Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Weekly / Vol. 66 / No. 50
December 22, 2017

Prevalence of Obesity Among Adults, by Household Income and Education — United States, 2011–2014

Cynthia L. Ogden, PhD[1]; Tala H. Fakhouri, PhD[1]; Margaret D. Carroll, MSPH[1]; Craig M. Hales, MD[1]; Cheryl D. Fryar, MSPH[1]; Xianfen Li, MS[2]; David S. Freedman, PhD[3]

Studies have suggested that obesity prevalence varies by income and educational level, although patterns might differ between high-income and low-income countries (*1*–*3*). Previous analyses of U.S. data have shown that the prevalence of obesity varied by income and education, but results were not consistent by sex and race/Hispanic origin (*4*). Using data from the National Health and Nutrition Examination Survey (NHANES), CDC analyzed obesity prevalence among adults (aged ≥20 years) by three levels of household income, based on percentage (≤130%, >130% to ≤350%, and >350%) of the federal poverty level (FPL) and individual education level (high school graduate or less, some college, and college graduate). During 2011–2014, the age-adjusted prevalence of obesity among adults was lower in the highest income group (31.2%) than the other groups (40.8% [>130% to ≤350%] and 39.0% [≤130%]). The age-adjusted prevalence of obesity among college graduates was lower (27.8%) than among those with some college (40.6%) and those who were high school graduates or less (40.0%). The patterns were not consistent across all sex and racial/Hispanic origin subgroups. Continued progress is needed to achieve the *Healthy People 2020* targets of reducing age-adjusted obesity prevalence to <30.5% and reducing disparities (*5*).

NHANES is a biannual cross-sectional survey designed to monitor the health and nutritional status of the civilian noninstitutionalized U.S. population (*6*). The survey consists of in-home interviews and standardized physical examinations conducted in mobile examination centers. During the physical examination, standardized measurements of weight and height were obtained. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared. Obesity was defined as a BMI ≥30 kg/m^2. The NHANES sample is selected through a complex, multistage probability design. Participants self-reported race/Hispanic origin, and were divided into five categories: non-Hispanic white, non-Hispanic black, non-Hispanic Asian, Hispanic and "other." During 2011–2014, non-Hispanic black, non-Hispanic Asian, and Hispanic persons, among other groups, were oversampled. A total of 308 non-Hispanic persons reporting other races or more than one race were placed in an "other" category, and their data were included in the overall results. The NHANES examination response rate for adults aged ≥20 years was 64.5% in the 2011–2012 survey and 63.7% in the 2013–2014 survey.

Household income was categorized using FPL information, which accounts for inflation and family size (https://aspe.hhs.gov/prior-hhs-poverty-guidelines-and-federal-register-references); income levels were designated as ≤130%, >130%

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to ≤350%, and >350% of FPL. The cut point for participation in the Supplemental Nutrition Assistance Program is 130% of the poverty level, and 350% provides relatively equal sample sizes for each of the three income groups. Education was categorized as high school graduate or less, some college, and college graduate.

All estimates were adjusted to account for the complex survey design, including examination sample weights. Estimates were age-adjusted to the 2000 projected U.S. Census population using the age groups 20–39, 40–59, and ≥60 years. Confidence intervals for estimates were calculated using the Wald method. Differences between income and education groups were tested using a two-sided, univariate t-statistic, with statistical significance defined as a p-value of <0.05. Temporal trends from 1999–2002 to 2011–2014 were analyzed using orthogonal contrasts and 2-year survey cycles. Pregnant women (122) and participants with missing weight or height (571) were excluded, resulting in a total sample size of 10,636 for the period 2011–2014. For estimates by FPL, an additional 851 participants were excluded because of missing FPL data, and for estimates by education, eight participants were excluded because information on education was missing.

During 2011–2014, the age-adjusted prevalence of obesity was 38.3% among women and 34.3% among men (Table). The prevalence of obesity was 34.5% among non-Hispanic white adults, 48.1% among non-Hispanic black adults, 11.7% among non-Hispanic Asian adults, and 42.5% among Hispanic adults.

Among women, prevalence was lower in the highest income group (29.7%) than in the middle (42.9%) and lowest (45.2%) income groups. This pattern was observed among non-Hispanic white, non-Hispanic Asian, and Hispanic women, but it was only significant for white women. Among non-Hispanic black women, there was no difference in obesity prevalence among the income groups.

Among men, the prevalence of obesity was lower in both the lowest (31.5%) and highest (32.6%) income groups compared with the middle-income group (38.5%). This pattern was seen among both non-Hispanic white and Hispanic men, although among non-Hispanic white men, the difference between the highest-income and middle-income groups was not statistically significant. Among non-Hispanic black men, obesity prevalence was higher in the highest income group (42.7%) than in the lowest income group (33.8%). There was no difference in obesity prevalence by income among non-Hispanic Asian men.

In 2011–2014, the prevalence of obesity was lower among women and men who were college graduates (27.8% [women], 27.9% [men]) than among women and men with some college (41.2%, 40.0%) and women and men who were high school graduates or less (45.3%, 35.5%). By race/Hispanic origin, the same pattern was seen among non-Hispanic white, non-Hispanic black, and Hispanic women, and also among non-Hispanic white men, although the differences were not all statistically significant. Although the difference was not statistically significant among non-Hispanic black men, obesity prevalence increased with educational attainment. Among

The *MMWR* series of publications is published by the Center for Surveillance, Epidemiology, and Laboratory Services, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services, Atlanta, GA 30329-4027.

Suggested citation: [Author names; first three, then et al., if more than six.] [Report title]. MMWR Morb Mortal Wkly Rep 2017;66:[inclusive page numbers].

TABLE. Prevalence of obesity among adults,* by race/Hispanic origin, sex, household income (percentage of FPL), and education — National Health and Nutrition Examination Survey, 2011–2014

		Race/Hispanic origin				
		Overall	White, non-Hispanic	Black, non-Hispanic	Asian, non-Hispanic	Hispanic
Characteristic	No.	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Overall	10,636	36.3 (34.7–38.0)	34.5 (32.4–36.7)	48.1 (45.5–50.7)	11.7 (9.8–13.7)	42.5 (39.8–45.3)
Women	5,413	38.3 (36.1–40.5)	35.5 (32.4–38.6)	56.9 (54.2–59.7)	11.9 (8.8–15.1)	45.7 (42.2–49.2)
Men	5,223	34.3 (32.6–36.1)	33.6 (31.4–35.7)	37.5 (34.3–40.8)	11.2 (8.8–13.6)	39.0 (35.4–42.5)
Household income, both sexes						
≤130% FPL	3,462	39.0 (36.9–41.0)	35.8 (32.8–38.7)	46.6 (43.2–50.0)	15.0 (9.7–20.3)	42.6 (38.1–47.1)
>130 to ≤350% FPL	3,331	40.8 (38.2–43.4)	40.2 (36.5–43.9)	48.8 (44.6–52.9)	11.2 (6.6–15.8)	45.0 (40.7–49.2)
>350% FPL	2,992	31.2 (28.3–34.2)†,§	30.6 (27.3–34.0)†,§	49.3 (43.4–55.1)	10.7 (8.3–13.1)	39.1 (33.9–44.3)
Household income, women						
≤130% FPL	1,835	45.2 (42.5–48.0)	42.0 (37.4–46.5)	55.8 (52.2–59.4)	17.2 (10.3–24.1)	48.7 (43.1–54.4)
>130 to ≤350% FPL	1,702	42.9 (40.1–45.8)	42.5 (38.8–46.1)	59.4 (53.7–65.2)	11.7 (5.6–17.7)	44.6 (37.4–51.8)
>350% FPL	1,453	29.7 (26.1–33.3)†,§	27.9 (24.0–31.9)†,§	56.7 (50.0–63.5)	9.7 (5.8–13.7)	42.9 (35.2–50.5)
Household income, men						
≤130% FPL	1,627	31.5 (28.5–34.4)	28.5 (24.4–32.6)	33.8 (28.9–38.6)	11.8 (4.7–18.9)	35.9 (30.9–40.8)
>130 to ≤350% FPL	1,629	38.5 (35.1–41.9)†	37.8 (32.7–43.0)†	35.6 (30.7–40.5)	10.3 (5.6–15.0)	44.6 (40.1–49.2)†
>350% FPL	1,539	32.6 (29.4–35.8)§	32.9 (29.2–36.6)	42.7 (35.8–49.6)†	11.8 (7.9–15.7)	35.6 (27.8–43.4)§
Education, both sexes						
High school graduate or less	4,714	40.0 (37.9–42.2)	38.1 (34.5–41.6)	46.6 (42.8–50.4)	11.5 (7.6–15.5)	43.8 (40.6–47.0)
Some college	3,231	40.6 (38.1–43.1)	39.2 (35.9–42.5)	50.5 (46.3–54.7)	12.4 (8.9–15.8)	42.9 (38.2–47.5)
College graduate	2,683	27.8 (25.0–30.7)¶,**	27.5 (24.1–30.9)¶,**	47.3 (43.3–52.1)	11.1 (8.7–13.6)	36.9 (30.6–43.2)¶
Education, women						
High school graduate or less	2,277	45.3 (42.3–48.3)	43.3 (38.7–47.8)	57.9 (53.2–62.6)	11.4 (6.1–16.7)	49.6 (45.6–53.7)
Some college	1,777	41.2 (38.5–43.9)	38.9 (35.1–42.7)	58.8 (53.8–63.9)	13.3 (7.6–19.0)	43.0 (36.3–49.8)
College graduate	1,355	27.8 (24.1–31.5)¶,**	27.0 (22.3–31.6)¶,**	52.1 (47.4–56.8)**	11.3 (7.6–15.0)	36.1 (26.5–45.6)¶
Education, men						
High school graduate or less	2,437	35.5 (33.0–37.9)	34.1 (29.7–38.5)	36.0 (30.7–41.2)	11.0 (5.7–16.2)	37.7 (34.0–41.4)
Some college	1,454	40.0 (35.9–44.1)	39.9 (34.7–45.1)	38.2 (32.7–43.7)	10.3 (5.6–15.1)	42.9 (36.0–49.9)
College graduate	1,328	27.9 (24.3–31.5)¶,**	28.1 (24.1–32.1)**	40.4 (32.4–48.3)	11.0 (7.9–14.1)	38.5 (28.1–48.8)

Abbreviations: CI = confidence interval; FPL = federal poverty level.
* Age-adjusted by the direct method to the 2000 projected U.S. Census population using the age groups 20–39, 40–59, and ≥60 years.
† Significantly different from ≤130% FPL, p<0.05.
§ Significantly different from >130 to ≤350% FPL, p<0.05.
¶ Significantly different from high school graduate or less, p<0.05.
** Significantly different from some college, p<0.05.

non-Hispanic Asian women and men and Hispanic men there were no differences in obesity prevalence by education level.

