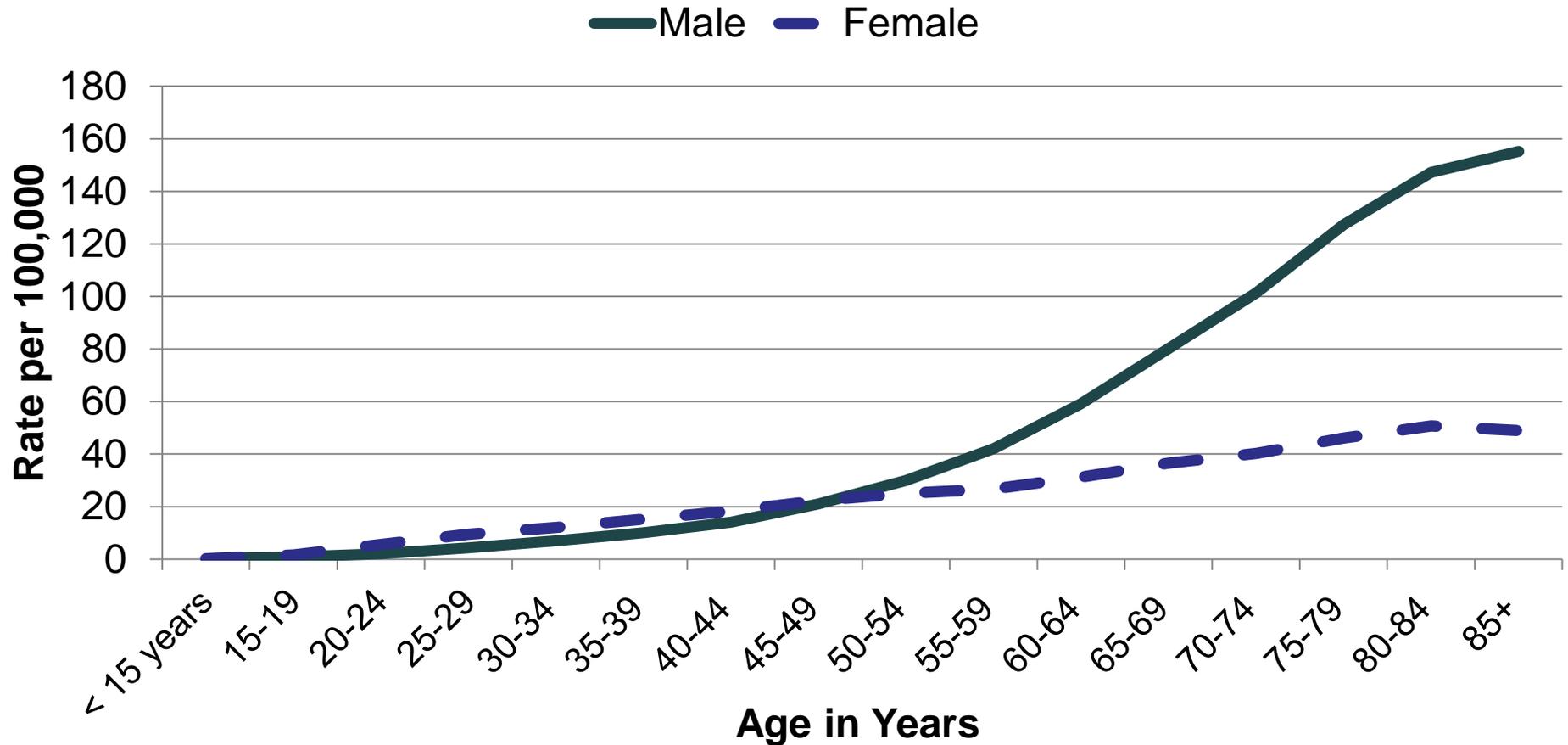
Lentigo maligna melanoma

Trends in Melanoma Incidence, SEER, 1973-2011



APC=Annual Percent Change
 * Denotes APC statistically significant

Age Distribution of Melanoma Incidence, United States, 2007-2011



Data are from population areas that meet United States Cancer Statistics publication criteria (www.cdc.gov/cancer/npcr/uscs/technical_notes/criteria.htm) for 2007-2011 and were reported to the National Program of Cancer Registries (CDC) and the Surveillance, Epidemiology and End Results (SEER) program (National Cancer Institute)

The Economic Burden of Skin Cancer

- Nearly 5 million people are treated for skin cancer each year at a cost of \$8.1 billion
- The annual cost of skin cancer treatment increased 126% between 2002-2006 and 2007-2011



Skin Type and Other Genetic Factors Strongly Influence Risk of Skin Cancer

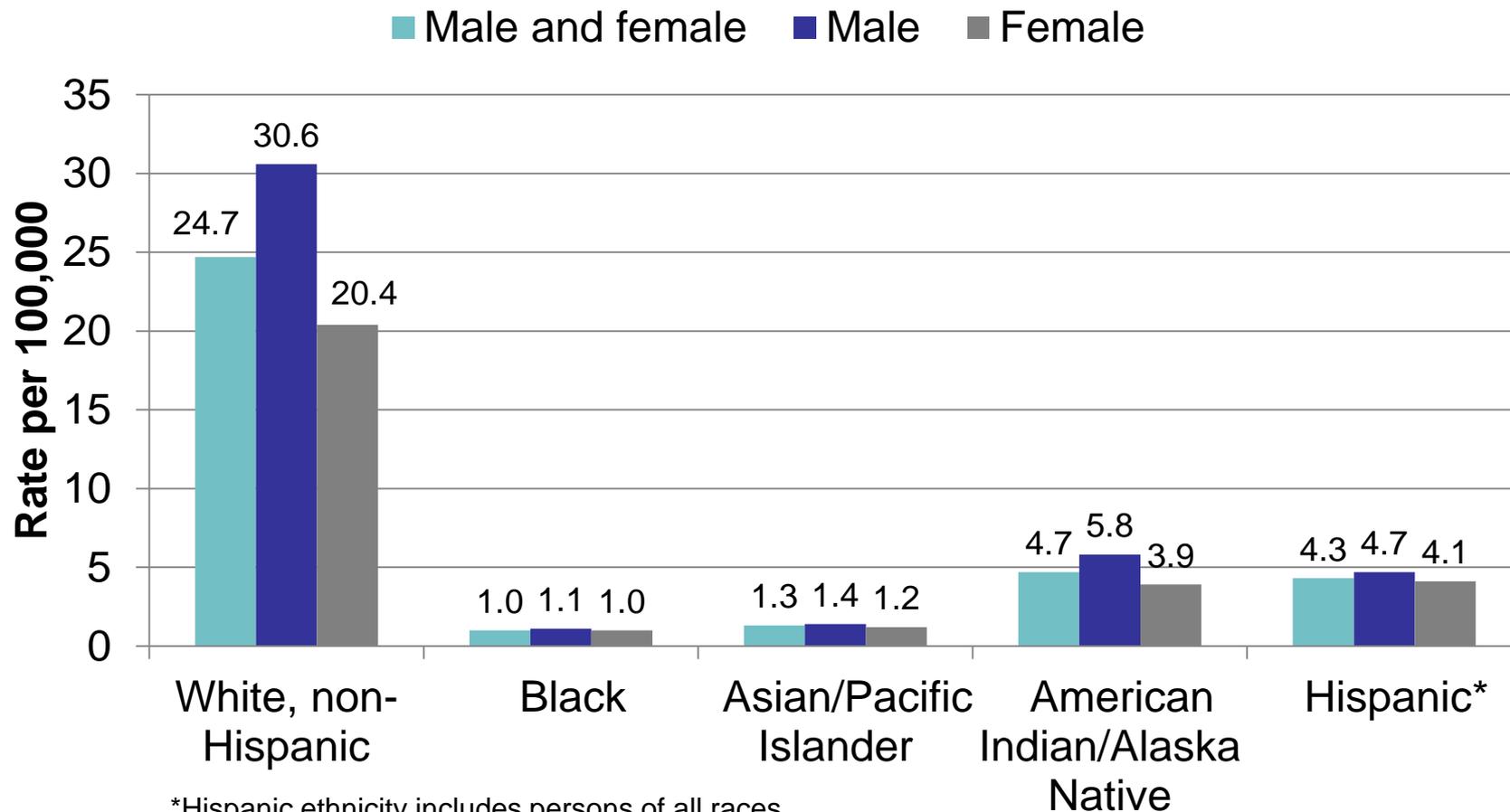
❑ **Genetics has strong effect on risk**

