

Changing Social Norms to Decrease Adolescent Tobacco Use: Massachusetts, 1993–1996

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BACKGROUND AND OVERVIEW The Massachusetts Tobacco Control Program (MTCP) was funded by a 25-cent cigarette tax increase in January of 1993. The program developed counter-tobacco media coverage in the summer of 1993 and began community programming early in 1994. By altering the social norms pertaining to tobacco use, the MTCP seeks to protect the residents of Massachusetts from environmental tobacco smoke, to assist smokers in successfully quitting their habit, and to reduce the rates of initiation and progression to habitual use of tobacco products among youths and younger adults. This chapter assesses the progress of the MTCP through 1997 by examining prevalence rates among adolescents in Massachusetts and changes in the direction and strength of factors associated with youth smoking. It will also compare smoking prevalence rates for Massachusetts to those of the nation as a whole.

Data are presented from four representative in-school surveys. Two were conducted within Massachusetts—the Massachusetts Prevalence Survey (MPS) of junior high and high school students (Briton *et al.*, 1997), and the Massachusetts Youth Risk Behavior Survey (MYRBS) of high school students (Massachusetts Department of Education, 1998). Selected items from two national surveys—the Monitoring the Future study (MTF), which follows 8th-, 10th-, and 12th-grade students (Johnston *et al.*, 1999), and the national Youth Risk Behavioral Survey (YRBS) of high school students (CDC, 1998)—are presented for comparison.

Information is presented on both lifetime and current¹ smoking, but only current smoking (“smoked at least once in the past 30 days”) is defined in a consistent manner across all surveys and years. The MYRBS and YRBS define lifetime use as “ever smoked a cigarette, even one or two puffs,” while the MTF defines it as “ever smoked cigarettes,”² and the MPS defines lifetime use as “ever smoked a whole cigarette” (U.S. DHHS, 1994).

This chapter examines changes among junior high as well as high school youths and, therefore, relies most heavily on the MPS. These data must be interpreted in the context of program intervention, as

1. Or *recent* in the YRBS and MYRBS.

2. Those who reported that they had tried cigarettes at least once or twice were classified as ever smokers.

Massachusetts youths in the 7th and 8th grades in 1996 would have had the benefit of 1 to 2 years' exposure to prevention programming prior to the average age (12.2 years) of smoking initiation (MPS, Briton *et al.*, 1997). In following with Worden *et al.* (1998), who detected a 50 percent reduction in smoking uptake among a cohort of middle school youths after 4 years of comprehensive tobacco control program exposure, we would expect to see preliminary evidence of the effectiveness of the MTCP in this younger group.

A series of analyses were conducted using MPS data to examine differences from 1993 to 1996 for males, females, individual grade, and for all grades combined (7 through 12) on current and lifetime smoking and specific correlates of smoking behavior—*i.e.*, peer influences (friends who smoke, friends who disapprove) and educational status (performance, plans after high school). Results were obtained by chi-square analyses using SPSS version 8.0 (SPSS, 1998).

**TRENDS IN
MASSACHUSETTS
AND THE NATION
PRIOR TO MTCP**

The MTCP began at a time when tobacco use (cigarettes and smokeless tobacco) was increasing among youths both nationally and in Massachusetts (MTF—Johnston *et al.*, 1999; MPS—Briton *et al.*, 1997). Massachusetts evidenced this increase 2 to 4 years before it was apparent in the nation as a whole (1987–1990 as compared with 1991–1992, respectively)³.

At MTCP baseline, the 1993 MPS (Briton *et al.*, 1997) assessed 5,321 public school students in grades 7 through 12 and found lifetime use of cigarettes among 9th through 12th graders (63.6 percent) to be virtually unchanged since 1990 (62.7 percent); however, lifetime use of smokeless tobacco significantly increased from 1990 (19.3 percent) to 1993 (24.6 percent). From 1990 to 1993, rates for current cigarette use across grades 9 through 12 increased from 29.2 percent to 33.6 percent; likewise, rates for current smokeless tobacco use increased from 6.4 percent to 9.3 percent[‡]. Alarming, the greatest increase in tobacco use from 1990 to 1993 occurred in the lower grades, with lifetime use of cigarettes for 7th and 8th graders increasing from 36.6 percent to 45.4 percent and current use almost doubling from 12.8 percent to 22.6 percent. For smokeless tobacco, lifetime use among 7th and 8th graders increased fourfold, from 4.1 percent to 16.4 percent, and current use increased threefold, from 1.7 percent to 5.7 percent.

3. Nationally, 12th graders reached their lowest levels on lifetime and current measures in 1992, as did 10th graders on lifetime use. Lifetime use among 8th graders and current use among 8th and 10th graders increased since the first recording in 1991. In Massachusetts, lowest levels of lifetime and current smoking among 7th, 9th, 10th, and 11th grade students were recorded in 1990, with 8th and 12th grade current rates lowest in 1987. There were similar increases in Massachusetts in smokeless rates, with lifetime use for all but the 11th grade at lowest levels in 1990, the first year asked of junior high school students. Lifetime use of smokeless tobacco in 11th grade and current use in grades 9 through 12 were lowest in 1987, the first year data were collected from high school students. Nationally, current rates for smokeless were lowest in 1993 for 8th grade and 12th grade, and 1996 for 10th grade.

