

Preventing Tobacco Use Among Youth and Young Adults

A Report of the Surgeon General

Executive Summary

2012

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Message from Kathleen Sebelius *Secretary of Health and Human Services*

Tobacco is the leading cause of preventable and premature death, killing an estimated 443,000 Americans each year. Cigarette smoking costs the nation \$96 billion in direct medical costs and \$97 billion in lost productivity annually. In addition to the billions in medical costs and lost productivity, tobacco is enacting a heavy toll on young people.

Each day in the United States, over 3,800 young people under 18 years of age smoke their first cigarette, and over 1,000 youth under age 18 become daily cigarette smokers. The vast majority of Americans who begin daily smoking during adolescence are addicted to nicotine by young adulthood. Despite the well-known health risks, youth and adult smoking rates that had been dropping for many years have stalled. When this Administration took office, we decided that if these numbers were not changing, we had to do something. We accelerated our efforts to fight tobacco by helping Americans stop smoking and protecting young people from starting to smoke.

The first step was the historic Family Smoking Prevention and Tobacco Control Act which gives the U.S. Food and Drug Administration the authority to regulate tobacco products to prevent use by minors and reduce the impact on public health. The law includes many vital provisions, including a ban on cigarettes with certain characterizing flavorings such as candy and fruit, restrictions on the sale of single cigarettes and the prohibition of marketing practices aimed at children. The Family Smoking Prevention and Tobacco Control Act also provides for graphic warning labels that make the danger of smoking abundantly clear.

Second, as part of the Recovery Act, the Department of Health and Human Services (HHS) invested \$225 million to support tobacco prevention and control efforts in states. These investments were made in communities that have used evidence-based tobacco interventions and will eventually become models for the rest of the country.

The third step was the Affordable Care Act, which provides a new opportunity to transform how our nation addresses tobacco use through the Prevention and Public Health Fund. The law expands access to recommended treatment programs, such as tobacco use cessation, often at no additional cost. For the first time, Medicare and Medicaid will cover tobacco use cessation for all beneficiaries. The health care law also provides support for state 1-800 quitlines and implementation of innovative social media initiatives including text messaging and smart phone applications.

We are using the many tools at our disposal, from regulatory power to state and local investments, to end the tobacco epidemic. In November 2010, HHS announced the Department's first ever comprehensive tobacco control strategic action plan, titled Ending the Tobacco Epidemic, which will help us bring all of these strategies together to achieve our goals. An important component of our HHS plan focuses on preventing the initiation of tobacco use among young people, through hard-hitting mass media campaigns that will discourage our country's youth from starting to use tobacco products and motivate current tobacco users to quit. This key strategic action, combined with others in the plan, signify HHS's commitment to provide a clear roadmap for the future of tobacco prevention and control.

We have come a long way since the days of smoking on airplanes and in college classrooms, but we have a long way to go. We have the responsibility to act and do something to prevent our youth from smoking. The prosperity and health of our nation depend on it.

Message from Howard Koh *Assistant Secretary for Health*

Tobacco use imposes enormous public health and financial costs on this nation—costs that are completely avoidable. Until we end tobacco use, more young people will become addicted, more people will become sick, and more families will be devastated by the loss of loved ones.

The simple fact is that we cannot end the tobacco epidemic without focusing our efforts on young people. Nearly 100% of adults who smoke every day started smoking when they were 26 or younger, so prevention is the key. The tobacco industry spends almost \$10 billion a year to market its products, half of all movies for children under 13 contain scenes of tobacco use, half of our states continue to allow smoking in public places, and images and messages normalize tobacco use in magazines, on the Internet, and at retail stores frequented by youth. With a quarter of all high school seniors and a third of all young adults smoking, and with progress in reducing prevalence slowing dramatically, the time for action is now.

This Surgeon General's Report is an important addition to our base of knowledge on the prevalence, causes, effects, and implications of tobacco use by young people. It elucidates in powerful detail the factors that lead youth and young adults to initiate tobacco use, and the devastating health and economic impact of that decision on our nation as well as on individuals, their families, and their communities. This report also identifies proven, effective strategies that hold the potential of dramatically reducing tobacco use.

The Department's overall tobacco control strategy is to strengthen and fully implement these proven, effective strategies as part of a comprehensive approach that combines educational, clinical, regulatory, economic, and social initiatives. In November 2010, the Department released *Ending the Tobacco Epidemic: A Tobacco Control Strategic Action Plan for the U.S. Department of Health and Human Services* which provides a framework for coordinating this approach. The plan sets forth specific actions which HHS can implement to build on recent legislative milestones, respond to the changing market for tobacco products, and promote robust tobacco control programs at the federal, state, and community levels.

