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Sexual Intercourse Among High School Students — 29 States and United States Overall, 2005–2015

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Early initiation of sexual activity is associated with having more sexual partners, not using condoms, sexually transmitted infection (STI), and pregnancy during adolescence (*1*,*2*). The majority of adolescents initiate sexual activity during high school, and the proportion of high school students who have ever had sexual intercourse increases by grade; black students are more likely to have ever had sexual intercourse than are white students (*3*). The proportion of high school students overall who had ever had sexual intercourse did not change significantly during 1995–2005 (53.1% to 46.8%) (Division of Adolescent and School Health, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC, unpublished data). To assess whether changes have occurred in recent years in the proportion of high school students who have ever had sexual intercourse, CDC examined trends overall and by grade, race/ethnicity, and sex among U.S. high school students, using data from the 2005–2015 national Youth Risk Behavior Surveys (YRBSs) and data from 29 states* that conduct the YRBS and have weighted data. Nationwide, the proportion of high school students who had ever had sexual intercourse decreased significantly overall and among 9th and 10th grade students, non-Hispanic black (black) students in all grades, and Hispanic students in three grades. A similar pattern by grade was observed in nearly half the states (14), where the prevalence of ever having had sexual intercourse decreased only in 9th grade or only in 9th and 10th grades; nearly all other states saw decreases in some or all grades. The overall decrease in the prevalence of ever having had sexual intercourse during 2005–2015 is a positive change in sexual risk among adolescents (i.e., behaviors that place them at risk for human immunodeficiency virus, STI, or pregnancy) in the United States, an overall decrease that did not occur during the preceding 10 years. Further, decreases by grade and race/ethnicity represent positive changes among groups of students who have been determined in previous studies to be at higher risk for negative outcomes associated with early sexual initiation, such as greater numbers of partners, condom non-use, teen pregnancy, and STI (*1*–*3*). More work is needed to understand the reasons for these decreases and to ensure that they continue.

The national YRBS is a biennial, school-based survey of U.S. high school students conducted by CDC. For each survey, a three-stage cluster sample design was used to produce a nationally representative sample of students in grades 9–12 who

* Alabama, Alaska, Arizona, Arkansas, Connecticut, Delaware, Florida, Idaho, Illinois, Indiana, Kentucky, Maine, Massachusetts, Michigan, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New York, North Carolina, North Dakota, Oklahoma, Rhode Island, South Carolina, South Dakota, West Virginia, and Wyoming.

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attend public and private schools. During 2005–2015, sample sizes ranged from 13,917 to 16,410, and overall response rates ranged from 60% to 71%. Data were weighted to yield nationally representative estimates.

Data from 29 state YRBSs conducted by state health and education agencies also were included in this report. In each state survey, a two-stage cluster sample design was used to produce representative samples of public school students in 28 states and in public and private school students in one state. During 2015, sample sizes across state surveys ranged from 1,313 to 14,837; overall response rates ranged from 60% to 81%. Data were weighted to yield representative estimates by state.

Survey procedures for the national and state surveys were designed to protect students' privacy by allowing anonymous and voluntary participation. Local parental permission procedures were followed before survey administration. Students completed the self-administered questionnaire during one class period and recorded their responses directly on a computer-scannable booklet or answer sheet. Each questionnaire included the following question to ascertain prevalence of ever having had sexual intercourse: "Have you ever had sexual intercourse?" Response options were "yes" and "no." No definition for sexual intercourse was provided.

For the national YRBS, prevalence estimates were computed overall and by grade (9th, 10th, 11th, or 12th), sex (male or female), and race/ethnicity (non-Hispanic white [white], black, or Hispanic). For the state YRBSs, prevalence estimates were computed by grade. Statistical software was used to account for the complex sample designs during analyses.

Logistic regression analyses were used to account for all available estimates; control for changes in sex, grade, and race/ethnicity over time; and assess statistically significant ($p<0.05$) long-term linear and quadratic trends in ever having had sexual intercourse during 2005–2015. A quadratic trend indicates a significant but nonlinear trend in prevalence over time. Both a linear and quadratic trend are possible because the linear trend indicates the direction of the trend from the start to the end of the time frame, and the quadratic trend indicates a nonlinear change within the time frame. For the national YRBS, race/ethnicity data are presented for black, white, and Hispanic students only.

Nationwide, during 2005–2015, a significant linear decrease in the prevalence of ever having had sexual intercourse among all students in grades 9–12 (46.8% to 41.2%) was identified (Table) (Figure 1). A significant linear decrease also was identified among male (47.9% to 43.2%), female (45.7% to 39.2%), black (67.6% to 48.5%), and Hispanic (51.0% to 42.5%) students. Among black students, a significant quadratic trend also was identified. The prevalence of ever having had sexual intercourse among black students did not change between 2005 (67.6%) and 2009 (65.2%), but subsequently decreased from 2009 (65.2%) to 2015 (48.5%).

During 2005–2015, among 9th grade students, a significant linear decrease in the prevalence of ever having had sexual intercourse was identified overall (34.3% to 24.1%) and

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TABLE. Trends in prevalence of ever having had sexual intercourse among high school students, by sex, race/ethnicity, and grade in school — National Youth Risk Behavior Surveys, United States, 2005–2015

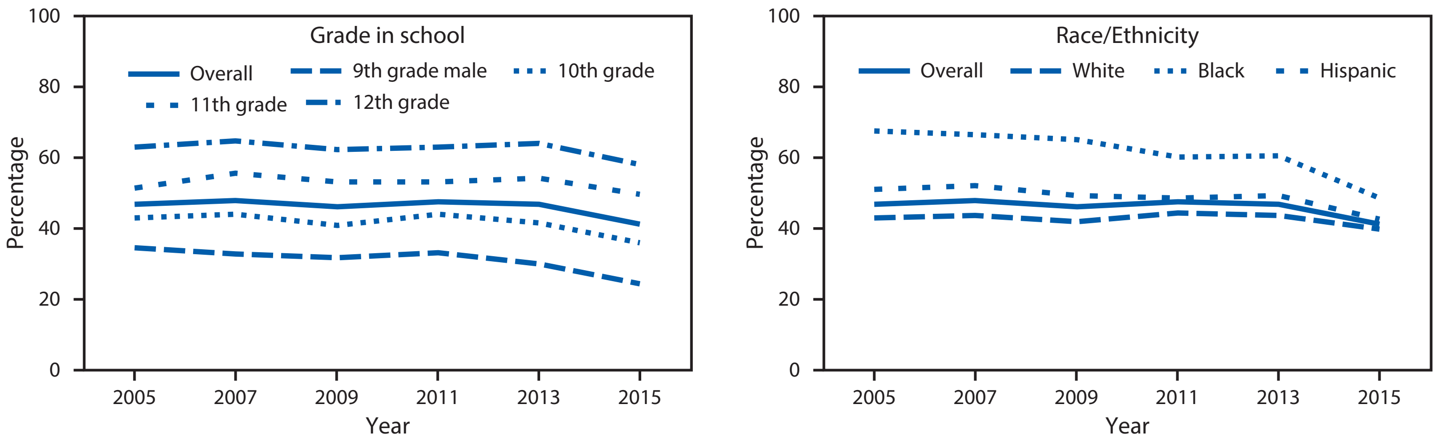
Characteristic	Prevalence, %						Trend p-value*	
	2005	2007	2009	2011	2013	2015	Linear	Quadratic
Total	**46.8**	**47.8**	**46.0**	**47.4**	**46.8**	**41.2**	**0.0069†**	**0.0770**
Sex								
Male	47.9	49.8	46.1	49.2	47.5	43.2	0.0106†	0.1919
Female	45.7	45.9	45.7	45.6	46.0	39.2	0.0176†	0.0648
Race/Ethnicity								
White§	43.0	43.7	42.0	44.3	43.7	39.9	0.3711	0.4370
Black§	67.6	66.5	65.2	60.0	60.6	48.5	0.0000†	0.0163†
Hispanic	51.0	52.0	49.1	48.6	49.2	42.5	0.0003†	0.1194
9th grade	34.3	32.8	31.6	32.9	30.0	24.1	0.0000†	0.0541
Sex								
Male	39.3	38.1	33.6	37.8	32.0	27.3	0.0000†	0.1789
Female	29.3	27.4	29.3	27.8	28.1	20.7	0.0080†	0.0713
Race/Ethnicity								
White§	29.4	25.8	24.9	27.3	26.5	21.3	0.0614	0.8057
Black§	55.4	52.5	51.5	48.2	43.1	31.4	0.0000†	0.0417†
Hispanic	40.5	39.7	37.9	36.8	31.6	25.9	0.0001†	0.0637
10th grade	42.8	43.8	40.9	43.8	41.4	35.7	0.0449†	0.1769
Sex								
Male	41.5	45.6	41.9	44.5	41.1	37.9	0.1283	0.2272
Female	44.0	41.9	39.6	43.0	41.7	33.5	0.0506	0.2927
Race/Ethnicity								
White§	37.5	38.1	34.7	38.4	35.4	32.8	0.3625	0.7079
Black§	66.4	66.4	64.8	58.4	62.6	47.3	0.0002†	0.0784
Hispanic	46.9	49.1	44.8	46.5	45.8	36.0	0.0095†	0.0674
11th grade	51.4	55.5	53.0	53.2	54.1	49.6	0.3631	0.1934
Sex								
Male	50.6	57.3	53.4	54.5	54.3	51.2	0.5238	0.1321
Female	52.1	53.6	52.5	51.9	53.9	48.2	0.3724	0.3940
Race/Ethnicity								
White§	47.3	52.3	49.8	50.5	53.0	47.8	0.7905	0.3021
Black§	74.8	74.1	71.3	63.6	63.5	57.2	0.0000†	0.8166
Hispanic	55.0	58.1	56.2	56.0	56.7	52.2	0.2288	0.2815
12th grade	63.1	64.6	62.3	63.1	64.1	58.1	0.0811	0.2155
Sex								
Male	63.8	62.8	59.6	62.6	65.4	59.0	0.3548	0.9941
Female	62.4	66.2	65.0	63.6	62.8	57.2	0.0328†	0.0276†
Race/Ethnicity								
White§	60.5	62.1	60.6	62.5	61.0	58.8	0.6164	0.3767
Black§	80.0	81.8	79.7	73.9	77.4	63.3	0.0002†	0.1352
Hispanic	69.7	70.5	64.7	60.0	69.3	60.7	0.0336†	0.5242