[‡] Data not shown.

Prior to 1993, junior high school youths had not been exposed to a comprehensive, coordinated anti-smoking media campaign or any school- or community-based prevention programs, but they both knew and liked Joe Camel (DiFranza *et al.*, 1991). It is probable that they could purchase their own cigarettes and could receive free samples from cigarette manufacturers at neighborhood events or through the mail. The brands they favored were heavily advertised in the magazines they read (King *et al.*, 1998) and many youths owned tobacco-branded merchandise (Biener *et al.*, 1994). Local provisions (ordinances and regulations) pertaining to youth access or reduction of environmental tobacco smoke had been passed in only a handful of cities and towns in Massachusetts, and there were few places where smoking was strictly prohibited. In 1994, close to half of all purchase attempts by underage youths resulted in illegal sales of tobacco products (Hamilton, 1998). Cigarettes were affordable, as the impact of the 1993 January tax increase was all but obliterated by the price reduction of premium brands by cigarette manufacturers in the months following the excise tax (Harris *et al.*, 1997). In 1993, not surprisingly, about one-third of youths surveyed reported that they would probably smoke in the next year—and they did.

TRENDS SINCE 1993 Increases in rates of smoking initiation and progression to regular use for those in lower grades (as documented by increased lifetime and current smoking rates for 1993) were reflected in the higher rates of current smoking by 9th and 10th grade youths in the 1995 MYRBS, and by 10th and 11th grade youths in the 1996 MPS (Table 6-1). Data from the 1996 MPS (Briton *et al.*, 1997) were collected from 6,844 public school students in grades 6⁴ through 12 during November and December of 1996 and early January of 1997. Significant increases were found for current smoking among a combined sample of 10th, 11th, and 12th graders, from 33.3 percent in 1993 to 37.5 percent in 1996, $X^2(1) = 10.27$, $p < 0.002$. In contrast, there were significant decreases in current smoking for a combined sample of 7th, 8th, and 9th graders, from 26.4 percent in 1993 to 24.2 percent in 1996, $X^2(1) = 3.87$, $p = 0.04$. Students in a 7th, 8th, and 9th grade combined sample reported significantly lower lifetime cigarette use in 1996 (53.8 percent) than in 1993 (57.7 percent), $X^2(1) = 9.00$, $p < 0.003$. Likewise, lifetime rates decreased for boys [63 percent to 55.4 percent, $X^2(1) = 16.82$, $p < 0.001$] and for Hispanic youths [63 percent to 52 percent, $X^2(1) = 15.4$, $p < 0.001$] in this group. Current rates also declined among boys [28.1 percent to 21.6 percent, $X^2(1) = 16.0$, $p < 0.001$] and African American youths [27.1 percent to 16.1 percent, $X^2(1) = 23.48$, $p < 0.001$] in this combined sample.

Respondents in the overall sample (grades 7 through 12) who identified themselves as Asian/Pacific Islanders were significantly more likely to have ever smoked in 1996 than in 1993, while African American youths were

4. Sixth graders were first included in the MPS during the 1996 survey. Analyses comparing the results from the 1996 MPS to other MPS surveys focus on grades 7 through 12 only.

Table 6-1

Prevalence of Current[§] Tobacco Use among Massachusetts Youths by Grade, 1987–1999

Year: Survey:	1987 MPS**	1990 MPS**	1993 MYRBS*	1993 MPS**	1995 MYRBS*	1996 MPS**	1997 MYRBS*	1999 MYRBS*	1999 MPS**
Grade									
6						18.1 ^{†††}			N/A
7	11.6	7.5		18.5 [†]		16.2 ^{†††}			N/A
8	15.5	19.6		26.5 ^{††}		26.0 ^{†††}			N/A
9	32.0	24.9	28.9	34.5 ^{†††}	32.3 ^{††}	30.3 ^{†††}	27.8	25.1	N/A
10	28.1	26.6	25.2	28.5	34.8 ^{†††}	36.6 ^{†††}	35.8 [†]	29.2	N/A
11	34.9	31.6	31.0	33.1	37.7	38.9 ^{†††}	35.5 ^{††}	31.4	N/A
12	31.7	33.0	35.9	37.8	39.1	40.6 ^{†††}	40.2 ^{†††}	36.9 [†]	N/A
13								N/A ^{††}	
14								N/A ^{†††}	
15									
16									

[§] Current cigarette use defined as having smoked at least once in the past month.

Surveys: MPS—Massachusetts Prevalence Survey conducted by Health & Addictions Research, Inc.;
MYRBS—Massachusetts Youth Risk Behavior Survey conducted by the Department of Education.

