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Cigarette Use Among High School Students — United States, 1991–2003

Cigarette use is the leading preventable cause of death in the United States (*1*). One of the national health objectives for 2010 is to reduce the prevalence of current cigarette use among high school students to ≤16% (objective no. 27-2b) (*1*). To examine changes in cigarette use among high school students in the United States during 1991–2003, CDC analyzed data from the national Youth Risk Behavior Survey (YRBS). This report summarizes the results of that analysis, which indicated that although 1) the prevalence of lifetime cigarette use was stable among high school students during the 1990s and 2) the prevalence of both current and current frequent cigarette use increased into the late 1990s, all three behaviors had declined significantly by 2003. Prevention efforts must be sustained to ensure this pattern continues and the 2010 objective is achieved.

The national YRBS, a component of CDC's Youth Risk Behavior Surveillance System, used independent three-stage cluster samples for the 1991–2003 surveys to obtain cross-sectional data representative of public and private school students in grades 9–12 in all 50 states and the District of Columbia. During 1991–2003, sample sizes ranged from 10,904 to 16,296, school response rates ranged from 70% to 81%, student response rates ranged from 83% to 90%, and overall response rates ranged from 60% to 70%. For each cross-sectional national survey, students completed an anonymous, self-administered questionnaire that included identically worded questions about cigarette use.

For this analysis, temporal changes for three behaviors were assessed: 1) lifetime cigarette use (i.e., ever tried cigarette smoking, even one or two puffs), 2) current cigarette use (i.e., smoked cigarettes on ≥1 of the 30 days preceding the survey), and 3) current frequent cigarette use (i.e., smoked cigarettes on ≥20 of the 30 days preceding the survey). For current cigarette use, temporal changes and subgroup differences in 2003 were analyzed by sex, race/ethnicity, and grade. Data are presented only for non-Hispanic black, non-Hispanic white, and Hispanic students because the numbers of students from other racial/ethnic groups were too small for meaningful analysis.

Data were weighted to provide national estimates, and SUDAAN was used for all data analyses. Temporal changes were analyzed by using logistic regression analyses that assessed linear and quadratic time effects simultaneously and controlled for sex, race/ethnicity, and grade. Quadratic trends indicated significant but nonlinear trends in the data over time. When a significant quadratic trend accompanied a significant linear trend, the data demonstrated a nonlinear variation (e.g., leveling off or change in direction) in addition to an overall increase or decrease over time. T-tests were used to examine differences in current cigarette use in 2003 by sex, race/ethnicity, and grade. All results are statistically significant ($p<0.05$) unless otherwise noted.

Significant linear and quadratic trends were detected for lifetime and current cigarette use. The prevalence of lifetime cigarette use, although stable during the 1990s, declined significantly, from 70.4% in 1999 to 58.4% in 2003 (Table 1). The prevalence of current cigarette use increased from 27.5% in 1991 to 36.4% in 1997 and then declined significantly to 21.9% in 2003. A significant quadratic trend was detected for current frequent cigarette use; the prevalence increased from 12.7% in 1991 to 16.7% in 1997 and 16.8% in 1999, then declined significantly to 9.7% in 2003.

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Significant linear and quadratic trends were detected in current cigarette use among both sexes (Table 2). Among female students, the prevalence of current cigarette use peaked during 1997–1999 and then declined significantly to 21.9% in 2003. Among male students, the prevalence of current cigarette use peaked in 1997 and then declined significantly to 21.8% in 2003. Similarly, among white, white female, Hispanic, Hispanic female, Hispanic male, and 9th- and 11th-grade students, current cigarette use prevalence peaked by 1997 and then declined significantly in 2003. Significant quadratic trends were detected among white male, black, black female, black male, and 10th- and 12th-grade students, indicating that the prevalence of current cigarette use peaked by 1999 and then declined significantly.