From 1997 to 2004 youth smoking fell rapidly. Since that time smoking among high school seniors has continued to fall, but slowly from 24.4% in 2003 to 18.7% in 2010 (daily smoking among youth has fallen from 16.8% in 1999 to 7.3% in 2009). Since 2003 prevalence among adults has fallen from 21.6 to 19.3% in 2010. The current problem is not that the evidence-based tools that drove the progress from 1997 to 2004 stopped working; it is that they have not been applied with sufficient effort or nationwide. That these tools still work is reflected in the fact that many states have seen significant reductions since 2005. Between 2005 and 2010 twenty states had declines of 20% or more.

Even with decades of progress and recent tobacco control initiatives, however, we must do more. We have ample evidence that comprehensive, multi-component interventions are effective at reducing tobacco use. But knowledge is not enough. We must also have commitment—the commitment to sustain comprehensive programs, to give our young people another perspective on tobacco, to create an environment that makes it harder for youth to smoke, to make cessation services accessible and affordable. It is within our grasp to make the next generation tobacco-free if we have the will to do so.

Foreword

Preventing smoking and smokeless tobacco use among young people is critical to ending the epidemic of tobacco use. Since the first Surgeon General's report on youth in 1994, the basis for concern about smoking during adolescence and young adulthood has expanded beyond the immediate health consequences for the young smoker to a deeper understanding of the implications for health across the life span from early use of tobacco. Cigarette smoking remains the leading cause of preventable death in the United States, accounting for approximately 443,000 deaths, or about 1 of every 5 deaths, in the United States each year.

Since 1994, there have been many legal and scientific developments that have curtailed somewhat the tobacco companies' ability to market to young people. The 1998 Master Settlement Agreement eliminated most cigarette billboard and transit advertising, print advertising directed to underage youth, and limited brand sponsorship. In addition, the Master Settlement Agreement resulted in the release of internal tobacco industry documents that have been analyzed by scientists. Furthermore, during this time, the prices of cigarettes and smokeless tobacco products also increased. These significant developments, among others, resulted in a sharp decrease in tobacco use among adults and youth. However, this progress has stalled in recent years.

More than 80% of adult smokers begin smoking by 18 years of age with 99% of first use by 26 years of age. In addition, adolescent smokeless tobacco users are more likely than nonusers to become adult cigarette smokers. Adolescents and young adults are uniquely susceptible to social and environmental influences to use tobacco, and tobacco companies spend billions of dollars on cigarette and smokeless tobacco marketing. The findings in this report provide evidence that coordinated, high-impact interventions including mass media campaigns, price increases, and community-level changes protecting people from secondhand smoke and norms are effective in reducing the initiation and prevalence of smoking among youth. However, many of these comprehensive tobacco control programs remain underfunded. Now more than ever, it is imperative that we continue investing in tobacco prevention and control. An increase in spending on sustained comprehensive tobacco control programs will result in reductions in youth and adult smoking rates and, ultimately, in health care costs.

Reducing tobacco use is a winnable battle. We have the science and, with additional effort and support for evidence-based, cost-effective strategies that we can implement now, we will improve on our nation's health and our children's future.

Thomas R. Frieden, M.D., M.P.H.
Director
Centers for Disease Control and Prevention
and
Administrator
Agency for Toxic Substances and Disease Registry

Preface
from the Surgeon General,
U.S. Department of Health and Human Services

Nearly all tobacco use begins during youth and young adulthood. These young individuals progress from smoking occasionally to smoking every day. Each day across the United States over 3,800 youth under 18 years of age start smoking. Although much progress has been made to reduce the prevalence of smoking since the first Surgeon General's report in 1964, today nearly one in four high school seniors and one in three young adults under age 26 smoke.

Of every three young smokers, only one will quit, and one of those remaining smokers will die from tobacco-related causes. Most of these young people never considered the long-term health consequences associated with tobacco use when they started smoking; and nicotine, a highly addictive drug, causes many to continue smoking well into adulthood, often with deadly consequences.

This Surgeon General's report examines in detail the epidemiology, health effects, and causes of tobacco use among youth ages 12 through 17 and young adults ages 18 through 25. For the first time tobacco data on young adults as a discrete population has been explored. This is because nearly all tobacco use begins in youth and young adulthood, and because young adults are a prime target for tobacco advertising and marketing activities. This report also highlights the efficacy of strategies to prevent young people from using tobacco.

After years of steady decrease following the Tobacco Master Settlement Agreement of 1998, declines in youth tobacco use have slowed for cigarette smoking and stalled for use of smokeless tobacco. The latest research shows that concurrent use of multiple tobacco products is common among young people, and suggest that smokeless tobacco use is increasing among White males.

