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Long-Term Health and Medical Cost Impact of Smoking Prevention in Adolescence

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Abstract

Purpose: To estimate smoking progression probabilities from adolescence to young adulthood and to estimate long-term health and medical cost impacts of preventing smoking in today's adolescents.

Methods: Using data from the National Longitudinal Study of Adolescent Health (Add Health), we first estimated smoking progression probabilities from adolescence to young adulthood. Then, using the predicted probabilities, we estimated the number of adolescents who were prevented from becoming adult daily smokers as a result of a hypothetical 1 percentage point reduction in the prevalence of ever smoking in today's adolescents. We further estimated lifetime medical costs saved and quality-adjusted life years (QALYs) gained as a result of preventing adolescents from becoming adult daily smokers. All costs were in 2010 dollars.

Results: Compared with never smokers, those who had tried smoking at baseline had higher probabilities of becoming current or former daily smokers at follow-up regardless of baseline grade or sex. A hypothetical 1 percentage point reduction in the prevalence of ever smoking in 24.5 million students in 7th–12th grades today could prevent 35,962 individuals from becoming a former daily smoker and 44,318 individuals from becoming a current daily smoker at ages 24–32 years. As a result, lifetime medical care costs are estimated to decrease by $1.2 billion and lifetime QALYs is estimated to increase by 98,590.

Conclusions: Effective smoking prevention programs for adolescents go beyond reducing smoking prevalence in adolescence; they also reduce daily smokers in young adulthood, increase QALYs, and reduce medical costs substantially in later life. This finding indicates the importance of continued investment in effective youth smoking prevention programs.

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Keywords

Smoking in adolescence; Smoking progression probabilities; Daily smoking in adulthood; Medical costs saved; QALYs gained

Tobacco use is widely acknowledged to be the leading cause of preventable death in the United States [1]. Approximately 480,000 Americans die each year as a result of smoking [2]. On average, smokers die 10 years earlier than nonsmokers [3]. In addition, smoking harms nearly every organ of the body and causes many diseases, such as coronary heart disease, stroke, and lung cancer [4]. Direct medical costs attributable to smoking total at least $133 billion per year; these expenditures plus the productivity losses ($156 billion) exceed $289 billion per year [2].

Because of nicotine dependence and social factors, smoking during adolescence is highly associated with persistent smoking in adulthood. Most adult smokers (90%) begin smoking before 18 years of age [5]. This evidence has brought about the need for effective prevention programs to reduce the prevalence of youth smoking. In the past couple of decades, four types of intervention programs have been identified as effective in reducing smoking experimentation/initiation among youth including (1) counter-advertising mass-media campaigns; (2) comprehensive school-based tobacco use prevention policies and programs; (3) community interventions that reduce tobacco advertising, promotions, and commercial availability of tobacco products; and (4) higher costs for tobacco products through increased excise taxes [6]. However, the long-term effects of these programs on smoking in adulthood remain unknown.

Because smoking-attributable morbidity and mortality mostly occur in adulthood and the ultimate goal of preventing smoking in adolescence is to prevent smoking in adulthood, it is important to know programs' long-term effects on the number of adult smokers prevented. On the basis of findings from previous review studies of smoking prevention programs for youth [7–9], we believe that a 1 percentage point reduction in the prevalence of ever smoking is possible, regardless of the methods used to achieve these reductions. If smoking prevention during adolescence can reduce the current prevalence of ever smoking (even just one or two puffs) by 1 percentage point, what potential difference will this make in adulthood? Although long-term follow-up studies are typically cost prohibitive, the expected long-term effects can be estimated based on programs' short-term effects and smoking progression probabilities from adolescence to adulthood if they are available.

The objectives of this study are to (1) estimate smoking progression probabilities from adolescence to young adulthood using data from the National Longitudinal Study of Adolescent Health (Add Health) and (2) estimate the potential long-term impact of a hypothetical 1 percentage point reduction in the prevalence of ever smoking among the national population of 7th–12th graders, including the number of adolescents who were prevented from becoming adult daily smokers, quality-adjusted life years (QALYs) gained, and medical care cost saved. We hope this study will offer insight into the relationship between a program's short-term success and long-term health and medical cost benefits.