During 2003, white students were significantly more likely than black and Hispanic students to report current cigarette use. More white female students than black and Hispanic female students and more Hispanic female than black female students reported current cigarette use. The prevalence of current cigarette use was not significantly different among white, black, and Hispanic male students. By grade level, significantly more 10th-, 11th-, and 12th-grade students than 9th-grade students and more 12th-grade than 10th-grade students reported current cigarette use.

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Editorial Note: The findings in this report indicate that the prevalence of current cigarette use has declined substantially since the late 1990s and is at the lowest level since YRBS was initiated in 1991. These findings are consistent with trends observed in other national surveys, although the other surveys suggest the rate of decline might be slowing (*2–4*). Factors that might have contributed to the decline in cigarette use include 1) a 90% increase in the retail price of cigarettes during December 1997–May 2003 (*5*), 2) increases in school-based efforts to prevent tobacco use, and 3) increases in the proportion of young persons who have been exposed through the mass media to smoking-prevention campaigns funded by states or the American Legacy Foundation (*6*). Factors that might have slowed the rate of decline in cigarette use among young persons include 1) tobacco industry expenditures on tobacco advertising and promotion, which increased from $5.7 billion in 1997 to $11.2 billion in 2001 (*7*); 2) reductions in Master Settlement Agreement funds used for tobacco-use prevention; and 3) the frequency with which smoking was depicted in films (*8*).

TABLE 1. Percentage of high school students who reported lifetime cigarette use*, current cigarette use†, and current frequent cigarette use§, by category — Youth Risk Behavior Survey, United States, 1991–2003¶

Category	1991		1993		1995		1997		1999		2001		2003	
	%	(95% CI**)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Lifetime	70.1	(±2.2)	69.5	(±1.4)	71.3	(±1.7)	70.2	(±1.9)	70.4	(±3.0)	63.9	(±2.1)	58.4	(±3.1) †† §§
Current	27.5	(±2.7)	30.5	(±1.9)	34.8	(±2.2)	36.4	(±2.3)	34.8	(±2.5)	28.5	(±2.0)	21.9	(±2.1) †† §§
Current frequent	12.7	(±2.2)	13.8	(±1.7)	16.1	(±2.6)	16.7	(±1.9)	16.8	(±2.5)	13.8	(±1.6)	9.7	(±1.4) §§

* Ever tried cigarette smoking, even one or two puffs.
† Smoked cigarettes on ≥1 of the 30 days preceding the survey.
§ Smoked cigarettes on ≥20 of the 30 days preceding the survey.
¶ Linear and quadratic trend analyses were conducted by using a logistic regression model controlling for sex, race/ethnicity, and grade. Prevalence estimates shown here were not standardized by demographic variables.
** Confidence interval.
†† Significant (p<0.05) linear effect.
§§ Significant quadratic effect.

TABLE 2. Percentage of high school students who reported current cigarette use*, by sex, race/ethnicity†, and grade — Youth Risk Behavior Survey, United States, 1991–2003§

