

## Sunburn and Sun Protective Behaviors Among Adults Aged 18–29 Years — United States, 2000–2010

Skin cancer is an important public health concern. Nonmelanoma skin cancers, comprised mainly of basal cell carcinoma and squamous cell carcinoma, are the most common malignancies in the United States (1). Melanoma, although less common, is the deadliest form of skin cancer (2). Both melanoma and nonmelanoma skin cancers can be disfiguring, negatively affect quality of life, and create economic burden (2,3). Furthermore, age-adjusted incidence rates of both have increased in recent years (1,4). Different patterns of sun exposure are associated with different types of skin cancer. Continuous, chronic sun exposure, such as that observed among outdoor workers is associated with squamous cell carcinoma (3). Intermittent exposure, such as recreational exposure, is associated with melanoma and basal cell carcinoma (3,5–7). Sunburn typically occurs after intermittent exposure, and the risk for melanoma increases with an increasing number of sunburns during all periods of life (4–7). Sunburn is more common among persons aged 18–29 years compared with older adults (8). To evaluate trends in sunburn and sun protective behaviors among persons aged 18–29 years, CDC and the National Cancer Institute analyzed data from the 2000, 2003, 2005, 2008, and 2010 National Health Interview Survey (NHIS). The results indicated that although protective behaviors such as sunscreen use, shade use, and wearing long clothing to the ankles have increased in recent years, sunburn prevalence remains high, with 50.1% of all adults and 65.6% of whites aged 18–29 years reporting at least one sunburn in the past 12 months. These results suggest that additional efforts are needed to identify and implement effective strategies targeting younger adults to improve their sun protective behaviors and prevent sunburn and ultimately skin cancer.

NHIS is an annual, cross-sectional survey of the civilian, noninstitutionalized U.S. population. Data about persons of all ages in the family are collected throughout the year. Interviews are conducted, mainly in person, with adults aged ≥18 years in each household, with follow-up by telephone when necessary. For this report, data from the NHIS cancer control

supplement, which includes questions about sun protective behaviors and sunburn were used. Participants were asked how often they stay in the shade, wear a wide-brimmed hat, wear a long-sleeved shirt, and use sunscreen when outdoors in the sun; participants also were asked about the sun protection factor (SPF) of the sunscreen they usually use.

Beginning in 2005, three additions were made to the supplement. First, a question about wearing long clothing to the ankles was added. Second, a question asking “Is the SPF usually 1–14 or 15–50?” was added as a probe to decrease missing data on sunscreen SPF. Third, a question about wearing “a baseball cap or sun visor” (which do not provide sufficient protection) was inserted to precede the question regarding use of wide-brimmed hats (which do provide full sun protection to the face, ears, and neck), along with pictures of examples of wide-brimmed hats. This addition is thought to have improved the accuracy of wide-brimmed hat use estimates by reducing hat misclassification (9). Only estimates of wide-brimmed hat use during 2005, 2008, and 2010 are provided in this report. In 2000, 2005, and 2010, participants were asked the number of sunburns they had in the past 12 months. Final response rates for the sample adult component of NHIS each year were 72.1% (2000), 74.2% (2003), 69.0% (2005), 62.6% (2008), and 60.8% (2010).

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Statistical software was used to account for the complex sampling design. Survey weights were used to produce nationally representative estimates. Analyses were limited to adults aged 18–29 years and age-adjusted to the 2000 U.S. population using the age groups 18–24 and 25–29 years. Estimates and 95% confidence intervals (CIs) for the percentage engaging in each of the sun protective behaviors “always” or “most of the time” and reporting one or more sunburns in the past 12 months were calculated for each year overall, by sex, and by race/ethnicity (white, black, other race, and Hispanic). Persons identified as Hispanic might be of any race; persons identified as white, black, or other race are all non-Hispanic.

Percentage differences were assessed using linear contrasts. Overall and subcategory trends were assessed using logistic regression analyses, with survey year included as a categorical covariate while controlling for age group. For all analyses, differences with  $p < 0.05$  were considered statistically significant.

Among women, using sunscreen (37.1%, CI = 34.7–39.5) and staying in the shade (34.9%, CI = 32.6–37.3) were the most common protective behaviors reported in 2010 (Figure 1). Wearing a wide-brimmed hat (3.8%, CI = 3.1–4.7) and wearing a long-sleeved shirt (5.3%, CI = 4.3–6.6) were the least common. Shade use ranged from 29.4% to 30.5% during 2000–2008 but increased to 34.9% in 2010 ( $p < 0.05$ ). Sunscreen use increased overall from 2000 to 2010 ( $p < 0.01$ ), and wearing long clothing to the ankles increased from 21.1% in 2005 to 25.7% in 2010 ( $p < 0.01$ ). Among women overall, no

significant increases in wearing a long-sleeved shirt or wearing a wide-brimmed hat were observed over time. White women were less likely to report shade use ( $p < 0.05$  each year), and black women were less likely to report sunscreen use ( $p < 0.01$  each year) compared with persons of other races or Hispanics.

Among men, wearing long clothing to the ankles was the most common protective behavior reported in 2010 (32.9%, CI = 30.5–35.3), followed by staying in the shade (25.6%, CI = 23.4–27.9) and using sunscreen (15.6%, CI = 13.8–17.6) (Figure 2). Wearing a wide-brimmed hat (6.7%, CI = 5.6–8.0) and a long-sleeved shirt (7.6%, CI = 6.3–9.3) were least common. Shade use ranged from 18.5% to 20.6% during 2000–2008 but increased to 25.6% in 2010 ( $p < 0.01$ ). Wearing long clothing to the ankles increased from 28.3% in 2005 to 32.9% in 2010 ( $p < 0.01$ ). Changes in sunscreen use were inconsistent from 2000 to 2005, but use increased slightly from 13.6% in 2005 to 15.6% in 2010. Among men overall, no significant increases in wearing a long-sleeved shirt or wearing wide-brimmed hat were observed over time. No consistent differences in protective behaviors across racial/ethnic groups were observed.

In 2000, 2005, and 2010, sunburn prevalence was highest among whites (65.6% in 2010) and lowest among blacks (10.9% in 2010). The prevalence of sunburn among men (49.1% in 2010) was not significantly different from the prevalence among women (51.3% in 2010) overall or across racial/ethnic categories (Table). No significant differences in sunburn prevalence were observed in 2010 (50.1% overall)

The *MMWR* series of publications is published by the Office of Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30333.

**Suggested citation:** Centers for Disease Control and Prevention. [Article title]. *MMWR* 2012;61:[inclusive page numbers].