Methods

Estimation of smoking progression probabilities

In this study, we used Add Health data to generate smoking progression probabilities from adolescence to young adulthood. Add Health is a longitudinal study of a nationally representative sample of 20,745 adolescents in grades 7–12 in the United States during the 1994–1995 school year when the study sample was aged 11–21 years and followed them into young adulthood (aged 23–33 years) [10,11]. Four waves of in-home survey data were collected in 1995 (wave I), 1996 (wave II), 2000–2001 (wave III), and 2007–2008 (wave IV). The present study used data from wave I in-home interview and parent questionnaire and wave IV in-home interview to predict daily smoking status in adulthood based on the status of ever smoking in adolescence.

We used three smoking questions: (1) "Have you ever tried cigarette smoking, even just 1 or 2 puffs?" (2) "Have you ever smoked cigarettes regularly–that is, at least one cigarette every day for 30 days?" And (3) "During the past 30 days, on how many days did you smoke cigarettes?" At baseline (wave I), respondents were defined as *ever smokers* if they answered "yes" to the first question and *never smokers* if they answered "no." At follow-up (wave IV), respondents were defined as *current daily smokers* if they answered "yes" to the second question and "30 days" to the third question, *former daily smokers* if they answered "yes" to the second question and "less than 30 days" to the third question, and *nondaily smokers* if they answered "no" to the second question.

We used logistic regression models to predict the probability of current daily smoking, former daily smoking, and nondaily smoking at follow-up based on the status of respondents who had ever tried cigarette smoking (yes/no) at baseline. The models were run separately for 7th–8th graders, 9th–10th graders, and 11th–12th graders. Other covariates in the logistic regression models included age at baseline, sex of the adolescent, race/ethnicity (Hispanic, black, white, and others), parent's educational attainment at baseline (<12 years vs. ≥12 years), family income at baseline (<$16,000 vs. ≥$16,000, $16,000 was the poverty line for a family of four in 1994), household cigarette smoking at baseline (yes/no), friends smoking at baseline (yes/no), and participant's educational attainment at follow-up (<12 yrs vs. ≥12 yrs).

The wave IV in-home interviews consisted of 15,701 respondents aged 23–33 years. The combined waves I and IV data provided a weighted sample of 14,800 respondents. We further excluded those who did not report grade level (n = 306) or race (n = 12) questions at baseline and those who did not respond to the ever daily smoking question at follow-up (n = 9) or had inconsistent responses (n = 42) to the ever daily smoking and the current daily smoking questions (i.e., reported currently daily smoking but not ever daily smoking). We retained a study cohort of 14,431 for our analysis.

From our analytic sample (14,431), there were additional missing data in smoking variables and social and demographic variables. To maximize the use of valuable information, we used the multiple imputation procedure (fully conditional specification option) in SAS statistical software (PROC MI; release 9.3; SAS Institute Inc., Cary, NC) to impute the missing data. Ten imputed data sets were created, and SAS PROC MIANALYZE was used to combine the results from each imputed data set. To assess the validity of the imputed data, we also ran the same model with a sample that had complete data (i.e., using listwise deletion) and compared the results from the imputed data set with those from the complete data set.

Estimation of long-term impact of a hypothetical 1 percentage point reduction in the prevalence of ever smoking in adolescents

Number of adolescents prevented from becoming adult smokers.—To estimate the number of adolescents who were prevented from becoming adult daily smokers as a result of preventing smoking in adolescence, we developed a smoking progression model to estimate the number of adult daily smokers in two scenarios: (1) with current ever smoking rate and (2) with the hypothetical 1 percentage point reduction from the current ever smoking rate. The analyses were performed separately for each sex and 2-grade group. We divided each group into 2 subgroups: ever smokers and never smokers at baseline. Then, within each subgroup, we estimated the expected number of former daily smokers and current daily smokers in young adulthood using the smoking progression probabilities derived in this study. As an example, Figure 1 illustrates how the model was used to estimate the expected number of adult daily smokers among male seventh to eighth graders in each of the two scenarios. The 2011 U.S. Census data on student enrollment status were used for the population number of each 2-grade group [12]. The 2011 National High School Youth Risk Behavior Survey (YRBS) data [13] and the 2011 State Middle School YRBS data [14] on the “ever tried cigarette smoking” were used for the rate of ever smokers. For the middle school YRBS, 13 states reported data on “ever tried cigarette smoking.” We used the median of the 13 states for the seventh to eighth grade group. Smoking progression probability estimates derived in this study were used to estimate the number of current daily smokers and former daily smokers in each subgroup. The number of adolescents who were prevented from becoming adult daily smokers was calculated as the difference in the estimated number of adult daily smokers between the “current” ever smoking rate and the “1 percentage point lower” ever smoking rate among adolescents.