An important element of this Surgeon General's report is the review of the health consequences of tobacco use by young people. Cigarette smoking by youth and young adults is proven to cause serious and potentially deadly health effects immediately and into adulthood. One of the most significant health effects is addiction to nicotine that keeps young people smoking longer, causing increased physical damage. Early abdominal aortic atherosclerosis has been found in young smokers which affects the flow of blood to vital organs such as the lungs. This leads to reduced lung growth that can increase the risk of chronic obstructive pulmonary disease later in life, and reduced lung function.

This report examines the social, environmental, advertising, and marketing influences that encourage youth and young adults to initiate and sustain tobacco use. Tobacco products are among the most heavily marketed consumer goods in the U.S. Much of the nearly \$10 billion spent on marketing cigarettes each year goes to programs that reduce prices and make cigarettes more affordable; smokeless tobacco products are similarly promoted. Peer influences; imagery and messages that portray tobacco use as a desirable activity; and environmental cues, including those in both traditional and emerging media platforms, all encourage young people to use tobacco. These influences help attract youth to tobacco use and reinforce the perception that smoking and various forms of tobacco use are a social norm—a particularly strong message during adolescence and young adulthood.

Many initiatives have been put into place to help counter the influences that encourage young people to begin tobacco use. The Tobacco Master Settlement Agreement in 1998 curtailed much of the advertising that was particularly appealing to young people. With the passage of the 2009 legislation giving the U.S. Food and Drug Administration the authority to regulate tobacco products and tobacco advertising, we now have another important means of helping decrease the appeal of tobacco use to this population. Coordinated, multi-component interventions that include mass media campaigns, comprehensive community programs, comprehensive statewide tobacco control programs, price increases, and school-based policies have also proven effective in preventing onset and use of tobacco use among youth and young adults.

We know what works to prevent tobacco use among young people. The science contained in this and other Surgeon General's reports provides us with the information we need to prevent the needless suffering of premature disease caused by tobacco use, as well as save millions of lives. By strengthening and continuing to build upon effective policies and programs, we can help make our next generation tobacco free.

Regina Benjamin, M.D., M.B.A.
Surgeon General

The Tobacco Epidemic Continues Because Youth and Young Adults Begin to Use—and Become Addicted to—Cigarettes and Smokeless Tobacco Products

Tobacco use is a pediatric epidemic, around the world as well as in the United States. Although progress has been made since the first Surgeon General's report in 1964, too many of our youth still use tobacco. Among U.S. high school seniors, one out of four is a regular cigarette smoker (Youth Risk Behavior Survey [YRBS] 2009, Chapter 3). Because few high school smokers are able to break free from the powerful addicting effects of nicotine, about 80% will smoke into adulthood. Among those who persist in smoking, one-half will die about 13 years earlier than his or her nonsmoking peers (Fagerström 2002; Doll et al. 2004).

In addition to cigarette smoking, use of other forms of tobacco by youth and young adults is epidemic. Nearly one in five White adolescent males (12–17 years old) uses smokeless tobacco (YRBS 2009, Chapter 3), and 1 in 10 young adults (18–25 years old) smokes cigars (National Survey on Drug Use and Health [NSDUH] 2010, Chapter 3). The concurrent use of multiple tobacco products is common, too, with over 50% of White and Hispanic male tobacco users reporting that they use more than one tobacco product (YRBS 2009, see Chapter 3). The numbers are staggering. They translate into over a million new tobacco users a year in the United States alone. But there are proven methods to prevent this epidemic from claiming yet another generation, if our nation has the will to implement those methods in every state and community.

Nearly all tobacco use begins in childhood and adolescence. In all, 88% of adult cigarette smokers who smoke daily, report that they started smoking by the age of 18 (NSDUH 2010, Chapter 3). This is a time in life of great vulnerability to social influences, and the pervasive presence of tobacco product marketing—including everything from sleek ads in magazines to youth-generated posts on social networking sites, to images of smoking in the movies—conveys messages that make tobacco use attractive to youth and young adults.

The first comprehensive Surgeon General's report on youth, *Preventing Tobacco Use Among Young People*, was published in 1994 (U.S. Department of Health and Human Services [USDHHS] 1994). That report concluded that if young people can remain free of tobacco until age 18, most will never start to smoke. The report

documented the addiction process for young people and how the symptoms of addiction in youth are similar to those in adults. Use of tobacco was also presented as a gateway drug among young people, because its use generally precedes and increases the risk of illicit drug use. Cigarette advertising and promotional activities were seen as a potent way to increase the risk of cigarette smoking among young people, while community-wide efforts were shown to have been successful in reducing tobacco use among youth. All of these conclusions remain important, relevant, and accurate, as documented in the current report, but there has been considerable research since 1994 that greatly expands our knowledge about tobacco use among youth, its prevention, and the dynamics of cessation among young people. Thus, there is a compelling need for the current report.