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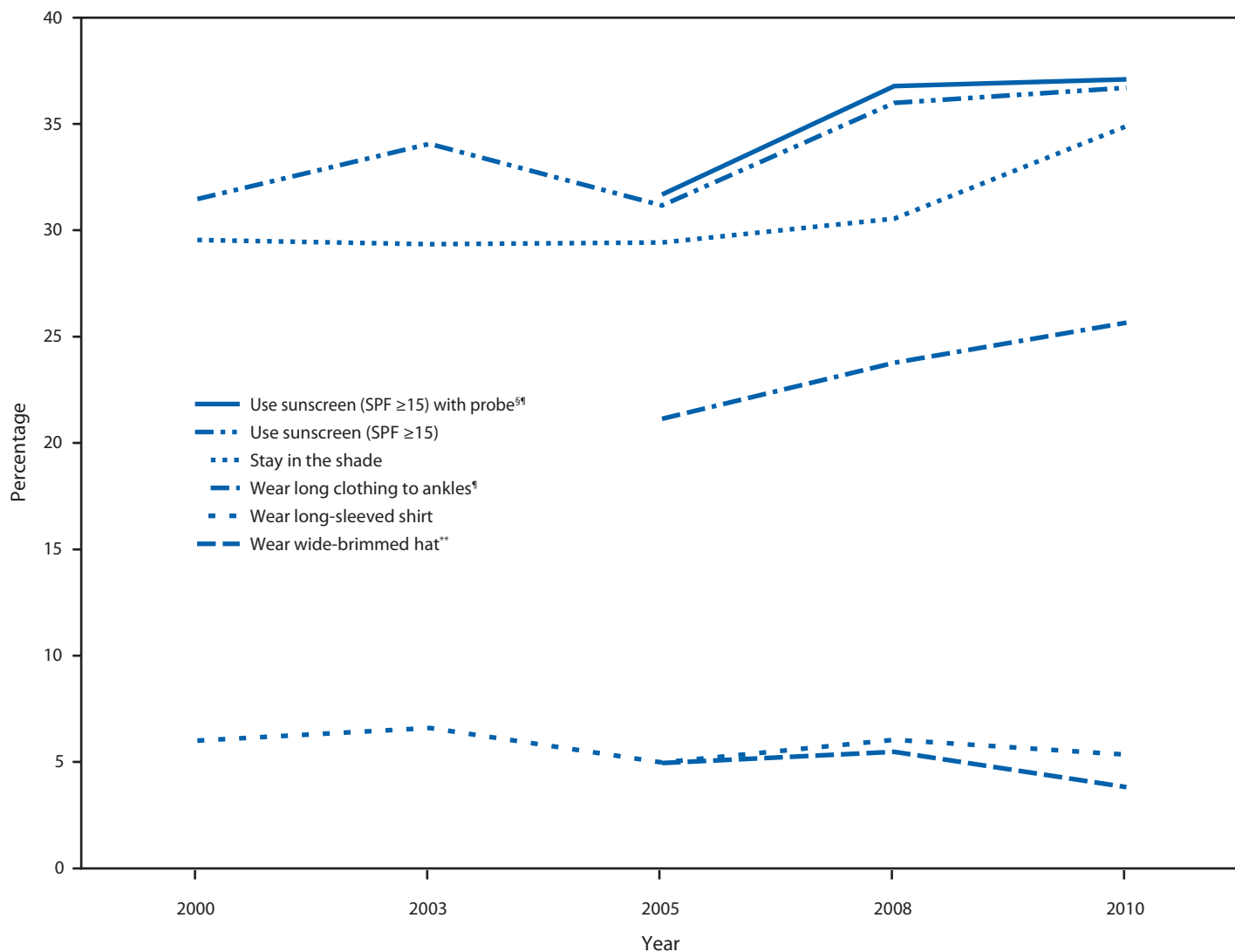
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FIGURE 1. Prevalence\* of sun protective behaviors† among women aged 18–29 years, by survey year — National Health Interview Survey, United States, 2000, 2003, 2005, 2008, and 2010



**Abbreviation:** SPF = sun protection factor.

\* Age-adjusted to the 2000 U.S. population using the age groups 18–24 and 25–29 years.

† The percentage who reported engaging in each sun protective behavior always or most of the time when outdoors in the sun. Response options included “always,” “most of the time,” “sometimes,” “rarely,” or “never.”

§ Each year, participants were asked, “What is the SPF number of the sunscreen you use most often?” In 2005, 2008, and 2010, participants who responded to this question with “more than one,” “different ones,” or “other” also were asked, “Is the SPF usually 1–14 or 15–50?” as a probe to decrease missing data.

¶ Only asked in 2005, 2008, and 2010.

\*\* Data on wide-brimmed hat use in 2000 and 2003 are not shown. Data from 2005, 2008, and 2010 are thought to more accurately estimate wide-brimmed hat use because of the addition of a question about wearing “a baseball cap or sun visor” and the use of pictures of examples of wide-brimmed hats, starting in 2005.

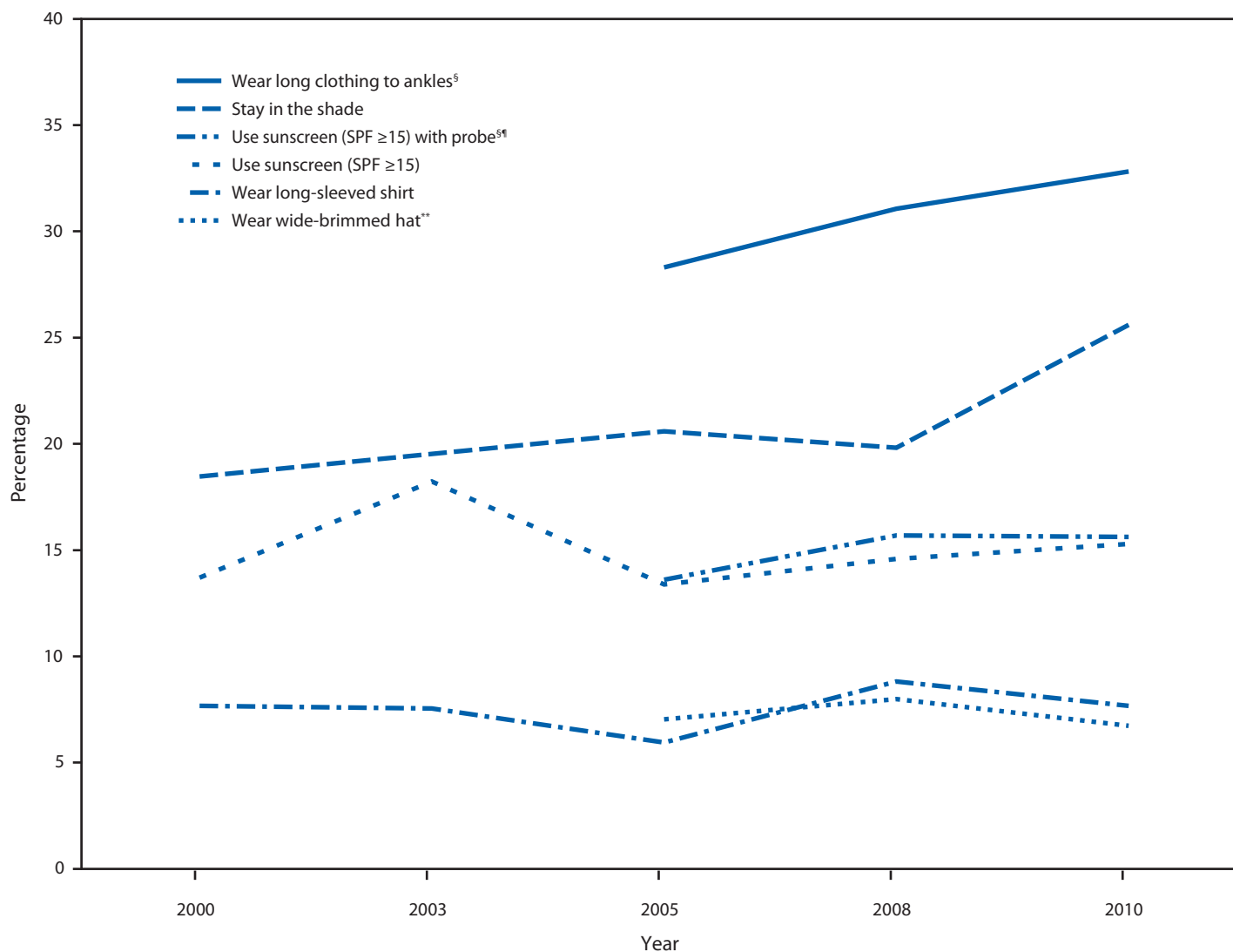
compared with 2000 (50.9% overall). However, sunburn prevalence decreased significantly from 2000 to 2005 (45.5% overall) before increasing in 2010 (Table).