From 1999–2002 to 2011–2014 the prevalence of obesity increased among women in the two lower income groups, but not among women living in households with incomes above 350% of FPL. Obesity prevalence increased among men in all three income groups during this period (Figure 1). Obesity prevalence also increased among both women and men in all education groups except men who were college graduates (Figure 2).

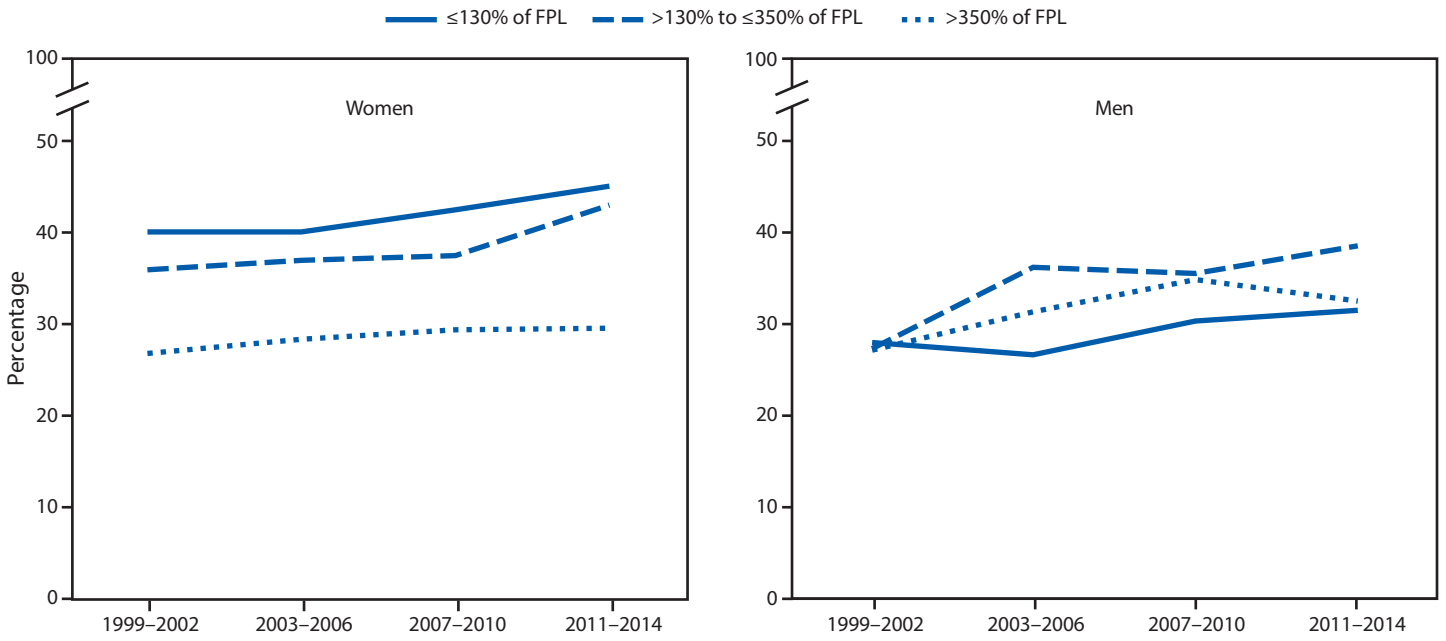
Discussion

During 2011–2014, the relationships between obesity and income, and obesity and education were complex, differing among population subgroups. Whereas overall obesity prevalence decreased with increased levels of income and educational attainment among women, the association was more complex among men.

Similar to results based on data from 2005–2008 (*4*), during 2011–2014, obesity prevalence was lower in the highest income group among women, but this was not the case among men. In fact, among non-Hispanic black men the prevalence of obesity was higher in the highest income group than in the lowest income group. Both women and men who were college graduates, on the other hand, had lower prevalences of obesity than did persons with less education.

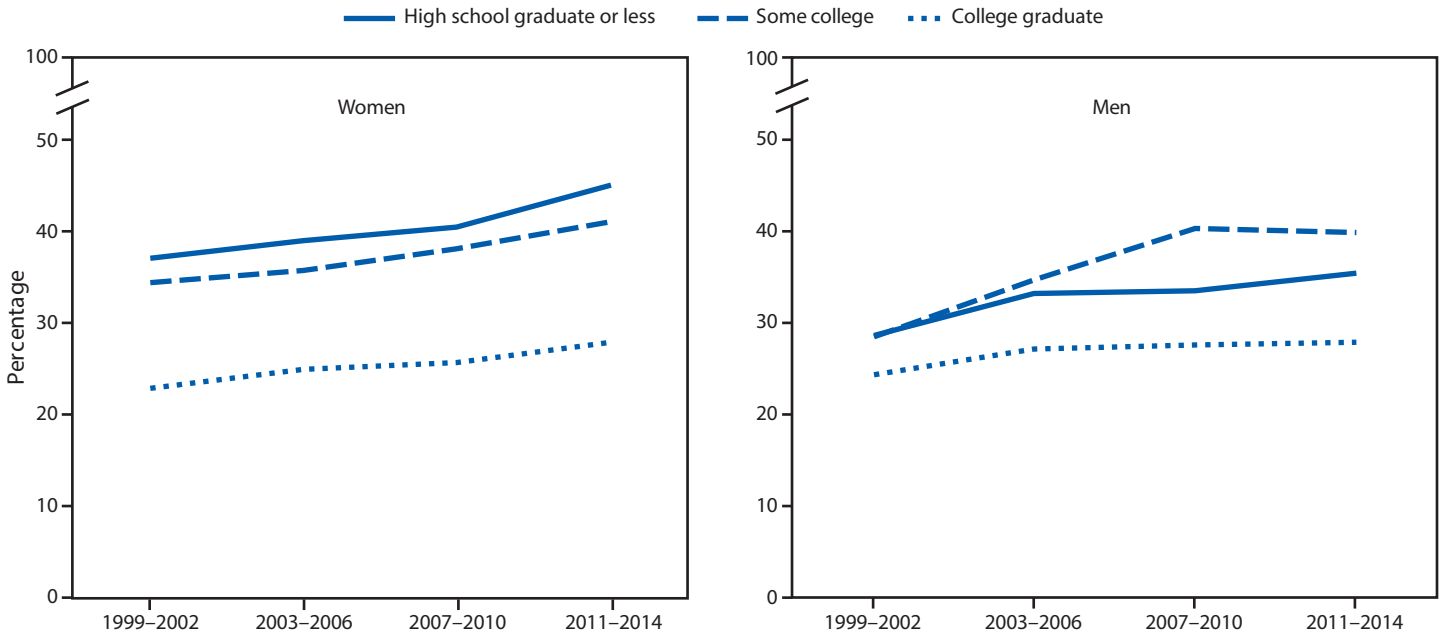
In general, prevalence of obesity among women was lowest among college graduates, although among non-Hispanic Asians there was no difference in prevalence by level of education. This relationship was not seen when obesity was examined by income level. For example, obesity prevalence was lower in the highest income group among non-Hispanic white women, but among non-Hispanic black women, prevalence did not differ between the highest and lowest household income groups. In contrast, among both non-Hispanic black women and non-Hispanic white women, the prevalence of obesity was lower among college graduates than among women with some college. This difference in the relationship between obesity and

FIGURE 1. Obesity prevalence among adults, by household income (percentage of FPL) and sex — National Health and Nutrition Examination Survey, 1999–2002 to 2011–2014*,†



Abbreviation: FPL = federal poverty level.
* Estimates age-adjusted by the direct method to the 2000 projected U.S. Census population using the age groups 20–39, 40–59, and ≥60 years.
† Significant linear trends for all groups except >350% of FPL for women. For >350% of FPL for men also significant quadratic trend. All p<0.05.

FIGURE 2. Obesity prevalence among adults, by education level and sex — National Health and Nutrition Examination Survey, 1999–2002 to 2011–2014*,†



* Estimates age-adjusted by the direct method to the 2000 projected U.S. Census population using the age groups 20–39, 40–59, and ≥60 years.
† Significant linear trends for all groups (p<0.01) except men who were college graduates. For women college graduates p = 0.056.

income and obesity and education has been reported in at least one other study (*7*) in children. These findings demonstrate that lower levels of income and education are not universally associated with obesity; the association is complex and differs by sex and race/Hispanic origin.

This is the first report to describe differences in obesity prevalence by income and education among non-Hispanic Asian adults. There were no significant differences in prevalence by income or education among either non-Hispanic Asian women or men; however, there was a pattern of decreasing prevalence with increasing income among non-Hispanic Asian women.

The findings in this report are subject to at least two limitations. First, BMI is a proxy for body fat and BMI ≥30 was applied to persons in all racial/Hispanic origin groups, which might result in underestimating health risks for certain populations. For example, it has been suggested that the BMI cut point (≥30 kg/m^2) that typically defines obesity might be too high for Asians and underestimate associated health risks (*8*,*9*). Second, the small sample size among some subgroups reduced the ability to detect differences when differences exist. Additional years of data might provide more information about obesity prevalence by income, especially among non-Hispanic Asian women.

Trends in obesity prevalence over time show that differences by income and education have existed at least since 1999–2002 among women. Among men, college graduates have consistently had a lower prevalence of obesity, whereas differences by household income have been less consistent. Further study is needed to understand the reasons for the different patterns by sex and race/Hispanic origin in the relationship between obesity and income or education.

Conflict of Interest

No conflicts of interest were reported.

[1]Division of Health and Nutrition Examination Surveys, National Center for Health Statistics, CDC; [2]Office of Analysis and Epidemiology, National Center for Health Statistics, CDC; [3]Divsion of Nutrition, Physical Activity and Obesity, National Center for Chronic Disease Prevention and Health Promotion, CDC.

Corresponding author: Cynthia L. Ogden, cogden@cdc.gov, 301-458-4405.

Summary

What is already known about this topic?

Studies have suggested that obesity prevalence varies by income or education, although patterns might differ in high and low income countries.

What is added by this report?

Analysis of data from the 2011–2014 National Health and Nutrition Examination Survey (NHANES) examining the association between obesity and education and obesity and income among U.S. adults demonstrate that obesity prevalence patterns by income vary between women and men and by race/Hispanic origin. The prevalence of obesity decreased with increasing income in women (from 45.2% to 29.7%), but there was no difference in obesity prevalence between the lowest (31.5%) and highest (32.6%) income groups among men. Moreover, obesity prevalence was lower among college graduates than among persons with less education for non-Hispanic white women and men, non-Hispanic black women, and Hispanic women, but not for non-Hispanic Asian women and men or non-Hispanic black or Hispanic men. The association between obesity and income or educational level is complex and differs by sex, and race/non-Hispanic origin.

What are the implications for public health practice?

NHANES will continue to be an important source of data on disparities in obesity prevalence. These data will help track the *Healthy People 2020* objective of reducing obesity disparities and might inform CDC, state, or local obesity prevention programs.