* Based on linear and quadratic trend analyses using logistic regression models controlling for grade, sex, and race/ethnicity.
† Statistically significant trend ($p<0.05$).
§ Non-Hispanic; Hispanic persons could be of any race.

among male (39.3% to 27.3%), female (29.3% to 20.7%), black (55.4% to 31.4%), and Hispanic (40.5% to 25.9%) students. Among 9th grade black students, a significant quadratic trend also was identified; prevalence decreased between 2005 (55.4%) and 2011 (48.2%) and then decreased even more sharply from 2011 (48.2%) to 2015 (31.4%). Among 10th grade students, a significant linear decrease in prevalence was identified overall (42.8% to 35.7%) and among black (66.4% to 47.3%) and Hispanic (46.9% to 36.0%) students. Among 11th grade students, a significant linear decrease in prevalence was identified only among black students (74.8% to 57.2%). Among 12th grade students, a significant linear decrease in prevalence was identified among female (62.4% to 57.2%), black (80.0% to 63.3%), and Hispanic (69.7% to 60.7%) students; among 12th grade female students, a significant quadratic trend also was identified. The prevalence of ever having had sexual intercourse did not change between 2005 (62.4%) and 2009 (65.0%) and then decreased from 2009 (65.0%) to 2015 (57.2%). The prevalence of ever having sexual intercourse among white students did not change overall or in any grade.

Across 29 states, a significant linear decrease in the prevalence of ever having had sexual intercourse was identified among

FIGURE 1. Trends in prevalence of ever having had sexual intercourse among high school students, by grade in school and race/ethnicity — national Youth Risk Behavior Surveys, United States, 2005–2015

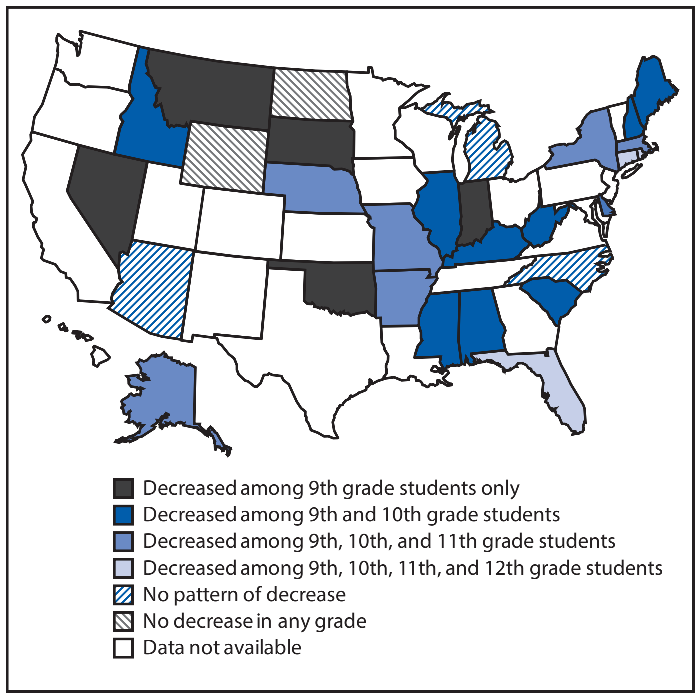


only 9th grade students in five states; among only 9th and 10th grade students in nine states; among only 9th, 10th, and 11th grade students in seven states; among 9th, 10th, 11th, and 12th grade students in three states; and among other combinations of grades in three states (Figure 2). In two states (North Dakota and Wyoming), the prevalence of ever having had sexual intercourse did not decrease over time in any grade.

Discussion

Nationwide, although the prevalence of ever having had sexual intercourse decreased overall during 2005–2015, closer examination of the data indicated several distinctions by sex, grade, and race/ethnicity. First, among students overall, significant linear decreases were observed among all sex and race/ethnicity subgroups except white students. Second, decreases were seen among 9th and 10th grade students, but not 11th and 12th grade students. A similar pattern was observed in almost half (14) of the states where the prevalence of ever having had sexual intercourse decreased only in 9th grade or only in 9th and 10th grades, and only two states experienced no decreases by grade. Finally, nationwide decreases were seen among black students in all grades and Hispanic students in three grades (9th, 10th, and 12th grades), but no statistically significant decreases were observed among white students in any grade. Thus, these data indicate that during 2005–2015, significant decreases in the percentage of high school students who had sexual intercourse (particularly students in grades 9 and 10 and black students) occurred at the national level and in many states for which data were available. Although these findings cannot be connected directly to any specific intervention, the results indicate that decreases in prevalence of sexual intercourse occurred among the nation's high school students. During 2005–2015, the United States experienced significant shifts in various influences that might have affected

FIGURE 2. Trends in prevalence of ever having had sexual intercourse among high school students, by grade within state — Youth Risk Behavior Surveys, 29 States, 2005–2015



these findings, including changes in technology and the use of social media by youth, requirements and funding for education, and innovations in and federal resources for human immunodeficiency virus infection, STI, and teen pregnancy prevention (*4,5*).

The findings in this report are subject to at least two limitations. First, these data apply only to youths who attend school and, therefore, are not representative of all persons in this age group. Nationwide, in 2012, among persons aged 16–17 years, approximately 3% were not enrolled in a high school program

Summary

What is already known about this topic?

Early initiation of sexual activity is associated with more sexual partners, not using condoms, teen pregnancy, and sexually transmitted infection (STI) during adolescence. Most adolescents initiate sexual activity during high school. The percentage of students who had ever had sexual intercourse did not change significantly during 1995–2005 (53.1% to 46.8%).

What is added by this report?

Analysis of data from national Youth Risk Behavior Surveys indicated that the proportion of high school students nationwide who had ever had sexual intercourse decreased significantly during 2005–2015 overall, among 9th and 10th grade students, among black students across all grades, and among Hispanic students in three grades. A similar pattern by grade was observed in nearly half of the states with available data.

What are the implications for public health practice?

During 2005–2015, the overall decrease in the prevalence of ever having had sexual intercourse is a positive change in the level of sexual risk among adolescents in the United States. The decreases by grade suggest that fewer students are having sexual intercourse during the earlier years of high school. This observation, as well as decreases in the prevalence of sexual intercourse among black and Hispanic students, represent positive changes among groups of students who have been determined in previous studies to be at higher risk for negative outcomes associated with early sexual initiation. Understanding the underlying causes of these decreases in the prevalence of ever having had sexual intercourse can inform strategies to ensure that such decreases continue.

and had not completed high school (*6*). Second, the extent of underreporting or overreporting of behaviors cannot be determined, although the survey questions demonstrate good test-retest reliability (*7*).

The decreases in sexual intercourse by grade suggest that fewer students are having sexual intercourse during the earlier years of high school; this finding is especially encouraging. This finding, coupled with decreases in the prevalence of sexual intercourse among black and Hispanic students, represent positive changes among groups of students (e.g., students who have sex at younger ages and black youths) who have been indicated in previous studies to be at higher risk for negative outcomes associated with early sexual initiation, such as higher numbers of partners, non-use of condoms, teen pregnancy, and sexually transmitted diseases. Adolescence is characterized by profound intellectual, emotional, and psychological growth (*8*), all of which could be influenced by sociocultural and educational changes. More research is necessary to understand the contributing factors and the implications of these findings and to examine the contribution of these declines to declines in teenage childbearing and the potential relationship with STI.

Conflict of Interest

No conflicts of interest were reported.

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Health Care Provider Counseling for Physical Activity or Exercise Among Adults with Arthritis — United States, 2002 and 2014

Jennifer M. Hootman, PhD[1]; Louise B. Murphy, PhD[1]; John D. Omura, MD[2]; Teresa J. Brady, PhD[1]; Michael Boring, MS[1]; Kamil E. Barbour, PhD[1]; Charles G. Helmick, MD[1]

Arthritis affects an estimated 54 million U.S. adults and, as a common comorbidity, can contribute arthritis-specific limitations or barriers to physical activity or exercise for persons with diabetes, heart disease, and obesity (*1*). The American College of Rheumatology's osteoarthritis management guidelines recommend exercise as a first-line, nonpharmacologic strategy to manage arthritis symptoms (*2*), and a *Healthy People 2020* objective is to increase health care provider counseling for physical activity or exercise among adults with arthritis.* To determine the prevalence and percentage change from 2002 to 2014 in receipt of health care provider counseling for physical activity or exercise (counseling for exercise) among adults with arthritis, CDC analyzed 2002 and 2014 National Health Interview Survey (NHIS) data. From 2002 to 2014, the age-adjusted prevalence of reporting health care provider counseling for exercise among adults with arthritis increased 17.6%, from 51.9% (95% confidence interval [CI] = 49.9%–53.8%) to 61.0% (CI = 58.6%–63.4%) ($p<0.001$). The age-adjusted prevalence of reporting health care provider counseling for exercise among persons with arthritis who described themselves as inactive increased 20.1%, from 47.2% (CI = 44.0%–50.4%) in 2002 to 56.7% (CI = 52.3%–61.0%) in 2014 ($p = 0.001$). Prevalence of counseling for exercise has increased significantly since 2002; however, approximately 40% of adults with arthritis are still not receiving counseling for exercise. Improving health care provider training and expertise in exercise counseling and incorporating prompts into electronic medical records are potential strategies to facilitate counseling for exercise that can help adults manage their arthritis and comorbid conditions.