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FIGURE 2. Prevalence\* of sun protective behaviors<sup>†</sup> among men aged 18–29 years, by survey year — National Health Interview Survey, United States, 2000, 2003, 2005, 2008, and 2010



**Abbreviation:** SPF = sun protection factor.

\* Age-adjusted to the 2000 U.S. population using the age groups 18–24 and 25–29 years.

<sup>†</sup> The percentage who reported engaging in each sun protective behavior always or most of the time when outdoors in the sun. Response options included “always,” “most of the time,” “sometimes,” “rarely,” or “never.”

<sup>§</sup> Only asked in 2005, 2008, and 2010.

<sup>¶</sup> Each year, participants were asked, “What is the SPF number of the sunscreen you use most often?” In 2005, 2008, and 2010, participants who responded to this question with “more than one,” “different ones,” or “other” also were asked, “Is the SPF usually 1–14 or 15–50?” as a probe to decrease missing data.

<sup>\*\*</sup> Data on wide-brimmed hat use in 2000 and 2003 are not shown. Data from 2005, 2008, and 2010 are thought to more accurately estimate wide-brimmed hat use because of the addition of a question about wearing “a baseball cap or sun visor” and the use of pictures of examples of wide-brimmed hats, starting in 2005.

### Editorial Note

Surveying sun protective behaviors and sunburn over time is a method for measuring the impact of skin cancer prevention activity and tracking progress toward achieving *Healthy People 2020* objectives, which include increasing the proportion of persons who participate in behaviors that reduce their exposure

to harmful ultraviolet (UV) irradiation and avoid sunburn (8).\* The findings in this report suggest an increase in sunscreen use, shade use, and wearing long clothing to the ankles in recent years among persons aged 18–29 years but no corresponding decrease in the proportion reporting sunburn.

\* Objective C-20, available at <http://healthypeople.gov/2020/topicsobjectives2020/objectiveslist.aspx?topicid=5>.

TABLE. Prevalence\* of at least one sunburn in the past 12 months among adults aged 18–29 years, by sex and race/ethnicity — National Health Interview Survey, United States, 2000, 2005, and 2010

Sex and race/ethnicity <sup>†</sup>	2000 (N = 5,980)		2005 (N = 5,416)		2010 (N = 4,914)	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
<b>Women</b>						
White	65.6	(62.8–68.4)	61.0	(58.4–63.6) <sup>§</sup>	65.9	(62.5–69.1)
Black	12.8	(9.4–17.1)	12.5	(9.1–16.8)	12.8	(9.7–16.9)
Hispanic	33.0	(28.7–37.7)	28.2	(24.5–32.3)	38.3	(33.7–43.0)
Other race	33.1	(24.2–43.4)	31.4	(20.2–45.3)	31.2	(22.8–40.9)
<b>Total</b>	<b>51.8</b>	<b>(49.6–54.1)</b>	<b>46.9</b>	<b>(44.9–49.0)<sup>§</sup></b>	<b>51.3</b>	<b>(48.8–53.7)</b>
<b>Men</b>						
White	65.2	(62.3–68.1)	59.0	(55.5–62.4) <sup>§</sup>	65.3	(61.7–68.7)
Black	6.4	(4.1–9.8)	6.2	(3.5–10.8)	8.7	(5.2–14.2)
Hispanic	30.8	(26.4–35.6)	26.2	(22.6–30.1)	32.4	(28.2–36.9)
Other race	18.1	(12.3–25.8)	19.7	(11.8–31.1)	23.1	(16.1–31.9)
<b>Total</b>	<b>49.9</b>	<b>(47.5–52.4)</b>	<b>44.1</b>	<b>(41.5–46.7)<sup>§</sup></b>	<b>49.1</b>	<b>(46.4–51.7)</b>
<b>Total</b>	<b>50.9</b>	<b>(49.3–52.5)</b>	<b>45.5</b>	<b>(43.9–47.2)<sup>§</sup></b>	<b>50.1</b>	<b>(48.2–52.0)</b>

Abbreviation: CI = confidence interval.

\* Estimates are age-adjusted to the 2000 U.S. population using the age groups 18–24 and 25–29 years.

<sup>†</sup> Persons identified as Hispanic might be of any race. Persons identified as white, black, or other race are all non-Hispanic.

<sup>§</sup> Statistically significant difference compared with 2000.

#### What is already known on this topic?

Previous data have indicated that most U.S. adults aged 18–29 years do not regularly engage in protective behaviors when outdoors in the sun, and approximately half have experienced sunburn in the past year.

#### What is added by this report?

Although some sun protective behaviors, including shade and sunscreen use and wearing long clothing to the ankles, have increased in recent years among adults aged 18–29 years, the prevalence of sunburn in 2010 remained high (50.1%), especially among whites (65.6%).

#### What are the implications for public health practice?

Provision of shade and sunscreen in recreational settings and clinical counseling of younger adults are promising strategies for creating environments and social norms that facilitate sun protection and sunburn prevention in this population.