Quality-adjusted life years gained and medical costs saved.—Earlier studies assessed the impact of smoking on QALYs and lifetime medical costs and estimated QALYs gained and medical costs saved per person who was prevented from becoming an established smoker (ever smoked at least 100 cigarettes) [15,16]. Wang et al. [15] estimated QALYs of established smokers, experimenters, and never smokers after age 26 years and found that on average, an estimated 1.9 QALYs would be gained for each current established smoker whose smoking was prevented and .4 QALYs would be gained for each former established smoker whose smoking was prevented (discounted to age 14 years at 3%). We applied those estimates in our base case analysis of the QALYs gained as a result of the 1 percentage point reduction in ever smoking rate among adolescents.

Hodgson [16] estimated the lifetime medical costs of smoking-related illness beginning at age 17 years and found that over a lifetime, the medical costs of an average male smoker were $20,718 more than a never smoker and the medical costs of an average female current smoker were $24,263 more (2010 dollars, discounted at 3%). The study by Hodgson did not estimate the medical cost of former smokers. A study by Centers for Disease Control and Prevention showed that continuing smokers have a 50% chance of dying from smoking and former smokers have a 10%–37% chance of dying from smoking [17]. Appling the most conservative death risk ratio (10%:50%) to the previously mentioned medical costs suggests that a former smoker's excess medical costs would be 20% of that of a current smoker. Thus, the medical costs of a male former smoker would be $4,142 more than a never smoker, and the medical costs of an average female former would be $4,853 more. We used those estimates in our base case analysis of the medical costs saved as a result of the 1 percentage point reduction. It is important to note that both the medical cost estimates and the QALY estimates were originally derived for established smokers (ever smoked more than 100 cigarettes) and not daily smokers (smoked every day for 30 days). Because we applied those estimates to daily smokers, our estimation of medical costs saved and QALYs gained should be considered conservative.

Sensitivity analysis

Because the model results depended largely on estimates derived in this study and previously published studies, to test how those estimates affect the main results, we conducted multivariate sensitivity analysis by varying the values of three major parameters (smoking progression probabilities, QALYs gained per smoker prevented, and medical costs saved per smoker prevented) over a plausible range. For smoking progression probability estimates, we used the range of base case probability estimate ± 2 standard error for variation. For QALYs gained and medical costs saved, we used the range of base case value ± 25% for variation. Monte Carlo simulation of 10,000 trials was performed using @RISK (Palisade Corp., Newfield, NY). Parameter values for each simulation trial were selected randomly from the plausible range identified above assuming a triangular distribution of values for all parameters.

Results

Table 1 shows the descriptive data of the study sample that was used to derive smoking progression probabilities. It shows the sample distribution by grade level, social and demographic characteristics, and smoking status at baseline and follow-up. At baseline, 56% had ever tried smoking. At follow-up, 21% were current daily smokers and 22% were former daily smokers. Across all grade levels, missing data for smoking variables were very low, less than 1%.

Table 2 summarizes the predicted probabilities of current and former daily smoking in adulthood on the basis of ever smoking status in adolescence. As expected, compared with never smokers at baseline, those who had ever tried smoking at baseline had higher probabilities of becoming current or former daily smokers at follow-up regardless of baseline grade or sex. For example, a female student who had tried smoking in seventh to eighth grade would have 31.38% chance becoming a current daily smoker and 26.63% chance becoming a former daily smoker at age 24–25 years. In contrast, a female student who had not tried smoking in 7^{th}–8^{th} grade would have only 11.97% chance becoming current daily smokers and 21.29% chance becoming former daily smokers at age 24–25 years. Among those who had ever tried smoking at baseline, the age of initial trial of smoking has a clear impact on current daily smoking in adulthood. As listed in Table 2, those who had tried smoking by eighth grade had the highest probability of becoming current daily smokers in adulthood, followed by those who had ever tried smoking by 10th and 12th grades. Among those who had not tried smoking at baseline, the probability of becoming current daily smokers in adulthood decreases as they age and remain never smoking. In addition, the predicted prevalence of daily smoking status in adulthood using the imputed data sets (Table 2) was consistent with the results from the analyses restricted to complete cases (results not shown).