- Light hair and eyes
- Fair skin
- Skin that burns or freckles
- Certain types or a large number of moles
- Family or personal history of skin cancer

❑ **Those with darker skin often diagnosed with skin cancer at a later stage, making it difficult to treat**

- African-Americans, Hispanics

Populations at Greatest Risk of Melanoma, United States, 2007-2011



Data are from population areas that meet United States Cancer Statistics publication criteria (www.cdc.gov/cancer/npcr/uscs/technical_notes/criteria.htm) for 2007-2011 and were reported to the National Program of Cancer Registries (CDC) and the Surveillance, Epidemiology and End Results (SEER) program (NCI)

Ultraviolet (UV) Radiation

The Most Preventable Cause

- ❑ **Most skin cancers caused, at least in part, by UV radiation**
 - Sunlight
 - Artificial sources (e.g. indoor tanning, occupational exposure)
- ❑ **UVA penetrates more deeply than UVB due to its longer wavelength**
 - Both can cause cancer

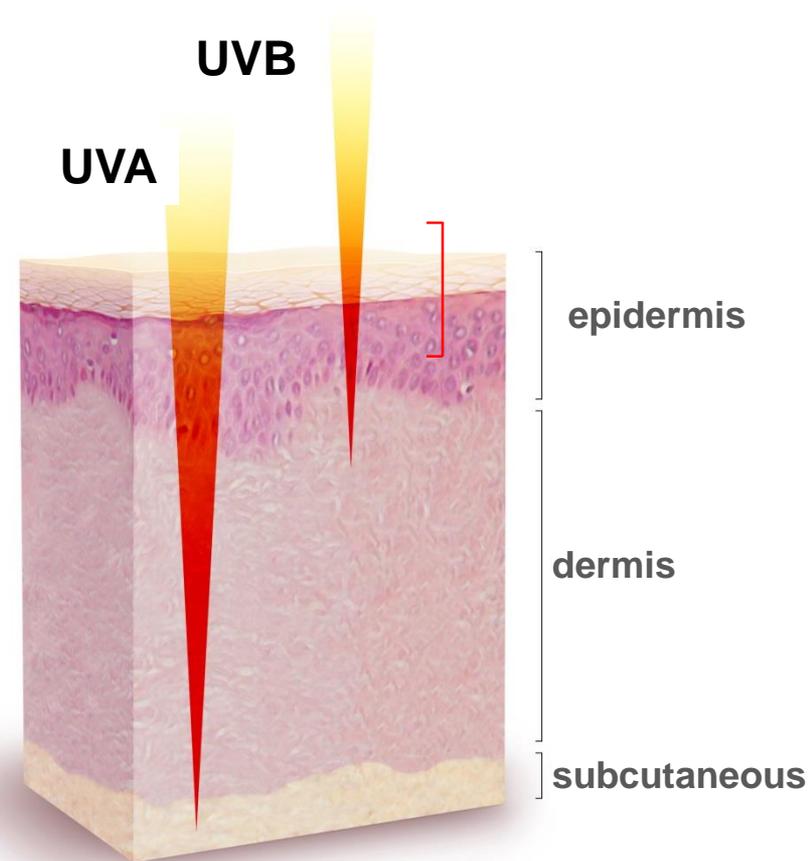


Image: U.S. Department of Health and Human Services. (2014). The Surgeon General's Call to Action to Prevent Skin Cancer. Washington DC: U.S. Dept of Health and Human Services, Office of the Surgeon General.

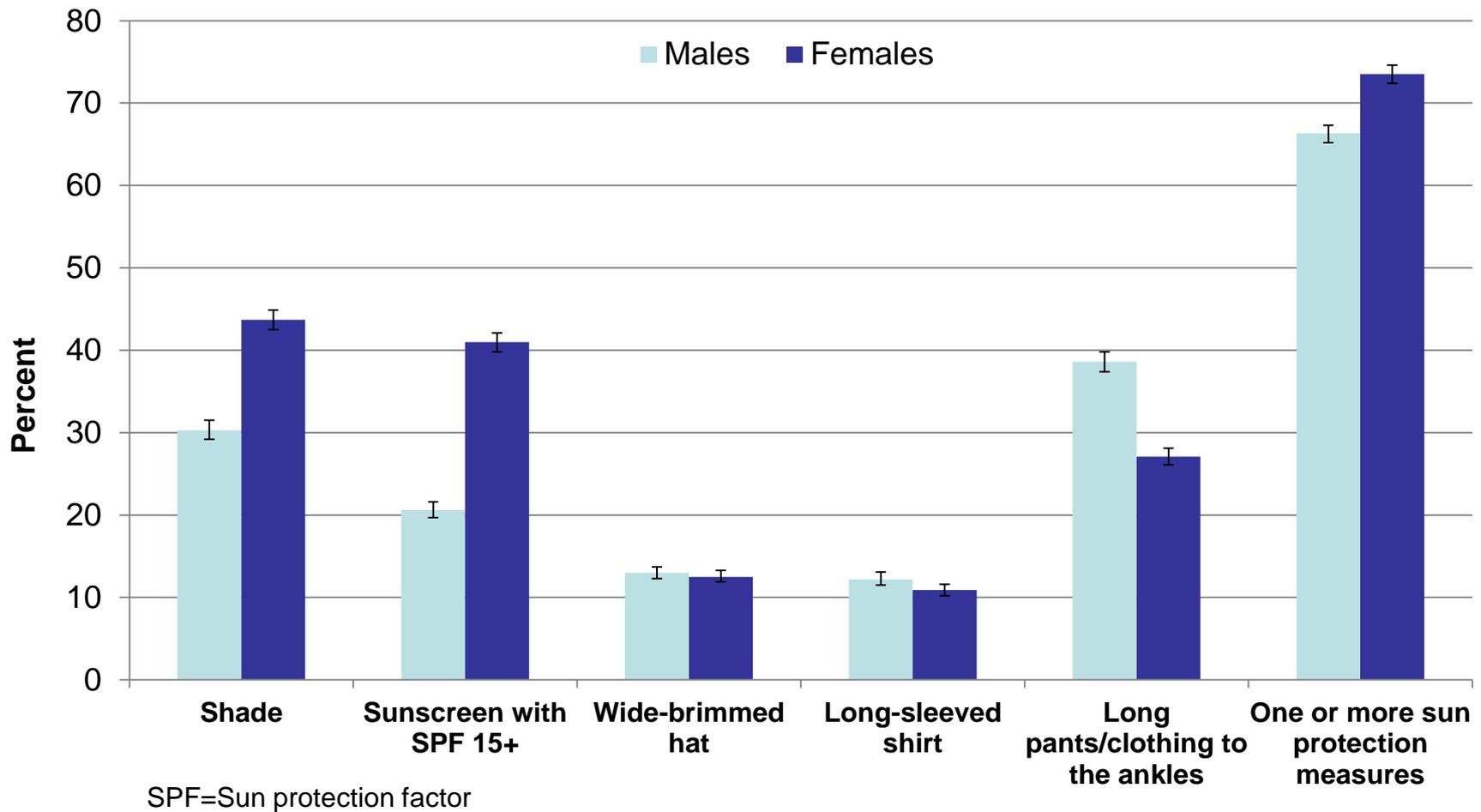
Tanning and Burning Indicate Damage to Skin's DNA

- ❑ **Tans and sunburns are the body's response to damage from UV radiation**
 - Tanning is the body's way of attempting to protect against future damage, and tanned skin indicates damage has already occurred
 - Sunburns are often used as indicators of UV overexposure
 - Sunburn = cell death

Prevalence of Sunburn Remains High

- ❑ **37% of Americans report getting sunburned annually**
 - 44% of non-Hispanic whites
 - 52% of 18-29 year olds
 - 65% of those 18-29 and non-Hispanic white
- ❑ **Many report frequent sunburns (4 or more times in past year)**
 - 12% of all sunburned in past year
 - 16% of those aged 18-29 years
 - 12% of non-Hispanic whites and 19% of blacks
- ❑ **UV damage adds up over time**

US Adults' Use of Sun Protection When Outside for > 1 Hour on a Sunny Day



CDC, National Center for Health Statistics, 2010 National Health Interview Survey, www.cdc.gov/nchs/nhis.htm

Adolescent Use of Sun Protection

- ❑ Only 10% of high school students report wearing sunscreen when outdoors on a sunny day for more than one hour



Indoor Tanning Increases Risk for Skin Cancer

- ❑ **Indoor tanning exposes users to intense UV radiation for cosmetic purposes**
- ❑ **More than 400,000 cases of skin cancer estimated caused by indoor tanning each year**
 - 6,200 melanomas

Wehner MR, Chren M, Nameth D, et al. *JAMA Dermatol.* 2014;150(4):390-400.