NHIS is an ongoing survey of the civilian, noninstitutionalized U.S. population that gathers data on a variety of health topics. CDC analyzed data from 2002 (adult respondents aged ≥18 years = 31,044; response rate = 74.3%) and 2014 (36,697 adults; response rate = 58.9%).† Arthritis was defined as a "yes" response to the question, "Have you ever been told by a doctor or other health care professional that you have arthritis, rheumatoid arthritis, gout, lupus or fibromyalgia?" Health care provider counseling for exercise was defined as a "yes" response to the question "Has a doctor or other health professional ever suggested physical activity or exercise to help your arthritis or joint symptoms?" Age-adjusted percentages and CIs for health care provider counseling for exercise were calculated overall and by sociodemographic and health-related characteristics. Physical activity was calculated as minutes per week of moderate-intensity physical activity using six questions regarding the (typical/usual) frequency, intensity, and duration of aerobic physical activity. The level was categorized as active (≥150 minutes/week moderate-intensity equivalent activity), insufficiently active (some moderate-intensity equivalent activity but not enough to meet active definition), and inactive (no moderate-intensity equivalent activity that lasted at least 10 minutes). Age-adjusted prevalence ratios (PRs) to assess the relationship between counseling for exercise and physical inactivity were calculated using logistic regression.

Changes in age-adjusted prevalence of counseling for exercise were examined across the 5 years (2002, 2003, 2006, 2009, and 2014) in which both arthritis and counseling for exercise questions were included on the survey. All analyses included adjustment for the multistage complex survey design, including applying sampling weights to make estimates representative of the U.S. civilian, noninstitutionalized population. Estimates were age-standardized to the 2000 projected U.S. population using three age groups (18–44 years, 45–64 years, and ≥65 years).§ Statistically significant differences ($p<0.05$) in percentages were determined using t-tests.

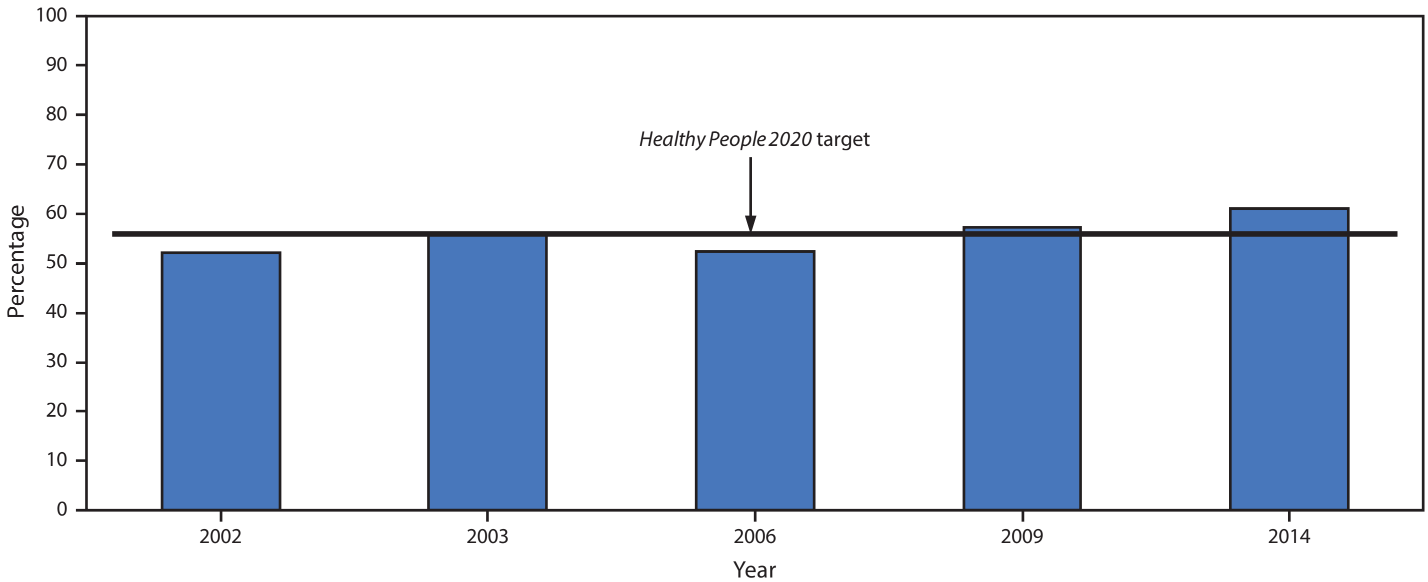
In 2002 and 2014, the age-adjusted prevalences of health care provider counseling for exercise among adults with arthritis were 51.9% and 61.0%, respectively, representing a 17.6% increase ($p<0.001$) (Figure). In 2014, all subgroups exceeded the *Healthy People 2020* age-standardized target of 57.4% for adults with arthritis, with the exception of non-Hispanic other races (53.8%), underweight/normal weight persons (50.0%), current smokers (56.9%), inactive persons (56.7%), and persons without a primary care provider (50.7%). In 2002 and 2014, age-adjusted prevalences of health care provider counseling for exercise among adults with arthritis who were inactive were 47.2% and 56.7%, respectively, representing a 20.1% increase ($p = 0.001$) (Table). Overall, adults with arthritis and obesity had a higher prevalence of having received counseling for exercise than did those who were underweight/normal weight (70.7% versus 50.0% in 2014), but prevalence

* https://www.healthypeople.gov/2020/topics-objectives/topic/Arthritis-Osteoporosis-and-Chronic-Back-Conditions/objectives.

† https://www.cdc.gov/nchs/nhis/quest_data_related_1997_forward.htm.

§ https://www.cdc.gov/nchs/data/statnt/statnt20.pdf.

FIGURE. Percentage of adults with arthritis who reported receiving health care provider counseling for exercise — National Health Interview Survey, United States, 2002, 2003, 2006, 2009, and 2014



estimates by activity status were not statistically different within body mass index categories.

In both 2002 and 2014, adults with arthritis who did not receive health care provider counseling for exercise had a higher age-adjusted prevalence of physical inactivity. Compared with the referent group of active persons, the prevalence for 2002 was 41.4%, compared with 34.7% (age-adjusted PR = 1.2; CI = 1.1–1.3), and for 2014 was 36.8% compared with 30.5% (age-adjusted PR = 1.2; CI = 1.2–1.3).

Discussion

Among adults with arthritis, the prevalence of reported health care provider counseling for exercise increased from 51.9% in 2002 to 61.0% in 2014. However, it should be noted that, in a 2014 report, fewer than one third of primary care physicians said they provide exercise counseling for arthritis during office visits (*3*). Although the improvement among all health care providers is encouraging, opportunities exist to further increase counseling for exercise among adults with arthritis. This might be particularly true for some subgroups such as persons who are inactive and who might especially benefit from exercise counseling to help get them started.

Efforts to help health care providers identify patients with arthritis who are inactive, including strategies such as those from Exercise is Medicine (EIM),[¶] might help facilitate provider counseling for exercise during health care encounters. EIM's goals are to have clinicians evaluate physical activity levels at every patient visit, assess whether patients are meeting physical activity guidelines, and provide exercise counseling and referral to appropriate therapeutic or community-based physical activity resources. The EIM website has free tools and resources to help providers incorporate these principles to improve chronic disease management in their practices. Other subgroups that have not reached the *Healthy People 2020* target, including underweight/normal weight persons, current smokers, and certain racial/ethnic groups, warrant attention by health care providers during office visits. Adults without a primary health care provider also had a lower prevalence of receiving counseling for exercise. Other health care providers might need to be encouraged to provide exercise counseling, and adults without a primary provider might be encouraged to obtain one.

Health care providers and adults with arthritis agree that physical activity has important benefits for managing arthritis, and federal physical activity guidelines have been found reasonable for adults with arthritis (*3*,*4*). The 2008 *Physical Activity Guidelines for Americans*[**] recommend that persons with chronic medical conditions including osteoarthritis, engage in regular physical activity according to their abilities, and highlight that any activity is better than none. Health care providers can serve as valuable sources of exercise advice (*4*), as suggested by the finding that receiving counseling for exercise was associated with lower physical inactivity. However, health care providers often rate their confidence and ability to promote physical activity as low to medium (*5*–*7*). In one study, 61% of health care providers surveyed felt unsure about their knowledge and skills or that they did not have the needed knowledge and skills to provide counseling on

¶ http://exerciseismedicine.org/.

** https://www.health.gov/paguidelines.

TABLE. Percentage of adults with arthritis who reported receiving health care provider counseling for exercise, by selected characteristics — National Health Interview Survey, United States, 2002 and 2014