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Prevalence and Disparities in Tobacco Product Use Among American Indians/Alaska Natives — United States, 2010–2015

Satomi Odani, MPH[1]; Brian S. Armour, PhD[1]; Corinne M. Graffunder, DRPH[1]; Bridgette E. Garrett, PhD[1]; Israel T. Agaku, DMD, PhD[1]

An overarching goal of *Healthy People 2020* is to achieve health equity, eliminate disparities, and improve health among all groups.* Although significant progress has been made in reducing overall commercial tobacco product use,† disparities persist, with American Indians or Alaska Natives (AI/ANs) having one of the highest prevalences of cigarette smoking among all racial/ethnic groups (*1*,*2*). Variations in cigarette smoking among AI/ANs have been documented by sex and geographic location (*3*), but not by other sociodemographic characteristics. Furthermore, few data exist on use of tobacco products other than cigarettes among AI/ANs (*4*). CDC analyzed self-reported current (past 30-day) use of five tobacco product types among AI/AN adults from the 2010–2015 National Survey on Drug Use and Health (NSDUH); results were compared with six other racial/ethnic groups (Hispanic; non-Hispanic white [white]; non-Hispanic black [black]; non-Hispanic Native Hawaiian or other Pacific Islander [NHOPI]; non-Hispanic Asian [Asian]; and non-Hispanic multirace [multirace]). Prevalence of current tobacco product use was significantly higher among AI/ANs than among non-AI/ANs combined for any tobacco product, cigarettes, roll-your-own tobacco, pipes, and smokeless tobacco. Among AI/ANs, prevalence of current use of any tobacco product was higher among males, persons aged 18–25 years, those with less than a high school diploma, those with annual family income <$20,000, those who lived below the federal poverty level, and those who were never married. Addressing the social determinants of health and providing evidence-based, population-level, and culturally appropriate tobacco control interventions could help reduce tobacco product use and eliminate disparities in tobacco product use among AI/ANs (*1*).

NSDUH is an annual, national survey of the civilian, noninstitutionalized U.S. population aged ≥12 years (*4*). The analyses in this report were restricted to persons aged ≥18 years. Because of the limited sample size of AI/ANs, data were pooled across six NSDUH waves (2010–2015) to increase precision of estimates; pooled sample sizes were 3,655 for AI/AN adults and 235,262 for non-AI/AN adults.§ Annual response rates averaged 65.4% among all respondents. The AI/AN population included persons who identified AI/AN as their only race/ethnicity on the survey. Non-AI/AN populations comprised whites; blacks; NHOPIs; Asians; multiracial persons; and Hispanics. Current tobacco product use was defined as past 30-day use of the following tobacco products: cigarettes; cigars (big cigars, cigarillos, or little cigars); roll-your-own tobacco; pipes; and smokeless tobacco (chewing tobacco, snuff, dip, and snus).¶ Current users of any tobacco product** were persons who reported past 30-day use of one or more of the assessed tobacco product types.

Data were weighted to adjust for nonresponse and to yield nationally representative estimates. Prevalence was calculated overall and by sex, age group (18–25 years, 26–34 years, 35–49 years, and ≥50 years), education (less than a high school diploma, high school graduate, some college, college graduate), annual family income (<$20,000, $20,000–$49,999, $50,000–$74,999, and ≥$75,000), poverty,†† and marital status; prevalence estimates with relative standard errors ≥30% were suppressed. Non-AI/AN adults were used as comparison groups, both as a single combined group comprising the six other racial/ethnic groups and as individual racial/ethnic groups. Among AI/ANs, disparities in tobacco product use within sociodemographic subgroups were calculated using prevalence ratios (PRs) with 95% confidence intervals, with the group with the lowest prevalence of any tobacco use serving as the referent. Statistical comparisons were performed with Chi-square tests, with statistical significance defined as $p<0.05$.

During 2010–2015, prevalence among AI/ANs was significantly higher than that among non-AI/ANs combined for current use of any tobacco product (43.3% versus 27.7%, respectively); cigarettes (37.3% versus 23.0%); roll-your-own tobacco (7.1% versus 3.5%), pipes (1.9% versus 0.9%) and smokeless tobacco (6.6% versus 3.5%) (Table 1). With the exception of persons with a college degree or higher, current use of any tobacco product, cigarettes, and smokeless tobacco were

* https://www.healthypeople.gov/.

† Commercial tobacco is defined as tobacco that is manufactured by the tobacco industry for recreational use. http://keepitsacred.itcmi.org/tobacco-and-tradition/traditional-v-commercial/.

§ The survey weights were recalibrated by dividing by 6 (number of years pooled) to ensure that estimates were nationally representative.

¶ Until the 2014 survey, snus was not included in smokeless tobacco questions in NSDUH. It was first added in the 2015 survey.

** Respondents who had at least one missing response to any of the five tobacco product type questions were excluded from the analysis (752 [0.3%] respondents; 18 [0.5%] AI/AN respondents and 734 [0.3%] non-AI/AN respondents).

†† Poverty level was assessed since 2003. Poverty level indicates a person's family income relative to federal poverty thresholds. https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html.

TABLE 1. Current use of tobacco products among AI/AN and non-AI/AN adults aged ≥18 years, overall and by sociodemographic and socioeconomic characteristics — National Survey on Drug Use and Health, 2010–2015

Characteristic	Any tobacco product* % (95% CI)	Cigarettes % (95% CI)	Cigars (big cigars/ cigarillos/little cigars) % (95% CI)	Roll-your-own tobacco % (95% CI)	Pipe % (95% CI)	Smokeless tobacco (snuff/dip/ chewing/snus) % (95% CI)
AI/AN adults (N = 3,655)						
All	**43.3 (40.1–46.5)†**	**37.3 (34.2–40.3)†**	**5.9 (4.7–7.2)**	**7.1 (5.7–8.4)†**	**1.9 (1.1–2.8)†**	**6.6 (5.5–7.8)†**
Sex						
Male	49.7 (44.9–54.5)†	39.8 (35.3–44.3)†	9.6 (7.2–12.0)	8.6 (6.4–10.8)†	2.7 (1.2–4.2)†	11.7 (9.4–13.9)†
Female	37.8 (33.6–42.0)†	35.1 (31.0–39.2)†	2.7 (1.7–3.8)	5.7 (3.9–7.5)†	–§	2.3 (1.5–3.1)†
Age group (yrs)						
18–25	55.6 (51.6–59.7)†	47.3 (43.2–51.5)†	12.2 (9.4–14.9)	9.7 (7.3–12.1)†	2.3 (1.1–3.6)	10.1 (7.8–12.4)†
26–34	53.0 (46.9–59.1)†	47.8 (41.7–53.9)†	8.4 (4.8–12.0)	11.9 (7.3–16.6)†	–§	9.1 (5.7–12.5)†
35–49	49.7 (44.2–55.3)†	41.8 (36.4–47.2)†	7.2 (4.0–10.4)†	6.1 (4.2–8.1)†	2.4 (1.1–3.6)†	7.8 (5.5–10.0)†
≥50	29.6 (23.8–35.4)†	25.4 (19.9–31.0)†	–§	4.5 (2.2–6.8)†	–§	3.3 (1.7–4.9)†
Education						
<High school	49.8 (42.8–56.8)†	45.1 (38.3–51.9)†	7.2 (4.3–10.2)	9.7 (6.4–13.1)	–§	7.6 (4.9–10.3)†
High school	45.3 (40.2–50.4)†	39.7 (34.7–44.7)†	4.8 (3.1–6.5)	8.3 (5.7–10.9)†	1.1 (0.5–1.7)	7.5 (5.6–9.3)†
Some college	43.5 (37.6–49.4)†	36.5 (31.0–42.0)†	5.7 (3.6–7.8)	5 0.0(3.2–6.7)†	–§	6.3 (4.2–8.4)†
≥College	21.0 (13.9–28.1)	13.1 (7.6–18.5)	–§	–§	–§	2.5 (1.1–3.9)
Annual family income						
<$20,000	50.3 (44.7–55.9)†	45.8 (40.3–51.4)†	6.9 (4.6–9.2)	10.7 (7.8–13.6)†	2.7 (1.3–4.2)†	6.9 (4.8–8.9)†
$20,000–$49,999	41.2 (36.1–46.3)†	36.8 (32.0–41.7)†	5.0 (3.4–6.6)	6.5 (4.3–8.7)†	0.5 (0.2–0.8)	6.2 (4.5–7.9)†
$50,000–$74,999	40.6 (32.4–48.8)†	30.2 (23.1–37.3)†	3.4 (0.9–6.0)	4.2 (1.9–6.4)†	–§	7.3 (3.9–10.6)†
≥$75,000	32.4 (25.2–39.6)†	21.0 (15.4–26.6)†	8.3 (3.5–13.1)	–§	–§	6.7 (3.7–9.7)†
Poverty level**						
Poverty	51.3 (45.6–57.0)†	46.8 (41.2–52.5)†	7.6 (5.1–10.1)	10.5 (7.5–13.4)	2.6 (1.1–4.2)†	7.2 (5.0–9.4)†
Up to 2x threshold	43.5 (37.8–49.2)†	38.2 (32.7–43.7)†	4.4 (2.7–6.0)	7.3 (4.7–9.9)†	0.8 (0.4–1.3)	6.6 (4.6–8.6)†
>2x threshold	36.0 (31.1–40.9)†	28.1 (23.8–32.4)†	5.6 (3.5–7.7)	3.9 (2.2–5.5)†	–§	6.1 (4.3–7.8)†
Marital status						
Married	37.9 (33.0–42.8)†	31.4 (26.8–36.0)†	4.5 (2.7–6.2)	4.3 (2.3–6.3)†	–§	5.5 (3.7–7.4)†
Widowed/Divorced/ Separated	40.9 (33.7–48.1)†	36.8 (29.8–43.7)†	–§	6.0 (3.5–8.5)	–§	5.0 (3.0–7.1)†
Never married	50.5 (45.8–55.2)†	43.4 (38.9–47.9)†	9.8 (7.3–12.3)	10.6 (8.0–13.3)†	2.5 (1.1–3.9)†	9.0 (7.0–10.9)†

See table footnotes on next page.

all significantly higher among AI/ANs than their combined non-AI/AN counterparts within all subgroups. For current cigar smoking prevalence, a significant difference between AI/ANs and non-AI/ANs combined was seen among persons aged 35–49 years. Current use prevalence of roll-your-own tobacco was significantly higher among AI/ANs, compared with their combined non-AI/AN counterparts, for all subgroups except persons with less than a high school diploma; living in poverty; and widowed, divorced, or separated. Compared with their combined non-AI/AN counterparts, current pipe smoking prevalence was significantly higher among AI/AN males, as well as among persons aged 35–49 years; those with annual family income <$20,000; living in poverty; and who were never married (all p<0.05).