* Data Collected in November, December, January (NDJ).

** Data Collected in April, May, June (AMJ).

Cohort progression (e.g., using data from MPS):

Seventh[†], 8th^{††}, 9th^{†††} grades at MTCP baseline in NDJ of 1993; advance to 10th[†], 11th^{††}, 12th^{†††} grades in NDJ of 1996.

N/A: Data not assessed.

significantly less likely to have smoked in the past 30 days in 1996 than in 1993 (Table 6-2). Tables 6-3 and 6-4 present changes in cigarette use from 1993 to 1996 for females and males, respectively. There were significant increases in current cigarette use for males in grade 12; however, there were declines in overall male and White male lifetime use, with 7th grade males significantly less likely to smoke (lifetime and current) in 1996 than in 1993 (Table 6-4). All grades experienced declines from 1993 to 1996 on lifetime and current use of smokeless tobacco and, with the exception of 10th grade (lifetime), 11th grade (current), and 12th grade youths, these declines were significant[‡].

The 1993 MYRBS (Massachusetts Department of Education, 1998) reported lifetime and current rates of cigarette use among public school students in grades 9 through 12 as 67.8 percent and 30.2 percent, respectively[‡]. Differences between current prevalence rates reported in the MYRBS and MPS for the same calendar year (e.g., 1993) might be a function of sampling error or of the timing for data collection. Specifically, the MYRBS is administered in April, May, and early June, whereas the MPS is conducted in November, December, and early January.

[‡] Data not shown.

Table 6-2

Lifetime and Current Smoking Prevalence of Adolescents by Sex, Grade, Race/Ethnicity*, Educational Performance, Friends who Smoke, Friends who Disapprove of Smoking, and Plans after High School—Massachusetts, 1993, 1996

	Lifetime Use						
	1993			1996			
	%	(n)	95% CI		%	(n)	95% CI
Sex							
Female	62.0	(1,713)	± 1.8		63.1	(1,837)	± 1.8
Male	66.6	(1,679)	± 1.9	**	62.2	(1,799)	± 1.8
Grade Level							
7th	45.9	(439)	± 3.2		41.1	(412)	± 3.1
8th	60.1	(608)	± 3.0		58.5	(546)	± 3.2
9th	67.6	(617)	± 3.1		62.0	(635)	± 3.0
10th	67.8	(563)	± 3.2		70.6	(751)	± 2.7
11th	71.8	(548)	± 3.2		70.3	(633)	± 3.0
12th	75.1	(632)	± 2.9		74.9	(659)	± 2.9
Race/Ethnicity*							
White	64.4	(1,694)	± 1.8		62.4	(1,719)	± 1.8
Hispanic	64.2	(652)	± 3.0		61.6	(754)	± 2.7
African American	68.1	(856)	± 2.6		66.8	(887)	± 2.6
Asian/P.I.	44.3	(132)	± 5.7	**	58.2	(174)	± 5.6
Native American	70.6	(48)	±11.1		64.6	(53)	±10.6
Educational Performance[†]							
Above average	53.5	(1,527)	± 1.8		50.1	(1,574)	± 1.8
Average	75.2	(1,469)	± 1.9		75.9	(1,594)	± 1.8
Below average	82.1	(389)	± 3.5		84.1	(455)	± 3.1
Friends Who Smoke							
None	32.3	(352)	± 2.8	**	25.4	(301)	± 2.5
Few	60.2	(1,258)	± 2.1		57.9	(1,300)	± 2.0
Many	79.6	(1,055)	± 2.2		82.5	(1,127)	± 2.0
All	92.7	(719)	± 1.8		93.8	(877)	± 1.6
Friends Who Disapprove							
None	77.5	(478)	± 3.3		76.1	(472)	± 3.4
Few	76.7	(1,961)	± 1.6		78.9	(2,137)	± 1.5
Many	56.4	(610)	± 3.0		53.2	(709)	± 2.7
All	32.4	(329)	± 2.9	**	26.6	(285)	± 2.7
Plans after High School							
Go to work	79.1	(276)	± 4.3		80.2	(364)	± 3.7
Armed Forces	80.2	(162)	± 5.6		72.4	(268)	± 4.6
College	61.1	(2,634)	± 1.5		59.3	(2,618)	± 1.5
Other/Unsure	73.7	(323)	± 4.2		68.0	(376)	± 3.9
Totals	64.0	(3,408)	± 1.3		62.5	(3,636)	± 1.3

Table 6-2 (continued)