Guy GP, Berkowitz Z, Watson M, Holman DM, Richardson LC. *JAMA Intern Med.* 2013;173(20):1920-1922.

Indoor Tanning in the United States

- ❑ **Estimated 11.6 million Americans tan indoors annually**
 - 1 in 3 non-Hispanic white women age 16-25 indoor tans each year
- ❑ **1.6 million teens under age 18 estimated to tan each year**
 - Contraindicated by FDA
 - Prohibited in 11 states



What Works to Prevent Skin Cancer?

❑ **Multicomponent community-wide interventions**

- Combination of strategies across multiple settings
- For example, a comprehensive intervention in Australia has led to a decline in skin cancer rates among young adults

❑ **Education and policy interventions in schools**

- Childcare, grades K-8

❑ **Education and policy interventions in outdoor and recreational settings**



What Works to Prevent Skin Cancer?

❑ **Recommended: Provider counseling**

- Fair-skinned patients aged 10-24 years about minimizing exposure to UV

❑ **Insufficient evidence: Provider screening**

- “Screening” defined as whole-body skin examination by a primary care clinician or patient skin self-examination for the early detection of cutaneous melanoma, basal cell cancer, or squamous cell skin cancer in the adult general population
- USPSTF currently re-reviewing



Surgeon General's Call To Action to Prevent Skin Cancer: 5 Strategic Goals

- ❑ Increase opportunities for sun protection in outdoor settings
- ❑ Provide individuals with the information they need to make informed, healthy choices about exposure to UV radiation
- ❑ Promote policies that advance the national goal of preventing skin cancer
- ❑ Reduce harms from indoor tanning
- ❑ Strengthen research, surveillance, monitoring and evaluation related to skin cancer prevention



Preventing Skin Cancer In Arizona: A Snapshot



Sharon McKenna, BA

Arizona SunWise Skin Cancer Prevention Program Manager

Alternate Public Information Officer

Bureau of Epidemiology and Disease Control

Office of Environmental Health

Arizona Department of Health Services



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

Preventing Skin Cancer in Arizona: My Odyssey

- ❑ From sun-seeker and journalist to melanoma survivor and skin cancer prevention specialist
- ❑ One person – YOU can make a difference!
- ❑ Start with one step, one action 
- ❑ One of many (survivors and advocates)



Why is Sun Safety Especially Important in Arizona?

☐ Intense exposure to natural ultraviolet radiation

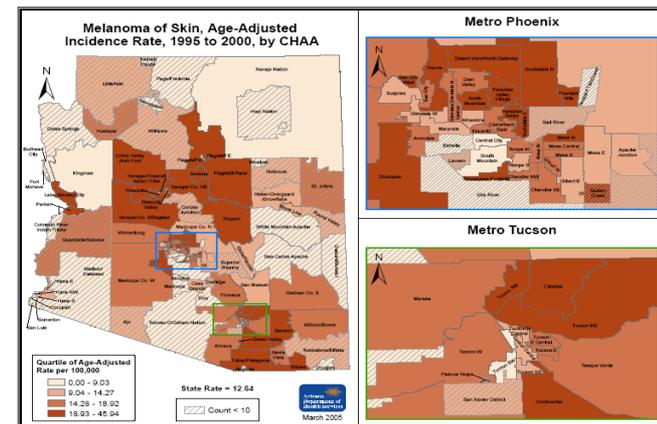
- More than 300 sunny days each year
- If AZ was a country, it would be second only to Australia in skin cancer rates

☐ Sun safety is an Arizona Department of Health Services priority



Turning Our Data into Action

- ❑ In 2010 in Arizona, 1,057 invasive melanoma cases reported, with a melanoma death rate of 2.9 per 100,000 compared to 2.7 per 100,000 in the US
- ❑ Melanoma reporting is a priority
 - Collecting and cleaning 2000-2014 melanoma data from the state's 531 dermatologists
 - Revising the melanoma reporting form
 - Creating a monthly newsletter focused on providers and reporting requirements
 - Utilizing CHAAs to identify high-risk locales and target messaging



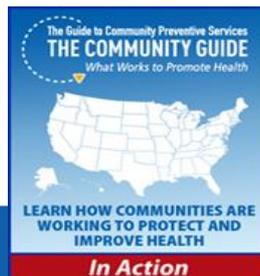
Arizona's School Sun Safety Mandate

☐ Arizona: first state to mandate sun safety education

- Affects 707,329 students in 1,100 K-8 public and charter schools
- Partnerships with ~250 organizations including sports teams, summer camps, libraries, afterschool programs
- Prior to the mandate, half of Arizona's K-8 schools voluntarily using program
- Requirement for the state's 2,488 licensed childcare providers

☐ History of mandate

- Passed May 2005, took effect August 2005



Initial Goals: Protect Kids and Reduce Ultraviolet Radiation Exposure

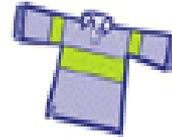
❑ Adapted EPA SunWise Program

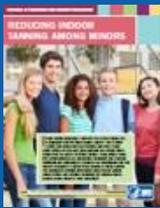
- Easy-to-use curriculum activities incorporate math, science, health, social studies, language arts and critical thinking
- Activities average 20 minutes, categorized by grade (K-2, 3-5, 6-8)
- Schools teach 3 to 5 activities annually
- Modified to meet AZ standards, wrote physical education module to make curriculum physically active



Precautions and Sun Safety Messages

- Cover up
- Use sunscreen and lip balm with a Sun Protection Factor (SPF) of 15+ every day
- Wear a wide-brimmed hat
- Wear sunglasses
- Seek shade
- Limit midday exposure
- Check the UV Index
- Avoid sun lamps and tanning booths





Phase II Goals of Sun Safety Mandate: Policies and Publications

- ❑ **Expand school commitment to sun safety with strong policies**
- ❑ **School educator respondents study, 2007-2014**
 - 63 percent increase in student ability to provide examples of the harmful health effects of the sun on skin. Student ability to provide examples is up 25 percent since the question was first asked in 2007
 - 85% of educator respondents reported their source of sun safety and skin cancer prevention information is AzDHS
 - Results to be released July 2015



Sample Sun Safety Policy for Schools

❑ Introduction

❑ Rationale

❑ Policy and Guidelines



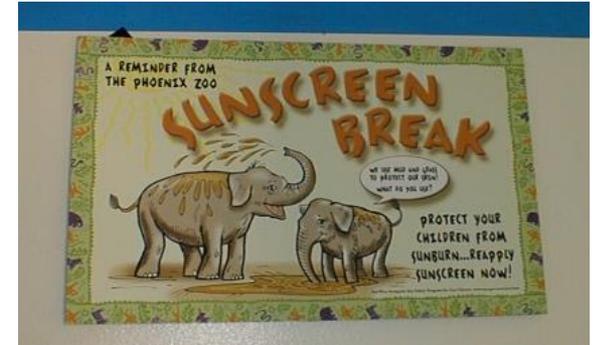
- The following precautions will be taken for all outdoor activity and physical activity including but not limited to: recess, physical education classes, field trips, club meetings, after-school and before-school activities, athletic practices and competitions. Students and staff are encouraged to protect skin with sunscreen SPF 15+, lip balm, hats, sunglasses, clothing, shade, and to limit exposure during peak midday UV.