Among AI/ANs, the prevalence of current use of any tobacco product was 1.31 times higher among males than among females (Table 2). Compared with prevalence among persons aged ≥50 years, prevalence was higher among those aged 34–49 years (PR = 1.68); 26–34 years (PR = 1.79); and 18–25 years (PR = 1.88). By education attainment, prevalence was higher among persons with some college (PR = 2.07); a high school diploma (PR = 2.16); and less than a high school diploma (PR = 2.37) than among those with at least a college degree. Compared with prevalence among persons with annual family income ≥$75,000, prevalence was 1.55 times higher among those earning <$20,000. By poverty status, prevalence was higher among persons living at up to twice the federal poverty threshold (PR = 1.21) and in poverty (PR = 1.43) than among those living at more than twice the federal poverty threshold. Compared with those who were married, prevalence was 1.33 times higher among persons who were never married (all p<0.05).

AI/ANs had higher prevalence of any tobacco product use and cigarette smoking than any other individual racial/ethnic group (Figure). Prevalence of cigar smoking among AI/ANs was lower than among blacks, but higher than among Hispanics and Asians. Prevalence of roll-your-own tobacco and pipe use among AI/ANs was higher than among whites, blacks, Asians and Hispanics, and prevalence of smokeless tobacco use among AI/ANs was significantly higher than prevalence among all other racial/ethnic groups, with the exception of NHOPIs (all p<0.05).

TABLE 1. (*Continued*) Current use of tobacco products among AI/AN and non-AI/AN adults aged ≥18 years, overall and by sociodemographic and socioeconomic characteristics — National Survey on Drug Use and Health, 2010–2015

Characteristic	Any tobacco product* % (95% CI)	Cigarettes % (95% CI)	Cigars (big cigars/ cigarillos/little cigars) % (95% CI)	Roll-your-own tobacco % (95% CI)	Pipe % (95% CI)	Smokeless tobacco (snuff/dip/chewing/ snus) % (95% CI)
Non-AI/AN (N = 235,262)						
All	**27.7 (27.4–27.9)**	**23.0 (22.7–23.2)**	**5.1 (5.0–5.3)**	**3.5 (3.4–3.6)**	**0.9 (0.8–0.9)**	**3.5 (3.4–3.6)**
Sex						
Male	34.3 (33.9–34.8)	25.8 (25.4–26.2)	8.5 (8.3–8.8)	4.4 (4.2–4.6)	1.5 (1.4–1.6)	6.7 (6.5–7.0)
Female	21.5 (21.1–21.8)	20.3 (20.0–20.7)	2.0 (1.9–2.1)	2.6 (2.5–2.7)	0.3 (0.3–0.3)	0.4 (0.4–0.5)
Age group (yrs)						
18–25	37.2 (36.8–37.6)	30.7 (30.4–31.1)	10.3 (10.0–10.6)	5.0 (4.8–5.2)	1.9 (1.8–2.0)	5.7 (5.5–5.9)
26–34	36.9 (36.3–37.6)	31.6 (31.0–32.3)	7.3 (7.0–7.7)	4.4 (4.1–4.7)	0.9 (0.8–1.0)	4.6 (4.3–4.9)
35–49	30.1 (29.5–30.6)	24.8 (24.4–25.3)	4.6 (4.4–4.9)	3.6 (3.4–3.8)	0.5 (0.5–0.6)	4.2 (4–4.5.0)
≥50	19.7 (19.3–20.2)	16.2 (15.7–16.6)	2.9 (2.7–3.1)	2.5 (2.3–2.7)	0.7 (0.6–0.8)	1.9 (1.7–2.1)
Education						
<High school	36.0 (35.2–36.8)	31.8 (31.1–32.6)	6.0 (5.7–6.4)	7.3 (6.8–7.7)	1.4 (1.2–1.6)	4.2 (3.9–4.6)
High school	33.5 (32.9–34.0)	28.7 (28.2–29.3)	5.2 (4.9–5.4)	4.4 (4.2–4.6)	0.9 (0.8–1.0)	4.4 (4.1–4.6)
Some college	29.9 (29.4–30.5)	24.8 (24.3–25.3)	5.8 (5.5–6.0)	3.2 (3.0–3.4)	0.9 (0.8–0.9)	3.7 (3.5–3.9)
≥College	16.0 (15.6–16.5)	11.5 (11.2–11.9)	4.1 (3.9–4.3)	1.0 (0.9–1.2)	0.6 (0.5–0.7)	2.1 (1.9–2.2)
Annual family income						
<$20,000	37.5 (36.8–38.2)	33.6 (32.9–34.2)	6.7 (6.4–7.0)	7.8 (7.5–8.1)	1.5 (1.3–1.6)	3.3 (3.1–3.6)
$20,000–$49,999	30.3 (29.8–30.8)	26.3 (25.8–26.8)	4.8 (4.6–5.0)	3.8 (3.6–4.0)	0.9 (0.8–1.0)	3.3 (3.1–3.5)
$50,000–$74,999	25.2 (24.5–25.9)	20.5 (19.9–21.1)	4.4 (4.1–4.7)	2.3 (2.1–2.5)	0.8 (0.6–0.9)	3.7 (3.4–3.9)
≥$75,000	20.9 (20.4–21.4)	15.1 (14.7–15.5)	5.0 (4.7–5.2)	1.3 (1.2–1.4)	0.6 (0.5–0.7)	3.7 (3.5–3.9)
Poverty level¶						
Poverty	39.0 (38.2–39.7)	35.3 (34.6–36.0)	6.9 (6.6–7.3)	8.5 (8.1–8.9)	1.5 (1.3–1.6)	3.3 (3.0–3.5)
Up to 2x threshold	32.7 (32.0–33.3)	28.7 (28.1–29.4)	5.4 (5.1–5.6)	4.8 (4.5–5.1)	1.0 (0.9–1.1)	3.3 (3.1–3.5)
>2x threshold	23.6 (23.3–24.0)	18.5 (18.2–18.8)	4.6 (4.5–4.8)	1.9 (1.8–2.0)	0.7 (0.6–0.8)	3.6 (3.4–3.7)
Marital status						
Married	20.8 (20.4–21.1)	16.1 (15.7–16.4)	3.6 (3.4–3.8)	2.0 (1.9–2.1)	0.6 (0.5–0.6)	3.2 (3.1–3.4)
Widowed/Divorced/ Separated	31.7 (31.0–32.4)	28.3 (27.6–29.0)	3.7 (3.5–4.0)	4.6 (4.3–4.9)	0.9 (0.8–1.1)	2.6 (2.4–2.8)
Never married	38.0 (37.6–38.5)	32.4 (31.9–32.8)	9.1 (8.9–9.4)	5.4 (5.2–5.6)	1.5 (1.4–1.6)	4.6 (4.4–4.8)

Abbreviations: AI/AN = American Indian or Alaska Native; CI = confidence interval; NSDUH = National Survey on Drug Use and Health.

* Persons who reported current (past 30-day) use current (past 30-day) use of at least one of the five tobacco product types (cigarettes, cigars, roll-your-own tobacco, pipe, and smokeless tobacco) were considered to be current users of any tobacco product. Persons who had at least one missing response to any of the tobacco product use questions were excluded from the analysis (18, 0.5% of the AI/AN respondents). AI/AN population comprised persons who identified AI/AN as their only race/ethnicity. Non-AI/AN population comprised non-Hispanic White; non-Hispanic Black; non-Hispanic Native Hawaiian/other Pacific Islander; non-Hispanic Asian; non-Hispanic multirace; and Hispanic.

† Prevalence significantly different from corresponding estimate among non-AI/AN population.

§ Estimates not presented because of relative standard error (RSE) ≥30%.

¶ Poverty level indicates a person's family income relative to federal poverty level threshold. https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html.

Discussion

During 2010–2015, the prevalence of current use of any tobacco product was significantly higher among AI/ANs than among non-AI/ANs, overall and among all assessed subgroups, except persons with at least a college degree. Among AI/ANs, the greatest disparity was associated with level of education: prevalence of any tobacco product use was 2.37 times higher among persons with less than high school diploma than among those with a college degree or higher. Socioeconomic status has a strong, inverse relationship with tobacco product use (*5*). Given that a higher percentage of AI/ANs live in poverty than do non-AI/ANs (28.4% versus 15.3% nationally) or have less than a high school education (23% versus 14% nationally),[§§] addressing inequalities in education and poverty among AI/ANs might help reduce the high burden of tobacco product use among this population. Additional research is needed to identify the role of other factors (e.g., cultural, environmental, social) that might explain some of the observed differences.

Some American Indian tribes have long used traditional tobacco in cultural ceremonies of medicinal and spiritual importance (*6*). However, evidence suggests that commercial tobacco products, such as cigarettes and packaged loose

[§§] https://www.census.gov/newsroom/releases/archives/facts_for_features_special_editions/cb11-ff22.html.

TABLE 2. Disparities in current use of any tobacco product among American Indians/Alaska Natives — National Survey on Drug Use and Health, United States, 2010–2015

Characteristic	Current use of any tobacco product* (%)	Prevalence ratio† (95% CI)
Sex		
Male	49.7	1.31 (1.14–1.52)
Female	37.8	Referent
Age group (yrs)		
18–25	55.6	1.88 (1.53–2.32)
26–34	53.0	1.79 (1.43–2.25)
35–49	49.7	1.68 (1.34–2.11)
≥50	29.6	Referent
Education		
<High school	49.8	2.37 (1.64–3.43)
High school graduate	45.3	2.16 (1.51–3.09)
Some college	43.5	2.07 (1.44–2.99)
≥College graduate	21.0	Referent
Annual family income		
<$20,000	50.3	1.55 (1.21–1.99)
$20,000–$49,999	41.2	1.27 (0.99–1.64)
$50,000–$74,999	40.6	1.25 (0.93–1.69)
≥$75,000	32.4	Referent
Poverty level		
Poverty	51.3	1.43 (1.19–1.70)
Up to 2x threshold	43.5	1.21 (1.00–1.46)
>2x threshold	36.0	Referent
Marital status		
Married	37.9	Referent
Widowed/Divorced/Separated	40.9	1.08 (0.87–1.34)
Never married	50.5	1.33 (1.14–1.56)

Abbreviation: CI = confidence interval.

* Persons who reported current (past 30-day) use of at least one of the five tobacco product types (cigarettes, cigars, roll-your-own tobacco, pipe, and smokeless tobacco) were considered to be current users of any tobacco product. Persons who had at least one missing response to any of the tobacco product use questions were excluded from the analysis (18, 0.5% of the AI/AN respondents).

† Prevalence ratios were computed as regression coefficients, with the group with the lowest prevalence of any tobacco use serving as the referent.

tobacco, are being increasingly substituted for ceremonial purposes (*6,7*). In addition, tobacco products are less expensive on tribal lands, which might increase tobacco access and consumption (*8*). The tobacco industry has also been shown to target AI/ANs by marketing of cigarette brands with cultural icons, names, and symbols belonging exclusively to AI/ANs (*9*).