Table 3 lists all the parameters we used in estimating the long-term health and medical cost impact, including the value and data source for each parameter.

Table 4 summarizes the results of both base case study and sensitivity analysis. A hypothetical 1 percentage point reduction in the prevalence of ever smoking in 24.5 million students in grade 7th–12th could prevent 35,962 individuals from becoming a former daily smoker and 44,318 individuals from becoming a current daily smoker at ages 24–32 years. As a result, lifetime medical care costs would decrease by $1.2 billion and lifetime QALYs would increase by 98,590. In 95% of the simulation trials of the multivariate sensitivity analysis, lifetime medical cost saved ranged from $970 million to $1.4 billion and lifetime QALYs gained ranged from 78,179 to 120,788.

Discussion

The present study fills a void in the current literature by deriving smoking progression probabilities from adolescence to young adulthood. Students who had ever tried smoking at baseline had higher probabilities of becoming current or former daily smokers at follow-up than those who had never smoked at baseline regardless of baseline grade level or sex of the adolescent. Among those who had not tried smoking at baseline, the probability of becoming current daily smokers in adulthood decreases as they age and remain never smoking. In addition, the younger an adolescent tries smoking, the more likely he or she will become a daily smoker in young adulthood.

Although long-term follow-up studies are cost prohibitive, an alternative approach is to estimate an intervention's long-term reduction in adult daily smokers or established smokers based on smoking progression probabilities and interventions' short-term effect in reducing the prevalence of ever smoking in adolescence. The smoking progression probabilities derived in this study can be used by researchers to estimate an intervention's long-term impact. For example, if an intervention could prevent 100 female students from experimenting smoking in seventh to eighth grade, then how many current daily smokers would be prevented at age 24–25 years? According to the progression probability estimates derived in this study, a female student who has tried smoking in seventh to eighth grade has 31.38% chance becoming a current daily smoker, and a female student who has not initiated smoking in seventh to eighth grade has only 11.97% chance of becoming a current daily smoker at age 24–25 years. Thus, preventing a female student from experimenting smoking in seventh to eighth grade would reduce her chance of becoming a current daily smoker by 19 percentage points. Then, preventing 100 female students from experimenting smoking in seventh to eighth grade could prevent 19 female students from becoming current daily smokers at age 24 to 25 years.

Using the probability estimates derived in this study and other published estimates, we estimated the potential long-term impact of a hypothetical 1 percentage point reduction in the prevalence of ever smoking among today's adolescents. Of a total of 24.5 million students in grades 7th–12th, 35,962 would be prevented from becoming former daily smokers and 44,318 would be prevented from becoming current daily smokers in young adulthood. As a result, lifetime medical care costs would decrease by $1.2 billion and lifetime QALYs would increase by 98,590.

A key determination about any prevention intervention is whether financial investment in the program is justified by the public health outcomes. The long-term benefits estimated in this study can be used to determine the maximum investment that an intervention can spend and still meet acceptable standards of cost effectiveness. In the United States, an intervention is generally considered cost effective if the cost-effectiveness ratio is ≤$50,000 per QALY saved [18,19]. Based on this benchmark, a national program which costs less than $6.1 billion or $248.57 per person and reduces the prevalence of ever smoking in adolescents by 1 percentage point can be considered cost effective. The program can also be cost saving if the program costs less than $1.2 billion or $47.49 per person. Using this information, policymakers and program planners can make informed decisions about allocating resources and selecting programs for youth smoking prevention.