Characteristic	2002				2014				% change 2002 to 2014¶
	No. in sample*	No. in U.S.† (thousands)	Unadjusted % (95% CI)	Age-adjusted§ % (95% CI)	No. in sample*	No. in U.S.† (thousands)	Unadjusted % (95% CI)	Age-adjusted§ % (95% CI)	
Overall	**3,572**	**22,355**	**52.8 (51.3–54.3)**	**51.9 (49.9–53.8)**	**5,639**	**33,108**	**61.6 (60.2–63.1)**	**61.0 (58.6–63.4)**	**17.6**
Age group (yrs)									
18–44	616	4,214	50.1 (46.8–53.4)	50.1 (46.8–53.4)	693	4,750	59.9 (55.7–64.0)	59.9 (55.7–64.0)	19.6
45–64	1,545	10,220	55.6 (53.4–57.8)	55.6 (53.4–57.8)	2,340	15,184	63.4 (61.2–65.5)	63.4 (61.2–65.5)	14.0
≥65	1,411	7,921	50.9 (48.8–53.0)	50.9 (48.8–53.0)	2,606	13,174	60.4 (58.3–62.4)	60.4 (58.3–62.4)	18.6
Sex									
Male	1,084	7,815	46.7 (44.5–49.0)	44.8 (42.0–47.7)	1,910	12,683	58.7 (56.4–61.1)	58.3 (54.7–61.9)	30.2
Female	2,488	14,540	56.7 (55.0–58.5)	56.8 (54.4–59.2)	3,729	20,425	63.6 (61.9–65.3)	62.9 (59.8–66.0)	10.8
Race/Ethnicity									
White, non-Hispanic	2,619	17,867	52.1 (50.4–53.7)	51.1 (48.8–53.3)	3,909	24,838	60.5 (58.8–62.2)	60.9 (57.9–63.8)	19.2
Black, non-Hispanic	530	2,636	58.5 (54.8–62.2)	59.0 (54.1–63.8)	894	4,022	64.9 (61.4–68.3)	63.0 (57.6–68.1)	6.7
Hispanic	362	1,412	53.8 (49.1–58.3)	52.3 (47.2–57.4)	597	3,120	67.5 (63.0–71.6)	64.7 (58.6–70.4)	23.7
Other race, non-Hispanic	61	440	48.4 (38.3–58.6)	43.4 (33.3–54.0)	239	1,127	61.0 (52.2–69.2)	53.8 (41.3–65.8)	24.1
Education									
Less than high school graduate	739	3,896	45.9 (43.0–48.8)	45.9 (41.2–50.7)	988	4,998	59.0 (55.6–62.3)	59.0 (52.6–65.0)	28.5
High school graduate or equivalent	1,087	7,137	52.3 (49.7–54.9)	49.8 (46.2–53.4)	1,554	9,204	59.9 (56.9–62.9)	58.1 (53.5–62.5)	16.7
Technical school/Some college	1,039	6,541	56.3 (53.8–58.8)	55.2 (52.2–58.1)	1,730	10,379	62.9 (60.5–65.4)	64.2 (60.6–67.6)	16.4
University degree	680	4,614	56.0 (52.8–59.2)	55.1 (50.9–59.2)	1,346	8,362	63.6 (60.8–66.4)	60.9 (56.0–65.6)	10.6
Work status									
Employed	1,430	9,899	52.5 (50.3–54.7)	51.2 (48.8–53.7)	2,042	13,518	61.1 (58.7–63.5)	60.4 (57.2–63.5)	18.0
Unemployed	86	484	44.6 (36.4–53.1)	47.0 (38.2–55.9)	205	1,381	62.7 (55.0–69.7)	61.0 (52.3–69.0)	29.8
Unable to work/ Disabled	588	3,244	54.8 (51.3–58.2)	51.4 (46.4–56.3)	1,024	5,312	64.6 (61.3–67.8)	63.9 (58.5–69.0)	24.3
Other	1,464	8,710	53.0 (50.9–55.0)	59.8 (54.1–65.3)	2,365	12,890	60.9 (58.8–63.0)	58.7 (51.3–65.8)	-1.8
Arthritis limitations									
Limited by arthritis	1,626	9,563	60.2 (58.1–62.3)	58.4 (55.3–61.4)	2,696	15,253	67.7 (65.4–69.9)	65.7 (61.4–69.8)	12.6
Not limited by arthritis	1,940	12,762	48.3 (46.3–50.2)	48.1 (45.7–50.6)	2,939	17,826	57.3 (55.4–59.1)	57.8 (54.9–60.6)	20.0
Self-rated health									
Excellent/Very good	1,196	7,945	49.2 (46.8–51.5)	49.0 (46.2–51.8)	1,939	12,350	58.7 (56.6–60.8)	58.4 (55.1–61.7)	19.2
Good	1,203	7,759	55.4 (53.0–57.7)	54.3 (50.9–57.6)	1,929	11,353	63.9 (61.2–66.6)	61.8 (57.0–66.4)	14.0
Fair/Poor	1,170	6,637	54.8 (52.3–57.3)	53.9 (50.0–57.7)	1,770	9,400	63.0 (60.5–65.5)	64.6 (60.5–68.4)	19.9
BMI**									
Underweight/Normal	914	5,622	45.9 (43.3–48.5)	46.5 (43.1–49.9)	1,186	6,987	51.3 (48.3–54.3)	50.0 (45.1–54.8)	7.6
Overweight	1,081	6,914	49.1 (46.7–51.5)	47.6 (44.1–51.2)	1,753	10,734	60.4 (57.9–62.8)	58.9 (54.8–62.8)	23.7
Obese	1,387	8,638	61.3 (58.9–63.6)	59.6 (56.3–62.7)	2,461	14,066	70.1 (67.9–72.2)	70.7 (67.3–73.9)	18.7
Smoking status									
Current smoker	655	4,136	48.8 (45.7–51.9)	47.9 (44.4–51.4)	904	5,451	56.8 (53.1–60.5)	56.9 (52.5–61.2)	18.8
Former smoker	1,170	7,597	52.7 (50.2–55.1)	51.6 (47.4–55.8)	1,848	10,997	64.1 (61.4–66.7)	63.6 (58.4–68.5)	23.3
Never smoker	1,713	10,418	54.4 (52.4–56.4)	53.8 (51.0–56.5)	2,845	16,453	61.8 (59.8–63.9)	62.0 (58.2–65.5)	15.2
Physical activity level									
Inactive	1,504	8,765	48.4 (46.3–50.5)	47.2 (44.0–50.4)	2,070	11,485	56.6 (54.3–59.0)	56.7 (52.3–61.0)	20.1
Insufficiently active	762	4,821	57.3 (54.1–60.4)	54.2 (49.6–58.7)	1,368	8,336	69.2 (65.8–72.3)	64.7 (58.5–70.5)	19.5
Sufficiently active	1,199	8,039	55.3 (53.0–57.6)	54.4 (51.6–57.3)	2,088	12,608	62.3 (60.2–64.4)	62.5 (59.5–65.3)	14.7
Have a primary care provider									
No	261	1,468	42.3 (37.7–47.0)	42.3 (37.6–47.1)	399	2,338	52.9 (46.3–59.4)	50.7 (44.8–56.6)	20.0
Yes	3,292	20,766	53.6 (52.1–55.2)	53.1 (50.9–55.2)	5,190	30,538	62.6 (61.0–64.1)	62.6 (59.9–65.3)	18.0
No. of annual provider visits									
None to three	1,075	7,098	46.7 (44.5–49.0)	45.2 (42.4–48.1)	1,999	11,899	56.0 (53.6–58.3)	56.4 (52.8–59.9)	24.7
Four to seven	1,028	6,539	53.3 (50.6–56.0)	55.7 (51.8–59.5)	1,720	10,363	65.1 (62.5–67.6)	63.7 (57.8–69.2)	14.4
Eight or more	1,408	8,373	58.8 (56.6–61.0)	57.8 (54.7–60.9)	1,819	10,311	66.3 (63.8–68.7)	66.1 (62.4–69.6)	14.3
No. of chronic conditions									
None	47	276	50.3 (39.4–61.1)	46.0 (34.4–58.1)	111	710	66.2 (57.8–73.6)	63.3 (51.7–73.5)	37.5
One or two	2,089	13,496	51.2 (49.4–53.0)	50.5 (48.3–52.7)	2,993	18,431	58.9 (56.8–60.9)	58.7 (55.8–61.5)	16.2
Three or more	1,436	8,583	55.5 (53.2–57.8)	56.8 (52.3–61.3)	2,535	13,967	65.5 (63.3–67.5)	67.6 (63.2–71.7)	18.9

Abbreviations: BMI = body mass index (kg/m^2); CI = confidence interval.
* Unweighted sample size.
† Weighted number in U.S. population in 1,000s.
§ Age-adjusted using the 2000 projected U.S. population.
¶ Percentage change calculated using age-adjusted estimates.
** BMI levels: <25.0 underweight/normal weight; 25.0 to <30.0 overweight; ≥30.0 obese.

Summary

What is already known about this topic?

The American College of Rheumatology's osteoarthritis management guidelines recommend exercise as a first-line, nonpharmacologic strategy to manage arthritis symptoms. An estimated 54 million adults in the United States are affected by arthritis.

What is added by this report?

The prevalence of receiving health care provider counseling for exercise among adults with arthritis increased 17.6% from 51.9% in 2002 to 61.0% in 2014. However, nearly 40% of adults with arthritis still do not receive health care provider counseling for exercise. In addition, subgroups including non-Hispanic persons of other races, underweight/normal weight persons, current smokers, inactive persons, and persons without a primary health care provider, are still below the *Healthy People 2020* target of 57.4%.

What are the implications for public health practice?

Health care provider education and training in exercise counseling, electronic medical record prompts, and connections to community programs might help increase health care provider counseling for exercise among adults with arthritis.

exercise to patients with osteoarthritis or rheumatoid arthritis (*8*). Incorporating counseling into clinical training curriculum and continuing education programming (e.g., EIM) might encourage health care providers to provide exercise counseling. Other strategies include incorporating prompts into electronic medical records and training health care providers to provide easily tailored exercise prescriptions.

Providers can reduce arthritis-specific barriers to exercise by referring patients who are uncertain about exercising safely to evidence-based, community programs. Several community group and self-directed exercise programs are available for adults with arthritis (e.g., Enhance Fitness, Walk with Ease, and Active Living Every Day[††]) and can reduce pain and improve function, mobility, and mood.[§§] Community based organizations, including the National Parks and Recreation Association[¶¶] and the YMCA[***] disseminate these evidence-based physical activity programs throughout the United States.

The findings in this report are subject to at least four limitations. First, NHIS data are self-reported and might be susceptible to recall and social desirability biases. Second, NHIS is only representative of the civilian, noninstitutionalized population, and therefore, estimates do not include those living in long-term care facilities, prisons, or military personnel. Third, low response rates (74.3% in 2002 and 58.9% in 2014) might introduce response bias, although the sampling weights at least partially adjust for this potential bias. Finally, the exercise counseling question does not address the quality or frequency of the counseling.

Prevalence of health care provider counseling for exercise among adults with arthritis has increased significantly over more than a decade, but the prevalence of counseling remains low for a self-managed behavior (exercise) with proven benefits and few risks (*8*), especially among those who are inactive. Various strategies such as health care provider education and training in exercise counseling and electronic medical record prompts might increase health care provider counseling for exercise among adults with arthritis.