The equitable implementation of evidence-based tobacco control interventions, such as comprehensive smoke-free policies, is important to reduce tobacco product use among AI/ANs. CDC has implemented population-level strategies to help reduce disparities among AI/ANs, including Good Health and Wellness in Indian Country, an initiative that works to reduce commercial tobacco product use, while improving nutrition, physical activity, health literacy, and community-clinical linkages for AI/AN populations.¶¶ Moreover, CDC's Tips From Former Smokers tobacco education campaign uses culturally appropriate mass media campaigns to warn about the health risks of smoking. Some of this work is tailored toward racial/ethnic minorities, including AI/ANs.*** Reducing disparities in use of tobacco products will require focusing more attention on populations carrying a disproportionate burden of tobacco product use and dependence, and increasing reach to such groups through efforts that directly affect the scope of services and facilities serving those populations.

The findings in this report are subject to at least four limitations. First, tobacco product use and other sociodemographic characteristics were self-reported and subject to recall and social desirability bias. Second, small sample sizes resulted in imprecise estimates that could not be reported for some sociodemographic subgroups. Third, data were unavailable for certain tobacco products, including electronic cigarettes and hookahs. Finally, these analyses used data pooled across multiple years, and therefore, do not reflect possible secular trends in tobacco product use.

Tobacco use is associated with cultural norms and socioeconomic factors such as education and poverty (*1*). Thus, culturally appropriate strategies are important when addressing tobacco-related disparities among AI/ANs (*9*). These strategies could

Summary

What is already known about this topic?

Whereas significant progress has been made in reducing overall commercial tobacco product use, disparities persist, with American Indians/Alaska Natives (AI/ANs) having one of the highest cigarette smoking prevalences of all racial/ethnic groups.

What is added by this report?

Prevalence of current tobacco product use was significantly higher among AI/ANs than among non-AI/ANs for any tobacco product (43.3% versus 27.7%), cigarettes (37.3% versus 23.0%), roll-your-own tobacco (7.1% versus 3.5%), pipes (1.9% versus 0.9%), and smokeless tobacco (6.6% versus 3.5%). Among AI/ANs, prevalence of current use of any tobacco product was higher among males (49.7%), persons aged 18–25 years (55.6%), persons with less than a high school diploma (49.8%), persons with annual family income <$20,000 (50.3%), persons who lived below the poverty level (51.3%), and those who never married (50.5%).

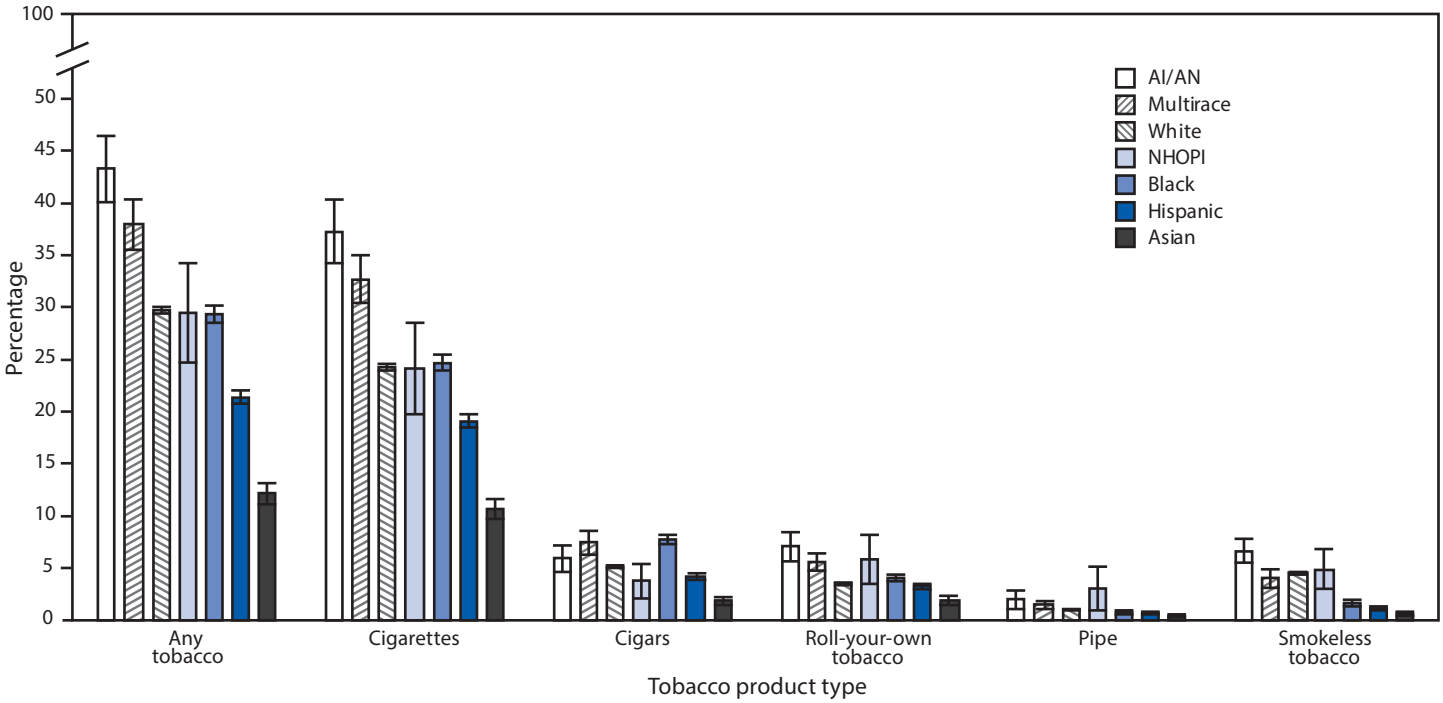
What are the implications for public health practice?

Addressing the social determinants of health and providing evidence-based, population-level, and culturally appropriate tobacco control interventions could help reduce tobacco product use and disparities in tobacco product use among AI/ANs. Such interventions could include engaging native community leaders and fostering respect for traditional/ceremonial use of tobacco as a reason for not using tobacco recreationally.

¶¶ https://www.cdc.gov/chronicdisease/tribal/factsheet.htm.

*** https://www.cdc.gov/tobacco/campaign/tips/.

FIGURE. Prevalence of tobacco product* use by race/ethnicity† — National Survey of Drug Use and Health, United States, 2010–2015



Abbreviations: AI/AN = American Indian or Alaska Native; NHOPI = Native Hawaiian or Other Pacific Islander.

* Persons who reported current (past 30-day) use of at least one of the five tobacco product types (cigarettes, cigars, roll-your-own tobacco, pipe, and smokeless tobacco) were considered to be current users of any tobacco product. Cigars include big cigars, cigarillos, and little cigars. Smokeless tobacco includes snuff, dip, chewing, and snus.

† AI/AN population comprised persons who identified AI/AN as their only race/ethnicity. Unless otherwise specified, all racial/ethnic groups are non-Hispanic.

include engaging traditional healers and respected community elders and fostering respect for traditional/ceremonial use of tobacco as a reason for not using tobacco recreationally,††† while also addressing the social determinants of health (*10*). Creating partnerships within the AI/AN community might also help increase access to and use of evidence-based cessation resources.

††† http://keepitsacred.itcmi.org/tobacco-and-tradition/traditional-v-commercial/.

Conflict of Interest

No conflicts of interest were reported.

[1]Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, CDC.

Corresponding author: Satomi Odani, lpu7@cdc.gov.

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CDC Grand Rounds: National Amyotrophic Lateral Sclerosis (ALS) Registry Impact, Challenges, and Future Directions

Paul Mehta, MD[1]; D. Kevin Horton, DrPH[1]; Edward J. Kasarskis, MD, PhD[2]; Ed Tessaro[3]; M. Shira Eisenberg[4]; Susan Laird[5]; John Iskander, MD[4]

Amyotrophic lateral sclerosis (ALS), commonly known as Lou Gehrig's disease, is a rapidly progressive fatal neurologic disease. Currently, there is no cure for ALS and the available treatments only extend life by an average of a few months. The majority of ALS patients die within 2–5 years of diagnosis, though survival time varies depending on disease progression (*1*,*2*). For approximately 10% of patients, ALS is familial, meaning it and has a genetic component; the remaining 90% have sporadic ALS, where etiology is unknown, but might be linked to environmental factors such as chemical exposures (e.g., heavy metals, pesticides) and occupational history (*3*).

Like many other noncommunicable conditions, ALS is a nonnotifiable disease in the United States; therefore, the federal government lacks reliable incidence and prevalence estimates for the United States. During October 2008, Congress passed the ALS Registry Act (*4*), directing CDC and its sister agency, the Agency for Toxic Substances and Disease Registry, to create a population-based ALS registry for the United States. The main objectives of the National ALS Registry, which was launched in October 2010, are to describe the national incidence and prevalence of ALS; describe the demographics of persons living with ALS; and examine risk factors for the disease (*4*,*5*). During January 2017, the Registry launched the National ALS Biorepository, which aims to promote research in areas including biomarkers, genetics, and environmental exposures to heavy metals or organophosphates (*6*,*7*).