	Current Use					
	1993			1996		
	%	(n)	95% CI	%	(n)	95% CI
Sex						
Female	30.1	(830)	± 1.7	32.3	(936)	± 1.7
Male	28.9	(727)	± 1.8	29.1	(836)	± 1.7
Grade Level						
7th	18.5	(177)	± 2.5	16.2	(162)	± 2.3
8th	26.5	(267)	± 2.7	26.0	(240)	± 2.8
9th	34.5	(314)	± 3.1	30.4	(309)	± 2.8
10th	28.9	(240)	± 3.1	33.7	(356)	± 2.9
11th	33.0	(252)	± 3.3	38.9	(348)	± 3.2
12th	37.7	(317)	± 3.3	40.7	(357)	± 3.3
Race/Ethnicity*						
White	31.5	(828)	± 1.8	32.7	(897)	± 1.8
Hispanic	26.1	(264)	± 2.7	26.5	(323)	± 2.5
African American	22.2	(276)	± 2.3	17.7	(230)	± 2.1
Asian/P.I.	13.1	(39)	± 3.9	20.1	(60)	± 4.6
Native American	34.3	(23)	±11.6	48.1	(39)	±11.1
Educational Performance[†]						
Above average	20.3	(578)	± 1.5	20.0	(626)	± 1.4
Average	37.2	(726)	± 2.2	41.0	(857)	± 2.1
Below average	54.4	(254)	± 4.5	53.5	(284)	± 4.3
Friends Who Smoke						
None	2.3	(25)	± 0.9	1.4	(16)	± 0.7
Few	18.7	(391)	± 1.7	17.1	(382)	± 1.6
Many	44.6	(589)	± 2.7	50.5	(690)	± 2.7
All	71.3	(552)	± 3.2	73.2	(679)	± 2.9
Friends Who Disapprove						
None	52.2	(322)	± 4.0	51.4	(314)	± 4.0
Few	39.7	(1,012)	± 1.9	45.7	(1,233)	± 1.9
Many	15.4	(166)	± 2.2	14.3	(190)	± 1.9
All	5.2	(53)	± 1.4	2.2	(24)	± 0.9
Plans after High School						
Go to work	46.8	(162)	± 5.3	58.4	(261)	± 4.6
Armed Forces	47.5	(96)	± 7.0	40.2	(147)	± 5.0
College	25.8	(1,110)	± 1.3	26.1	(1,149)	± 1.3
Other/Unsure	43.9	(191)	± 4.7	38.3	(210)	± 4.1
Total	29.5	(1,568)	± 1.2	30.5	(1,772)	± 1.2

* Analyses involving race/ethnicity were weighted to control for area as a possible confounding variable, due to the fact that a large proportion of minority students in Massachusetts live in urban areas. Area weights (based on population and student response per area stratum) were applied to all other analyses, so that the sample would be representative of the state population and inferences could be drawn for students on a statewide level.

** Indicates significant difference from 1993 to 1996 for the variable of interest at $p < 0.05$.

[†] Students reporting usual grades of As, As and Bs, or Bs were categorized as above average; Bs and Cs or Cs were categorized as average; Cs and Ds, Ds, or Ds and Fs were categorized as below average.

Table 6-3

Lifetime and Current Smoking Prevalence of Female Adolescents by Grade, Race/Ethnicity,* Educational Performance, Friends who Smoke, Friends who Disapprove of Smoking, and Plans after High School—Massachusetts, 1993, 1996

	Lifetime Use					
	1993			1996		
	%	(n)	95% CI	%	(n)	95% CI
Grade Level						
7th	39.3	(194)	± 4.3	38.4	(186)	± 4.4
8th	54.2	(280)	± 4.3	55.9	(243)	± 4.7
9th	65.4	(315)	± 4.3	61.4	(341)	± 4.1
10th	69.7	(295)	± 4.4	74.7	(375)	± 3.8
11th	71.6	(293)	± 4.4	71.4	(339)	± 4.1
12th	76.6	(334)	± 4.0	76.6	(353)	± 3.9
Race/Ethnicity*						
White	60.8	(833)	± 2.6	62.6	(869)	± 2.6
Hispanic	67.9	(368)	± 4.0	64.3	(405)	± 3.8
African American	74.3	(485)	± 3.4	70.5	(435)	± 3.7
Asian/P.I.	38.2	(63)	± 7.5	49.0	(77)	± 7.9
Native American	85.7	(18)	±15.7	81.8	(27)	±14.2
Educational Performance[†]						
Above average	50.8	(841)	± 2.4	50.8	(885)	± 2.4
Average	78.0	(712)	± 2.7	79.4	(742)	± 2.6
Below average	87.6	(149)	± 5.0	90.3	(205)	± 4.0
Friends Who Smoke						
None	30.1	(179)	± 3.7	23.5	(136)	± 3.5
Few	58.1	(609)	± 3.0	57.0	(617)	± 3.0
Many	76.4	(511)	± 3.2	83.0	(571)	± 2.8
All	92.4	(400)	± 2.5	93.9	(504)	± 2.1
Friends Who Disapprove						
None	76.4	(197)	± 5.2	81.7	(214)	± 4.8
Few	75.1	(1,036)	± 2.3	79.8	(1,103)	± 2.1
Many	57.5	(310)	± 4.2	54.8	(381)	± 3.7
All	27.4	(154)	± 3.7	23.3	(127)	± 3.6
Plans after High School						
Go to work	78.1	(100)	± 7.3	86.0	(172)	± 4.9
Armed Forces	79.1	(34)	±12.7	78.0	(92)	± 7.6
College	59.1	(1,403)	± 2.0	59.2	(1,404)	± 2.0
Other/Unsure	80.2	(170)	± 5.4	74.8	(163)	± 5.8
Total	62.0	(1713)	± 1.8	63.1	(1837)	± 1.8