†† https://www.cdc.gov/arthritis/interventions/physical-activity.html.
§§ https://www.cdc.gov/arthritis/marketing-support/compendium/docs/pdf/Compendium-2012.pdf.
¶¶ http://www.nrpa.org/our-work/partnerships/initiatives/healthy-aging-in-parks/.
*** http://www.ymca.net/enhancefitness/.

Conflict of Interest

No conflicts of interest were reported.

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Prevalence and Trends in Prepregnancy Normal Weight — 48 States, New York City, and District of Columbia, 2011–2015

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Women who enter pregnancy at a weight above or below normal weight, defined as a body mass index (BMI) of 18.5–24.9 (calculated as weight in kg/height in m^2), are more likely to experience adverse pregnancy outcomes and to have infants who experience adverse health outcomes. For example, prepregnancy underweight (BMI <18.5) increases the risk for small-for-gestational-age births, whereas prepregnancy overweight (BMI 25.0–29.9) and obesity (BMI ≥30.0) increase risks for cesarean delivery, large-for-gestational-age births, and childhood obesity (*1*). Given these outcomes, *Healthy People 2020* includes an objective to increase the proportion of women entering pregnancy with a normal weight from 52.5% in 2007 to 57.8% by 2020.* Because recent trends in prepregnancy normal weight have not been reported, CDC examined 2011–2015 National Vital Statistics System (NVSS) natality data, which included prepregnancy BMI. In 2015, for 48 states, the District of Columbia (DC), and New York City (NYC) combined, the prevalence of prepregnancy normal weight was 45.0%; prevalence ranged from 37.7% in Mississippi to 52.2% in DC. Among 38 jurisdictions with prepregnancy BMI data during 2011–2015, normal weight prevalence declined from 47.3% to 45.1%; declines were observed in all jurisdictions but were statistically significant for 27 jurisdictions after standardizing to the 2011 national maternal age and race/ethnicity distribution. Screening women's BMI during routine clinical care provides opportunities to promote normal weight before entering pregnancy.

NVSS collects demographic and health information for live births in 50 states† and DC via the U.S. Standard Certificate of Live Birth (birth certificate), which was revised in 2003 to include maternal height and prepregnancy weight. Height and prepregnancy weight are self-reported or abstracted from medical records§ and are used by NVSS to calculate prepregnancy BMI. The revised birth certificate was used in 36 states, DC, and NYC by 2011 and was used in 48 states, DC, and NYC by 2015 (representing 83% and 97% of all live births in 2011 and 2015, respectively).¶ Births to U.S. resident mothers in states adopting the revised birth certificate by January 1 of each year were eligible for analyses (17,906,182 mothers, representing 90% of all U.S. births during 2011–2015).** From these records, those with missing BMI (732,052) were excluded, resulting in 17,174,130 records for analysis (96% of births eligible for this analysis).

Prepregnancy BMI was categorized as underweight (<18.5), normal weight (18.5–24.9), overweight (25.0–29.9), or obese (≥30.0); for some analyses, obesity was categorized as class I (BMI = 30.0–34.9), class II (35.0–39.9), or class III (≥40.0). Overall and jurisdiction-specific prevalences for each prepregnancy BMI category were estimated. Overall and jurisdiction-specific trends were estimated as the percentage-point difference in prepregnancy normal weight prevalence from 2011 to 2015 for 38 jurisdictions with available data; overall trends for each prepregnancy BMI category were also estimated as the percentage change from 2011 to 2015. Because prepregnancy BMI increases with maternal age and varies by maternal race/ethnicity (*2*), jurisdiction-specific differences were estimated after directly standardizing each year to the race/ethnicity and age distribution†† of 2011 U.S. resident mothers to facilitate comparisons. Standardized, jurisdiction-specific differences were evaluated using the z-statistic; $p<0.05$ was considered statistically significant.

For 48 states, DC, and NYC in 2015, the overall prevalence of prepregnancy normal weight was 45.0%; prevalences ranged from 37.7% in Mississippi to 52.2% in DC (Table 1). Among 38 jurisdictions with prepregnancy BMI data from 2011 to 2015, prevalence of normal weight declined from 47.3% to 45.1%; after standardization, this represented a 1.9 percentage-point decline ($p<0.05$). Declines in prepregnancy normal

* *Healthy People 2020* Maternal, Infant and Child Health (MICH) Objective 16.5 for healthy prepregnancy weight (defined as normal weight BMI) was developed using state-specific surveillance data that rely on self-reported height and prepregnancy weight reported approximately 2–7 months postpartum. Data from 28 states participating in the Pregnancy Risk Assessment Monitoring System and data from California's Maternal and Infant Health Assessment survey contributed to the development of this objective. https://www.healthypeople.gov/2020/topics-objectives/topic/Maternal-Infant-and-Child-Health/objectives.

† Natality data from New York City are reported separately from those for the state of New York and are not included in New York estimates.

§ Per National Center for Health Statistics guidance for completing the 2003 revision of the U.S. Standard Certificate of Live Birth, the preferred source for prepregnancy weight and height is self-report by the mother around the time of delivery, which is recorded on the Mother's Worksheet (https://www.cdc.gov/nchs/data/dvs/momswkstf_improv.pdf). Maternal height and prepregnancy weight recorded in the mother's prenatal care record may be used as an alternative source. https://www.cdc.gov/nchs/data/dvs/birth_edit_specifications.pdf.

¶ Connecticut and New Jersey did not use the revised birth certificate by January 1, 2015.

** For each year from 2011 to 2015, the distributions of maternal race/ethnicity and age were not meaningfully different for women residing in states that used the revised birth certificate compared with the entire population of women giving birth in the United States. Additional information can be found in the Birth Data File User's Guide for each year. https://www.cdc.gov/nchs/data_access/Vitalstatsonline.htm.

†† Race/ethnicity was classified as Hispanic, non-Hispanic white, black, American Indian/Alaska Native, and Asian/Pacific Islander. Age was categorized into the following age groups: <19, 20–24, 25–29, 30–34, and >35 years.

TABLE 1. Prevalence of prepregnancy normal weight[*] among women with a live birth, by jurisdiction and year — 48 states,[†] District of Columbia, and New York City, 2011–2015

Jurisdiction	No. of live births					% of women with prepregnancy normal weight[§]					Percentage-point difference in standardized[¶] prevalence from 2011 to 2015
	2011	2012	2013	2014	2015	2011	2012	2013	2014	2015	
Alabama	—[**]	—	—	57,563	58,312	—	—	—	42.3	40.9	—
Alaska	—	—	10,871	11,101	10,956	—	—	46.4	45.9	46.2	—
Arizona	—	—	—	86,351	84,960	—	—	—	44.9	43.9	—
Arkansas	—	—	—	37,459	37,599	—	—	—	42.1	42.9	—
California	474,514	477,348	470,386	481,030	473,927	48.5	48.2	47.6	47.5	46.7	-1.7[††]
Colorado	63,266	63,372	63,340	63,909	64,528	52.3	51.1	50.5	50.6	49.5	-2.7[††]
Delaware	11,059	10,916	10,696	10,849	11,071	45.1	45.1	43.8	42.7	41.0	-3.5[††]
District of Columbia	8,050	8,597	8,608	9,022	9,240	52.7	52.4	52.6	53.0	52.2	-1.8
Florida	202,005	201,549	202,173	206,871	211,232	48.3	48.2	47.3	47.1	46.5	-1.7[††]
Georgia	102,287	110,951	109,530	116,260	121,378	42.6	42.3	41.5	42.3	42.1	-0.2
Hawaii	—	—	—	17,661	17,653	—	—	—	48.5	47.8	—
Idaho	22,232	22,883	22,299	22,819	22,703	50.1	49.3	48.8	48.4	47.4	-2.8[††]
Illinois	156,300	153,521	150,347	152,685	150,222	46.0	45.5	44.5	44.4	42.8	-2.9[††]
Indiana	82,794	82,545	82,442	83,736	83,727	45.0	44.4	43.2	43.1	42.0	-2.6[††]
Iowa	38,061	38,555	38,964	39,512	39,281	46.5	46.0	45.1	44.8	44.6	-1.5[††]
Kansas	38,588	39,479	38,095	38,676	38,999	46.8	46.3	45.9	44.5	44.0	-2.7[††]
Kentucky	54,413	54,873	54,706	55,653	55,397	43.7	43.0	42.2	42.1	41.1	-2.2[††]
Louisiana	59,214	60,165	60,920	62,428	62,191	43.8	43.1	43.0	42.5	41.3	-1.9[††]
Maine	—	—	—	12,585	12,562	—	—	—	43.1	41.7	—
Maryland	69,775	70,093	69,045	71,388	71,406	46.5	46.0	45.8	45.4	44.3	-2.1[††]
Massachusetts	—	68,218	66,589	67,812	68,945	—	52.5	52.4	51.9	51	—
Michigan	109,157	108,065	108,462	110,080	109,542	45.1	44.6	44.0	43.3	42.4	-2.5[††]
Minnesota	—	66,583	67,735	68,472	67,775	—	45.5	45.5	44.9	43.8	—
Mississippi	—	—	38,056	38,554	38,232	—	—	39.7	39.4	37.7	—
Missouri	74,491	74,038	73,978	74,352	74,121	47.3	47.0	46.5	46.0	45.3	-1.8[††]
Montana	11,761	11,652	11,963	12,241	12,458	49.0	48.8	48.5	48.0	46.5	-3.5
Nebraska	25,465	25,710	25,859	26,531	26,434	48.4	48.4	47.1	46.9	46.3	-2.1[††]
Nevada	34,793	34,521	34,636	35,288	35,694	48.8	48.9	47.9	47.2	46.4	-1.8[††]
New Hampshire	11,820	11,391	11,590	11,649	11,844	50.1	49.5	48.9	47.7	47.4	-2.4
New Mexico	25,390	25,447	25,028	24,666	24,899	43.2	44.1	44.3	43.6	42.0	-0.1
New York[§§]	114,593	114,215	113,392	111,635	112,131	46.7	46.3	46.0	45.1	44.3	-2.2[††]
New York City	117,787	118,093	115,251	116,281	115,814	53.2	53.5	53.0	52.2	52.1	-1.3[††]
North Carolina	116,970	116,249	116,489	118,550	117,841	46.4	45.8	45.1	45.1	44.5	-1.8[††]
North Dakota	9,382	9,948	10,364	11,115	11,155	41.0	41.0	42.4	41.8	40.2	-2.5
Ohio	130,723	131,056	131,785	135,214	135,442	46.9	46.7	46.2	45.7	44.8	-2.0[††]
Oklahoma	50,824	51,139	51,676	52,323	52,024	45.2	44.5	43.5	42.5	41.7	-3.2[††]
Oregon	44,311	43,917	43,909	44,675	45,098	48.5	47.9	48.2	47.7	47.0	-1.3[††]
Pennsylvania	130,461	128,323	126,663	133,108	130,973	49.2	48.8	48.4	48.4	47.1	-2.0[††]
Rhode Island	—	—	—	—	10,431	—	—	—	—	48.2	—
South Carolina	56,023	55,267	55,576	56,919	57,333	42.5	42.9	41.9	41.8	41.3	-0.6
South Dakota	11,675	11,954	12,094	12,136	12,194	47.8	48.6	47.0	47.8	46.5	-1.0
Tennessee	76,586	77,402	77,400	79,112	78,735	46.5	46.5	45.9	45.2	44.7	-1.6[††]
Texas	374,890	380,229	385,536	396,957	401,330	47.4	46.8	46.0	45.3	44.5	-1.9[††]
Utah	49,951	50,670	50,181	50,473	50,239	54.9	54.0	53.7	53.1	51.9	-2.4[††]
Vermont	5,957	5,927	5,900	6,053	5,818	49.4	49.2	47.9	47.6	46.7	-6.0
Virginia	—	—	74,145	77,879	91,400	—	—	48.4	48.1	45.4	—
Washington	81,676	83,051	81,723	83,821	84,917	46.4	45.9	45.5	45.3	45.9	-0.4
West Virginia	—	—	—	19,709	19,489	—	—	—	42.4	40.1	—
Wisconsin	66,647	66,342	65,556	65,915	65,727	43.1	43.2	42.9	42.3	41.7	-1.0[††]
Wyoming	7,278	7,448	7,532	7,609	7,703	50.1	49.9	50.3	50.2	49.0	-3.1
38 jurisdictions with BMI data from 2011 to 2015	3,121,169	3,136,901	3,124,094	3,191,541	3,194,768	47.3	46.9	46.3	45.9	45.1	-1.9[††]
All jurisdictions with available data	3,121,169	3,271,702	3,381,490	3,686,687	3,713,082	47.3	47.0	46.4	45.9	45.0	-2.1[††]