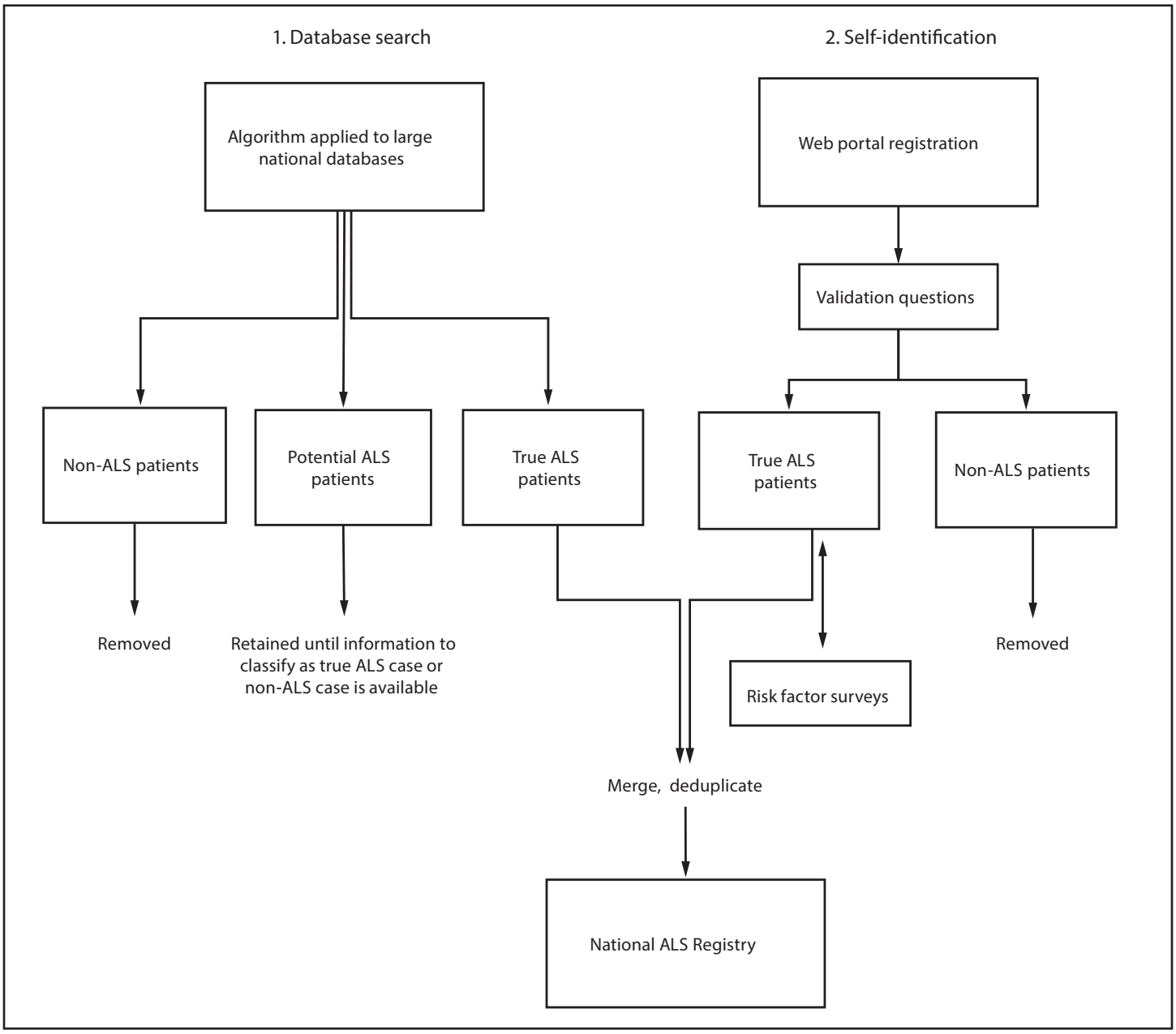
ALS Registry and Biorepository Methods and Impact

Because ALS is a nonnotifiable condition, the National ALS Registry uses a novel two-pronged approach for identifying cases in the United States (*5*) including searching national administrative databases and self-identification. The first approach applies a pilot-tested algorithm to large national databases (e.g., Medicare, Veterans Health Administration) to identify cases (*5*,*8*). The algorithm helps classify individual persons as having actual, potential, or non-ALS cases using variables including the *International Classification of Diseases – Ninth Revision* (ICD-9) diagnostic code for ALS, frequency of visits to neurologists, and use of prescription drugs (e.g., Rilutek) (*8*). Patients with ALS are added directly to the Registry, while those considered noncases are not. Potential ALS patients are not added to the Registry, but are retained until subsequent years of administrative data are available to be able to make a determination (*8*). The second approach uses a secure web portal to allow persons with ALS to self-identify (*8*). ALS patients answer a series of online validation questions (e.g., has a doctor ever diagnosed you with ALS?). Their responses to these questions determine whether they are considered actual ALS cases (*8*). In addition, this web portal approach allows ALS enrollees to take brief online risk factor surveys (e.g., occupational history, residential history, history of head trauma) that will allow scientists to learn more about the possible causes of ALS (*8*). Cases from both approaches are then merged and deduplicated so that cases are not counted multiple times (*8*) (Figure).

The National ALS Biorepository is part of the Registry; therefore, patients must enroll in the Registry to donate specimens (*6*). The Registry conducted a multiyear pilot study to determine the feasibility of the Biorepository (*6*). A group of external subject matter experts provided direction and deemed the Biorepository to be feasible, and it was launched in January 2017 (*6*). The Biorepository has a geographically representative sample collection scheme, that is, not all samples will come from one part of country, but are distributed based on population density (*7*). There are two components of the Biorepository: an in-home collection and a postmortem collection. The in-home collection consists of samples of blood, urine, and saliva from ALS patients, with an annual goal of 300 samples. The postmortem collection, consisting of samples of bone, brain, spinal cord, cerebrospinal fluid, and muscle targets 10 collections each year. The pre- and postmortem collections will seek to expand knowledge on ALS biomarkers, genetics, and ultimately, etiology. The Biorepository is unique in that the samples collected are not previously used or left over from another study. In addition, these samples will be matched with the Registry's survey data as well as a Global Unique Identifier (for those patients who elect to have a global unique identifier generated), which will allow researchers to track the progress of patients in multiple studies securely and anonymously. When researchers request samples, they can receive, in addition to the

This is another in a series of occasional MMWR *reports titled CDC Grand Rounds. These reports are based on grand rounds presentations at CDC on high-profile issues in public health science, practice, and policy. Information about CDC Grand Rounds is available at https://www.cdc.gov/about/grand-rounds.*

FIGURE. Methodology* for identification of amyotrophic lateral sclerosis (ALS), cases for inclusion in the National ALS Registry — United States, 2013



* *International Classification of Diseases – Ninth Revision* (ICD-9) code, frequency of neurology visits, prescription drug use.

samples, linked risk factor data such as demographics, occupation, and military service history (*7*). Lastly, the National ALS Biorepository will facilitate ALS research on etiologies and possible treatments.

ALS Prevalence and Risk Factors

In 2013, the most current year for which data are available, the Registry identified almost 16,000 cases of ALS, corresponding to a prevalence of five cases per 100,000 population in the United States (*9*). As with any surveillance system for a disease that is nonnotifiable, it is impossible to capture all cases of ALS through the Registry. For example, there are currently no linkages to private insurance systems such as health maintenance organizations, where potential ALS patients might seek diagnosis or treatment.

ALS disproportionately affects whites, males, and persons aged 60–69 years (*9*); the reasons for the increased incidence among whites and males is unknown (*9*). Military veterans, particularly men, are at higher risk for developing ALS than are those who have not served (*10*). Veterans who served in

the first Gulf War were twice as likely to develop ALS as were veterans who served during the same period but were not deployed to the Gulf (*11*). The reason for the increased risk among veterans is not known, but it might be related to selective environmental exposures (*9*,*10*).

Participation by athletes in certain sports, specifically American football, has purportedly been associated with an increased risk of developing ALS; several high-profile diagnoses in professional football players have also brought increased attention to ALS (*12*). Currently, it is unknown if football players might be at a greater risk for ALS than the general population; however, some research indicates it might be related to experiencing repeated concussions, or that ALS could be confused with a different condition such as chronic traumatic encephalopathy (*12*). More research is needed to investigate etiology of ALS and to learn more about the pathophysiology.

ALS incidence is stable; however, the prevalence slowly continues to increase (*13*). Proposed reasons for the increase in prevalence includes comprehensive health care that allows patients to live longer, and large ALS clinics that provide patients with neurologic and nursing care, dietary support, and physical therapy care in one setting (*13*). However, not all ALS patients have access to large multidisciplinary ALS clinics, and those living in rural areas still tend to see their local primary care physician or neurologist (*13*,*14*).

Challenges for Research, Drug Development, and Patient Care

The onset of ALS is insidious. Patients might experience weakness in an upper or lower limb or difficulty speaking or swallowing, with bulbar onset disease. No definitive blood, cerebrospinal fluid, or imaging biomarkers for ALS have been identified yet; thus, ALS is often a diagnosis of exclusion, typically made after other diseases have been ruled out (*15*). As a result, approximately 9–12 months might elapse during the onset of new progressive weakness and a definitive diagnosis. This time window, essentially one quarter of an ALS patient's remaining lifespan, is a lost opportunity for developing drugs aimed at stopping the degeneration and death of motor neurons.

Researchers can measure and monitor ALS progression and the effectiveness of drugs in clinical trials using self-rating of function with the ALS Functional Rating Scale or quantitative measures of muscle power, including pulmonary function tests (e.g., percentage of forced vital capacity, maximum inspiratory pressure, sniff nasal pressure), measurement of walking speed, and isometric muscle power (*16*). However, disease progression varies widely among patients. Certain functions can remain normal including bladder and bowel control, eye movements, and awareness (*15*). Unlike other progressive neurologic conditions such as Alzheimer's disease, cognition and largely memory remain intact for the vast majority of ALS patients; however, new research suggests that frontotemporal dementia may be affecting more ALS patients than previously thought (*17*).

Barriers to progress in identifying the etiology, means of prevention, and cure of ALS remain formidable. An estimated 50%–70% of motor neurons are no longer functional when patients with clinical signs and symptoms come to medical attention (*15*). Therefore, clinical trials that enroll ALS patients use drugs that can only attempt to slow disease progression. At this time, there are no identified therapeutics that stop or reverse the death of these motor neurons (*15*). Other barriers include the large number of patients required for sufficiently powered clinical trials and the costs of trials.

Living with ALS: A Patient's Perspective

A patient with ALS has written, "ALS patients can have a zeal for life rare among patients with other diseases. Shorter life expectancy often spurs patient with ALS to make life experiences and relationships deeper. It is helpful to understand the concept that 'everyone has a wheel chair,' and that no one avoids life's crises forever."

Organizations exist with the mission to defeat ALS through research, and provide support for the thousands of persons living with the disease in the United States. Such groups include the ALS Association, the Muscular Dystrophy Association, and the Les Turner ALS Foundation. However, more support for research is needed. Even with continued support from private donors, foundations, and institutions, rare diseases (those with <200,000 cases diagnosed nationwide)* like ALS still face barriers to research funding and treatment development.

The financial consequences of ALS after diagnosis can also be crippling, and go well beyond typical loss of income (*18*). Living with ALS becomes cost-prohibitive for a majority of patients (*18*). Some accommodations, including home conversion; a power wheelchair; and a van with ramp, lifts, and tech-assist devices can cost from $100,000 to $150,000, adding considerable stress to families already dealing with the diagnosis (*18*). The fear that family savings, retirement, mortgages, and educational funds are at risk, often provokes further health complications (*18*).

Development of a strong doctor-patient alliance can balance honest, diagnostic, and prognostic communications with messages that promote purpose, hope, and quality of life for patients with ALS. After the diagnosis, there is a great need to counsel patients in an affirmative way to accept the reality of the disease. Currently, this type of family counseling is rarely included in the ALS multispecialty clinic setting. Much can

* National Organization for Rare Disorders.

be done to help patients cope and see firsthand the optimism of new research, clinical trial enrollment, technology-based solutions, and self-determination techniques. Reluctance to spend time discussing these positive aspects for fear of creating false hope might result in a missed therapeutic opportunity.

The National ALS Registry as a Model for 21st Century Surveillance

Whereas understanding the epidemiology of ALS is one of the main objectives of the National ALS Registry, the Registry also conducts other vital activities to help both patients and researchers learn more about the disease.