Table 6-3 (continued)

	Current Use					
	1993			1996		
	%	(n)	95% CI	%	(n)	95% CI
Grade Level						
7th	14.2	(70)	± 3.1	19.0	(91)	± 3.5
8th	25.5	(132)	± 3.8	27.5	(120)	± 4.2
9th	34.8	(167)	± 4.3	33.0	(182)	± 4.0
10th	32.2	(136)	± 4.5	35.2	(176)	± 4.2
11th	35.9	(147)	± 4.7	42.0	(198)	± 4.5
12th	40.9	(178)	± 4.6	36.5	(168)	± 4.4
Race/Ethnicity*						
White	32.3	(442)	± 2.5	34.2	(474)	± 2.5
Hispanic	27.5	(148)	± 3.8	29.0	(181)	± 3.6
African American	22.3	(144)	± 3.2	18.4	(110)	± 3.1
Asian/P.I.	10.8	(18)	± 4.8	17.1	(27)	± 6.0
Native American	28.6	(6)	±21.3	54.5	(18)	±17.9
Educational Performance[†]						
Above average	20.8	(344)	± 2.0	20.8	(362)	± 1.9
Average	41.9	(382)	± 3.2	46.5	(434)	± 3.2
Below average	59.8	(101)	± 7.5	62.9	(139)	± 6.5
Friends Who Smoke						
None	1.3	(8)	± 1.0	1.4	(8)	± 1.0
Few	19.9	(208)	± 2.4	16.8	(181)	± 2.2
Many	43.9	(294)	± 3.8	51.1	(354)	± 3.8
All	72.5	(313)	± 4.2	73.4	(390)	± 3.8
Friends Who Disapprove						
None	54.3	(140)	± 6.1	58.8	(151)	± 6.1
Few	42.0	(579)	± 2.6	48.0	(662)	± 2.6
Many	15.5	(83)	± 3.1	14.2	(99)	± 2.6
All	3.4	(19)	± 1.5	2.8	(15)	± 1.4
Plans after High School						
Go to work	38.3	(49)	± 8.6	63.9	(124)	± 6.8
Armed Forces	39.5	(17)	±15.3	44.4	(52)	± 9.1
College	27.3	(647)	± 1.8	27.8	(657)	± 1.8
Other/Unsure	54.0	(114)	± 6.8	45.4	(99)	± 6.7
Total	30.1	(830)	± 1.7	32.3	(936)	± 1.7

* Analyses involving race/ethnicity were weighted to control for area as a possible confounding variable, due to the fact that a large proportion of minority students in Massachusetts live in urban areas. Area weights (based on population and student response per area stratum) were applied to all other analyses, so that the sample would be representative of the state population and inferences could be drawn for students on a statewide level.

** Indicates significant difference from 1993 to 1996 for the variable of interest at $p < 0.05$.

[†] Students reporting usual grades of As, As and Bs, or Bs were categorized as above average; Bs and Cs or Cs were categorized as average; Cs and Ds, Ds, or Ds and Fs were categorized as below average.

Table 6-4

Lifetime and Current Smoking Prevalence of Male Adolescents by Grade, Race/Ethnicity, Educational Performance, Friends who Smoke, Friends who Disapprove of Smoking, and Plans after High School—Massachusetts, 1993, 1996