Abbreviation: BMI = body mass index (kg/m2).

* BMI = 18.5–24.9.

† Connecticut and New Jersey did not use the revised birth certificate by January 1, 2015.

§ Crude prevalence.

¶ Standardized to 2011 race/ethnicity and age distribution.

** Revised birth certificate data not available for that jurisdiction during that year.

†† Statistically significant (p<0.05) decrease in mean prevalence standardized to the 2011 maternal age and race/ethnicity distribution.

§§ Natality data from New York City are reported separately and are not included in New York state estimates.

weight were observed in all 38 jurisdictions, but were statistically significant in 27 jurisdictions; declines ranged from 1.0 percentage point (p = 0.01) in Wisconsin to 3.5 percentage points (p<0.001) in Delaware over the 5-year period (Table 1).

Corresponding with the decline in prepregnancy normal weight prevalence during 2011–2015, the entire BMI distribution shifted toward a higher BMI (Figure). Specifically, there was an 8% decrease in the prepregnancy underweight prevalence, while there were 2% and 8% increases in overweight and obesity, respectively. Notably, class III obesity prevalence increased more rapidly than did class I or class II obesity (increase of 14% [class III], compared with 10% [class II] and 6% [class I]).

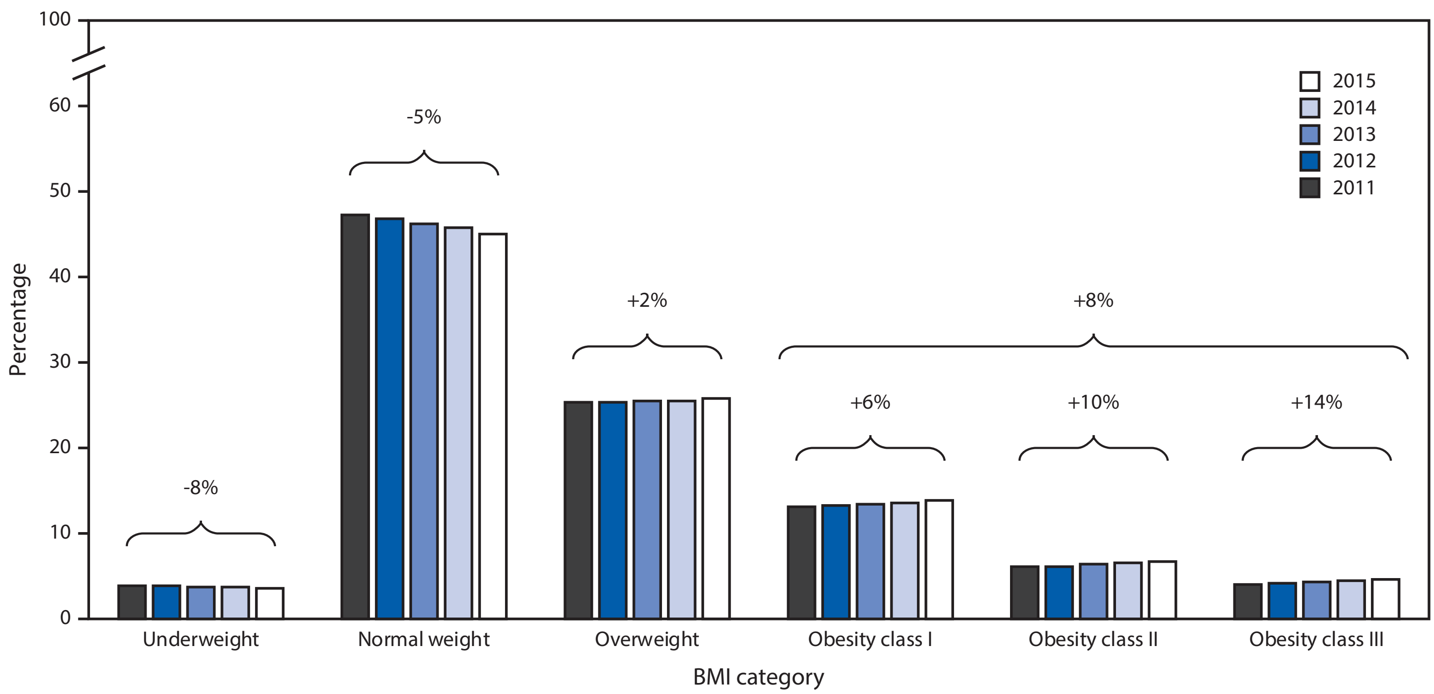
In 2015, jurisdictions with the highest prepregnancy normal weight prevalence (DC, Massachusetts, NYC, and Utah) had the lowest obesity prevalence, whereas jurisdictions with lowest prepregnancy normal weight prevalence (Mississippi and West Virginia) had the highest obesity prevalence (Table 2). Although NYC had a relatively high prevalence of prepregnancy normal weight, it also had the highest prevalence of underweight. Notably, some states exhibited a double burden of higher prevalences of prepregnancy underweight and obesity (Arkansas, Kentucky, and West Virginia).

Discussion

Among the 48 states, DC, and NYC that implemented the revised birth certificate, the overall prevalence of prepregnancy normal weight in 2015 was 45.0%. Among 38 jurisdictions with prepregnancy BMI data from 2011 to 2015, the prevalence of prepregnancy normal weight declined by 5%, whereas the prevalence of overweight increased by 2%, and the prevalence of obesity (all classes) increased by 8%; taken together, these results suggest movement away from the *Healthy People 2020* target for prepregnancy normal weight.

Trends from this analysis extend previous findings and demonstrate continued declines in prepregnancy normal weight prevalence. Data from 20 states participating in the Pregnancy Risk Assessment Monitoring System, a multistate representative surveillance system, found prevalence of prepregnancy normal weight declined from 54.5% in 2003 to 51.5% in 2009 (*3*). Data from the National Health and Nutrition Examination Survey indicate prevalence of normal weight

FIGURE. Prevalences and relative changes in prepregnancy BMI categories* among women with a live birth — 36 states, District of Columbia, and New York City,† 2011–2015



Abbreviation: BMI = body mass index (kg/m^2).

* Prepregnancy BMI was categorized as underweight (BMI <18.5), normal weight (BMI 18.5–24.9), overweight (BMI 25.0–29.9), obesity class I (BMI 30.0–34.9), obesity class II (BMI 35.0–39.9), and obesity class III (BMI ≥40.0).

† Data are from 38 jurisdictions that utilized the revised birth certificate by January 1, 2011 and, thus, had prepregnancy BMI data during 2011–2015. Jurisdictions included are California, Colorado, Delaware, District of Columbia, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maryland, Michigan, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Mexico, New York, New York City, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, Wisconsin, and Wyoming (natality data from New York City are reported separately and are not included in New York estimates).