The effectiveness of each protective behavior depends on the specific conditions and proper use (10). Similar to the findings of other studies, sunscreen use was one of the most commonly reported protective behaviors, but sunscreen use remained low, with only 37.1% of women and 15.6% of men reporting use always or most of the time (8,10). Under new regulations announced by the Food and Drug Administration, which will take effect by the summer of 2012, all sunscreens will be labeled for the indication of helping prevent sunburn.<sup>†</sup> The SPF value indicates the level of protection a sunscreen provides

against sunburn, which primarily is caused by UVB radiation. However, sunscreens that are labeled “broad spectrum” also will have demonstrated equivalent levels of UVA protection. Those labeled “broad spectrum” with an SPF  $\geq 15$  therefore will have high levels of both UV and UVB protection and will be labeled for the indication of helping to reduce the risk for skin cancer and premature skin aging when used in conjunction with other protective measures (e.g., limiting time in the sun, especially between the hours of 10 a.m. and 2 p.m., and wearing protective clothing, hats, and sunglasses).

The findings in this report are subject to at least five limitations. First, this study relies on self-reported information that is subject to recall and social desirability bias. Second, proper use of sun protection methods (e.g., adequate application of sunscreen) could not be assessed. Third, because of differences in questions, not all protective behaviors could be assessed for every survey year. Fourth, information was not available to determine the proportion of sunburns attributable to sun exposure versus tanning bed use. Finally, for this analysis, no data were collected on sun sensitivity, the amount of time spent in the sun, or sunburn severity, and no distinction was made between participants who had one sunburn or multiple sunburns, all factors that can be associated with the degree of risk for skin cancer (3,7).

Continued public health efforts are needed to facilitate sun protection, prevent sunburn, and avoid increases in skin cancer cases. Evidence from a recent review by the U.S. Preventive Services Task Force suggests that behavioral counseling in a primary-care setting can increase sun protective behaviors, particularly

<sup>†</sup> Additional information available at <http://www.fda.gov/drugs/resourcesforyou/consumers/buyingusingmedicinesafely/understandingover-the-countermedicines/ucm239463.htm>.

among persons aged 10–24 years.<sup>§</sup> Additionally, environmental and policy changes (e.g., provision of shade and sunscreen in recreational settings) could be promising strategies for creating social and physical environments that routinely promote sun protection for younger adults and persons of all ages.<sup>¶</sup>

<sup>§</sup> Additional information available at <http://www.uspreventiveservicestaskforce.org/uspstf/uspsskco.htm>.

<sup>¶</sup> Additional information available at <http://www.thecommunityguide.org/cancer/skin/education-policy/outdoorrecreation.html>.

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## Use of Indoor Tanning Devices by Adults — United States, 2010

Indoor tanning is associated with an increased risk for skin cancer, the most common form of cancer in the United States (1,2). The World Health Organization considers ultraviolet (UV) tanning devices to be a cause of cancer in humans (3). Exposure to UV radiation, either from sunlight or indoor tanning devices, is the most important, avoidable known risk factor for skin cancer (4,5). Annually, skin cancer costs an estimated \$1.7 billion to treat and results in \$3.8 billion in lost productivity (6). Reducing the proportions of adolescents and adults who report using artificial sources of UV light for tanning are *Healthy People 2020* objectives (7). Current state-level policies to restrict indoor tanning are directed at youths aged <18 years. To examine the proportion of the adult U.S. population reporting indoor tanning in the past 12 months, CDC and the National Cancer Institute analyzed data from the 2010 National Health Interview Survey (NHIS). Overall, the age-adjusted proportion of adults reporting indoor tanning in the past 12 months was 5.6%, with higher rates among whites, women, and adults aged 18–25 years. Nationwide, the highest rates of indoor tanning were among white women aged 18–21 years (31.8%) and 22–25 years (29.6%). Among white adults who reported indoor tanning, 57.7% of women and 40.0% of men reported indoor tanning  $\geq 10$  times in the past 12 months. Continued public health efforts are needed to identify and implement effective strategies for reducing indoor tanning among adults in the United States, particularly among whites, women, and adults aged 18–25 years.

NHIS data are collected annually from a continually conducted, nationally representative sample of the U.S. civilian, noninstitutionalized population, primarily through in-person household interviews. This report uses data from the NHIS cancer control supplement, which includes questions regarding indoor tanning.\* Specifically, respondents were asked, “During the past 12 months, have you used an indoor tanning device such as a sunlamp, sunbed, or tanning booth even one time? Do not include times you have gotten a spray-on tan.” Respondents replying “yes” to that question were then asked, “During the past 12 months, how many times have you used an indoor tanning device such as a sunlamp, sunbed, or tanning booth? Do not include times you have gotten a spray-on tan.” Data from 25,233 adults aged  $\geq 18$  years were available for analysis. The response rate for the sample adult data used in this study was 60.8%. Indoor tanning prevalence was examined

by age, sex, race/ethnicity, marital status, education level, poverty status, U.S. Census region (Northeast, Midwest, South, and West),<sup>†</sup> health status, family history of skin cancer, and having a sunburn in the past year. Analyses were performed using statistical software to account for the complex sampling design. Sample weights were applied to reflect probability of selection, adjustments for non-response, and poststratification to provide nationally representative estimates. Estimates were age-adjusted to the 2000 U.S. standard population for more direct comparison between groups. For racial/ethnic groups, persons identified as Hispanic might be of any race; persons in all other racial/ethnic categories are non-Hispanic.

Nationwide, 5.6% of adults reported indoor tanning in the past 12 months (Table 1). Compared with the overall adult population, a higher prevalence of indoor tanning was found among persons aged 18–21 years (12.3%), 22–25 years (12.3%), and 26–29 years (9.3%); those with a family history of skin cancer (9.0%); those in the Midwest (8.8%); white adults (8.1%); those who had a sunburn in the past 12 months (7.9%); those whose level of education was some college or technical school (7.5%); and those whose annual income exceeded 200% of the federal poverty level (6.5%).<sup>§</sup> By sex, age-adjusted indoor tanning prevalence was higher among women (8.9%), particularly among white women (12.9%), women with a family history of skin cancer (13.1%), and women aged 18–21 years (21.2%) and 22–25 years (20.4%). The highest prevalence of indoor tanning was found among white women aged 18–21 years (31.8%) and aged 22–25 years (29.6%), particularly among those aged 18–21 years in the Midwest (44.0%), and those aged 22–25 years in the South (36.4%) (Figure). Among white adults who reported indoor tanning, the frequency of use was higher among women, with an average of 20.3 sessions per year, and 57.7% reported tanning  $\geq 10$  times in the past 12 months. Increased use was found among white women aged 18–21 years, with an average of 27.6 sessions per year, and 67.6% reported tanning  $\geq 10$  times in the past 12 months (Table 2).