The Registry funds external research to help the ALS community learn more about potential ALS etiology and risk factors. To date, the Registry has funded 13 research projects including Large-Scale Genome-Wide Association Studies of ALS, gene-environment interaction studies, antecedent medical conditions, and environmental risk factors for ALS.

Importantly, the Registry is used to recruit enrollees into clinical trials and epidemiologic studies. The Registry speeds up difficult and costly clinical trial recruitment time, increases study sample size, and helps achieve racial, ethnic, and geographic diversity. The Registry's services are provided free to researchers (*9*). To date, the Registry has helped scientists in the public and private sectors recruit hundreds of patients into over 30 research studies.

The National ALS Registry is the first and only population-based ALS registry for the United States that is quantifying the epidemiology of the disease (*8*). The Registry is a critical tool in building the evidence to describe the ALS experience in the United States, provide epidemiologic data and biospecimens to scientists, and discover the etiology and risk factors for ALS.

Conflict of Interest

No conflicts of interest were reported.

[1]Environmental Health and Surveillance Branch, Division of Toxicology and Human Health Sciences, Agency for Toxic Substances and Disease Registry, CDC; [2]Cynthia Shaw Crispen Chair, ALS Research, Department of Neurology, Lexington, University of Kentucky; [3]person living with ALS; [4]Office of the Associate Director for Science, CDC; [5]Office of the Associate Director for Communication Science, CDC.

Corresponding author: Paul Mehta, MD, pum4@cdc.gov, 770-488-0556.

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Update: Providing Quality Family Planning Services — Recommendations from CDC and the U.S. Office of Population Affairs, 2017

Loretta Gavin, PhD[1]; Karen Pazol, PhD[2]; Katherine Ahrens, PhD[1]

In April 2014, CDC published "Providing Quality Family Planning Services: Recommendations of CDC and the U.S. Office of Population Affairs" (QFP), which describes the scope of services that should be offered in a family planning visit and how to provide those services (e.g., periodicity of screening, which persons are in need of services, etc.) (*1*). The sections in QFP include the following: Determining the Client's Need for Services; Contraceptive Services; Pregnancy Testing and Counseling; Clients Who Want to Become Pregnant; Basic Infertility Services; Preconception Health Services; Sexually Transmitted Disease Services; and Related Preventive Health Services. In addition, the QFP includes an appendix entitled Screening Services for Which Evidence Does Not Support Screening.

CDC and the Office of Population Affairs developed QFP recommendations by conducting an extensive review of published evidence, seeking expert opinion, and synthesizing existing clinical recommendations from CDC, agencies such as the U.S. Preventive Services Task Force (USPSTF), and professional medical associations such as the American College of Obstetricians and Gynecologists and the American Academy of Pediatrics.

The scope of preventive services related to reproductive health is constantly evolving as new scientific findings are published and clinical recommendations are modified accordingly. Being knowledgeable about the most current recommendations is an important step toward providing the highest quality care to patients. To keep QFP current with the latest recommendations, CDC and the Office of Population Affairs publish occasional updates that summarize newly published clinical recommendations. The first of these updates was published in March 2016 (*2*), and covered guidelines published during April 2014–December 2015. This report summarizes recommendations from guidelines published during January 2016–April 2017. CDC and the Office of Population Affairs prepared these updates by searching for materials from CDC, USPSTF, and other professional medical organizations that had recommendations referenced in the original QFP. When updated recommendations were identified, they were evaluated for changes in implications for providing family planning care. CDC and the Office of Population Affairs determined that none of the newly published recommendations marked a substantial shift in how family planning care should be provided, and therefore did not seek additional review to consider the implications for the QFP for this update. Technical reviews from clinical experts representing a broad range of family planning providers might be appropriate for future updates.

Updated recommendations that have implications for clinical practice for family planning providers are highlighted (Box). In addition, an updated reference list for each section in the QFP is provided for all recommendations published during January 2016–April 2017, including those that did not result in any change in recommended clinical practices for family planning providers.

BOX. Updated recommendations that might have implications for clinical practice, by section heading — Providing Quality Family Planning Services: Recommendations from CDC and the U.S. Office of Population Affairs, 2017

Contraceptive Services

Medical eligibility for contraceptive use

The 2016 CDC recommendations update earlier 2010 recommendations for the use of specific contraceptive methods by women and men who have certain characteristics or medical conditions.

The 2016 updated recommendations include the following:

- Addition of recommendations for women with cystic fibrosis, women with multiple sclerosis, and women receiving certain psychotropic drugs or taking St. John's wort.
- Revisions to the recommendations for emergency contraception, including the addition of ulipristal acetate (UPA) for emergency contraception.
- Revisions to the recommendations for postpartum women; women who are breastfeeding; women with known dyslipidemias, migraine headaches, superficial venous disease, gestational trophoblastic disease, sexually transmitted diseases (STDs), and human immunodeficiency virus (HIV) infection; and women who are receiving antiretroviral therapy.
- For all 2016 updated recommendations, see Tables A1 and A2: https://www.cdc.gov/mmwr/volumes/65/rr/rr6503a1_appendix.htm

Source: Curtis KM, Tepper NK, Jatlaoui TC, et al. U.S. medical eligibility criteria for contraceptive use, 2016. MMWR Recomm Rep 2016;65(No. RR-3).

Selected practice recommendations for contraceptive use

The 2016 CDC recommendations update earlier 2013 recommendations that address a select group of common, yet sometimes complex, issues regarding initiation and use of specific contraceptive methods.

Recommendations have been updated regarding when to start regular contraception after UPA emergency contraceptive pills:

- Advise the woman to start or resume hormonal contraception no sooner than 5 days after use of UPA, and provide or prescribe the regular contraceptive method as needed. For methods requiring a visit to a health care provider, such as depo-medroxyprogesterone acetate (DMPA), implants, and intrauterine devices (IUDs), starting the method at the time of UPA use may be considered; the risk that the regular contraceptive method might decrease the effectiveness of UPA must be weighed against the risk of not starting a regular hormonal contraceptive method.
  - The woman needs to abstain from sexual intercourse or use barrier contraception for the next 7 days after starting or resuming regular contraception or until her next menses, whichever comes first.
  - Any nonhormonal contraceptive method can be started immediately after the use of UPA.
  - The woman should be advised to have a pregnancy test if she does not have a withdrawal bleed within 3 weeks.

New recommendations have been made regarding medications used to ease IUD insertion:

- Misoprostol is not recommended for routine use before IUD insertion. Misoprostol might be helpful in select circumstances (e.g., in women with a recent failed insertion).
- Paracervical block with lidocaine might reduce patient pain during IUD insertion.

Source: Curtis KM, Jatlaoui TC, Tepper NK, et al. U.S. selected practice recommendations for contraceptive use, 2016. MMWR Recomm Rep 2016;65(No. RR-4).

Preconception Health Services

Depression

- The 2016 USPSTF recommendation for adults reaffirms the 2009 recommendation to screen all adults when staff-assisted depression care supports are in place. This replaces the 2009 recommendation regarding selective screening of adults.
- The 2016 USPSTF recommendation for adolescents aged 12–18 years reaffirms the 2009 recommendation to screen for major depressive disorder when systems are in place to ensure accurate diagnosis, effective treatment, and follow-up. The 2016 statement removes the recommendation of specific psychotherapies in recognition of decreased concern over the harms of pharmacotherapy in adolescents as long as they are adequately monitored.

Sources: US Preventive Services Task Force. Screening for depression in adults. Rockville, MD: US Department of Health and Human Services, Agency for Healthcare Research and Quality; 2016.

US Preventive Services Task Force. Screening for depression in children and adolescents. Rockville, MD: US Department of Health and Human Services, Agency for Healthcare Research and Quality; 2016.

Updated Reference List, by QFP Section

Determining the Client's Need for Services

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Sexually Transmitted Disease Services

US Preventive Services Task Force. Syphilis infection in nonpregnant adults and adolescents: screening. Rockville, MD: US Department of Health and Human Services, Agency for Healthcare Research and Quality; 2016. https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/syphilis-infection-in-nonpregnant-adults-and-adolescents

Related Preventive Health Services

US Preventive Services Task Force. Breast cancer: screening. Rockville, MD: US Department of Health and Human Services, Agency for Healthcare Research and Quality; 2016. https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/breast-cancer-screening1

US Preventive Services Task Force. Gynecological conditions: periodic screening with the pelvic examination. Rockville, MD: US Department of Health and Human Services, Agency for Healthcare Research and Quality; 2017. https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/gynecological-conditions-screening-with-the-pelvic-examination

Screening Services for Which Evidence Does Not Support Screening

US Preventive Services Task Force. Genital herpes infection: serologic screening. Rockville, MD: US Department of Health and Human Services, Agency for Healthcare Research and Quality; 2016. https://www.uspreventiveservicestaskforce.org/Page/Document/UpdateSummaryFinal/genital-herpes-screening1

Conflict of Interest

No conflicts of interest were reported.

[1]Office of Population Affairs, U.S. Department of Health and Human Services, Rockville, Maryland; [2]Division of Reproductive Health, CDC.

Corresponding author: Katherine Ahrens, kate.ahrens@hhs.gov, 240-453-2831.

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Notes from the Field

Use of Asynchronous Video Directly Observed Therapy for Treatment of Tuberculosis and Latent Tuberculosis Infection in a Long-Term–Care Facility — Puerto Rico, 2016–2017

Henry Olano-Soler, MPH[1,2,3]; Dana Thomas, MD[2,3,4]; Olga Joglar, MHSA[2,3]; Katrina Rios[5,6]; Milton Torres-Rodríguez, MPH[3,7]; Greduvel Duran-Guzman, MD[8]; Terence Chorba, MD[2]

To treat a cluster of tuberculosis (TB) transmission cases in a long-term care facility for cognitively impaired adults located in Puerto Rico (facility A), the Puerto Rico TB Control Program used a novel video directly observed therapy (VDOT) application. In 2016, active TB disease was diagnosed in 11 residents and latent TB infection (LTBI) was diagnosed in six residents of facility A. Asynchronous VDOT was used to monitor treatment for these 17 residents. One of the patients with active TB disease had received a diagnosis of LTBI during an investigation at facility A during 2011–2012.

During 2010–2012, seven residents of facility A received a diagnosis of active TB disease; four of these diagnoses were culture-confirmed, with isolates that had the same rare genotype (*1*). Drug susceptibility testing indicated sensitivity to the standard first-line regimen of rifampin, isoniazid, pyrazinamide, and ethambutol (RIPE). Three of the seven TB patients died before starting treatment; the other four were prescribed the RIPE regimen under the supervision of personnel from facility A. Two of the four patients who reportedly completed RIPE treatment in 2012 died in 2016 from unrecognized TB-related conditions; both patients were roommates of the 2016 index case patient. For these two patients, evidence of TB discovered during a postmortem medical record review included ineffective antibiotic treatments for putative community-acquired pneumonia and bronchitis and signs of wasting, which were corroborated by interviews with staff members and treating physician. No patients at facility A tested positive for human immunodeficiency virus infection in 2012 or 2016. The contact investigation performed in 2011–2012 identified LTBI in 26 residents and seven nonresidents. All contacts with LTBI were reported by facility staff members as having completed treatment with 4 months of daily rifampin (4R), one of a few standard LTBI regimens, in 2012.