- www.azdhs.gov/phs/sunwise

❑ Sun safety policies in K-8 schools recommended by The Community Guide

Phase II Goals of Sun Safety Mandate: Using Partnerships to Proliferate

- ❑ Skin cancer prevention listed as a top 5 priority of Arizona's State Improvement Plan to accredit the state health department
- ❑ Increasing the number of reported melanoma cases is also a top 5 objective of reducing skin cancer under the Arizona Comprehensive Cancer Control Plan
- ❑ Expanding to Empower Schools, a new program for K-12 schools receiving USDA National Lunch Program Services



Conclusions: Lessons from Arizona's Leadership in Skin Cancer Prevention

- ❑ **Measure processes and outcomes of skin cancer prevention efforts**
- ❑ **Use data and policy tools in a coordinated way**
- ❑ **Promote sun-safety policies at different levels**
 - Statewide and school-specific efforts
- ❑ **Target groups at high risk, such as children, for focused prevention efforts**
- ❑ **Partner widely outside of the public health and healthcare sectors**
- ❑ **Communicate with others working on sun safety**

Melanoma Moon Shot: MD Anderson's Comprehensive Approach to Melanoma



Jeffrey E. Gershenwald, MD

Professor, Department of Surgical Oncology

Professor, Department of Cancer Biology

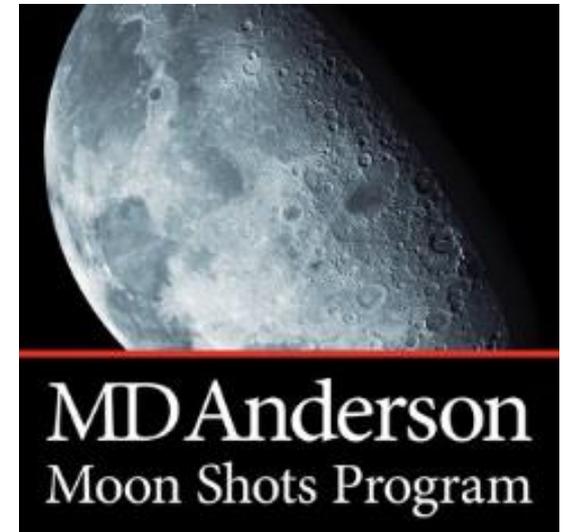
Center Medical Director, Melanoma and Skin Cancer

Co-Leader, Melanoma Moon Shot

The University of Texas MD Anderson Cancer Center

The University of Texas MD Anderson Moon Shot Program

- ❑ **Dramatically accelerate the pace of converting scientific discoveries into clinical advances that reduce cancer deaths**
- ❑ **Melanoma Moon Shot Co-Leaders**
 - Jeffrey E. Gershenwald, MD
 - Michael A. Davies, MD, PhD
- ❑ **Why Melanoma?**
 - Very large clinical and research programs
 - Clear vision and leadership
 - Potential for maximal clinical impact



Scope of the Problem - Introduction

❑ Early-stage disease

- Treatable, often curable
- Outcomes vary

❑ Advanced disease

- Historically poor long-term survival
- Scientific advances provide new treatment options

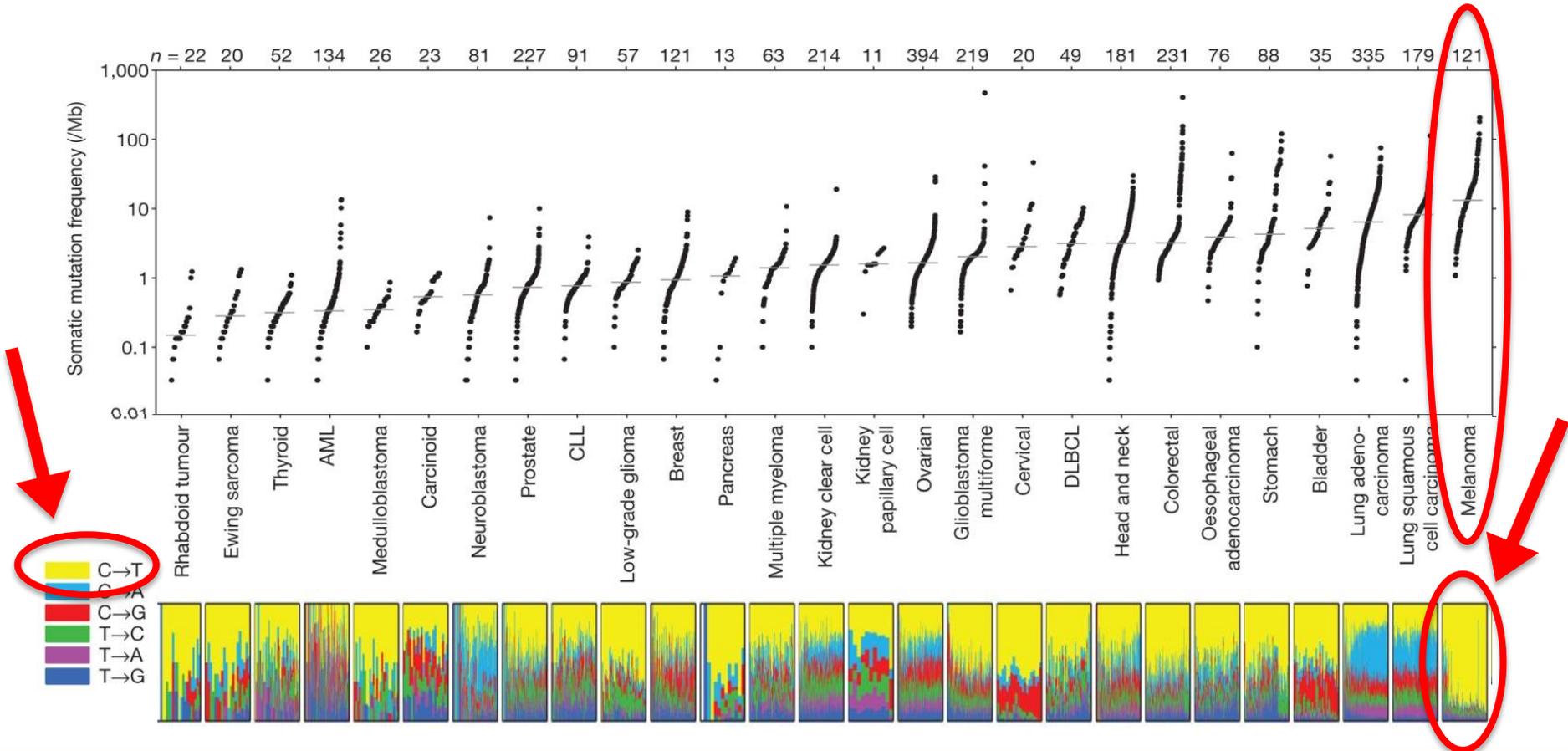
❑ Evidence that UV radiation contributes to melanoma risk

- Sources of UV radiation can be solar or indoor tanning
- Genetic sequencing data also support role of UV exposure in increasing risk for melanoma

The Cancer Genome Atlas (TCGA) Program

Melanoma Has the Highest Mutation Rate

Somatic mutation frequencies observed in exomes, 3,083 tumor-normal pairs



MS Lawrence *et al. Nature* 000, 1-5 (2013) doi:10.1038/nature12213

MD Anderson Melanoma Moon Shot Program Goals

- ❑ **Reduce incidence and increase the proportion of patients diagnosed with early-stage melanoma**
- ❑ **Personalize management strategies**
- ❑ **Improve long-term disease control and survival in advanced melanoma**