<sup>†</sup> *Northeast*: Connecticut, Maine, Massachusetts, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont; *Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; *West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming.  
<sup>§</sup> Poverty status is based on family income and family size using the U.S. Census Bureau's poverty thresholds for the previous calendar year. In NHIS, “poor/near poor” persons are defined as having incomes <200% of the poverty threshold, and “not poor” are defined as having incomes  $\geq 200\%$  of the poverty threshold. Additional information available at [ftp://ftp.cdc.gov/pub/health\\_statistics/nchs/dataset\\_documentation/nhis/2010/srvydesc.pdf](ftp://ftp.cdc.gov/pub/health_statistics/nchs/dataset_documentation/nhis/2010/srvydesc.pdf).

\*The findings in this report cannot be compared directly with findings from earlier National Health Interview Surveys because of differences in the wording of the questions asked. Additional information available at <http://www.cdc.gov/nchs/nhis.htm>.

TABLE 1. Percentage of adults who used an indoor tanning device\* at least once in the past 12 months, by selected characteristics — National Health Interview Survey (NHIS), United States, 2010

Characteristic	Total		Men		Women	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
<b>Total</b>	5.6	(5.2–6.0)	2.2	(1.9–2.6)	8.9	(8.2–9.7)
<b>Age group (yrs)<sup>†</sup></b>						
18–29	11.3	(10.1–12.6)	3.9	(3.0–4.9)	18.9	(16.9–21.1)
18–21	12.3	(10.1–14.9)	4.1	(2.7–6.3)	21.2	(17.1–25.8)
22–25	12.3	(10.4–14.6)	3.9	(2.5–6.1)	20.4	(17.1–24.2)
26–29	9.3	(7.8–11.0)	3.6	(2.4–5.2)	15.2	(12.6–18.3)
30–39	5.9	(5.2–6.7)	2.5	(1.8–3.3)	9.2	(7.9–10.7)
40–49	5.9	(5.1–6.9)	2.6	(1.9–3.6)	9.2	(7.8–10.8)
50–64	2.9	(2.4–3.5)	1.4	(1.0–2.0)	4.3	(3.5–5.4)
≥65	0.8	(0.5–1.1)	0.4 <sup>§</sup>	(0.2–0.7)	1.1	(0.7–1.7)
<b>Race/Ethnicity<sup>¶</sup></b>						
White	8.1	(7.5–8.7)	3.3	(2.8–3.8)	12.9	(11.9–13.9)
Black	0.3 <sup>§</sup>	(0.1–0.5)	0.1 <sup>§</sup>	(0.0–0.2)	0.4 <sup>§</sup>	(0.2–0.9)
Hispanic	1.6	(1.2–2.1)	0.4	(0.2–0.7)	2.9	(2.2–3.9)
Other race	2.1	(1.3–3.5)	0.5 <sup>§</sup>	(0.2–1.3)	3.6	(2.1–6.0)
<b>Marital status</b>						
Married/Partnered	5.7	(5.1–6.3)	2.0	(1.6–2.6)	9.0	(8.1–10.0)
Not married/partnered	5.6	(5.1–6.3)	2.6	(2.1–3.3)	8.7	(7.8–9.7)
<b>Education</b>						
College graduate	5.0	(4.3–5.8)	2.1	(1.6–2.7)	7.5	(6.4–8.8)
Some college or technical school	7.5	(6.7–8.3)	2.9	(2.3–3.6)	11.5	(10.3–12.9)
High school graduate	5.6	(4.9–6.4)	2.4	(1.8–3.1)	9.4	(8.1–10.8)
Some high school or less	2.7	(2.1–3.5)	0.9 <sup>§</sup>	(0.4–1.6)	4.8	(3.6–6.4)
<b>Poverty status<sup>**</sup></b>						
Poor/Near poor	4.0	(3.4–4.6)	1.4	(1.0–2.1)	6.2	(5.4–7.2)
Not poor	6.5	(6.0–7.2)	2.6	(2.2–3.1)	10.7	(9.7–11.7)
<b>Household type</b>						
1 adult, no children aged <18 yrs	6.5	(5.7–7.3)	3.5	(2.8–4.4)	10.6	(9.2–12.1)
Multiple adults, no children aged <18 yrs	5.7	(5.0–6.4)	2.5	(1.9–3.3)	9.5	(8.3–10.8)
1 adult, ≥1 children aged <18 yrs	6.7	(5.5–8.2)	2.9 <sup>§</sup>	(0.9–9.2)	7.5	(6.0–9.3)
Multiple adults, ≥1 children aged <18 yrs	4.6	(4.1–5.2)	1.3	(0.9–1.8)	7.6	(6.6–8.7)
<b>U.S. Census region<sup>††</sup></b>						
Northeast	4.4	(3.5–5.6)	1.5	(1.0–2.4)	7.3	(5.8–9.2)
Midwest	8.8	(7.8–9.8)	3.6	(2.9–4.5)	13.7	(12.2–15.4)
South	5.5	(4.9–6.2)	2.3	(1.8–3.0)	8.5	(7.5–9.7)
West	3.6	(2.9–4.5)	1.3	(0.9–1.9)	6.0	(4.8–7.5)
<b>Health status</b>						
Excellent	6.3	(5.6–7.1)	2.6	(2.2–3.2)	10.2	(8.9–11.6)
Very good	6.0	(5.4–6.8)	2.0	(1.5–2.7)	9.9	(8.9–11.1)
Good	4.8	(4.1–5.6)	2.0	(1.4–2.8)	7.5	(6.3–8.9)
Fair	3.7	(2.5–5.5)	1.8 <sup>§</sup>	(0.9–3.8)	5.1	(3.3–7.9)
Poor	3.4	(1.9–6.2)	2.4 <sup>§</sup>	(0.8–7.0)	4.3 <sup>§</sup>	(2.1–8.9)
<b>Sunburn in the past 12 months</b>						
Yes	7.9	(7.2–8.6)	3.2	(2.7–3.9)	12.6	(11.4–13.8)
No	3.8	(3.4–4.2)	1.4	(1.1–1.8)	6.1	(5.4–7.0)
<b>Family history of skin cancer<sup>§§</sup></b>						
Yes	9.0	(7.1–11.3)	3.7	(2.1–6.2)	13.1	(10.1–16.7)
No	5.5	(5.1–6.0)	2.2	(1.9–2.6)	8.8	(8.1–9.6)

Abbreviation: CI = confidence interval.

\* Indoor tanning device use defined as using a sunlamp, sunbed, or tanning booth (not including a spray-on tan).

† Data are age-adjusted to the 2000 U.S. standard population using age groups 18–29, 30–39, 40–49, 50–64, and ≥65 years.

§ Estimates based on fewer than 30 observations or with a relative standard error &gt;0.30 are considered unreliable by the standards of the National Center for Health Statistics.

¶ Persons identified as Hispanic might be of any race; persons in all other racial/ethnic categories are non-Hispanic.

