Stealing a March in the 21st Century: Accelerating Progress in the 100-Year War Against Tobacco Addiction in the United States

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Tobacco use in the United States has declined dramatically over the past 50 years, with the prevalence of cigarette smoking falling from about 42% of all adults to less than 20% by 2007. If this rate of decline continues, smoking could be eliminated in the United States by 2047.

Framed in military parlance, we may be halfway through a 100-year war against the leading public health killer of our time. We describe factors that have contributed to progress over the last 50 years and identify policy and other initiatives that can contribute to the elimination of tobacco use in the United States. (*Am J Public Health.* 2009;99:1170–1175. doi:10.2105/AJPH.2008.154559)

AMONG THE PUBLIC HEALTH successes of the 20th century, the decline in tobacco use since the early 1960s has been a historic achievement. As shown in Figure 1, adult smoking in the United States has fallen from a rate of about 42% a half century ago to less than 20% today. Framed in military parlance, we may be at the halfway point in a "100-year war" against tobacco addiction. This framing raises the question of what can be done to shorten this war. In essence, how can we steal a march in the 21st century in the battle against tobacco use and the tobacco industry? We review strategies that have worked thus far and recommend additional steps to further reduce tobacco use and dependence.

Numerous observers have claimed over time that tobacco use has plateaued and that progress against its use has stalled.[1–3] However, the remarkable decline in rates of tobacco use since the 1960s (Figure 1) belies this claim and underscores the remarkable success of tobacco control efforts to date. A review of smoking prevalence data from the Centers for Disease Control and Prevention shows that adult smoking between 1965 and 2007 declined by an average of about 0.5 percentage point per year (from 42% to 20%; Figure 1), although the actual annual declines have varied over these four decades. Extrapolation of these data reveals that, if this rate of decline continues, smoking will be essentially eliminated in the United States by about 2047.

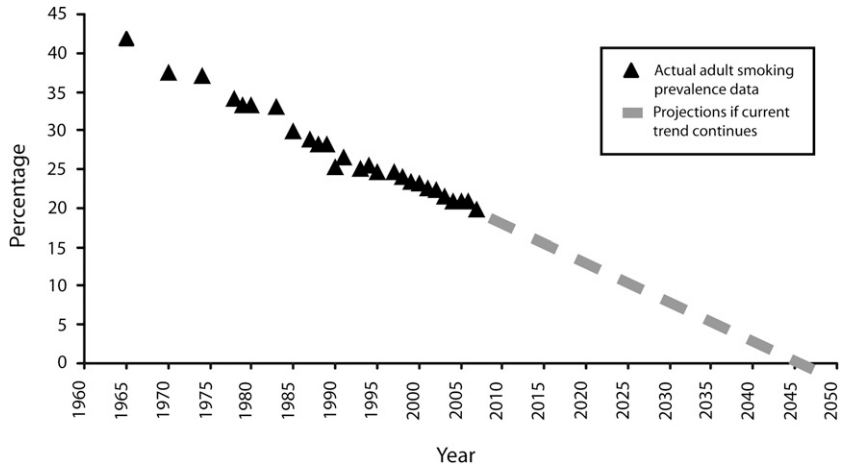
Fine-grained analyses of the declines suggest that the overall pattern of decreases was caused by the progressive enactment of new and stronger policies and interventions.[4–14] Continued innovation of tobacco control efforts and continued attention to tobacco industry tactics (e.g., price discounting, increased marketing of smokeless tobacco products) will be needed to maintain this rate of decline into the future.