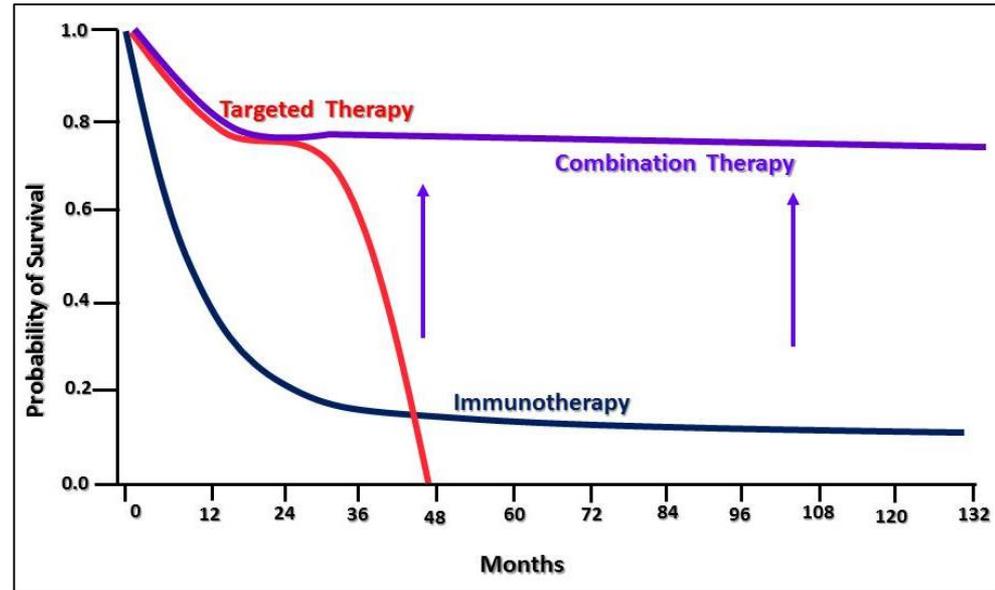


MD Anderson Melanoma Moon Shot Initial Flagship Projects



Primary prevention of melanoma by protecting youth from UV radiation

Mary K. Tripp, Susan K. Peterson,
and Ellen R. Gritz



Increasing long-term survival in melanoma by targeting of cancer genes and the anti-tumor immune response

Jeffrey E. Gershenwald and
Michael A. Davies

Melanoma Prevention Flagship

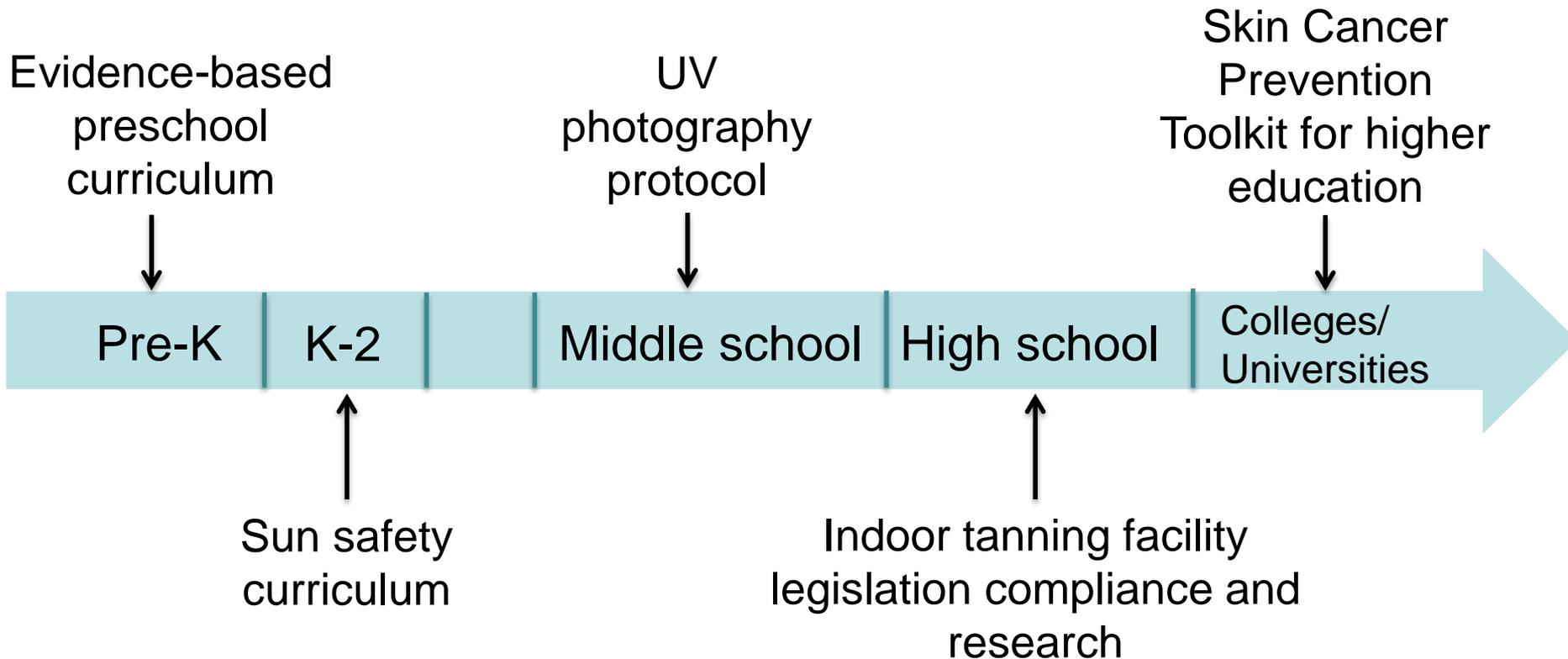
❑ **Goal: To reduce the incidence of melanoma by**

- Increasing protection from UV radiation in youth
- Decreasing youth sun exposure
- Decreasing youth tanning behavior

❑ **Activities**

- Support, facilitate and evaluate legislative activities
- Maximize reach and impact of evidence-based interventions

Melanoma Prevention: Opportunities Across the Age Continuum



Preschool Curriculum: Ray and the Sunbeatables™



Chloe

Serena

Ray

Stefan

Hanna™

MD Anderson/CATCH Global Foundation Partnership

□ Programs

- Early childhood
- Elementary school
- Middle school
- After school

□ Components

- Nutrition
- Physical education
- Classroom
- Community and family outreach



UV PROTECTION

CATCH, in conjunction with The University of Texas MD Anderson Cancer Center, now provides evidence-based sun protection curriculum to pre-K and early childhood programs.

THE UNIVERSITY OF TEXAS
~~MD Anderson
Cancer Center~~
Making Cancer History®



Promote Policies that Advance the National Goal of Preventing Skin Cancer

❑ ***Texas Senate Bill 329***

- Collaborative effort with MD Anderson Cancer Prevention and Control Platform and Governmental Relations, multiple medical societies, foundations and patients
- Law became effective September 2013
- 4th state in US to prohibit tanning bed use for persons under 18



2014-2015 Tanning Bed Prohibition Legislation Across U.S.

MD Anderson has reached out to share lessons learned and directly assist efforts in CO, KS, SC, WA, IA, MD, MS, OK, and AZ



Tanning Facility Legislation Compliance Protocol

- ❑ **Goal is to determine the proportion of Texas tanning facilities that comply with SB 329**
 - Over 1,100 licensed free-standing tanning facilities and spas with tanning devices
 - Examine how compliance is associated with tanning facility factors

FDA Classification of Medical Devices Prior to 2014

FDA Class	Examples
I	Tongue depressors Elastic bandages Indoor tanning devices
II	X-ray machines UV lamps used for dermatologic disorders Laser equipment used in surgery and dermatology
III	Replacement heart valves Silicone gel-filled breast implants Implantable cerebellar stimulators

FDA Classification of Medical Devices

Current as of May 2014

FDA Class

Examples

I
Tongue depressors
Elastic bandages

FDA Black-box warning

Attention: This sunlamp product should not be used on persons under the age of 18 years.¹

II
X-ray machines
UV lamps used for dermatologic disorders
Laser equipment used in surgery and dermatology
Indoor tanning devices

III
Replacement heart valves
Silicone gel-filled breast implants
Implantable cerebellar stimulators

Reaching Out to the Medical Community

Teens and Indoor Tanning: Time to Act on the US Food and Drug Administration's Black-Box Warning

Mark Gottlieb, Sophie J. Balk, Alan C. Geller & Jeffrey E. Gershenwald

Annals of Surgical Oncology

ISSN 1068-9265

Ann Surg Oncol
DOI 10.1245/s10434-014-4257-6

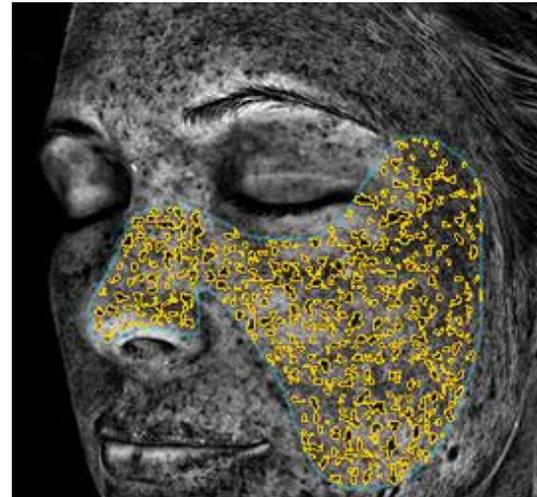


Can We Improve Sun Protection Behavior in Adolescents? UV Photography Study

- ❑ Intervention study using camera with UV filter
- ❑ Represents first opportunity to examine these important outcomes in a controlled setting in adolescents