	Lifetime Use						
	1993			1996			
	%	(n)	95% CI		%	(n)	95% CI
Grade Level							
7th	52.9	(241)	± 4.3	**	43.5	(226)	± 4.3
8th	66.5	(327)	± 4.2		60.8	(303)	± 4.4
9th	69.6	(295)	± 4.4		62.7	(294)	± 4.4
10th	67.1	(267)	± 4.6		67.0	(376)	± 3.9
11th	71.9	(253)	± 4.7		69.1	(293)	± 4.4
12th	74.1	(295)	± 4.3		73.0	(306)	± 4.3
Race/Ethnicity*							
White	68.6	(857)	± 2.6	**	62.2	(850)	± 2.6
Hispanic	59.2	(273)	± 4.5		58.8	(349)	± 4.0
African American	61.6	(361)	± 4.0		63.6	(452)	± 3.6
Asian/P.I.	52.3	(69)	± 8.7		68.5	(98)	± 7.8
Native American	63.0	(29)	±14.4		53.1	(26)	±14.5
Educational Performance[†]							
Above average	57.9	(683)	± 2.8	**	49.2	(689)	± 2.6
Average	72.9	(754)	± 2.7		73.2	(852)	± 2.6
Below average	78.9	(232)	± 4.8		79.6	(250)	± 4.4
Friends Who Smoke							
None	35.5	(172)	± 4.3	**	27.3	(165)	± 3.6
Few	62.9	(647)	± 3.0		58.7	(683)	± 2.8
Many	82.9	(539)	± 2.9		82.0	(556)	± 2.9
All	93.1	(311)	± 2.7		93.7	(373)	± 2.4
Friends Who Disapprove							
None	79.3	(279)	± 4.3		72.1	(258)	± 4.7
Few	78.6	(912)	± 2.4		77.9	(1,034)	± 2.2
Many	55.7	(299)	± 4.2		51.4	(328)	± 3.9
All	39.3	(175)	± 4.6	**	30.2	(159)	± 4.0
Plans after High School							
Go to work	80.1	(173)	± 5.4		75.6	(192)	± 5.3
Armed Forces	80.6	(129)	± 6.2		70.0	(177)	± 5.7
College	63.8	(1,220)	± 2.2	**	59.5	(1,214)	± 2.1
Other/Unsure	67.7	(151)	± 6.2		63.6	(213)	± 5.2
Total	66.6	(1,679)	± 1.9	**	62.2	(1,799)	± 1.8

Table 6-4 (continued)

	Current Use						
	1993			1996			
	%	(n)	95% CI		%	(n)	95% CI
Grade Level							
7th	22.7	(103)	± 3.9	**	13.7	(71)	± 3.0
8th	27.7	(135)	± 4.0		24.7	(121)	± 3.8
9th	34.0	(144)	± 4.5		27.2	(127)	± 4.1
10th	26.1	(104)	± 4.3		32.1	(179)	± 3.9
11th	29.3	(103)	± 4.8		35.4	(150)	± 4.6
12th	34.5	(137)	± 4.7	**	45.1	(188)	± 4.8
Race/Ethnicity*							
White	30.7	(383)	± 2.6		31.1	(423)	± 2.5
Hispanic	24.6	(113)	± 4.0		24.0	(142)	± 3.5
African American	21.6	(125)	± 3.4		17.1	(120)	± 2.8
Asian/P.I.	16.2	(21)	± 6.4		23.4	(33)	± 7.1
Native American	36.2	(17)	±14.4		43.8	(21)	±14.4
Educational Performance[†]							
Above average	19.5	(230)	± 2.3		19.0	(265)	± 2.1
Average	33.3	(344)	± 2.9		36.6	(423)	± 2.8
Below average	50.7	(146)	± 5.8		46.8	(145)	± 5.6
Friends Who Smoke							
None	3.3	(16)	± 1.6		1.3	(8)	± 0.9
Few	17.6	(181)	± 2.3		17.4	(201)	± 2.2
Many	44.9	(290)	± 3.9		49.9	(337)	± 3.8
All	70.1	(234)	± 4.9		72.9	(288)	± 4.4
Friends Who Disapprove							
None	51.4	(181)	± 5.3		45.9	(163)	± 5.2
Few	36.5	(422)	± 2.8	**	43.3	(571)	± 2.7
Many	15.3	(82)	± 3.1		14.3	(91)	± 2.7
All	7.7	(34)	± 2.5	**	1.7	(9)	± 1.1
Plans after High School							
Go to work	51.6	(110)	± 6.8		54.4	(137)	± 6.2
Armed Forces	49.4	(79)	± 7.9		38.2	(95)	± 6.1
College	24.0	(457)	± 1.9		24.2	(493)	± 1.9
Other/Unsure	33.9	(75)	± 6.3		33.5	(111)	± 5.1
Total	28.9	(727)	± 1.8		29.1	(836)	± 1.7

* Analyses involving race/ethnicity were weighted to control for area as a possible confounding variable, due to the fact that a large proportion of minority students in Massachusetts live in urban areas. Area weights (based on population and student response per area stratum) were applied to all other analyses, so that the sample would be representative of the state population and inferences could be drawn for students on a statewide level.

** Indicates significant difference from 1993 to 1996 for the variable of interest at $p < 0.05$.

[†] Students reporting usual grades of As, As and Bs, or Bs were categorized as above average; Bs and Cs or Cs were categorized as average; Cs and Ds, Ds, or Ds and Fs were categorized as below average.

From 1993 to 1995, MYRBS (Massachusetts Department of Education, 1998) rates for lifetime cigarette use among high school students increased from 67.8 percent to 71.5 percent, while current use increased from 30.2 percent to 35.7 percent. Daily smoking rates increased from 11.9 percent to 14.6 percent. Current smokeless tobacco use in Massachusetts decreased by over 10 percent, from 9.4 percent to 8.4 percent. However, from 1995 to 1997, daily smoking among high school students remained flat at 14.5 percent, while current-month smoking decreased somewhat to 34.4 percent and current smokeless tobacco use continued to decline sharply to 6.0 percent. Lifetime smoking remained flat at 69.1 percent[‡].