Characteristic	1991		1993		1995		1997		1999		2001		2003	
	%	(95% CI¶)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)	%	(95% CI)
Sex														
Female	27.3	(±3.4)	31.2	(±2.1)	34.3	(±3.2)	34.7	(±2.8)	34.9	(±2.6)	27.7	(±2.1)	21.9	(±2.8) ** ††
Male	27.6	(±3.1)	29.8	(±2.3)	35.4	(±2.4)	37.7	(±2.7)	34.7	(±3.0)	29.2	(±2.6)	21.8	(±2.1) ** ††
Race/Ethnicity														
White, non-Hispanic	30.9	(±3.3)	33.7	(±2.2)	38.3	(±2.7)	39.7	(±2.4)	38.6	(±3.2)	31.9	(±2.3)	24.9	(±2.4) ** ††
Female	31.7	(±4.6)	35.3	(±2.6)	39.8	(±3.5)	39.9	(±3.2)	39.1	(±3.5)	31.2	(±2.5)	26.6	(±3.7) ** ††
Male	30.2	(±3.8)	32.2	(±2.7)	37.0	(±3.3)	39.6	(±3.8)	38.2	(±3.7)	32.7	(±3.0)	23.3	(±2.5) ††
Black, non-Hispanic	12.6	(±2.5)	15.4	(±2.5)	19.2	(±3.2)	22.7	(±3.8)	19.7	(±4.1)	14.7	(±2.8)	15.1	(±2.8) ††
Female	11.3	(±2.3)	14.4	(±2.7)	12.2	(±3.1)	17.4	(±3.9)	17.7	(±3.5)	13.3	(±3.4)	10.8	(±2.9) ††
Male	14.1	(±4.5)	16.3	(±4.2)	27.8	(±5.5)	28.2	(±5.5)	21.8	(±7.1)	16.3	(±3.2)	19.3	(±3.7) ††
Hispanic	25.3	(±2.8)	28.7	(±2.9)	34.0	(±5.3)	34.0	(±2.7)	32.7	(±3.8)	26.6	(±4.3)	18.4	(±2.3) ** ††
Female	22.9	(±3.8)	27.3	(±3.9)	32.9	(±5.6)	32.2	(±3.7)	31.5	(±4.6)	26.0	(±3.7)	17.7	(±2.1) ** ††
Male	27.9	(±3.6)	30.2	(±3.4)	34.9	(±8.7)	35.5	(±3.6)	34.0	(±4.5)	27.2	(±7.0)	19.1	(±3.5) ** ††
Grade														
9th	23.2	(±3.8)	27.8	(±2.4)	31.2	(±1.6)	33.4	(±5.1)	27.6	(±4.0)	23.9	(±2.9)	17.4	(±2.4) ** ††
10th	25.2	(±2.7)	28.0	(±3.3)	33.1	(±3.8)	35.3	(±4.1)	34.7	(±2.5)	26.9	(±3.2)	21.8	(±2.9) ††
11th	31.6	(±3.8)	31.1	(±3.2)	35.9	(±3.8)	36.6	(±3.6)	36.0	(±3.0)	29.8	(±3.7)	23.6	(±3.2) ** ††
12th	30.1	(±4.4)	34.5	(±3.8)	38.2	(±3.6)	39.6	(±4.9)	42.8	(±5.5)	35.2	(±4.1)	26.2	(±2.8) ††

* Smoked cigarettes on ≥1 of the 30 days preceding the survey.
† Numbers for other racial/ethnic groups were too small for meaningful analysis.
§ Linear and quadratic trend analyses were conducted by using a logistic regression model controlling for sex, race/ethnicity, and grade. Prevalence estimates shown here were not standardized by demographic variables.
¶ Confidence interval.
** Significant (p<0.05) linear effect.
†† Significant quadratic effect.

The findings in this report are subject to at least two limitations. First, these data apply only to youths who attend high school. Nationwide, among persons aged 16–17 years, approximately 6% were not enrolled in a high school program and had not completed high school (*9*). Second, the extent of underreporting or overreporting in YRBS cannot be determined, although the survey questions demonstrate test/retest reliability (*10*).

Although the declines in cigarette use are encouraging, prevention efforts must be sustained if the nation is to reach its 2010 national health objective. In 2003, approximately one in five high school students were current smokers, and one in 10 were current frequent smokers. Reducing the prevalence of cigarette use further among young persons will require continued efforts in 1) devising targeted and effective media campaigns, 2) reducing depictions of tobacco use in entertainment media, 3) instituting campaigns to discourage family and friends from providing cigarettes to young persons, 4) promoting smoke-free homes, 5) instituting comprehensive school-based programs and policies in conjunction with supportive community activities to prevent smoking initiation and encourage smoking cessation, and 6) decreasing the number of adult smokers (e.g., parents) to present more nonsmoking role models.