■ Areas of brown or red skin
(e.g., freckles and
hyperpigmentation)



■ Areas of "UV spots"
indicating sun damage

Skin Cancer Prevention Toolkit for College and University Campuses

❑ **Evolving partnership with the American Cancer Society – Cancer Action Network**

- Promote adoption of a skin cancer prevention policy
- Promote commitment to eliminating students' use of indoor tanning devices
- Designed to increase awareness of college and university administrators about health risks associated with indoor tanning

Melanoma Moon Shot Team Roster

Jeffrey E. Gershenwald & Michael A. Davies – Co-leaders

Mary K. Tripp	Lauren Haydu	Carla Warneke
Susan K. Peterson	Zachary Cooper	Catherine Roca
Ellen R. Gritz	Tiffany Calderone	Charuta Kale
Elizabeth Burton	Sheila Duncan	Payal Pandit Talati
Irma Wintle	Paula Orban	Mandy Jo Euresti
Jennifer Wargo	Chantale Bernatchez	Elizabeth Winters
Rodabe Amaria	Marie Forget	Carmen Galvan
Victor Prieto	Shruti Malu	Andy Futreal
Michael Tetzlaff	Julie Gardner	Guilio Draetta
Jonathan Curry	Silva Frankian	Lynda Chin
Veera Balandayuthapani	Emily Casey	James Allison
Francesco Stingo	Rhiannon Dodge	Pam Sharma
Patrick Hwu	Elizabeth Sirman	Carlo Toniatti
Elizabeth Grimm	Kody Milburn	Tim Heffernan
Merrick Ross	Sakara Waller	Sam Hanash
Jeff Lee	Christine Spencer	Keith Perry
Ernie Hawk	Kerri Fernandes	Gordon Mills
Mark Moreno	Brenna Matejka	Kenna Shaw

A Comprehensive Approach to Skin Cancer Prevention



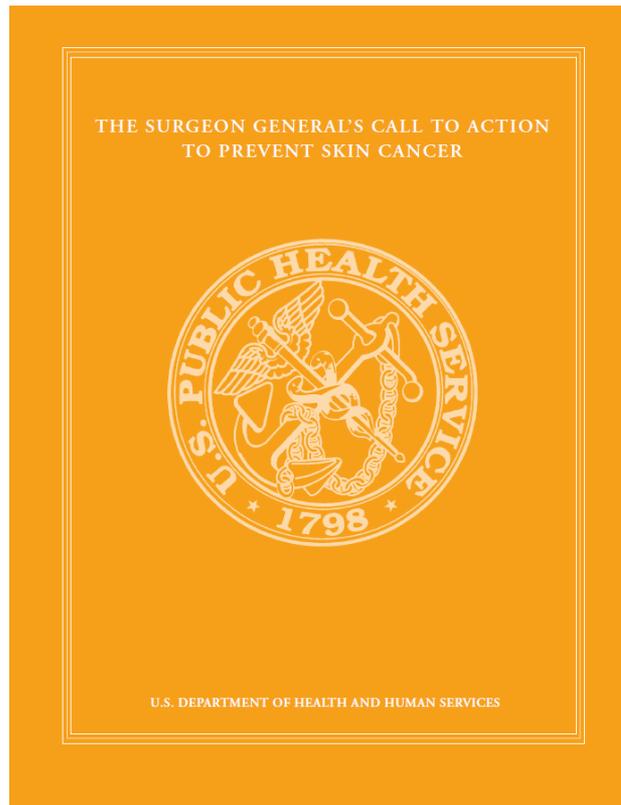
Boris D. Lushniak, MD, MPH
RADM, United States Public Health Service
Deputy U.S. Surgeon General

Skin Cancer is a Major Public Health Problem

- ❑ **Increasing disease burden and costs**
- ❑ **Rates of skin cancer in the United States are increasing, creating a public health concern we cannot ignore**
- ❑ **Now is the time for a comprehensive approach to prevent skin cancer**
- ❑ **Community partners, business leaders, government agencies, and individuals are uniting around a common cause**

The Surgeon General's Call to Action to Prevent Skin Cancer

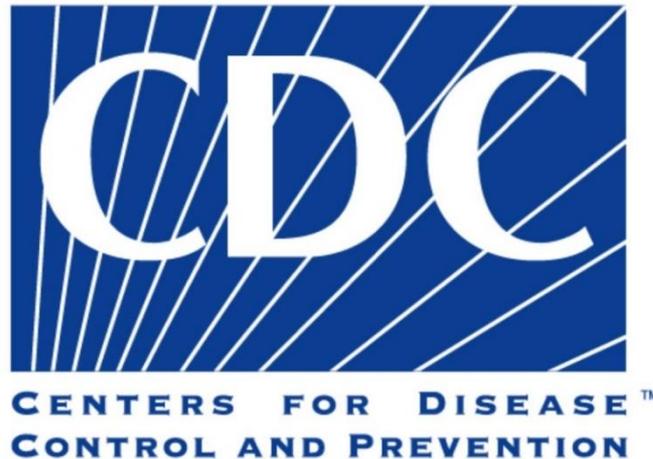
A science-based document to stimulate action nationwide to solve a major public health problem



- **Raises the issue of skin cancer prevention to a higher level of priority and attention**
- **Provides clear action steps to move the issue forward**

www.surgeongeneral.gov/library/calls/prevent-skin-cancer/index.html

Development of the Call to Action



Partners in Prevention



American Academy of Dermatology

NEW MEXICO
RAYS Skin Cancer Prevention Program



Prevention in Action



**RADM Lushniak
visits Bandelier
Elementary School
in Albuquerque, NM**

Calls To Action: Key Strategies

- ❑ **Incorporate sun safety education and policies in schools**
- ❑ **Support shade planning in land use development**
- ❑ **Protect outdoor workers from overexposure**
- ❑ **Enforce existing indoor tanning laws and consider adopting additional restrictions**
- ❑ **Providers can counsel patients according to USPSTF guidelines, and report cases of melanoma**



Indoor Tanning Among Youth

- ❑ **Millions of teens are exposing themselves, unprotected, to intense levels of UV radiation via indoor tanning**
- ❑ **Policy change can help change social norms to discourage intentional tanning**
 - WHO classified indoor tanning devices as carcinogenic to humans in 2009
 - FDA has clearly stated indoor tanning is contraindicated for minors, requiring warning labels on the devices
 - Members of congress have written letters to universities asking them to stop allowing students to use school debit cards to pay for tanning services

El Ghissassi, F., Baan, R., Straif, K., Grosse, Y., Secretan, B., Bouvard, V. et al. International Agency for Research on Cancer Monograph Working Group. *Lancet Oncol*, 10(8), 751-752

FDA (2014). Rule. General and Plastic Surgery Devices: reclassification of ultraviolet lamps for tanning, Henceforth To Be Known as Sunlamp Products and Ultraviolet Lamps Intended for Use in Sunlamp Products. *Fed Regist.*, 79, 31205-31214