The national YRBS (CDC, 1998), administered biannually, has reported flat rates for lifetime smoking since 1991 (70.1 percent, 69.5 percent, 71.3 percent, 70.2 percent)(CDC, 1992), while current smoking rates continue to rise (27.5 percent, 30.5 percent, 34.8 percent, 36.4 percent). Nationally, current smokeless rates (10.5 percent, 11.5 percent, 11.4 percent, 9.3 percent) have declined at about half the rate experienced in Massachusetts from 1995 to 1997[‡].

During the period between 1995 and 1997, declines in smoking were evidenced in high school students overall, but the greatest declines were among the 9th graders—the first high school class to have had the benefit of sustained MTCP activity prior to their initiation of tobacco use. The increases observed among 9th graders from 1993 to 1995 in lifetime (64.4 percent to 68.9 percent), past month (28.9 percent to 32.3 percent), and daily (8.1 percent to 11.8 percent) smoking were reversed in 1997, with lifetime and past-month cigarette use declining to pre-1993 levels (62.3 percent and 27.8 percent, respectively) and daily use easing slightly to 10.4 percent. Smokeless tobacco use continued to decline in 9th graders from 1993 to 1997 (10.3 percent to 5.7 percent)[‡] (MYRBS, Massachusetts Department of Education, 1998).

To summarize, prior to MTCP inception in 1993, overall trends for Massachusetts paralleled that of the nation, although Massachusetts' cigarette rates were higher, and smokeless rates were lower, than the rest of the country⁵. Since 1993, however, there has been some divergence in these trends. Specifically, there have been significant declines in cigarette rates among junior high school students. Similarly, smokeless tobacco rates have declined among junior high and high school students in all grades—9th (current and lifetime), 10th (current), and 11th (lifetime) (MPS, Briton *et al.*, 1997). High school rates have remained level since 1995, yet declines in

5. The 1993 MYRBS (administered prior to MTCP) indicated that 12th-grade students' reported rate of current cigarette use was 20 percent higher than those reported for the country as a whole by MTF, a national survey of over 50,000 students (35.9 percent and 29.9 percent, respectively). MTF reported a national current smokeless tobacco rate of 10.4 percent for 10th graders and 11.1 percent for 12th graders. In Massachusetts, 10th and 12th graders reported current smokeless tobacco use of 8.1 percent and 8.8 percent, respectively.

[‡] Data not shown.

smoking among 9th graders from 1995 to 1997, although nonsignificant, have returned the rates to pre-1993 levels (MYRBS—Massachusetts Department of Education, 1998). In contrast, the nation as a whole experienced increases in high school (CDC, 1995 & 1998; Kann, 1996) and 8th grade (Johnston *et al.*, 1999) use during this same period.

CHANGES IN CORRELATES OF SMOKING: 1993–1996 The MPS in 1993 and 1996 contained items that have been associated with smoking prevalence—friends who smoke, friends who disapprove of smoking, educational performance, and plans after high school. It is plausible that friends' disapproval and the proportion of friends who smoke would be impacted by a program that seeks to de-normalize tobacco use. We would not expect educational performance or post-high-school plans to be affected by program exposure, although they are correlated with tobacco use and could alter program effectiveness. Findings revealed significant differences from 1993 to 1996 in overall proportions of those responding on friends who disapprove and plans after high school; in females on friends who smoke, friends who disapprove, educational performance, and plans after high school; and in males on plans after high school (Table 6-5). Within-grade analyses reveal significant differences for 8th, 9th, 11th, and 12th grades on friends who smoke, for 8th and 9th grades (marginally suggestive of change for 7th grade, $p = 0.057$) on friends who disapprove, for 9th grade on educational performance, and for all but 10th grade on plans after high school (Table 6-6).

Changes Associated with Gender In 1996, girls were less likely to say that none, a few, or many of their friends smoke and more likely to say that all of their friends smoke than in 1993. Increases were observed overall and for girls reporting that many of their friends disapprove, with slight declines for those reporting that none, few, or all friends disapprove. Also, there were increases in the proportion of girls reporting below-average grades. Finally, increases were observed for both boys and girls across the same time period on plans to go to work and join the armed forces after high school, as were decreases in plans to attend college. For boys, there were also increases in the percentage that were unsure of post-high-school plans, or had other plans (Table 6-5).

Changes Associated with Grade Level Patterns were consistent for all grades that showed significant changes on plans after high school: those expecting to go to college decreased, those going into the armed forces increased, and (with the exception of the 7th and 12th graders) those going to work increased. These changes should be associated with increased smoking from 1993 to 1996. For educational performance, the proportion of 9th grade students reporting above-average grades increased, while those reporting average grades decreased. No changes were observed for those reporting below-average grades. It is unclear how these changes in educational performance may affect smoking behavior, although doing poorly in school has generally been associated with increased smoking behavior (Table 6-6).