What strategies have been most effective in spurring declines in prevalence? There is no doubt that release of information about the health hazards of tobacco drove down use. The surgeon general's report on the health effects of smoking released in 1964 presaged a burst of prevention and cessation activities.[15] Additionally, the late 1960s demonstrated the power of public health countermarketing,[16–18] and this was amplified by later public health campaigns.[4,18–21] Moreover, evidence that secondhand smoke is a significant cause of mortality[22] and that tobacco is addictive[23] fostered both the acceptance of clean indoor air policies and the development of evidence-based clinical treatments.[24–26] Finally, given the cost-sensitive nature of tobacco use, increasing the cost of cigarettes through tobacco excise taxes reliably led to drops in consumption and prevalence.[5,27–29] Formal modeling analyses suggest that the reductions in prevalence observed over the last 40 years are a result of such policy changes and interventions as tax increases, clean indoor air laws, advertising restrictions, product labeling laws, youth access laws, mass media campaigns, and increased availability of cessation programs.[4–14]

POLICIES AND INTERVENTIONS THAT COULD ACCELERATE PROGRESS

Although these successful strategies of the past provide a blueprint for maintaining the current downward pressure on prevalence rates, we believe that additional innovation over the next decade is needed to further accelerate the rate of decline. The strategies that may prove most effective arise from research in a wide array of fields—including public policy, health economics, public health, cessation interventions, prevention, and genetics research—that links the severity of nicotine dependence with age at nicotine exposure.

Age at nicotine exposure warrants special consideration because a large body of converging evidence shows that early exposure is associated with more severe nicotine dependence among adult smokers. Smokers reporting an early onset of smoking (e.g., daily smoking in adolescence) differ from other smokers in that they develop more severe nicotine dependence,[30–32] smoke more cigarettes a day,[31,33] and are less likely to quit smoking.[30,34–39] This



Note. Projections assume that the average percentage point rate of decline per year observed from the 1960s to 2007 will continue. Actual annual rates of decline between the 1960s and 2007 have varied.

FIGURE 1—Smoking prevalence among adults aged 18 years and older: United States, 1965-2007, with projections to 2047.

human research is complemented by animal research showing that compared with initial nicotine exposure during adulthood, exposure during adolescence produces greater effects on the brain,[40–43] has greater rewarding effects,[41,44–47] and produces higher levels of self-administration.[48,49]

Recent data on adult smokers show that a major genetic risk for severe nicotine dependence,[32,50,51] variations in the nicotinic receptor CHRNA5/A3/B4 gene cluster, will not be expressed unless an individual begins daily smoking prior to age 17 years.[32] The implication is that policies and interventions that significantly reduce smoking and nicotine exposure among adolescents will eventually produce a generation of Americans with reduced vulnerability to nicotine dependence. Reducing smoking among youths is an especially important goal since research shows that once an adolescent has progressed to regular, heavy smoking, he or she is unlikely to quit for 20 to 30 years or more.[52,53] As a result, every new adolescent smoker today increases smoking prevalence, on average, for several decades.

These considerations lead us to identify several policies and interventions especially worthy of implementation (Box 1).

Tax Increases on Tobacco

Price, the single most effective tobacco use reduction policy currently available, has been underused. From 1965 to 2007, the proportion of the price of an average pack of cigarettes that went to taxes (federal and state) declined from 51.4% to 32.3%, despite significant tax increases by some states.[54] In 2003, the Subcommittee on Cessation of the Interagency Committee on Smoking and Health proposed a comprehensive tobacco cessation policy program for the United States that included a $2.00 per pack increase in the cigarette excise tax (with tax parity for noncigarette tobacco products to discourage product switching). The subcommittee estimated that the program would result in 4.7 million new quitters and a 10% reduction in adult smoking prevalence. Moreover, such a price increase would generate an estimated $28 billion in new revenue, part of which could be earmarked to fund other aspects of an aggressive campaign to eliminate tobacco use in the United States (including countermarketing, prevention, cessation, and research components). Importantly, research shows that youths are particularly sensitive to price increases, which have been shown to both promote cessation and prevent initiation of tobacco use among adolescents.[27,55]