In this study, we projected the long-term benefits of 1 percentage point reduction in the prevalence of ever smoking; findings from review studies on adolescent smoking prevention programs suggest that effects can be substantially larger than 1% reduction [7–9]. The Task Force on Community Preventive Services reviewed studies of comprehensive community-wide tobacco use prevention programs [7]. Of the 16 studies reviewed, 14 found significant reductions in student tobacco use. In particular, the combination of school-based programs, mass media campaigns, and community education demonstrated a consistent and strong reduction in adolescent tobacco use over time, with a median effect of −4.5% in absolute difference in smoking prevalence between control and intervention groups (with a range of −13% to −2%). For example, during 2000–2002, the National truth Campaign was found to reduce youth smoking rate by 1.6 percentage points [20]. Campaigns of longer duration and higher reach and frequency are associated with greater and faster declines in adolescent smoking rates [6]. For example, during 1998–2003, a comprehensive prevention program in Florida anchored by an aggressive youth-oriented health communications campaign reduced the prevalence of smoking among middle and high school students by 50% and 35%, respectively [21]. Thus, the actual benefits of those effective prevention programs could be much higher than what we have estimated in this study. To maximize those benefits, continued investment in effective prevention programs is critical.

This study has several limitations. First, smoking progression probabilities were derived based on self-reported data; survey participants may underreport smoking status because of social desirability bias. Second, although Add Health and the YRBS are both nationally representative samples of adolescents, there are differences between these two data sets such as the time frame of the studies and the YRBS data not having a nationally representative sample for the seventh and eighth graders. However, we believe these are the best available data sets, to our knowledge, to address the identified research questions. We tried to address these limitations by controlling for key variables that could affect smoking progression probabilities and using conservative statistical techniques. Third, smoking progression is affected by many factors; however, it was not feasible to control all the factors. Fourth, the long-term impact was estimated based on estimates derived in this study and other studies, not directly measured. Fifth, because of the limited cigarette smoking–related questions in the Add Health, the nondaily smokers defined in the analysis may include both never smokers and current some-day smokers. Similarly, former daily smokers may also include both current some-day smokers and former smokers. Therefore, potential mismatch could exist when we used QALYs gained and medical costs saved per person for current and former smokers. However, when we compared the percentages of current daily smokers, former daily smokers, and nondaily smokers in our sample with those of current, former, and never established smokers in the 2007 National Health Interview Survey data (personal communication), the results suggest that the mismatch is minimum.

Our findings suggest that smoking prevention in adolescence goes beyond reducing smoking prevalence among adolescents; it can also reduce the number of daily smokers in young adulthood, increase QALYs, and reduce medical costs substantially in later life. Smoking prevention in adolescence would benefit not only individuals through extended life expectancy and improved quality of life but also employers through increased productivity and reduced medical expenses. To maximize those benefits, continued investment in effective smoking prevention programs for adolescents is critical. The more and longer we invest in such programs, the greater and quicker the impact. Future intervention studies should include long-term health and medical cost benefits when quantifying the impact of smoking prevention on adolescents.

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IMPLICATIONS AND CONTRIBUTION

This study fills a void in the current literature by deriving smoking progression probabilities from adolescence to young adulthood. This study also demonstrates the potential long-term impact of a hypothetical 1 percentage point reduction in the prevalence of ever smoking in today’s adolescents, including QALYs gained and medical costs saved.