Since 1994, multiple legal and scientific developments have altered the tobacco control environment and consequently have affected smoking among youth. All states and the U.S. Department of Justice brought lawsuits against the cigarette companies, with the result that internal documents of the tobacco industry have been made public, analyzed, and introduced into the science of tobacco control. Also, the Master Settlement Agreement with the tobacco companies in 1998 resulted in the elimination of billboard and transit advertising, eliminated print advertising that directly targeted underage youth, and limited the use of brand advertising (National Association of Attorneys General [NAAG] 1998). This settlement also created the American Legacy Foundation, which was charged with implementing a nationwide antismoking campaign targeting youth. In 2009, the U.S. Congress passed a law that gave the U.S. Food and Drug Administration (FDA) authority to regulate tobacco products in order to promote the public's health (*Family Smoking Prevention and Tobacco Control Act* [2009]). Thus, the tobacco companies have, in the U.S., been somewhat curtailed in their ability to market to young people, have had to reimburse the state governments (through agreements made with certain states, the Master Settlement Agreement) for a portion of tobacco-related health care costs. These actions have, in part, resulted in a sharp decrease in tobacco use among adults and among youth, the latter of which is documented in this current report.

In addition, substantial new research has added to our knowledge and understanding of tobacco use and control as it relates to youth since the 1994 Surgeon General's report, including updates and new data in *Healthy People 2000*, 2010, subsequent Surgeon General's reports, in NCI Monographs, in Institute of Medicine reports, and in the Cochrane Collaboration

reviews in addition to hundreds of peer-reviewed publications, book chapters, and policy reports. Thus, although this report is a follow-up to the 1994 report, other important reviews have been undertaken in the past 17 years and have served to fill the gap during an especially active and important time in research on tobacco control among youth.

Evidence Summary

This report reviews updated evidence on the: 1) health consequences of tobacco use in youth and young adults, 2) epidemiology of cigarette and smokeless tobacco use among youth and young adults, 3) etiological factors associated with the onset and progression of tobacco use, 4) tobacco industry influences on the use of tobacco by youth, and 5) effective efforts to prevent or reduce tobacco use among youth.

With 99% of all first use of tobacco occurring by age 26 (NSDUH 2010, Chapter 3), if youth and young adults remain tobacco-free, very few people will begin to smoke or use smokeless products. Unfortunately, early use of tobacco has substantial health risks that begin almost immediately in adolescence and young adulthood, including impairment to the respiratory and cardiovascular systems. Many of the long-term diseases associated with smoking, such as lung cancer, are more likely among those who begin to smoke earlier in life (Doll and Peto 1978; Peto 1986; USDHHS 2004). Tobacco use is addictive for young people and, therefore, cessation is problematic and challenging, even for young users, and early quitting is very difficult (Chassin et al. 2000; Mayhew et al. 2000; Riggs et al. 2007). Adolescent and young adult smokers become adult smokers, with the associated and well-documented chronic diseases associated with adult smoking (White et al. 2002). And while young people might believe that smoking is associated with weight loss, the data do not support any reduction in weight among adolescent smokers (Klesges et al. 1998; Cachelin et al. 2003; Cooper et al. 2003; Bean et al. 2008).

One in four high school seniors (YRBS 2009, Chapter 3), and one in three young adults (NSDUH 2010, Chapter 3), are current smokers. While reductions in tobacco use have been realized, particularly since the Master Settlement Agreement in 1998, the data indicate that these reductions have stalled. Importantly, smokeless tobacco use is increasing among young White males and cigar smoking is increasing among Black females. In fact, over half of White and Hispanic high school males who

use tobacco use more than one tobacco product, and just under half of Hispanic females who use tobacco use more than one tobacco product, too (YRBS 2009, Chapter 3).

Adolescence and emerging adulthood are stages of life with increased vulnerability to tobacco use. These are times of remarkable growth—physically, mentally, and socially—that are not always synchronous and are complicated because the brain has not yet fully developed (Steinberg 2007). Peer influence is paramount during these life stages, and young people with greater numbers of peers who smoke are more likely to begin to smoke themselves (Landrine et al. 1994; Hu et al. 1995; Killen et al. 1997; Urberg et al. 1997; Flay et al. 1998; Robinson et al. 2006). Those who have fewer pro-social bonds to conventional institutions, such as school or places of worship, are also more likely to use tobacco (Choi et al. 2002; Evans-Whipp et al. 2004; van den Bree et al. 2004; Metzger et al. 2011). This is evidenced by the compelling associations between low academic achievement and smoking onset and use among adolescents (Dewey 1999; Sutherland and Shepherd 2001; Diego et al. 2003; Scal et al. 2003; Cox et al. 2007; Forrester et al. 2007; Tucker et al. 2008). Even exposure to smoking by actors in movies increases the likelihood that a young person will begin to smoke (Sargent et al. 2001, 2005; Hanewinkel and Sargent 2007; Thrasher et al. 2008).