National Media Campaign

An ongoing, extensive, national paid-media campaign has the potential to further denormalize tobacco use, highlight the dangers of secondhand smoke, discourage youths from initiating tobacco use, and drive tobacco users to use evidence-based cessation treatments.[56–58] Although such a well-funded, national paid-media effort has not been undertaken, state campaigns and other efforts have documented their effectiveness. For example, California's comprehensive tobacco control effort, initiated in 1988, resulted in a 39% decline in adult prevalence in 20 years, with prevalence falling from 22.8% in 1988 to 14% in 2007.[59,60] In contrast, the national rate of tobacco use declined only 30% over that time, from 28.1% in 1988 to 19.8% in 2007.[61,62] As part of a national campaign, it would be important to include media strategies that affect youths' attitudes toward both smoking and the tobacco

Policies to Accelerate Progress in the War Against Tobacco

- Enact substantial increases in federal and state tobacco excise taxes
- Ensure access to effective cessation treatments
- Implement a national clean indoor air ordinance
- Execute the systematic elimination of nicotine from tobacco products
- Mandate graphic warning labels on tobacco products
- Fund and execute an aggressive national counter-marketing media campaign
- Enact a comprehensive ban on tobacco advertising, promotion and sponsorship
- Protect adolescents against developing tobacco addiction, particularly during their period of heightened risk
- Enact comprehensive Food and Drug Administration regulation

companies and that appear to reduce their smoking rates.[4,21,63,64]

Graphic Warning Labels

Graphic warnings have led to significant decreases in tobacco consumption in countries all over the world.[65–67] Such warnings on cigarette packs have been recommended by the World Health Organization Framework Convention on Tobacco Control.[68,69] If implemented in the United States, such warnings would provide a low-cost, eminently feasible strategy that has the potential to dramatically boost awareness of risk and increase interest in cessation. In addition to these graphic warnings, cigarette packaging labels that include misleading terms such as "lights" or "mild" should be prohibited.[70,71]

Advertising, Promotion, and Sponsorship Bans

The Framework Convention on Tobacco Control has recommended a comprehensive ban on tobacco advertising, promotion, and sponsorship.[72] Such strategies can limit access to protobacco influences. There is evidence that such influences, including the depiction of smoking in movies, result in more favorable perceptions of smoking and contribute to increased tobacco use among youths and young adults.[73,74] Comprehensive advertising bans reduce tobacco consumption in both developed and developing countries.[13,14] If implemented in the United States, such bans could powerfully affect tobacco use, particularly among youths and young adults.

National Clean Indoor Air Ordinance

The United States should enact a strong, comprehensive, nationwide ban on indoor smoking, an approach that has been adopted in many countries throughout the world.[75] Although more than half of the US population now lives in a state or locality with a comprehensive clean indoor air law,[75] the absence of a strong national law (without preemptions that limit even stronger state and local ordinances) has limited their effectiveness. There is compelling evidence that such a nationwide ban would not only significantly reduce tobacco prevalence[25,75–79] but would also dramatically reduce illness and deaths for both smokers and nonsmokers.[80–84] In fact, smoking bans have been shown to increase quit attempts,[85–87] decrease levels of consumption,[75,78,86] decrease smoking among youths,[25,76,88,89] promote denormalization of smoking,[85,90] and decrease morbidity and mortality from heart attacks.[82,83,91–93] Finally, clean indoor air ordinances are popular,[94,95] and the widespread adoption of state and local bans reflects the substantial public and political acceptance of such policies.[84]

Elimination of Nicotine From Tobacco Products

The gradual elimination of nicotine from commercially available cigarettes, a strategy first proposed by Benowitz and Henningfield in the early 1990s,[30] would reduce the risk of nicotine dependence among adolescents by removing the underlying additive substrate for dependence development. At the same time, this policy could assist many adults in overcoming their dependence on tobacco,[30,96,97] particularly if the potential risk of compensatory smoking was addressed. Such mandated reductions in nicotine content could contribute to another essential strategy for eliminating tobacco use in the United States—comprehensive regulation of tobacco products and the tobacco industry by the Food and Drug Administration.[98]