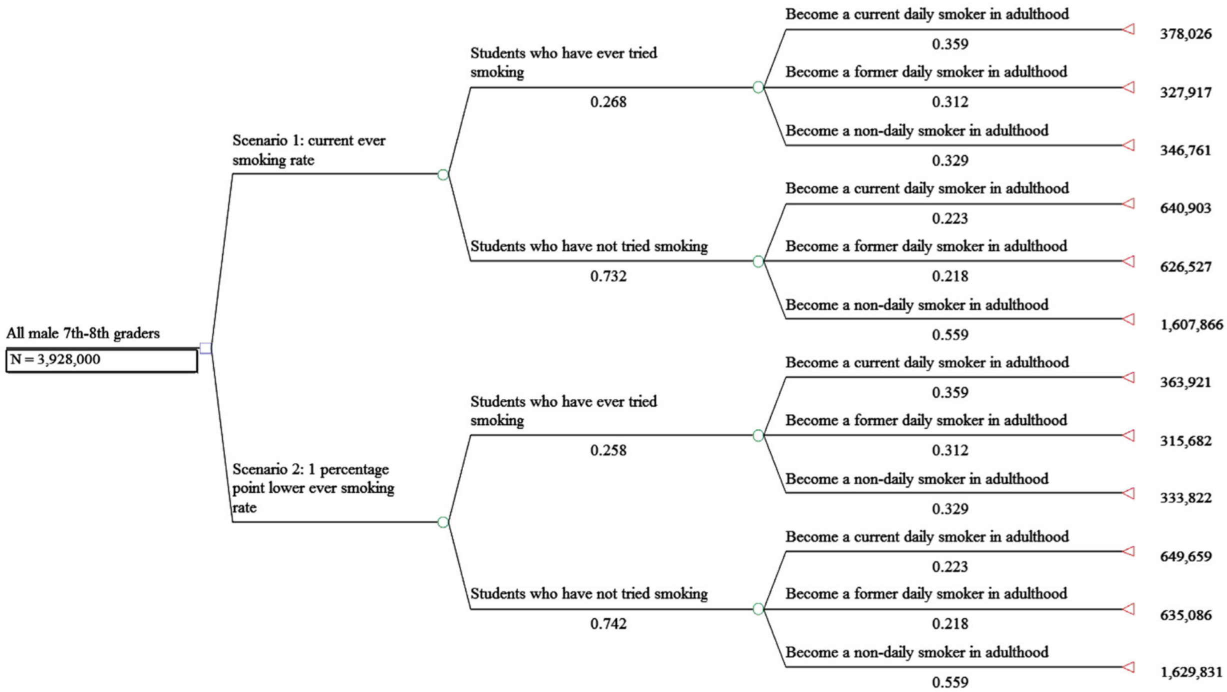

Figure 1.

Smoking progression model for male seventh to eighth graders.

Table 1

Descriptive data of the study cohort

	7th–8th Graders		9th–10th Graders		11th–12th Graders		Total	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Age at baseline, years								
Missing	1	.03	2	.04	1	.02	4	.03
11	5	.13	0	.00	0	.00	5	.03
12	394	10.09	0	.00	0	.00	394	2.73
13	1,642	42.06	16	.30	0	.00	1,658	11.49
14	1,478	37.86	548	10.14	3	.06	2,029	14.06
15	330	8.45	2,287	42.33	17	.33	2,634	18.25
16	43	1.10	2,037	37.70	746	14.56	2,826	19.58
17	9	.23	417	7.72	2,272	44.34	2,698	18.70
18	2	.05	83	1.54	1,855	36.20	1,940	13.44
19	0	0	11	.20	205	4.00	216	1.50
20	0	0	2	.04	23	.45	25	.17
21	0	0	0	0	2	.04	2	.01
Gender								
Male	1,793	45.93	2,560	47.38	2,411	47.05	6,764	46.87
Female	2,111	54.07	2,843	52.62	2,713	52.95	7,667	53.13
Race/ethnicity								
Hispanic	439	11.24	913	16.90	952	18.58	2,304	15.97
Black	969	24.82	1,152	21.32	1,006	19.63	3,127	21.67
Others	255	6.53	496	9.18	546	10.66	1,297	8.99
White	2,241	57.40	2,842	52.60	2,620	51.13	7,703	53.38
Parent's education attainment at baseline								
Missing	376	9.63	671	12.42	990	19.32	2,037	14.12
<High school	1,645	42.14	2,208	40.87	1,857	36.24	5,710	39.57
≥High school	1,883	48.23	2,524	46.71	2,277	44.44	6,684	46.32
Family income at baseline								
Missing	770	19.72	1,186	21.95	1,530	29.86	3,486	24.16