TABLE 2. Prevalence of prepregnancy BMI categories* among women with a live birth, by jurisdiction — 48 states,† District of Columbia, and New York City, 2015

Jurisdiction	% Underweight	% Normal weight	% Overweight	% Obese
Alabama	3.9	40.9	24.8	30.4
Alaska	2.4	46.2	25.4	26.0
Arizona	3.8	43.9	26.1	26.1
Arkansas	4.0	42.9	23.7	29.5
California	3.7	46.7	26.4	23.2
Colorado	3.5	49.5	26.1	20.9
Delaware	3.3	41.0	27.7	28.0
District of Columbia	4.4	52.2	23.4	19.9
Florida	4.2	46.5	26.1	23.3
Georgia	3.8	42.1	25.9	28.3
Hawaii	4.2	47.8	25.2	22.8
Idaho	3.2	47.4	25.2	24.2
Illinois	3.1	42.8	26.8	27.3
Indiana	3.5	42.0	25.8	28.7
Iowa	2.9	44.6	25.7	26.8
Kansas	3.2	44.0	26.4	26.4
Kentucky	4.1	41.1	24.8	30.0
Louisiana	3.8	41.3	25.1	29.9
Maine	2.0	41.7	26.2	30.1
Maryland	3.1	44.3	26.8	25.7
Massachusetts	3.5	51.0	25.3	20.3
Michigan	3.2	42.4	25.9	28.6
Minnesota	2.2	43.8	27.7	26.3
Mississippi	3.8	37.7	25.0	33.5
Missouri	3.8	45.3	24.5	26.4
Montana	3.3	46.5	25.5	24.7
Nebraska	2.9	46.3	26.0	24.7
Nevada	4.4	46.4	25.4	23.8
New Hampshire	2.8	47.4	25.9	23.9
New Mexico	3.9	42.0	26.8	27.2
New York§	2.9	44.3	27.0	25.8
New York City	5.4	52.1	24.8	17.8
North Carolina	3.8	44.5	25.2	26.6
North Dakota	2.3	40.2	27.8	29.7
Ohio	3.7	44.8	24.6	26.9
Oklahoma	3.8	41.7	25.7	28.8
Oregon	3.1	47.0	25.0	24.9
Pennsylvania	3.6	47.1	24.6	24.6
Rhode Island	2.8	48.2	26.6	22.4
South Carolina	3.7	41.3	25.3	29.7
South Dakota	3.0	46.5	25.7	24.9
Tennessee	4.4	44.7	24.4	26.4
Texas	3.6	44.5	26.4	25.6
Utah	4.1	51.9	23.5	20.5
Vermont	2.8	46.7	24.3	26.1
Virginia	3.4	45.4	26.4	24.7
Washington	3.1	45.9	26.0	25.0
West Virginia	4.7	40.1	23.9	31.3
Wisconsin	2.2	41.7	26.3	29.8
Wyoming	3.4	49.0	24.7	22.9
Total	**3.6**	**45.0**	**25.8**	**25.6**

Abbreviation: BMI = body mass index (kg/m2).
* Prepregnancy BMI was categorized as underweight (BMI <18.5), normal weight (BMI 18.5–24.9), overweight (BMI 25.0–29.9), and obese (BMI ≥30.0).
† Connecticut and New Jersey did not use the revised birth certificate by January 1, 2015.
§ Natality data from New York City are reported separately and are not included in New York state estimate.

also declined among nonpregnant women aged 20–34 years, from 42.5% in 1999–2002 to 38.1% in 2011–2014; similar declines were observed for women aged 35–44 years (*4*). The declining prevalence of prepregnancy normal weight is concerning because of adverse outcomes associated with entering pregnancy outside of normal weight. For example, prepregnancy underweight increases risks for preterm delivery and small-for-gestational-age births, whereas prepregnancy overweight and obesity increase risks for gestational diabetes mellitus and childhood obesity (*1*). Moreover, obesity during

Summary

What is already known about this topic?

Entering pregnancy outside a normal weight (body mass index [BMI] of 18.5–24.9 kg/m^2) is associated with adverse maternal and infant health outcomes; given these outcomes, *Healthy People 2020* includes an objective to increase the proportion of women entering pregnancy with normal weight. Recent trends in national or jurisdiction-specific prevalence of prepregnancy normal weight have not been reported.

What is added by this report?

Using data from the revised birth certificate for 48 states, the District of Columbia (DC), and New York City (NYC), this analysis found that the overall prevalence of prepregnancy normal weight was 45.0% in 2015; prevalence ranged from 37.7% in Mississippi to 52.2% in DC. Among 36 states, DC, and NYC with available prepregnancy BMI data from 2011 to 2015, prevalence of normal weight declined from 47.3% to 45.1%; declines were observed in all jurisdictions but were statistically significant among 27 after standardizing to the 2011 national maternal age and race/ethnicity distribution.

What are the implications for public health practice?

Overall and among most jurisdictions examined, the prevalence of prepregnancy normal weight is decreasing; this suggests movement away from the *Healthy People 2020* objective for prepregnancy normal weight. For women of reproductive age, BMI screening during routine clinical visits provides opportunities to address underweight or obesity, promote normal weight upon entering pregnancy, and ultimately help optimize maternal and child health outcomes.

pregnancy has been associated with increased health care service utilization, including longer hospital stays during delivery (*5*). Before pregnancy, obesity among women of reproductive age is associated with reduced fertility and potentially increased use of fertility treatments (*6*).

Preconception care is the provision of medical care and interventions that promote optimal health for reproductive-age women and also promote optimal pregnancy outcomes should a pregnancy occur (*7*). Weight-related screening, counseling, and referral for treatment services are some of the components of preconception care (*7*,*8*). The U.S. Preventive Services Task Force recommends that clinicians assess BMI to screen all adults for obesity and offer patients with obesity intensive, multicomponent behavioral interventions or refer patients for these interventions.[§§] The American College of Obstetricians and Gynecologists (ACOG) recommends BMI screening during routine well-woman visits[¶¶] and recently released an online toolkit[†††] to facilitate BMI screening and referral for treatment. The toolkit includes an obesity assessment algorithm, counseling methods, treatment options, referral resources, and a coding guide to facilitate reimbursement. For women with underweight BMI, ACOG recommends that clinicians counsel patients about adverse pregnancy outcomes associated with underweight and assess for disordered eating habits (*8*). Reports indicate prevalence of prepregnancy underweight is highest among women aged <20 years (*2*), possibly because adult BMI criteria are applied to pregnancies among adults and adolescents (*9*); this categorizes more adolescents as underweight than the pediatric growth charts and results in higher recommended pregnancy weight gain, which has been found to improve pregnancy outcomes among adolescents (*9*).

The findings in this report are subject to at least three limitations. First, height and prepregnancy weight on the birth certificate are self-reported or abstracted from medical records, which might result in misclassification of BMI category. Second, results of this analysis are not directly comparable to *Healthy People 2020* targets for prepregnancy normal weight because these targets were developed using surveillance data from 29 states that exclusively rely on height and prepregnancy weight self-reported 2–7 months postpartum; thus, these targets might differ from those developed using birth certificate data. Notably, the revised birth certificate is a census of all births, which will allow for ongoing monitoring of prepregnancy weight in all states. Finally, data were not available from all states for trend analyses; thus, results do not represent the entire U.S. population of women giving birth.

In 2015, the nearly national prevalence of prepregnancy normal weight was 45.0% and prevalence declined from 2011 to 2015 in most jurisdictions, suggesting movement away from the *Healthy People 2020* objective to increase the prevalence of prepregnancy normal weight. For all women of reproductive age, BMI screening during routine clinical visits provides opportunities to address underweight or obesity, promote normal weight upon entering pregnancy, and ultimately help optimize maternal and child health outcomes.

Conflict of Interest

No conflicts of interest were reported.

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§§ https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/obesity-in-adults-screening-and-management.

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Notes from the Field

Lead Contamination of Opium — Iran, 2016

Nasim Zamani, MD[1,2]; Hossein Hassanian-Moghaddam, MD[1,2]

On February 14, 2016, a patient with known addiction to oral opium and no occupational or other lead exposure was admitted to Loghman-Hakim Hospital and Poison Center (LHHPC) in Tehran, Iran, with abdominal pain, anemia, constipation, and a blood lead level (BLL) of 137 μg/dL (normal = <10 μg/dL). Over the next 8 months, approximately 3,000 oral opium users were evaluated at LHHPC, and found to have elevated BLLs (range = 47–1,124 μg/dL). During February–November 2016, 14 drug couriers who acknowledged transporting illicit substances across international borders in their gastrointestinal tracts (*1*) ("body packers") were evaluated at LHHPC to determine the lead content of the drugs they were carrying. Abdominopelvic computerized tomography scans were performed on all 14 persons. Four scans demonstrated varying amounts of amorphous radiodense material suggestive of lead; these were the only packs that contained opium. Packs carried by the other 10 couriers contained heroin (two persons), methamphetamine (five), and both heroin and methamphetamine (three). During the evaluation, the couriers were awake, with normal vital signs and physical findings; their BLLs ranged from 2 to 17 μg/dL. They reported having ingested 130, 300, 700, and 1000 g of opium (5–50 packs each) in 20-g to 250-g packs. The packs were expelled intact; a pooled sample of the contents was sent to the chemistry laboratory of Shahid Beheshti University of Medical Sciences in Tehran, where the lead content was found to be 3,553 ppm (equivalent to 3.55 mg/g) by atomic absorption. The study was approved by the Shahid Beheshti University of Medical Sciences Institutional Review Board.

According to the World Health Organization, tolerable weekly intake of lead is 25 μg/kg body weight (*2*) (approximately 0.0018 g per week for a 70-kg [154-lb] adult). The amount of opium consumed by opium users varies widely; published estimates range from 0.6 g/day (*3*) to >100 g/day (*4*). A recent U.S. study of a cluster of heavy metal poisoning among Ayurvedic medication users found BLLs >10 μg/dL in 40% of 115 persons tested and >25 μg/dL in 30% (*5*); the calculated average amount of lead consumed by persons with BLLs >10 μg/dL was 0.03 g/day. If, as in this analysis, contaminated opium contains 3.55 mg lead per gram, a user consuming 10 g of opium per day could be ingesting approximately 0.036 g of lead per day, approximately 20% more than that consumed by the Ayurvedic medicine users who experienced lead toxicity. The rate of absorption of lead from the gastrointestinal tract is variable*; however, the high levels of lead that might be ingested through opium use have the potential to cause substantial lead toxicity, as is currently being reported in Iran (*4*).