Tobacco companies have capitalized on the vulnerability of this age group to more effectively promote their products. Marketing efforts of the tobacco companies have caused young people to smoke, as demonstrated by extensive cross-sectional and longitudinal research outlined in this report (Armstrong et al. 1990; Aitken et al. 1991; Evans et al. 1995; Schooler et al. 1996; Gilpin et al. 1997, 2007; Pierce et al. 2010). Further, information explicitly revealed in tobacco industry documents makes clear the industry's interest in and efforts to entice young people to use their products (Perry 1999; *United States v. Philip Morris*, 449 F. Supp. 2d 1 [2006]). With young smokers being more price-sensitive than older smokers,

tobacco companies have increasingly focused attention on strategies that reduce the price of tobacco products (Chaloupka et al. 2002; Slater et al. 2007). The tobacco companies' own smoking prevention campaigns have not demonstrated any reduction in adolescent smoking or any evidence of effectiveness (Interactive Inc. 2000, 2001; Mandel et al. 2006).

Effective programs and policies are available and have demonstrated success in reducing youth smoking, though adequate dissemination and sustainability

of these successful approaches is currently lacking in nearly all states. Nonetheless, sufficient evidence exists to clearly indicate that coordinated, multi-component interventions that combine mass media campaigns, price increases, school-based policies and programs, community-wide changes, and statewide programs as effective in reducing the initiation, prevalence, and intensity of smoking among youth and young adults.

This report has drawn from the evidence reviewed and has five major conclusions.

Major Conclusions of This Report

1. Cigarette smoking by youth and young adults has immediate adverse health consequences, including addiction, and accelerates the development of chronic diseases across the full life course.
2. Prevention efforts must focus on both adolescents and young adults because among adults who become daily smokers, nearly all first use of cigarettes occurs by 18 years of age (88%), with 99% of first use by 26 years of age.
3. Advertising and promotional activities by tobacco companies have been shown to cause the onset and continuation of smoking among adolescents and young adults.
4. After years of steady progress, declines in the use of tobacco by youth and young adults have slowed for cigarette smoking and stalled for smokeless tobacco use.
5. Coordinated, multicomponent interventions that combine mass media campaigns, price increases including those that result from tax increases, school-based policies and programs, and statewide or community-wide changes in smokefree policies and norms are effective in reducing the initiation, prevalence, and intensity of smoking among youth and young adults.

Chapter Summaries and Conclusions

Chapter 2: The Health Consequences of Tobacco Use Among Young People

While the 1994 Surgeon General's report clearly identified that smoking had immediate and long-term health consequences for young people, further evidence presented in the current report has strengthened these conclusions. Research now documents strong causal associations between active cigarette smoking in young people and addiction to nicotine, reduced lung function, reduced lung growth, asthma, and early abdominal aortic atherosclerosis. These associations have met the criteria for causality first introduced in the 1964 Surgeon General's

report: consistency, strength, specificity, temporality, and biological plausibility of the scientific evidence. These are serious social, physical, and mental health problems that manifest during adolescence and young adulthood and are the precursors to other long-term chronic diseases. Smoking is the chief preventable cause of premature death in this country, and the early stages of the diseases associated with adult smoking are already evident among young smokers (Doll and Peto 1978; Peto 1986; USDHHS 2004). For example, young adult smokers under age 30 exhibit signs of and are being diagnosed with early disease of the abdominal aorta, a serious indicator of heart disease (McGill et al. 2000; McMahan et al. 2005, 2006). This chapter also includes a comprehensive review of the associations between smoking and body weight and weight

control methods, given the country's current concern with childhood obesity. While there is ample evidence that young people believe that cigarette smoking will help them control their body weight, there is no evidence that young smokers weigh less or lose weight because of their smoking (Cachelin et al. 2003; Cooper et al. 2003; Klesges et al. 1998; Bean et al. 2008).