	7th–8th Graders		9th–10th Graders		11th–12th Graders		Total	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
<$16,000	568	14.55	688	12.73	506	9.88	1,762	12.21
≥$16,000	2,566	65.73	3,529	65.32	3,088	60.27	9,183	63.63
Household smoking at baseline								
Missing	356	9.12	649	12.01	984	19.20	1,989	13.78
No	1,966	50.36	2,591	47.95	2,357	46.00	6,914	47.91
Yes	1,582	40.52	2,163	40.03	1,783	34.80	5,528	38.31
Friends smoking at baseline								
Missing	85	2.18	97	1.80	58	1.13	240	1.66
No	2,583	66.16	2,842	52.60	2,537	49.51	7,962	55.17
Yes	1,236	31.66	2,464	45.60	2,529	49.36	6,229	43.16
Ever smoking at baseline								
Missing	28	.72	35	.65	24	.47	87	.60
No	2,136	54.71	2,171	40.18	1,927	37.61	6,234	43.20
Yes	1,740	44.57	3,197	59.17	3,173	61.92	8,110	56.20
Participants' education attainment at follow-up								
Missing	1	.03	1	.02	0	0	2	.01
<High school	1,083	27.74	1,311	24.26	979	19.11	3,373	23.37
≥High school	2,820	72.23	4,091	75.72	4,145	80.89	11,056	76.61
Current daily smoking at follow-up								
Missing	21	.54	28	.52	20	.39	69	.48
No	2,944	75.41	4,194	77.62	4,181	81.60	11,319	78.44
Yes	939	24.05	1,181	21.86	923	18.01	3,043	21.09
Ever daily smoking at follow-up								
No	785	20.11	1,094	20.25	1,070	20.88	2,949	20.44
Yes	1,760	45.08	2,383	44.11	2,056	40.12	6,199	42.96
Never	1,359	34.81	1,926	35.65	1,998	38.99	5,283	36.61

Table 2

Predicted smoking progression probabilities

Ever smoking at baseline	Male		Female	
	Former daily smoking at follow-up; estimate (SE)	**Current daily smoking at follow-up; estimate (SE)**	**Former daily smoking at follow-up; estimate (SE)**	**Current daily smoking at follow-up; estimate (SE)**
7th–8th Graders				
No	.2179 (.0244)	.2229 (.0295)	.2129 (.0265)	.1197 (.0162)
Yes	.3115 (.0330)	.3591 (.0364)	.2663 (.0224)	.3138 (.0368)
9th–10th Graders				
No	.1173 (.0155)	.1578 (.0243)	.0768 (.0170)	.0707 (.0143)
Yes	.2657 (.0257)	.3281 (.0308)	.2554 (.0281)	.2733 (.0300)
11th–12th Graders				
No	.1423 (.0233)	.0880 (.0182)	.0634 (.0120)	.0522 (.0130)
Yes	.3397 (.0333)	.2700 (.0308)	.2626 (.0295)	.2513 (.0298)

SE = standard error.

Table 3

Data used to project the number of daily smokers prevented in adulthood, lifetime medical costs saved, and QALYs gained

	Male	**Female**	**Sources**
Population number			
7th–8th Graders	3,928,000	3,899,000	2010 U.S. Census
9th–10th Graders	4,259,000	3,873,000	2010 U.S. Census
11th–12th Graders	4,293,000	4,263,000	2010 U.S. Census
Ever tried cigarette smoking			
7th–8th Graders	.266	.245	Youth On-Line, middle school YRBS data
9th–10th Graders	.406	.379	Youth On-Line, high school YRBS data
11th–12th Graders	.528	.488	Youth On-Line, high school YRBS data
Lifetime excess medical costs ($)			
Former established smoker	4,142	4,853	Hodgson and authors' assumption
Current established smoker	20,712	24,263	Hodgson
QALYs gained as a result of preventing a			
Former established smoker	.4	.4	Wang et al.
Current established smoker	1.9	1.9	Wang et al.

QALYs = quality-adjusted life years; YRBS = Youth Risk Behavior Survey.

Table 4

Projected number of daily smokers prevented, medical costs saved, and QALYs gained

	Base case	Sensitivity analysis (95% of simulation trials)
Number of former daily smokers prevented		
Male	18,471	14,241–22,770
Female	17,491	13,816–21,186
Both sexes	35,962	30,283–41,556
Number of current daily smokers prevented		
Male	20,416	15,742–25,065
Female	23,902	20,029–27,737
Both sexes	44,318	38,128–50,334
Medical costs saved ($)		
Male	499,377,550	375,433,500–637,726,500
Female	664,825,765	523,639,400–822,012,600
Both sexes	1,164,203,315	970,160,000–1,370,473,000
QALYs gained		
Male	46,179	34,542–59,073
Female	52,411	40,713–65,074
Both sexes	98,590	78,179–120,788

QALYs = quality-adjusted life years.