Opium is an important cause of lead poisoning in countries with a high prevalence of opium addiction (*4*,*6*), and lead-contaminated opium has previously been reported in Iran (*4*). However, the concentrations of lead in samples obtained by police in 2006 were substantially lower than that found in this analysis (*4*). The reason for high levels of lead in opium seized in Iran has not been determined; however, it is suspected to result from either deliberate adulteration by distributors to make the drug heavier so they can realize more profit or an unintentional addition during the preparation process (*4*). Iran is one of the main pathways for opium trafficking from Afghanistan to the rest of the world. Although opium production in Afghanistan declined by 48% in 2015 (*7*), Afghanistan still accounted for two thirds of the global fields of illicit opium poppy production, and it has been estimated that the 2015 decline will not affect global heroin markets. Although most opiate trafficking to the United States is through South America and Mexico (*7*), some Afghanistan-produced product is supplied to U.S. markets through African countries.

It is not known whether lead is added to other products reportedly transported by drug couriers, including cocaine, heroin, marijuana, hashish, amphetamines, and 3,4-methylenedioxymethamphetamine ("ecstasy"). Clinicians should be aware that persons using opium products that appear to have been smuggled through Iran could be at risk for lead poisoning.

* Safety evaluation of certain food additives and contaminants. World Health Organization; 2011. http://apps.who.int/food-additives-contaminants-jecfa-database/document.aspx?docID=9003.

Acknowledgment

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Conflict of Interest

No conflicts of interest were reported.

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Notes from the Field

Investigation of Carbapenemase-Producing Carbapenem-Resistant Enterobacteriaceae Among Patients at a Community Hospital — Kentucky, 2016

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Carbapenemase-producing carbapenem-resistant Enterobacteriaceae (CP-CRE) express plasmid-encoded carbapenemases, enzymes that inactivate carbapenem antibiotics. They have the potential for epidemic spread through person-to-person transmission and horizontal transfer of resistance mechanisms (*1*,*2*). Typically, CP-CRE are associated with health care exposure. Clinical CRE infections can have mortality rates as high as 50% (*3*); however, the majority of CRE patients are asymptomatic. These asymptomatic colonized patients can serve as a source for transmission to other patients (*4*).

On August 11, 2016, two *Klebsiella pneumoniae* carbapenemase (KPC)–producing CP-CRE isolates from clinical cultures were reported from patients hospitalized at a rural, community hospital in Kentucky; CRE had not been identified previously at this facility. During the next 4 months, an additional 21 CRE isolates were identified from facility patients, resulting in a total of 23 isolates, including 17 *K. pneumoniae,* five *Escherichia coli*, and one *Enterobacter cloacae* isolate. Seventeen (74%) of these isolates were identified through patient screening cultures; the rest were from clinical cultures. Two carbapenemase types were identified through testing of 14 available isolates; 13 produced KPC and one produced New Delhi metallo-ß-lactamase. All CP-CRE were *K. pneumoniae* with the exception of two KPC-producing *E. coli.* Pulsed-field gel electrophoresis of these isolates identified three indistinguishable pairs, one of which was the KPC-producing *E. coli* isolates. Medical chart review and patient interviews indicated that the patients from whom each pair had been isolated had exposure to the emergency department or to the same medical-surgical ward, suggesting transmission on these units. Common health care exposures outside the hospital were not identified among the three pairs. Five of 13 interviewed patients reported receipt of health care outside the local area; three might have introduced CP-CRE into the facility, including one patient who was not screened at admission and two who had CRE identified from admission screening. Targeted environmental cultures identified CP-CRE on an emergency department environmental services cart and from the floor sink drain of the involved medical-surgical ward's environmental services closet.

This investigation suggested CP-CRE in this Kentucky facility was likely attributable to both importation into and transmission within the facility and highlights two points relevant to CP-CRE control. First, demonstration of environmental services cart contamination is notable and suggests a possible role for cleaning equipment in CP-CRE spread. This equipment can move between patient rooms and might not be cleaned regularly. Further investigation is needed to better understand the role of this equipment in transmission of resistant organisms in health care facilities. Second, although CP-CRE has been primarily identified from urban areas, these multidrug-resistant organisms can be introduced into rural areas by patients with exposure to health care in higher CP-CRE–prevalence areas, resulting in local transmission. Facilities in lower CP-CRE–prevalence areas that treat patients who also access care in higher prevalence areas should be aware of this risk. Recommendations to this facility included initiation of CRE surveillance for patients at high risk (e.g., patients with health care exposures during the past year in areas with known higher CP-CRE prevalence); reinforcement of daily and terminal cleaning practices by the environmental services team, including daily cleaning of environmental services carts; and working with facilities in its patient-sharing network to implement a regional CP-CRE prevention strategy (*5*,*6*).

Conflict of Interest

No conflicts of interest were reported.

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Announcement

National Birth Defects Prevention Month and Folic Acid Awareness Week — January 2018

The Zika virus outbreak and response led to renewed focus on how infections can increase the risk for having a baby born with a birth defect. "Prevent Infections for Baby's Protection" is the theme of January 2018's National Birth Defects Prevention Month. Birth defects are common, costly, and critical conditions that affect one in 33 U.S. babies annually (*1*). Not all birth defects can be prevented, but women can increase their chances of having a healthy baby by reducing their risk for getting infections before and during pregnancy.

Women who are pregnant or might become pregnant can take the following steps to prevent infections: talk to their health care provider about how they can reduce their risk for infections; get vaccinated to help protect against influenza (*2*) and pertussis (*3*); protect themselves from insects, such as mosquitoes, known to carry infections, including Zika (*4*); and reduce contact with saliva and urine from babies and young children to prevent infections such as cytomegalovirus (*5*). CDC encourages everyone to join this nationwide effort to raise awareness of birth defects, their causes, and their impact. Additional information is available at https://www.cdc.gov/ncbddd/birthdefects/prevention-month.html.

January 7–13, 2018 is National Folic Acid Awareness Week. CDC urges all reproductive-aged women to get 400 μg of folic acid every day to help reduce the risk for serious birth defects of the brain and spinal cord (spina bifida and other neural tube defects) (*6*). Women can get folic acid from fortified foods, supplements, or both. This guidance is especially important for Hispanic/Latina women, because this group has the highest rate of pregnancies affected by neural tube defects and the lowest reported consumption of folic acid (*7*). Additional information about folic acid is available at https://www.cdc.gov/ncbddd/folicacid/index.html.

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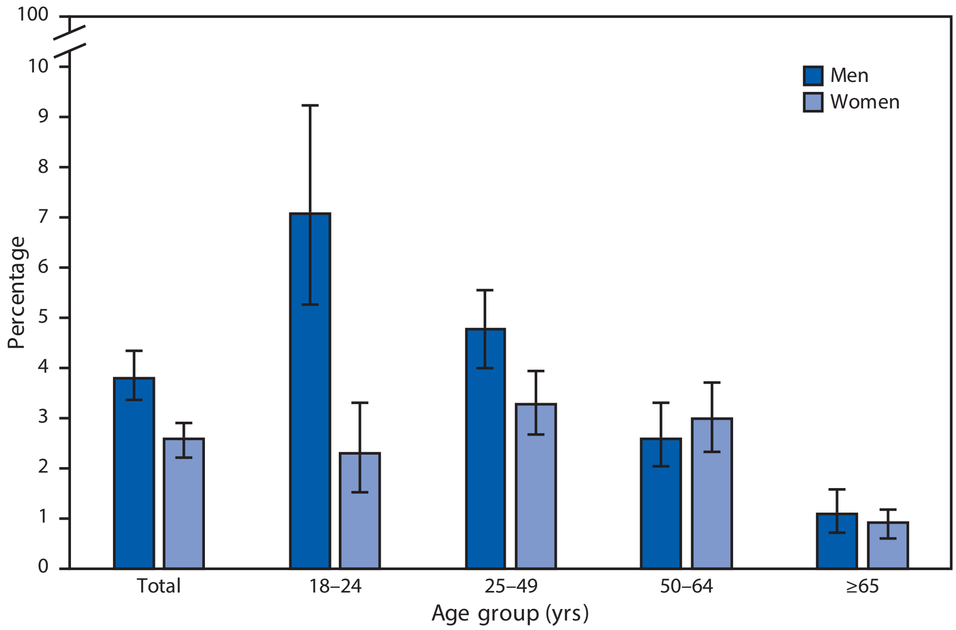
QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage* of Adults Aged ≥18 Years Who Currently Use E-Cigarettes,† by Sex and Age Group — National Health Interview Survey,§ 2016



* With 95% confidence intervals indicated with error bars.

† Based on a positive response to the question "Have you ever used an e-cigarette even one time?" and a response of "every day" or "some days" to the follow-up question "Do you now use e-cigarettes every day, some days, or not at all?" The denominator was adults aged ≥18 years.

§ Estimates are based on household interviews of a sample of the civilian, noninstitutionalized U.S. population and are derived from the National Health Interview Survey Sample Adult component.

In 2016, 3.8% of men and 2.6% of women aged ≥18 years currently used e-cigarettes. Among men, current e-cigarette use decreased with advancing age, from 7.1% among men aged 18–24 years to 4.8% among men aged 25–49 years, 2.6% among men 50–64 years, and 1.1% among men aged ≥65 years. Among women, current e-cigarette use increased between ages 18–24 years (2.3%) and 25–49 years (3.3%) and decreased between ages 50–64 years (3.0%) and ≥65 years (0.9%). A greater percentage of men aged 18–24 years and 25–49 years currently used e-cigarettes compared with women in the same age groups.

Source: National Health Interview Survey, 2016. https://www.cdc.gov/nchs/nhis/index.htm.

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