Access to Effective Cessation Treatments

A final strategy would involve a greater emphasis on ensuring that all smokers have access to effective treatment interventions. The recently released Public Health Service guideline update, *Treating Tobacco Use and Dependence*,[99] highlighted vital new information on the clinical treatment of smokers. One important finding was that effective interventions now exist for all types of smokers. For example, there are now interventions that increase quit attempts by smokers who were previously unwilling or unmotivated to quit,[100,101] providing a treatment option for the 60% to 65% of smokers who do not try to quit each year.[102,103] The guideline also identified counseling and medication treatments that were especially effective for smokers willing to make a quit attempt, treatments that have been independently endorsed by the Cochrane Collaboration and others.[104–107] Finally, the 2008 guideline update found that there was now sufficient evidence to recommend certain smoking cessation interventions as effective for adolescent smokers, meaning that this vulnerable population can now benefit from cessation counseling intervention.

DELIVERY OF INTERVENTIONS

At present, most smokers do not enjoy the benefits of such treatment advances. Most smokers unwilling to make a quit attempt typically receive no intervention, and smokers willing to quit often do not receive the most efficacious interventions.[99,108,109] This situation is avoidable, because research shows that most smokers visit a health care setting each year.[110,111] All this underscores the need for enhanced treatment delivery mechanisms, including a greater use of chronic care models, telephone quit lines to deliver optimal smoking interventions to every smoker, and health insurance mandates for the coverage of evidence-based counseling and medication.

It is especially vital that effective treatments reach populations that comprise disproportionate numbers of smokers: individuals with low educational attainment, certain ethnic minorities, and the mentally ill. For instance, mental illnesses such as depression, psychoses, or substance use disorders show smoking prevalence rates that are 2 to 4 times higher than those of the population as a whole.[112–118] Persons with mental illness or substance abuse disorders constitute 22% of the US population but consume 44% of all cigarettes sold.[119,120] These populations also bear a disproportionate health and economic burden from tobacco use. Cessation interventions are effective with these populations,[99] but they too infrequently receive treatment.[121] It is therefore important to fund high-reach intervention delivery systems such as an expanded National Tobacco Quitline Network (1-800-QUIT NOW) that would provide enhanced treatment options, including medication interventions to complement the quit line counseling. The reach of the quit line would be increased by the expanded media campaign that targets underserved populations.[122–124]

Finally, there is a need for continued research aimed at the development of additional effective interventions: medications including nicotine vaccines,[125,126] strategies to increase consumer demand for treatment,[127,128] treatments for those not willing to make a quit attempt at this time, and even more effective counseling interventions.

CONCLUSION

The progress made in reducing tobacco prevalence over the last five decades should in no way temper our commitment to achieving further reductions. On the contrary, we must redouble our efforts because this progress proves the worth and effectiveness of our actions. Nor should progress be misinterpreted to mean that tobacco use is less toxic or that the tobacco companies have been rendered ineffective. Tobacco use remains the leading preventable cause of death and disability in the United States, and the core intent of the tobacco industry is to sow these costs as broadly as possible.

We have reached a tipping point. Progress made over the last 50 years now makes the elimination of tobacco dependence in the United States an achievable goal. Reaching that goal will require innovative policy and clinical approaches that result in an accelerated rate of decline in prevalence. These efforts must enhance previously effective strategies as well as implement novel ones, all while carefully watching the tobacco industry's tactics aimed at undermining our efforts. Given recent research underscoring the relation between early tobacco use and severe lifelong nicotine dependence, it is important to include efforts that significantly reduce tobacco initiation by youths. Especially promising strategies in this ongoing public health battle include the following: an increased national excise tax on tobacco; aggressive national media campaigns; use of graphic warning labels on cigarette packaging; a comprehensive ban on tobacco advertising, sponsorship, and promotion; an expanded array of effective cessation therapeutics, with greater access to such treatments; a systematic reduction in the nicotine content of commercially available cigarettes; comprehensive Food and Drug Administration regulation of tobacco products and the tobacco industry; and a national ban on indoor smoking. If implemented, the proposed strategies will dramatically reduce adult smoking prevalence while protecting adolescents from becoming dependent on tobacco, thereby stealing a march in the 21st-century war against tobacco use and the tobacco industry. ■

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