

# Trends in tobacco use among adolescents by grade, sex and race, 1991-2019

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## Abstract

**Importance:** Use of e-cigarettes increased among adolescents between 2011 and 2019. However, whether these changes are affecting patterns of use of other tobacco products, especially cigarettes, remains unclear. **Objective:** To examine the long-term and recent trends in cigarette smoking and smokeless tobacco product use among US adolescents by grade (8th, 10th, and 12th), sex (male and female), and race (White and Black). **Design, Setting, and Participants:** In this cross-sectional study, joinpoint regression analyses were performed to characterize trends in tobacco product use for key sociodemographic groups, identifying change of trend years (joinpoints). Students in the 8th, 10th, and 12th grades at US secondary schools and high schools who participated in the nationally representative Monitoring the Future survey from January 7, 1991, to June 3, 2019, were evaluated. **Exposures:** Cigarette smoking and smokeless tobacco product use during the past 30 days. **Main Outcomes and Measures:** Past 30-day and daily prevalence of cigarette smoking and smokeless tobacco product use by year, grade, sex, and race. The prevalence trend segments, change of trend years (joinpoints), and annual percentage change (APC) in prevalence within each trend segment were estimated using joinpoint regression. **Results:** Since 1991, 487 335 8th-grade, 447 310 10th-grade, and 424 236 12th-grade students have completed the Monitoring the Future survey (including 663 663 girls and 632 698 boys [those who did not respond to the sex question in the survey were excluded from the sex analyses]). Past 30-day and daily smoking prevalence increased in all groups analyzed from 1991 until 1996 and 1997 and has been decreasing ever since, with more rapid reductions in recent years. For example, daily smoking among 12th-grade boys increased at an APC of 4.9% (95% CI, 3.5%-6.3%) from 1991 to 1998, decreased at an APC of -8.0% (95% CI, -9.3% to -6.7%) from 1998 to 2006, decreased at an APC of -1.6% (95% CI, -4.6% to 1.5%) from 2006 to 2012, and decreased at an APC of -17.4% (95% CI, -19.4% to -15.4%) from 2012 to 2019. Similar results were observed for boys in the 8th grade (5.0% [95% CI, 0.1%-10.2%] for 1991-1996, -8.8% [95% CI, -10.0% to -7.6%] for 1996-2011, and -17.3% [95% CI, -22.2% to -12.0%] for 2011-2019) and 10th grade (7.1% [95% CI, 3.7%-10.7%] for 1991-1997, -11.1% [95% CI, -13.9% to -8.2%] for 1997-2005, -0.7% [95% CI, -5.9% to 4.9%] for 2005-2011, and -17.9 [95%, -21.7% to -13.9%] for 2011-2019), for girls in 8th grade (10.9% [95% CI, 5.0%-17.2%] for 1991-1996 and -10.8% [95% CI, -11.7% to -10.0% for 1996-2019), 10th grade (7.2% [95% CI, 3.9%-10.7%] for 1991-1997, -9.5% [95% CI, -10.5% to -8.6%] for 1997-2012, and -16.3% [95% CI, -21.8% to -10.4%] for 2012-2019), and 12th grade (6.5% [95% CI, 3.6%-9.5%] for 1991-1997, -7.2% [95% CI, -8.1% to -6.3%] for 1997-2012, and -17.5% [95% CI, -21.2% to -13.6%] for 2012-2019). Results were similar, too, for Black adolescents (2015-2019 average annual percentage change: -8.6% [95% CI, -10.3% to -6.8%] for 8th graders; -17.7% [95% CI, -26.3% to -8.2%] for 10th graders; and -18.3% [95% CI, -23.9% to -12.2%] for 12th graders) and White adolescents (2015-2019 average annual percentage change: -17.3% [95% CI, -20.6% to -13.7%] for 8th graders; -16.9% [95% CI, -20.5% to -13.2%] for 10th graders; and -17.0% [95% CI, -20.5% to -13.2%] for 12th graders). Smokeless tobacco was used more variably through 2012, followed by consistent decreases in the past 5 years. For instance, smokeless tobacco use in the past 30 days in 10th-grade boys decreased at an APC of -6.5% (95% CI, -7.5% to -5.4%) from 1991 to 2004, increased at an APC of 3.1% (95% CI, -0.8% to 7.1%) from 2004 to 2012, and decreased at an APC of -11.6% (95% CI, -15.7% to -7.4%) from 2012 to 2019. Similarly, daily smokeless tobacco use in 12th-grade boys decreased at an APC of -3.8% (95% CI, -5.4% to -2.1%) from 1992 to 2005, increased at an APC of 3.1% (95% CI, -0.2% to 6.5%) from 2005 to 2015, and decreased at an APC of -23.0% (95% CI, -33.3% to -11.0%) from 2015 to 2019. **Conclusions and Relevance:** This cross-sectional study suggests that, despite the increase in the prevalence of e-

cigarette use among adolescents between 2011 and 2019, the prevalence of cigarette and smokeless tobacco use has decreased more rapidly during the same period compared with earlier years.

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