Prevention in Action



dailytarheel.com



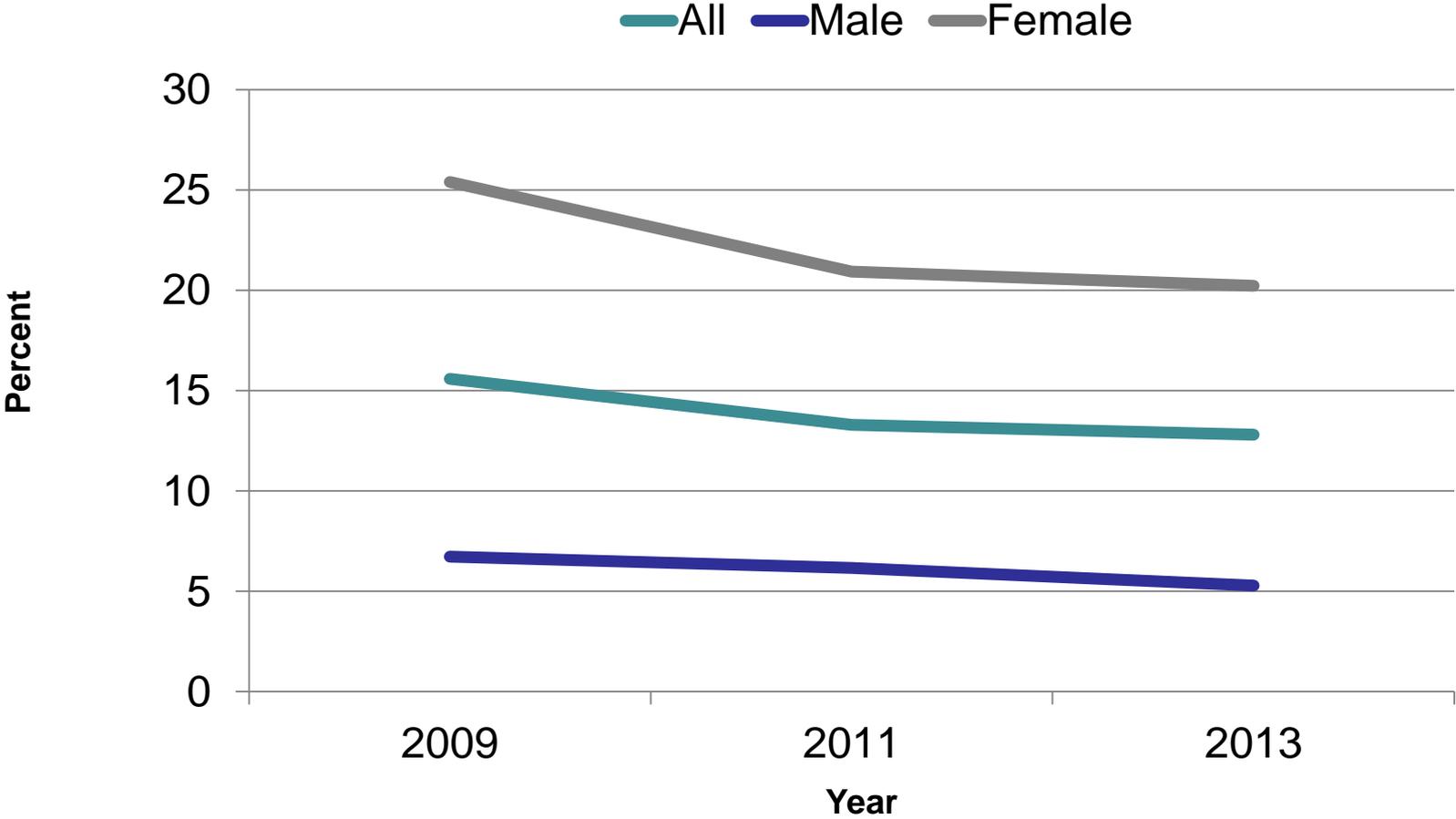
UNC student brings tanning beds under fire at Chapel Hill Town Council

A UNC junior presented a petition on tanning beds to the council.

BY [ERIN KOLSTAD](#) | PUBLISHED 01/13/15 12:51AM

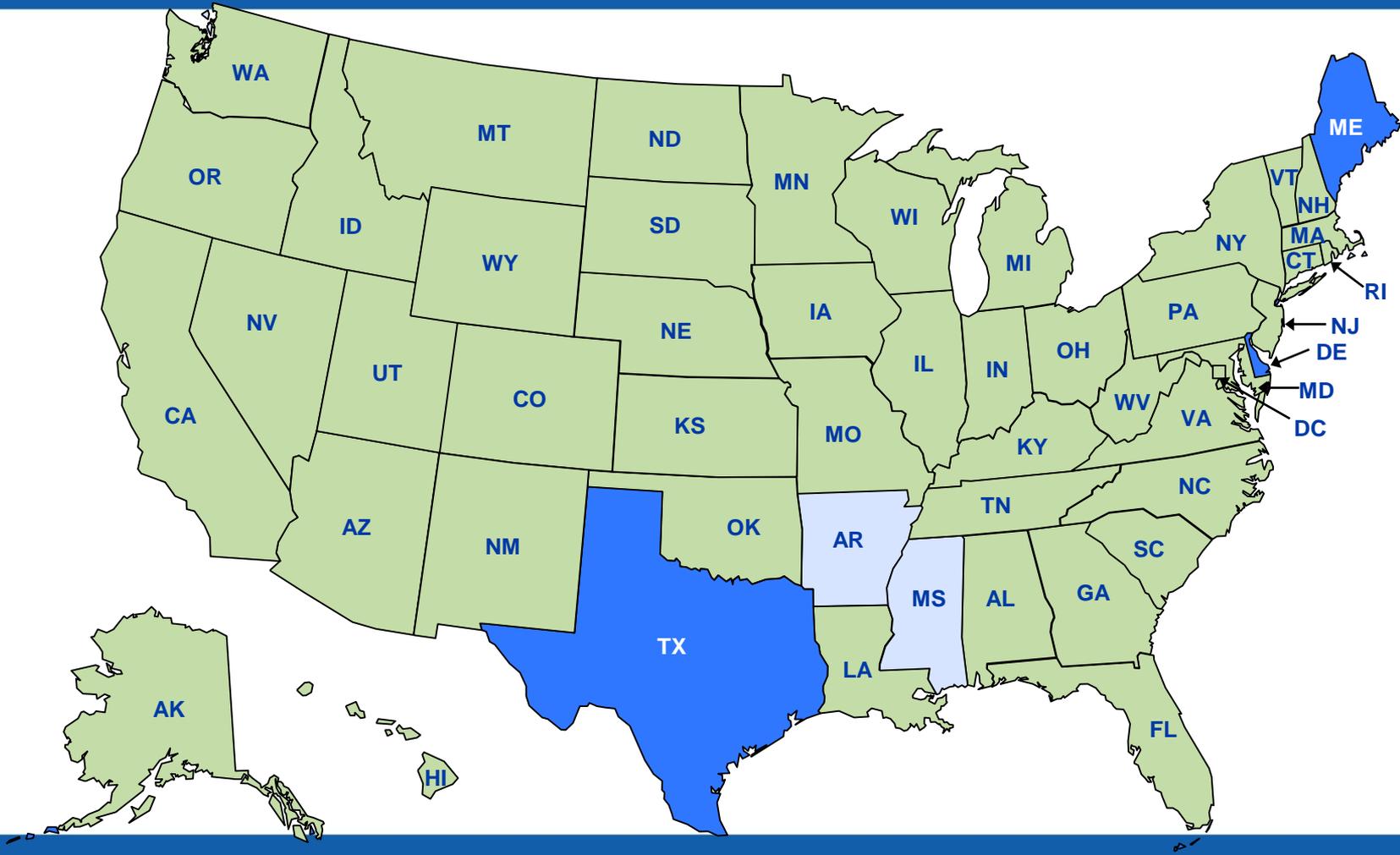
26% of Chapel Hill, NC apartment complexes provide indoor tanning to renters