Conclusions

1. The evidence is sufficient to conclude that there is a causal relationship between smoking and addiction to nicotine, beginning in adolescence and young adulthood.
2. The evidence is suggestive but not sufficient to conclude that smoking contributes to future use of marijuana and other illicit drugs.
3. The evidence is suggestive but not sufficient to conclude that smoking by adolescents and young adults is *not* associated with significant weight loss, contrary to young people's beliefs.
4. The evidence is sufficient to conclude that there is a causal relationship between active smoking and both reduced lung function and impaired lung growth during childhood and adolescence.
5. The evidence is sufficient to conclude that there is a causal relationship between active smoking and wheezing severe enough to be diagnosed as asthma in susceptible child and adolescent populations.
6. The evidence is sufficient to conclude that there is a causal relationship between smoking in adolescence and young adulthood and early abdominal aortic atherosclerosis in young adults.
7. The evidence is suggestive but not sufficient to conclude that there is a causal relationship between smoking in adolescence and young adulthood and coronary artery atherosclerosis in adulthood.

Chapter 3: The Epidemiology of Tobacco Use Among Young People in the United States and Worldwide

The major national data sets that assess youth and young adult smoking were analyzed to provide updated data for this report. Cigarette smoking is shown, again,

to primarily begin in adolescence, and very few adults begin to smoke after age 26 (1%) (NSDUH 2010, Chapter 3). Since the 1994 Surgeon General's report, tobacco use among adolescents and young adults has substantially decreased, especially since 1998. However, there has been a leveling off in the past few years, particularly since 2007, and in some groups there are increases in the prevalence of tobacco use, such as smokeless tobacco use among White males. Some groups of young people continue to smoke more than others, notably American Indians and Alaska Natives, but also Whites and Hispanics. With the introduction of new tobacco products and promotion of smokeless tobacco products, use of multiple tobacco products is common. Among tobacco users, more than one-half of White and Hispanic high school males and almost one-half of Hispanic high school females use more than one product.

Conclusions

1. Among adults who become daily smokers, nearly all first use of cigarettes occurs by 18 years of age (88%), with 99% of first use by 26 years of age.
2. Almost one in four high school seniors is a current (in the past 30 days) cigarette smoker, compared with one in three young adults and one in five adults. About 1 in 10 high school senior males is a current smokeless tobacco user, and about 1 in 5 high school senior males is a current cigar smoker.
3. Among adolescents and young adults, cigarette smoking declined from the late 1990s, particularly after the Master Settlement Agreement in 1998. This decline has slowed in recent years, however.
4. Significant disparities in tobacco use remain among young people nationwide. The prevalence of cigarette smoking is highest among American Indians and Alaska Natives, followed by Whites and Hispanics, and then Asians and Blacks. The prevalence of cigarette smoking is also highest among lower socioeconomic status youth.
5. Use of smokeless tobacco and cigars declined in the late 1990s, but the declines appear to have stalled in the last 5 years. The latest data show the use of smokeless tobacco is increasing among White high school males, and cigar smoking may be increasing among Black high school females.
6. Concurrent use of multiple tobacco products is prevalent among youth. Among those who use tobacco,

nearly one-third of high school females and more than one-half of high school males report using more than one tobacco product in the last 30 days.

7. Rates of tobacco use remain low among girls relative to boys in many developing countries, however, the gender gap between adolescent females and males is narrow in many countries around the globe.

Chapter 4: Social, Environmental, Cognitive, and Genetic Influences on the Use of Tobacco Among Youth

Adolescents and young adults are uniquely vulnerable to influences to use tobacco (Steinberg 2007). As young people move toward adulthood, they increasingly rely on their social contexts and peer groups in adopting or changing behavior. In particular, this chapter documents the potent influence of peer groups, and whether peers in their environment use tobacco and perceive of tobacco use as normative or acceptable. Young people are more likely to use tobacco if their peers use tobacco or are anti-social (Landrine et al. 1994; Hu et al. 1995; Headen et al. 1991; Killen et al. 1997; Urberg et al. 1997; Flay et al. 1998; Robinson et al. 2006). Those with higher academic achievement are less likely to use tobacco (Dewey 1999; Sutherland and Shepherd 2001; Diego et al. 2003; Scal et al. 2003; Cox et al. 2007; Forrester et al. 2007; Tucker et al. 2008). Because of the particular vulnerability of this age group to peer group influences, external messages that target the peer group can be especially potent.

Conclusions

1. Given their developmental stage, adolescents and young adults are uniquely susceptible to social and environmental influences to use tobacco.
2. Socioeconomic factors and educational attainment influence the development of youth smoking behavior. The adolescents most likely to begin to use tobacco and progress to regular use are those who have lower academic achievement.
3. The evidence is sufficient to conclude that there is a causal relationship between peer group social influences and the initiation and maintenance of smoking behaviors during adolescence.