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Diminishing Racial Disparities in Early-Onset Neonatal Group B Streptococcal Disease — United States, 2000–2003

Increased use of intrapartum antibiotics to prevent perinatal group B streptococcal (GBS) disease during the 1990s led to substantial declines in the incidence of GBS disease in newborns (*1*). Despite this success, at the end of the 1990s, early-onset GBS disease (in infants aged <7 days) continued to be a leading infectious cause of neonatal mortality in the United States, and black infants remained at higher risk than white infants (*1*). In 2002, CDC and the American College of Obstetricians and Gynecologists (ACOG) revised guidelines for prevention of early-onset GBS disease to recommend late prenatal screening of all pregnant women and intrapartum antibiotic prophylaxis (IAP) for GBS carriers (*2,3*). These guidelines were expected to result in further declines in early-onset disease (*4*). This report updates early-onset incidence trends since 1999 analyzed by using population-based, multistate data from the Active Bacterial Core surveillance (ABCs)/Emerging Infections Program Network. The results of the analysis indicated that 1) after a plateau in early-onset disease incidence during 1999–2002, rates declined 34% in 2003 and 2) although racial disparities in incidence persist, rates for blacks now approach the 2010 national health objective of 0.5 cases per 1,000 live births (*5*). Continued implementation of screening and prophylaxis guidelines by clinicians and public health practitioners should lead to further declines in racial disparities.

ABCs conducts active, laboratory-based surveillance for all cases of invasive GBS, including periodic audits to ensure completeness of case finding. A case of early-onset GBS disease was defined as isolation of GBS from a normally sterile site (e.g., blood or cerebrospinal fluid) in a neonate aged 0–6 days residing in an ABCs area. Participating areas during 2000–2003 were Connecticut, Maryland, Minnesota, and selected counties in California, Colorado (beginning in 2001), Georgia, New York, Oregon, and Tennessee, representing a population that produced 419,062 live births in 2001. Of the 2001 live-birth cohort, 73% were white, 20% were black, and 7% were of other races; 15% were of Hispanic origin. The incidence of early-onset disease was calculated by using live-birth data for 2000 and 2001 from ABCs states' vital statistics or the National Vital Statistics Report (available at http://www.cdc.gov/nchs/data/nvsr/nvsr51/nvsr51_02.pdf). Incidence for 2002 and 2003 were calculated by using 2001 live-birth data. Incidence of GBS disease from earlier surveillance years was derived from data published previously (*1*) using comparable methods. A total of 184 (13.2%) of 1,397 cases with missing or unspecified race data during 1996–2002 were matched with birth records to improve the completeness of race reporting. Remaining cases of unknown race (during 1996–2002, a total of 77 [5.5.%] of 1,397; in 2003, a total of 21 [15.7%] of 134) were distributed on the basis of the known race distribution within each county and included in all reported rates. To assess the impact of the August 2002 guidelines, incidence in 2003 was compared with the average incidence for 2000 and 2001; 2002 was considered a transition year.

During 2000–2003, a total of 701 cases of early-onset GBS disease were reported in the surveillance areas (Table). Outcome was known for 676 (96.4%) cases; the case-fatality ratio was 6.5%. A total of 150 (21.4%) infants were born before 37 weeks' gestation; among these preterm infants, the case-fatality ratio was 22.7%.

During 1999–2001, early-onset disease incidence remained nearly constant, with an average of 0.47 cases per 1,000 live births. In 2003, the overall disease incidence was 0.32 (Figure 1), representing a 34% (95% confidence interval [CI] = 20%–46%) decline in incidence since 2000–2001. The incidence in 2003 varied geographically, from 0.53 in Tennessee to 0.14 in Oregon (Table). Rates in Georgia decreased significantly compared with the 2000–2001 baseline ($p<0.01$), and rates in Tennessee decreased marginally ($p = 0.06$).

During 1999–2001, disease incidence remained stable for both black and white populations, and rates among black