Indoor Tanning Among US High School Youth

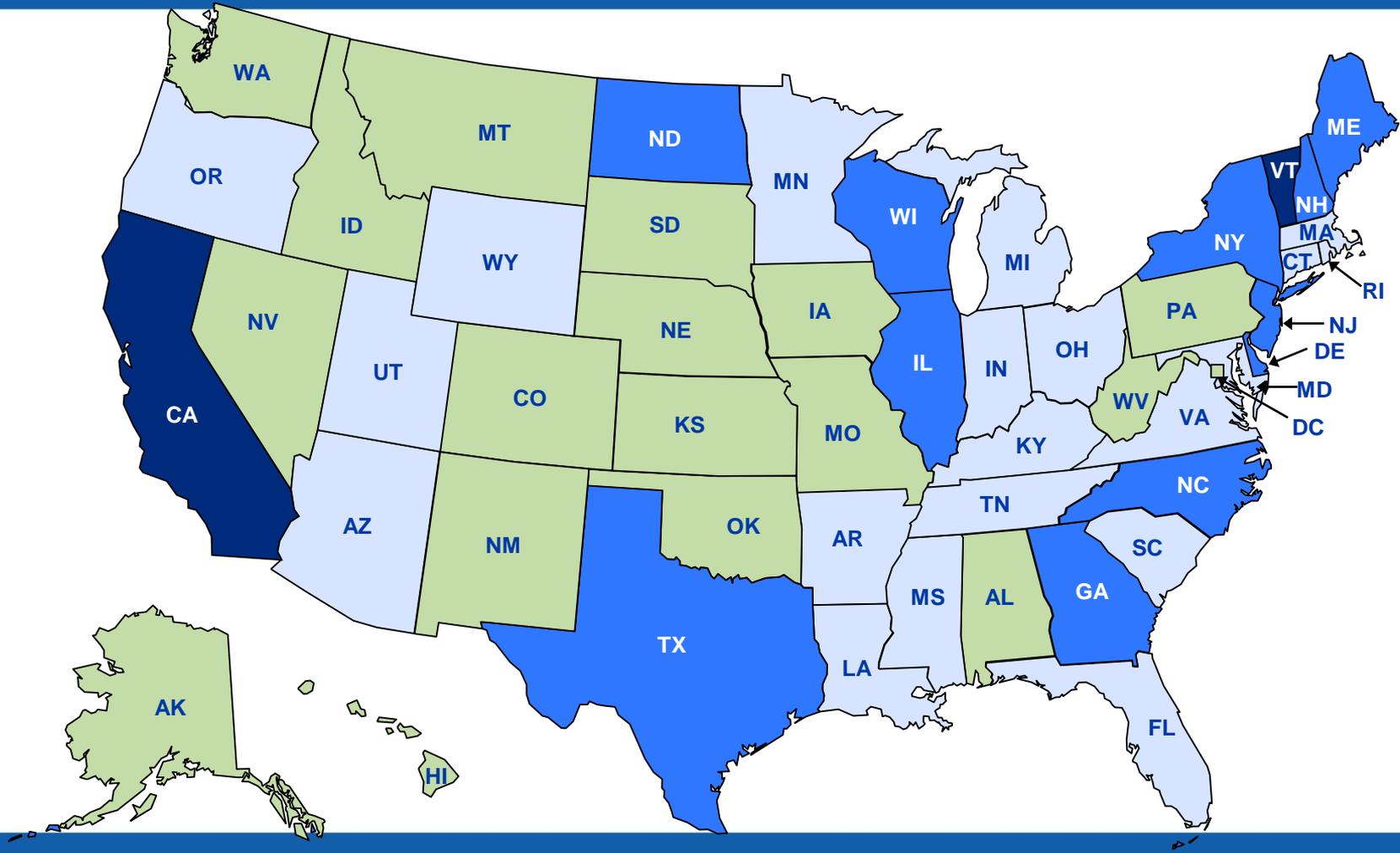


CDC. 1991-2013 High School Youth Risk Behavior Survey Data
Available at nccd.cdc.gov/youthonline/

Indoor Tanning Restrictions for Under Age 18, 2009

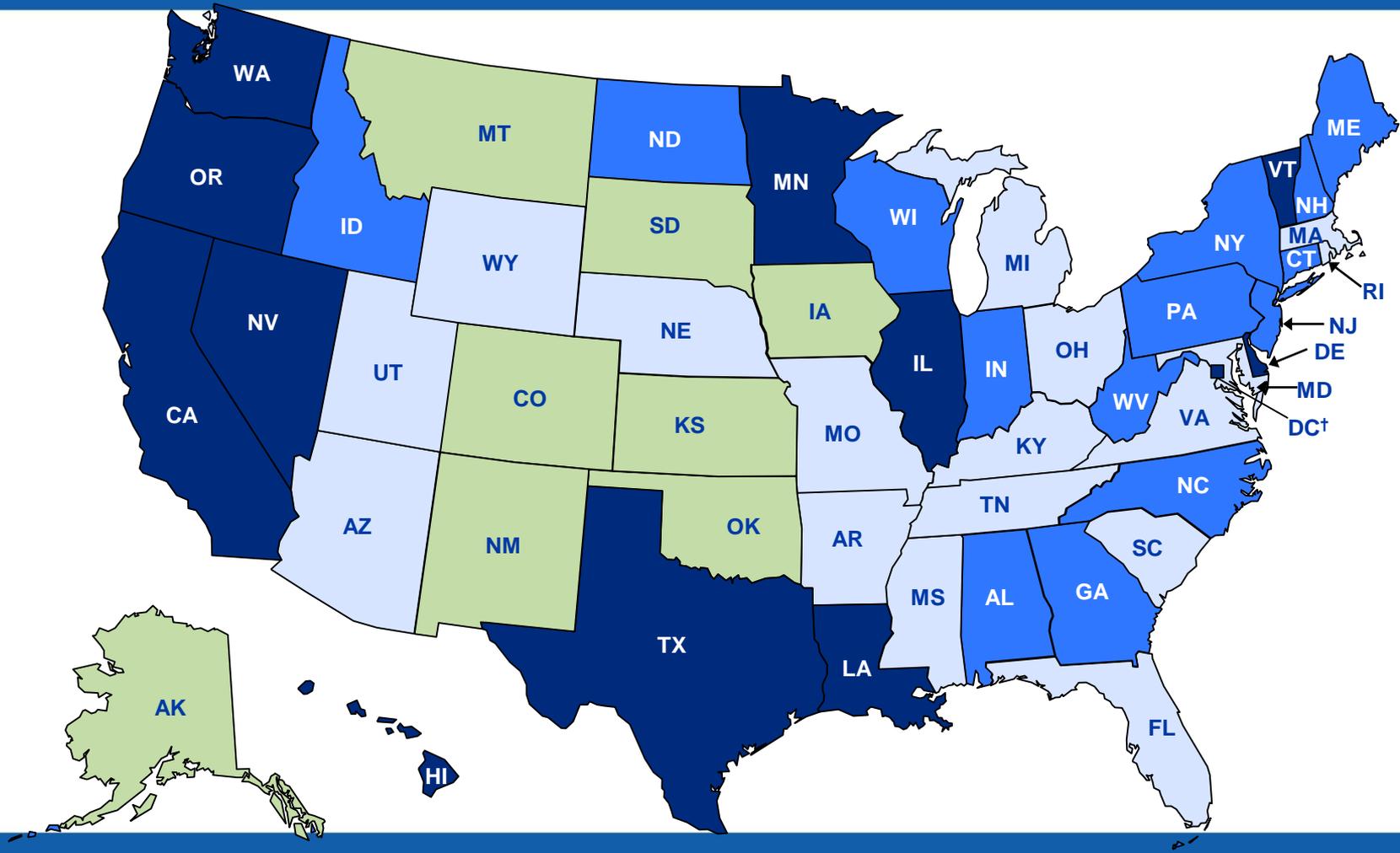


Indoor Tanning Restrictions for Minors, 2012



Indoor Tanning Restrictions for Minors, 2014-2015

- Prohibits all minors under 18 from tanning
- Prohibits some minors from tanning
- Parental permission only
- No restrictions for minors



In states with
multiple youth
access restrictions,
the odds of indoor
tanning among
teen girls were
42% less.



Skin Cancer Prevention: Progress and Room for Improvement

- ❑ **More than 1 in 3 Americans reports getting sunburned each year**
- ❑ **Indoor tanning**
 - Rates declining, but still common among some groups
 - CDC estimates 1.6 million persons under age 18 use indoor tanning each year – more than the population of 11 U.S. states and the District of Columbia
 - Although contraindicated by FDA, 39 states still permit indoor tanning by minors under age 18
- ❑ **Rates of sun protection still low**

Next Steps

- ❑ ***Comprehensive, community wide efforts to prevent skin cancer can work, with adequate support and a unified approach***



Photo courtesy of Queensland Department of Health
SunSmart Australia: www.sunsmart.com.au
Shih ST, Carter R, Sinclair C, Mihalopoulos C, Vos T. *Prev Med.* 2009;49(5):449-453



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