4. Affective processes play an important role in youth smoking behavior, with a strong association between youth smoking and negative affect.
5. The evidence is suggestive that tobacco use is a heritable trait, more so for regular use than for onset. The expression of genetic risk for smoking among young people may be moderated by small-group and larger social-environmental factors.

Chapter 5: The Tobacco Industry's Influences on the Use of Tobacco Among Youth

The tobacco companies spent nearly \$10 billion in 2008 on advertising and promotional efforts (Federal Trade Commission [FTC] 2011a,b). While there have been restrictions on marketing to young people as a result of the Master Settlement Agreement, there have not been corresponding reductions in marketing expenses—these have increased since 1998 (FTC 2011a,b). Most tobacco industry marketing efforts involve promotional activities that reduce the price of cigarettes, strategies that should be effective with price-sensitive adolescents (FTC 2011a,b). Since the 1994 Surgeon General's report, considerable evidence has accumulated that supports a causal association between marketing efforts of tobacco companies and the initiation and progression of tobacco use among young people. This evidence includes data from cross-sectional studies on exposure to advertising and use of tobacco; longitudinal studies with non-susceptible, never-users of tobacco and subsequent initiation; examination of industry marketing efforts and use of specific brands; and evidence from tobacco industry documents on their marketing practices (Armstrong et al. 1990; Aitken et al. 1991; Evans et al. 1995; Schooler et al. 1996; Gilpin et al. 1997; Perry 1999; Chaloupka et al. 2002; *United States v. Philip Morris*, 449 F. Supp. 2d 1 [2006]; Gilpin et al. 2007; Slater et al. 2007; Pierce et al. 2010). This body of evidence consistently and coherently points to the intentional marketing of tobacco products to youth as being a cause of young people's tobacco use. The tobacco companies have launched anti-smoking efforts themselves, but while these efforts have had a positive impact on public perceptions of the tobacco industry among youth and young adults, they have not demonstrated success in impacting young people's tobacco use (Interactive Inc. 2000, 2001; Mandel et al. 2006). Importantly, new avenues for restrictions

on tobacco companies are now available and can be considered, such as changes in packaging, labeling, product design, and restricting smoking in movies.

Conclusions

1. In 2008, tobacco companies spent \$9.94 billion on the marketing of cigarettes and \$547 million on the marketing of smokeless tobacco. Spending on cigarette marketing is 48% higher than in 1998, the year of the Master Settlement Agreement. Expenditures for marketing smokeless tobacco are 277% higher than in 1998.
2. Tobacco company expenditures have become increasingly concentrated on marketing efforts that reduce the prices of targeted tobacco products. Such expenditures accounted for approximately 84% of cigarette marketing and more than 77% of the marketing of smokeless tobacco products in 2008.
3. The evidence is sufficient to conclude that there is a causal relationship between advertising and promotional efforts of the tobacco companies and the initiation and progression of tobacco use among young people.
4. The evidence is suggestive but not sufficient to conclude that tobacco companies have changed the packaging and design of their products in ways that have increased these products' appeal to adolescents and young adults.
5. The tobacco companies' activities and programs for the prevention of youth smoking have not demonstrated an impact on the initiation or prevalence of smoking among young people.
6. The evidence is sufficient to conclude that there is a causal relationship between depictions of smoking in the movies and the initiation of smoking among young people.

Chapter 6: Efforts to Prevent and Reduce Tobacco Use Among Young People

There is a large, robust, and consistent evidence base that documents known effective strategies in reducing the initiation, prevalence, and intensity of smoking among youth and young adults. Since the release in 1994 of the

first Surgeon General's report on preventing tobacco use among young people, the emphasis on environmental and policy approaches to tobacco control has increased, including increasing the unit price of tobacco products and implementing smoking bans through policies, regulations, and laws, as well as other coordinated efforts that establish smokefree social norms (USDHHS 2000; Task Force on Community Preventive Services [TFCPS] 2005; NIH [National Institutes of Health] State-of-the-Science Panel 2006; Bonnie et al. 2007; Centers for Disease Control and Prevention [CDC] 2007; National Cancer Institute [NCI] 2008). Evidence indicates that mass media campaigns can be one of the most effective strategies in changing social norms and preventing youth smoking. Influential and successful campaigns contain a number of essential elements including optimized themes, appropriate emotional tone, appealing format, clear messages, intensity, and adequate repetition (Pechmann 2001; Siegel 2002; Farrelly et al. 2003; Wakefield et al. 2003a,b; Schar et al. 2006; Richardson et al. 2007; Angus et al. 2008; NCI 2008). There also is strong evidence that media ads designed for adults also decrease the prevalence of smoking among youth.