On June 20, 2016, a resident of facility A, who was a contact from the 2011–2012 investigation and whose facility records indicated prior treatment for LTBI with 4R, was identified as having advanced cavitary TB disease; the genotype and drug susceptibility testing of this patient's isolate matched that of the original cases. This resident began treatment with a 6-month course of RIPE; ethambutol was discontinued after drug sensitivities were confirmed. Among 38 residents and 15 staff members, 10 additional cases of active TB disease were diagnosed among residents; these patients were prescribed rifampin, isoniazid, and pyrazinamide (without ethambutol). Six other residents with diagnosed LTBI were prescribed 4R treatment. Because of staffing shortages, Puerto Rico Department of Health (PRDH) TB field personnel were not available to administer daily directly observed therapy (DOT) at facility A and facility A did not have the personnel needed to provide daily patient transport to the PRDH clinic.

VDOT uses video and computer equipment that allows public health officials to observe patients taking medications for TB, and it has been successfully used to ensure proper completion of TB treatment (*2*–*5*). A standard live VDOT protocol (e.g., using FaceTime) (*4*) was attempted at facility A but was not sustainable because cell phones or Internet connectivity were not consistently available. An asynchronous VDOT protocol that did not require real-time Internet connection or a cellular plan, complied with the Health Insurance Portability and Accountability Act, and provided a Spanish external-facing application[*,†] was implemented to ensure proper treatment for TB and LTBI patients. Use of this asynchronous system avoided audio/visual interruption related to poor connectivity, which can be problematic in standard live VDOT applications (*4*), by capturing and storing videos of patients as they swallowed their TB medications, and automatically uploading the videos after Internet connection became available. Videos were viewed by PRDH staff members at 2–10 times the speed at which they were recorded. In addition to the clinic-to-facility commute, which would have taken 1.5 hours per day, DOT for the 17 severely cognitively challenged men would have required an additional 1.5 hours per day of observation. Use of asynchronous VDOT saved PRDH approximately 240 hours in DOT-related activities, equivalent to 25% of the workload for a full-time epidemiology technician/case manager over 6 months of treatment.

As of July 12, 2017, all 11 patients with active TB disease and all six with LTBI had completed treatment with recommended ≥80% compliance (percentage of scheduled doses actually taken) (Table) (*6*). Active TB disease treatment rates were higher than those for LTBI because protocols exist for

[*] https://www.emocha.com/press/_press/downloads/emocha_SA_Expansion_PR_090315_FINAL.pdf.

[†] https://technical.ly/baltimore/2016/08/02/emochas-public-health-apps-heading-california/.

TABLE. Active tuberculosis (TB) disease and latent tuberculosis infection (LTBI) patient compliance with daily directly observed therapy verified through asynchronous video — Puerto Rico, 2016–2017

Patient no.	% Compliance*	No. doses taken†	No. doses scheduled	Weeks of treatment§
Active TB cases (n = 11): completion of 6-month treatment for active TB disease with RIF, INH, and PZA*				
11	94	132	140	28
4	93	124	133	37¶
5	91	128	140	28
7	90	126	140	28
8	92	133	145	29
9	96	149	155	31
10	93	121	130	26
12	90	117	130	26
13	91	127	140	28
14	93	125	135	27
15	93	130	140	28
All	92	1,412	1,528	—
LTBI patients (n = 6): completion of 4-month treatment for LTBI with RIF				
16	86	94	110	22
17	88	96	110	22
18	88	97	110	22
19	85	93	110	22
20	87	95	110	22
21	91	100	110	22
All	**87**	**575**	**660**	—

Abbreviations: INH = Isoniazid; LTBI = latent TB infection; PZA = Pyrazinamide; RIV = Rifampin.

* Percentage of recommended doses taken.

† CDC recommends completion of 130-dose treatment during a 5 day/week regimen for active TB disease and compliance is recommended to be at least 80%. Doses taken were counted only during weeks in which ≥4 doses occurred (80% compliance). For LTBI, CDC recommends completion of 120-dose Rifampin treatment during a 7 day/week regimen. Duration of treatment was extended from 16 to 22 weeks to accommodate 5 day/week dosing and achieve 80% compliance. https://www.cdc.gov/tb/publications/ltbi/treatment.htm#treatmentRegimens

§ Including the index case, patient 11, active TB patients began treatment over a range of several weeks as clinical signs and symptoms of disease were identified. Group visits to the TB clinic occurred simultaneously for all patients.

¶ Patient 4 received a modified treatment plan for active disease during phase 1. Standard doses were taken 3 days/week instead of 5 days/week because of interactions with other medications.

treating 5 days per week; LTBI treatment, however, is normally 7 days per week and, in this case, was extended by 1 month to achieve ≥80% compliance. All patients with active TB disease have shown clinical signs of improvement. In addition to using daily symptom queries attached to the videos and telephonic communication as needed, the medical director used asynchronous VDOT to observe directly any complex patients on multiple hepatotoxic drugs for side effects that could interfere with treatment compliance and to verify a daily measurement of treatment completion. VDOT has been demonstrated to be cost-effective in multiple settings (*5*). CDC has developed an eDOT toolkit (https://www.cdc.gov/tb/publications/guidestoolkits/tbedottoolkit.htm) to facilitate adoption of these practices.

Conflict of Interest

Katrina Rios is an employee of a private company that licensed VDOT technology and allowed the Puerto Rico Department of Health to use the technology at no cost to address this outbreak. No other conflicts of interest were reported.

[1]Public Health Associate Program, Office for State, Tribal, Local and Territorial Support, CDC; [2]Division of Tuberculosis Elimination, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, CDC; [3]Tuberculosis Control Program, Puerto Rico Department of Health; [4]Division of State and Local Readiness, Office of Public Health Preparedness and Response, CDC; [5]Emocha Mobile Health, Inc., Baltimore, Maryland; [6]Johns Hopkins University School of Medicine, Baltimore, Maryland; [7]Division of STD/HIV Prevention, Puerto Rico Department of Health; [8]Central Office for HIV/AIDS, Viral Hepatitis, STD and TB Prevention, Puerto Rico Department of Health.

Corresponding author: Henry Olano-Soler, HOlanoSoler@cdc.gov, 787-306-4392.

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Erratum

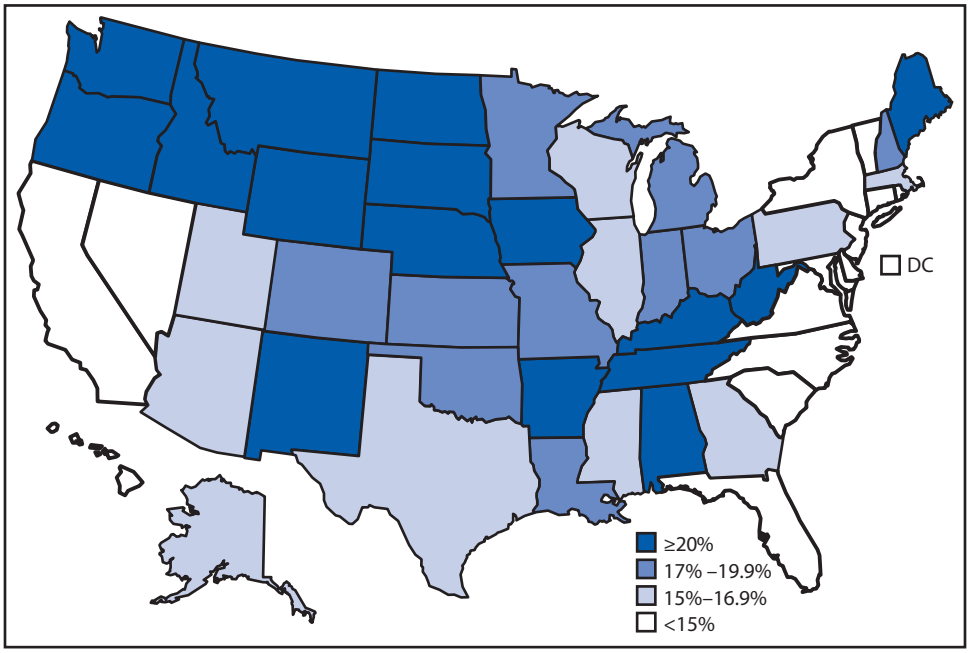
Vol. 66, No. 32

In the report "Progress Toward Poliomyelitis Eradication — Afghanistan, January 2016–June 2017," on page 857, the last sentence of the last paragraph should have read "Detection of orphan viruses, which are **≥1.5%** divergent from the most closely related isolate, indicating extended undetected circulation of poliovirus, along with continued close genetic linkages with Pakistan viruses, highlight the need for Afghanistan and Pakistan to continue to prioritize coordination to improve surveillance, and to track and vaccinate their mobile populations, thereby stopping the ongoing cross border transmission and reducing the risk for poliovirus circulation in hard-to-reach areas of Afghanistan."

QuickStats

FROM THE NATIONAL CENTER FOR HEALTH STATISTICS

Percentage of Adults Aged ≥18 Years with Any Hearing Loss,* by State — National Health Interview Survey,† 2014–2016



* Based on a survey question that asked respondents, "Without the use of hearing aids or other listening devices, is your hearing excellent, good, have a little trouble hearing, moderate trouble, a lot of trouble, or are you deaf?" "A little trouble hearing," "moderate trouble," "a lot of trouble," and "deaf" were combined for this chart.
† Estimates are based on household interviews of a sample of the civilian, noninstitutionalized U.S. adult population and are shown for sample adults aged ≥18 years.

Overall, 15.9% of U.S. adults aged ≥18 years had any hearing loss during 2014–2016. The prevalence of any hearing loss was lowest in New Jersey (10.6%), Connecticut (11.0%), Maryland (11.0%), California (12.3%), New York (12.6%), and the District of Columbia (8.6%). The prevalence of any hearing loss was highest in West Virginia (24.7%), Oregon (24.6%), Montana (23.8%), Idaho (23.1%), and Wyoming (22.3%).

Source: National Health Interview Survey, 2014-2016. Survey data available at https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm. Tabular results available at https://www.cdc.gov/nchs/data/health_policy/hearing_loss_table_SEs.pdf.

Reported by: Debra L. Blackwell, PhD, DBlackwell@cdc.gov, 301-458-4103; Tina Norris, PhD.

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ISSN: 0149-2195 (Print)