\*\* Poverty status is based on family income and family size using the U.S. Census Bureau's poverty thresholds for the previous calendar year. In NHIS, "poor/near poor" persons are defined as having incomes below 200% of the poverty threshold, and "not poor" are defined as having incomes ≥200% of the poverty threshold. Additional information available at [ftp://ftp.cdc.gov/pub/health\\_statistics/nchs/dataset\\_documentation/nhis/2010/srvydesc.pdf](http://ftp.cdc.gov/pub/health_statistics/nchs/dataset_documentation/nhis/2010/srvydesc.pdf).†† *Northeast*: Connecticut, Maine, Massachusetts, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont; *Midwest*: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *South*: Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; *West*: Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming.

§§ Skin cancer includes melanoma, nonmelanoma, and skin cancer of unknown type.



**TABLE 2. Reported use of indoor tanning devices\* by non-Hispanic white adults who used an indoor tanning device in the past 12 months, by sex, age group, and U.S. Census region† — National Health Interview Survey, United States, 2010**

Characteristic	Men				Women			
	Mean no. of times	(95% CI)	% who tanned ≥10 times	(95% CI)	Mean no. of times	(95% CI)	% who tanned ≥10 times	(95% CI)
<b>Total</b>	<b>14.6</b>	<b>(10.2–19.0)</b>	<b>40.0</b>	<b>(32.8–47.7)</b>	<b>20.3</b>	<b>(18.1–22.5)</b>	<b>57.7</b>	<b>(53.9–61.5)</b>
<b>Age group (yrs)<sup>§</sup></b>								
18–29	9.3	(6.3–12.3)	35.8	(24.3–49.3)	22.4	(18.9–26.0)	61.1	(55.1–66.7)
18–21	7.8 <sup>¶</sup>	(5.5–10.1)	39.7 <sup>¶</sup>	(19.6–63.9)	27.6	(20.9–34.2)	67.6	(56.9–76.7)
22–25	13.0 <sup>¶</sup>	(4.5–21.4)	39.6 <sup>¶</sup>	(20.2–62.8)	18.0	(14.4–21.7)	56.3	(46.1–66.0)
26–29	7.3 <sup>¶</sup>	(4.3–10.2)	27.5 <sup>¶</sup>	(14.0–46.9)	21.9	(13.8–29.9)	59.2	(48.2–69.3)
30–39	10.7	(6.2–15.2)	40.0	(25.9–56.1)	19.0	(15.0–23.0)	61.2	(52.6–69.1)
40–49	31.9	(13.7–50.1)	50.9	(33.7–67.8)	19.9	(14.6–25.2)	53.5	(43.9–62.8)
50–64	10.1	(5.7–14.4)	31.4	(18.7–47.7)	16.7	(12.2–21.2)	53.5	(42.4–64.2)
≥65	10.5 <sup>¶</sup>	(5.8–15.3)	80.6 <sup>¶</sup>	(33.0–97.2)	12.6 <sup>¶</sup>	(3.8–21.4)	24.5 <sup>¶</sup>	(10.2–48.2)
<b>U.S. Census region</b>								
Northeast	37.3 <sup>¶</sup>	(7.9–66.8)	46.3 <sup>¶</sup>	(29.0–65.0)	20.4	(11.7–29.0)	42.5	(30.4–55.6)
Midwest	13.2	(8.8–17.5)	52.3	(43.2–61.3)	16.8	(14.0–19.6)	49.9	(44.1–55.7)
South	14.6	(7.9–21.2)	47.2	(33.8–61.0)	21.1	(16.6–25.6)	59.6	(50.2–68.3)
West	11.6 <sup>¶</sup>	(2.4–20.7)	29.5 <sup>¶</sup>	(13.6–52.6)	14.4	(10.9–18.0)	45.7	(36.2–55.6)

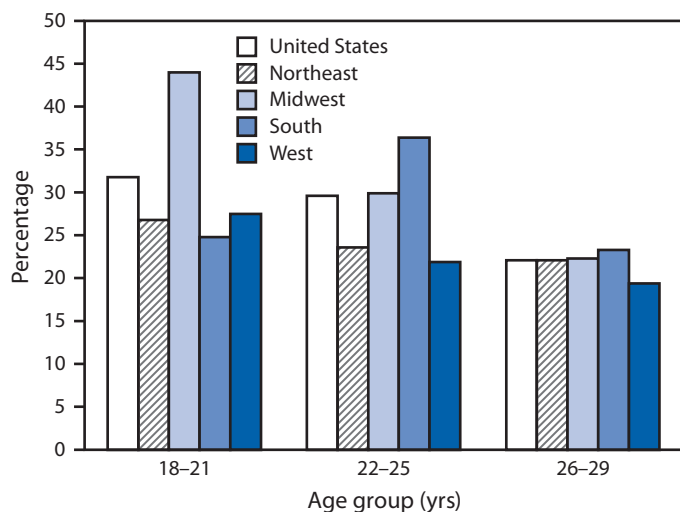
**Abbreviation:** CI = confidence interval.

\* Indoor tanning device use defined as using a sunlamp, sunbed, or tanning booth (not including a spray-on tan).

† *Northeast:* Connecticut, Maine, Massachusetts, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont; *Midwest:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; *West:* Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming.

§ Data are age-adjusted to the 2000 U.S. standard population using age groups 18–29, 30–39, 40–49, 50–64, and ≥65 years.

¶ Estimates based on fewer than 30 observations or with a relative standard error >0.30 are considered unreliable by the standards of the National Center for Health Statistics.

**FIGURE. Percentage of non-Hispanic white women aged 18–29 years who used an indoor tanning device\* at least once in the past 12 months, by age group and U.S. Census region — National Health Interview Survey, United States, 2010**

\* Indoor tanning device use defined as using a sunlamp, sunbed, or tanning booth (not including a spray-on tan).

† *Northeast:* Connecticut, Maine, Massachusetts, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, and Vermont; *Midwest:* Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin; *South:* Alabama, Arkansas, Delaware, District of Columbia, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, and West Virginia; *West:* Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, New Mexico, Nevada, Oregon, Utah, Washington, and Wyoming.

#### What is already known on this topic?

Exposure to ultraviolet radiation from indoor tanning devices is associated with an increased risk for melanoma and nonmelanoma skin cancer.

#### What is added by this report?

An estimated 5.6% of U.S. adults reported indoor tanning at least once in 2010, with the highest rate among white women aged 18–21 years (31.8%) and 22–25 years (29.6%). Among white users, 57.7% of women and 40.0% of men reported indoor tanning ≥10 times in the past 12 months. The overall prevalence of indoor tanning is highest among adults aged 18–25 years, among women, and among whites.

#### What are the implications for public health practice?

Public health efforts that target populations with particularly high levels of indoor tanning are needed to reduce indoor tanning and the subsequent risk for skin cancer.