In addition to mass media campaigns, a number of high-impact legislative and regulatory strategies have been proven to reduce tobacco use (USDHHS 2000; TFCPS 2005; NIH 2006; CDC 2007a,b). Federal, state, and local taxes that raise prices on tobacco products improve public health by reducing initiation, prevalence, and intensity of smoking among young people. The evidence shows that increasing tobacco prices is effective at lowering smoking prevalence as well as consumption levels of tobacco products, especially by youth and young adults, and other price-sensitive populations (Chaloupka and Warner 2000; USDHHS 2000b; Zaza et al. 2005). Evidence reviewed indicates that the strength of clean indoor air laws was inversely related to the prevalence of smoking among youth and increased the probability of smoking cessation among young adults (Tauras 2004; IARC 2009). FDA has continued a progression of legislative and regulatory initiatives that have reduced youth access to tobacco products and has implemented bans on a variety of other promotional activities traditionally used by the tobacco industry that are especially appealing to youth and young adults. Evidence cited in this chapter from a broad range of studies has concluded that bans on cigarette advertising, especially if the bans are comprehensive rather than partial, reduce youth smoking (Saffer and Chaloupka 2000; Lancaster and Lancaster 2003; Iwasaki et al. 2006; NCI 2008).

Numerous studies over many years have consistently concluded that comprehensive state tobacco con-

trol programs that include a range of coordinated and complementary strategies have been effective at not only reducing tobacco use by youth and young adults, but also have resulted in overall reductions in smoking prevalence and concomitant decreases in state spending on tobacco-related health care (USDHHS 2000; Sly et al. 2001; Rigotti et al. 2002; Soldz et al. 2002; Niederdeppe et al. 2004; Pierce et al. 2005; Bonnie et al. 2007; Lightwood et al. 2008; NCI 2008; Lightwood and Glantz 2011). Evidence on school-based programs points to short-term results for programs based on the social influences model using interactive delivery methods and teaching refusal skills, with some school-based prevention programs also demonstrating longer-term outcomes. As is the case with other strategies to prevent and reduce youth tobacco use, school-based programs produce larger and more sustained effects when they are implemented in combination with other initiatives such as mass media campaigns, family programs, and state and community programs. Further, the evidence indicates that sustained programs combining mass media campaigns; price increases on tobacco products, including those that result from tax increases; regulatory initiatives such as those that ban advertising to youth, restrictions on youth access to tobacco, and establishment of smoke-free public and workplace environments; and statewide, community-wide, and school-based programs and policies are effective in reducing the initiation, prevalence, and intensity of smoking among youth and young adults.

Conclusions

1. The evidence is sufficient to conclude that mass media campaigns, comprehensive community programs, and comprehensive statewide tobacco control programs can prevent the initiation of tobacco use and reduce its prevalence among youth.
2. The evidence is sufficient to conclude that increases in cigarette prices reduce the initiation, prevalence, and intensity of smoking among youth and young adults.
3. The evidence is sufficient to conclude that school-based programs with evidence of effectiveness, containing specific components, can produce at least short-term effects and reduce the prevalence of tobacco use among school-aged youth.

Chapter 7: A Vision for Ending the Tobacco Epidemic

Public health programs and policies have been in effect since the 19th century to dissuade young people from using tobacco. The first Surgeon General's report in 1964 provided irrefutable evidence of the harmful consequences of smoking and yet, 15 years later, as noted in the 1979 Surgeon General's report, rates of smoking among young people had not changed. By 1994, when the first Surgeon General's report focused on youth was released, smoking rates among young people were increasing, despite 30 years of evidence that cigarette smoking had become the leading cause of death in the United States. Since that landmark 1994 report, a large body of research, litigation by individual states and the federal government, the Master Settlement Agreement, and authority granted to the FDA have substantially changed the tobacco control policy environment, and tobacco advertising and promotional activities have been somewhat curtailed. The rates of tobacco use among youth and young adults began to decrease from the late 1990s to the mid-2000s. Thus, progress in reducing tobacco use has been achieved, but there still remain significant challenges ahead. Nearly one-fourth of our high school seniors are current smokers, and the decreasing rates of tobacco use have leveled off, and in some subgroups have increased since 2007. The efforts of the early 21st century need to be reinvigorated, and additional strategies considered, to end the tobacco epidemic. Providing and sustaining sufficient funding for comprehensive community programs, statewide tobacco control programs, school-based policies and programs, and mass media campaigns must be a priority. Taxing tobacco products is especially effective in reducing their use among young people. Greater consideration of further restrictions on advertising and promotional activities as well as efforts to decrease depictions of smoking in the movies is warranted, given the gravity of the epidemic and the need to protect young people now and in the future.

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