#### Reported by

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## Editorial Note

The findings in this report indicate that recent indoor tanning is not uncommon among adults in the United States and is more common among certain subgroups. Similar to previous findings, indoor tanning was most common among women, whites, and young adults (8). The highest rates of indoor tanning were found among young women; particularly white women aged 18–25 years. Among white women who reported indoor tanning, more than half (57.7%) reported indoor tanning  $\geq 10$  times in the past 12 months. Melanoma incidence rates are increasing and are higher among young white women than among young white men, which might be attributable, in part, to their increased rates of indoor tanning (9,10). Indoor tanning is particularly dangerous for younger users because indoor tanning before age 35 years increases the risk for melanoma by 75% (1).

UV radiation levels from indoor tanning devices far exceed those from sunlight. The UVA (long wavelengths, 320–400 nm) output of tanning devices has been shown to be four times higher than the noon sunlight in Washington, DC, during the summer, and the UVB (midrange wavelengths, 290–320 nm) output was twice as high (5). The high frequency of use among indoor tanners is of great concern given these high levels of UV radiation and the elevated risk for skin cancer with increasing numbers of sessions (2).

The findings in this report are subject to at least four limitations. First, the results from this study are generalizable only to the noninstitutionalized civilian adult population; military personnel and persons in nursing homes and other institutions were excluded. Second, the response rate for the NHIS sample adult data was only 60.8%. Third, use of an indoor tanning device was self-reported, and the degree of misreporting cannot be determined. Finally, the length of exposure for each indoor tanning session, and cumulative exposure, could not be assessed.

A higher rate of indoor tanning among adults with a family history of skin cancer suggests that the dangers of indoor tanning might not be understood fully, the known risks might not discourage the behavior, or both. Increased use of indoor tanning also might be attributable to the association of tanning behaviors among children and their parents or caretakers. Continued public health efforts are needed to increase awareness of the risk for skin cancer and how it can be prevented. Given the regional differences in the prevalence of indoor tanning, improved surveillance at the state level can aid future efforts in monitoring indoor tanning trends. Reducing exposure to UV radiation from indoor tanning is an important strategy for reducing the occurrence of skin cancer. Evidence from a recent review by the U.S. Preventive Services Task Force suggests that behavioral counseling in a primary-care setting can reduce UV exposure, including indoor tanning, among persons aged 10–24 years. In young women, the most likely group to indoor tan, appearance-focused behavioral interventions reduced indoor tanning behavior by up to 35%.<sup>¶</sup> Approaches

to reduce indoor tanning also include consideration of limits on indoor tanning by minors. Currently, 33 states have laws restricting minors' access to indoor tanning under a certain age (typically under age 14, 16, or 18 years), including bans on access or requiring parental accompaniment or consent. Evaluations of these relatively new policies typically have focused on compliance and the importance of high compliance levels in reducing use among the target population. Additional approaches include increased regulation of indoor tanning devices through reclassification of indoor tanning devices to a category requiring stricter regulations and mandatory disclosure of risk information to purchasers of tanning devices and customers of tanning salons. Given the high prevalence of indoor tanning among young adult women, an increased focus should be placed on this population to prevent melanoma from increasing significantly as this generation ages. Continued surveillance of indoor tanning use will aid program planning and evaluation by measuring the effect of skin cancer prevention policies and monitoring progress toward achieving *Healthy People 2020* national objectives.

## Acknowledgment

Richard Lee, Information Management Svcs, Inc., Silver Spring, Maryland.

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<sup>¶</sup> Additional information available at <http://www.uspreventiveservicestaskforce.org/uspsf/uspskco.htm>.

## New Framework (GRADE) for Development of Evidence-Based Recommendations by the Advisory Committee on Immunization Practices

The Advisory Committee on Immunization Practices (ACIP) is a federal advisory committee that provides expert advice to the Director of CDC and the Secretary of the U.S. Department of Health and Human Services. This advice comprises recommendations on the use of vaccines and related agents for control of vaccine-preventable diseases in the U.S. civilian population (1,2). To develop its recommendations, ACIP forms work groups that gather, analyze, and prepare scientific information and present it at public meetings. The work groups also present options for recommendations based on the scientific evidence they have assessed. Recommendations that are approved by a majority of ACIP's voting members are then reviewed by the Director of CDC. If approved by the Director, recommendations are published in *MMWR*. This report briefly summarizes the new framework for developing evidence-based recommendations that ACIP adopted at its October 2010 meeting.

New or substantially revised ACIP recommendations for vaccination will be developed using an evidence-based framework called "Grading of Recommendations Assessment, Development and Evaluation" (GRADE) (3–5). Recommendations will be made in one of two categories. Category A recommendations will include those for which ACIP recommends vaccination for all persons in an age group or a group at increased risk for vaccine-preventable disease. Category B recommendations do not apply to all members of a group; they provide guidance to the clinician in the context of individual clinician-patient interactions to help determine whether or not vaccination is appropriate for a specific patient. In some instances (e.g., when additional information is needed), ACIP might not make a recommendation.

Using the GRADE framework, ACIP will systematically assess the type or quality of evidence about a vaccine's expected health impacts and the balance of health benefits and risks, along with the values and preferences of persons affected, and health economic analyses. The evidence is grouped into four categories, with the order reflecting the level of confidence in the estimated effect of vaccination on health outcomes: 1) randomized controlled trials, or overwhelming evidence from observational studies; 2) randomized controlled trials with important limitations, or exceptionally strong evidence from observational studies; 3) observational studies, or randomized controlled trials with notable limitations; and 4) clinical experience and observations, observational studies with important limitations, or randomized controlled trials with several major limitations (4,5).

Randomized trials often cannot be used to assess the safety and efficacy of vaccination on rare or long-term outcomes, and

such trials might be unethical to conduct for vaccines that are already licensed. Observational studies frequently are conducted for such assessments. The GRADE framework allows evaluation of evidence derived from immunogenicity or other intermediate outcomes as well as evaluation of evidence based on extrapolations from findings with similar vaccines in similar populations or other indirect forms of evidence. The balance of benefits and harms is assessed through review of the baseline risk for disease and the expected relative and absolute effects of vaccination on health outcomes. Health economic analyses include computations of cost per quality-adjusted life year gained. Determination of values includes assessing the relative importance of outcomes related to benefits, harms, and health economic analyses. Evidence tables will be used to summarize the type of evidence for a vaccine's health impacts and its expected health benefits and risks.

This standardized and more explicit process for developing ACIP recommendations is expected to enhance transparency, consistency, and communication. Additional information about GRADE is available at <http://www.cdc.gov/vaccines/recs/acip/grade/about.htm#resources>.

### Reported by

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## Announcements

### Healthy Vision Month — May 2012

May is Healthy Vision Month. The theme of this year's observance is "Healthy Vision: Make It Last a Lifetime." CDC's Vision Health Initiative joins with the National Institutes of Health's National Eye Institute in encouraging everyone to make vision and eye health a lifetime priority.

Vision impairment is associated with the inability to perform daily activities, such as reading, driving a car, and preparing meals. Moreover, vision impairment is associated with an increased risk for falls, fall-related injuries, social isolation, and poorer overall health (1,2). Millions of persons in the United States have undiagnosed vision problems and eye conditions (3). Vision disorders are the seventh most common chronic condition for the U.S. general population, the fifth most common for adults aged  $\geq 65$  years, and the third most common for those aged  $\leq 17$  years (4).

Early detection, timely treatment, and the use of proper eye-safety practices can prevent or delay vision impairment. According to the National Eye Institute, a comprehensive dilated eye examination by an eye-care professional can detect certain eye diseases and conditions in their early stages, before vision loss occurs (3). Additional information regarding activities that promote early detection and treatment of eye diseases and strategies for preventing and controlling common eye diseases is available at <http://www.cdc.gov/visionhealth> and <http://www.nei.nih.gov/healthyeeyes>.

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### Skin Cancer Awareness Month — May 2012

May is Skin Cancer Awareness Month, a time to increase awareness of the importance of the prevention, early detection, and treatment of skin cancer. Each year, approximately 2 million persons in the United States are diagnosed with nonmelanoma skin cancers (mostly basal cell and squamous cell carcinomas) (1). Although death rates from nonmelanoma skin cancers are low, these cancers can cause damage and disfigurement if left untreated. Malignant melanoma is the deadliest form of skin cancer. In 2008, the most recent year for which data are available, 59,695 U.S. adults were diagnosed with melanoma, and 8,623 died from the disease (2).

Exposure to ultraviolet (UV) radiation and a history of sunburn are preventable risk factors for skin cancer. CDC recommends several ways for persons to protect themselves from UV radiation: seek shade, especially during midday hours; wear clothing to protect exposed skin; wear a hat with a wide brim to shade the face, head, ears, and neck; wear sunglasses; use sunscreen that has a sun protection factor of 15 or higher and has both UVA and UVB protection; and avoid indoor tanning. Additional information about skin cancer is available at [www.cdc.gov/cancer/skin](http://www.cdc.gov/cancer/skin).

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## Announcements

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### National Women's Health Week — May 13–19, 2012

National Women's Health Week, May 13–19, 2012, is an annual observance to encourage women to make their health a priority and take simple steps for a safer and healthier life. The week-long celebration brings together communities, health agencies and organizations, business, government, and others across the country to promote women's health.

National Women's Health Week starts on Mother's Day, and this year's theme is "It's Your Time." Activities and events around the country will include free health screenings; lectures, workshops, and conferences; educational training for health-care professionals; wellness and fitness expos; and webinars and online sessions. On May 14, which is National Women's Checkup Day, women are encouraged to visit their health-care provider to receive recommended check-ups, screenings, and vaccinations.

CDC promotes and advances the health and safety of women through the development, implementation, and support of research, disease surveillance, and national, state, and local disease and injury prevention and health promotion programs. Through numerous partnerships and programs, CDC works to improve women's health in many areas, including reproductive, occupational, global and environmental health, and to prevent injury, chronic and infectious diseases, and birth defects and disabilities.

CDC encourages women to be physically active, eat well, maintain a healthy weight, be tobacco free, manage stress, get enough sleep, prevent injury, and get vaccinations and periodic check-ups to help lead a safer and healthier life (*1*). More information on how to make those habits an integral part of daily life is available at <http://www.cdc.gov/women>. Additional information about National Women's Health Week is available at <http://www.womenshealth.gov/whw>.

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## Erratum

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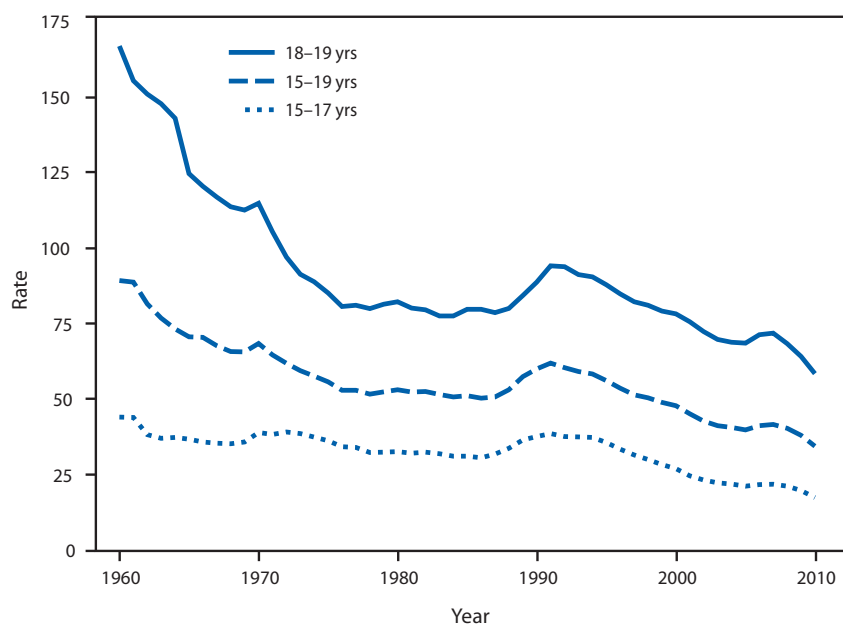
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In the report, "Trends in Tuberculosis — United States, 2011," on page 184, the third sentence in the first column should read, "Among these cases, the percentage of MDR TB for 2010 (1.3% [109 of **8,241**]) was unchanged from the percentage for 2009 (1.3%)."

## QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

### Birth Rates\* for Teens Aged 15–19 Years, by Age Group — National Vital Statistics System, United States, 1960–2010†



\* Births per 1,000 females in specified age group.

† Data for 2010 are preliminary.

U.S. teen birth rates declined to historic lows for all age groups in 2010. The rate for teens aged 15–19 years fell 62% from 1960, when the birth rate was 89.1 per 1,000 women, and 44% from a rate of 61.8 in 1991 to 34.3 in 2010. Most of the decline in birth rates for teens occurred from 1960 to 1980 and then again after 1991. Decreases in birth rates for teens aged 18–19 years generally were greater than the decreases for teens aged 15–17 years from 1960 through 1978. From 1991 to 2010, decreases in birth rates for teens aged 15–17 years were greater.

**Source:** Hamilton BE, Ventura SJ. Birth rates for U.S. teenagers reach historic lows for all age and ethnic groups. NCHS data brief, no 89. Hyattsville, MD: US Department of Health and Human Services, CDC, National Center for Health Statistics; 2012. Available at <http://www.cdc.gov/nchs/data/databriefs/db89.htm>.

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U.S. Government Printing Office: 2012-523-043/02011 Region IV ISSN: 0149-2195

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