Table 6-5

Friends who Smoke, Friends who Disapprove of Smoking, Educational Performance and Plans after High School, Overall and by Gender for 1993–1996

	Overall		Females		Males	
	%	(n)	%	(n)	%	(n)
Friends who Smoke						
				*		
1993						
None	21	1,091	22	595	19	485
Few	40	2,088	38	1,049	41	1,029
Many	25	1,327	24	670	26	650
All	15	776	16	434	13	334
Total	100	5,282	100	2,748	100	2,498
1996						
None	21	1,188	20	581	21	607
Few	39	2,246	37	1,083	41	1,163
Many	24	1,371	24	693	24	678
All	16	935	19	537	14	398
Total	100	5,740	100	2,894	100	2,846
Friends who Disapprove of Smoking						
		**		**		
1993						
None	12	617	9	259	14	352
Few	49	2,559	50	1,380	47	1,161
Many	21	1,081	20	539	22	537
All	19	1,014	21	563	18	445
Total	100	5,271	100	2,741	100	2,495
1996						
None	11	622	9	263	13	358
Few	47	2,714	48	1,386	47	1,328
Many	23	1,333	24	696	22	638
All	19	1,073	19	547	19	526
Total	100	5,742	100	2,892	100	2,850
Educational Performance[†]						
				*		
1993						
Below Average	9	474	6	170	12	293
Average	37	1,955	33	913	41	1,034
Above Average	54	2,853	61	1,656	47	1,179
Total	100	5,282	100	2,739	100	2,506
1996						
Below Average	9	544	8	229	11	315
Average	36	2,105	32	940	40	1,165
Above Average	54	3,148	60	1,746	49	1,401
Total	100	5,797	100	2,915	100	2,881

Table 6-5 (continued)

	Overall		Females		Males	
	%	(n)	%	(n)	%	(n)
Plans after High School	***		***		***	
1993						
Go to work	7	350	5	128	9	216
Armed forces	4	203	2	43	6	160
College	81	4,313	86	2,374	76	1,911
Other/unsure	8	438	8	211	9	224
<i>Total</i>	<i>100</i>	<i>5,304</i>	<i>100</i>	<i>2,756</i>	<i>100</i>	<i>2,511</i>
1996						
Go to work	8	454	7	199	9	255
Armed forces	6	371	4	118	9	252
College	76	4,424	82	2,379	71	2,045
Other/unsure	10	553	8	219	12	334
<i>Total</i>	<i>100</i>	<i>5,802</i>	<i>100</i>	<i>2,915</i>	<i>100</i>	<i>2,886</i>

* Indicates significance for 1993 to 1996 at $p < 0.05$.

** Indicates significance for 1993 to 1996 at $p < 0.01$.

*** Indicated significance for 1993 to 1996 at $p < 0.001$.

† Students reporting usual grades of As, As and Bs, or Bs were categorized as above average; Bs and Cs or Cs were categorized as average; Cs and Ds, Ds, or Ds and Fs were categorized as below average.

Table 6-6

Friends who Smoke, Friends who Disapprove of Smoking, Educational Performance and Plans after High School by Grade in School for 1993–1996

	Grade Level						Total
	7th	8th	9th	10th	11th	12th	
	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)	% (n)
Friends who Smoke		**	*		**	***	
1993							
None	43.3 (413)	19.9 (200)	14.1 (127)	15.7 (130)	14.2 (107)	13.6 (114)	20.7 (1,091)
Few	37.6 (358)	41.6 (419)	38.2 (344)	39.1 (323)	36.4 (275)	43.9 (369)	39.5 (2,088)
Many	11.6 (111)	26.7 (269)	28.2 (254)	25.0 (207)	32.2 (243)	28.9 (243)	25.1 (1,327)
All	7.5 (71)	11.8 (119)	19.4 (175)	20.2 (167)	17.2 (130)	13.6 (114)	14.7 (776)
Total	100.0 (953)	100.0 (1,007)	100.0 (900)	100.0 (827)	100.0 (755)	100.0 (840)	100.0 (5,282)
1996							
None	43.0 (419)	25.1 (231)	18.1 (185)	15.0 (158)	14.2 (127)	7.8 (68)	20.7 (1,188)
Few	36.3 (354)	42.3 (390)	40.6 (414)	40.9 (431)	33.1 (297)	41.2 (360)	39.1 (2,246)
Many	14.2 (138)	19.8 (183)	24.8 (253)	25.1 (264)	28.0 (251)	32.2 (281)	23.9 (1,370)
All	6.5 (63)	12.8 (118)	16.5 (168)	19.0 (200)	24.7 (222)	18.8 (164)	16.3 (935)
Total	100.0 (974)	100.0 (922)	100.0 (1,020)	100.0 (1,053)	100.0 (897)	100.0 (873)	100.0 (5,739)
Friends who Disapprove of Smoking		**	**				**
1993							
None	13.9 (132)	11.8 (118)	11.3 (102)	11.0 (91)	11.5 (87)	10.4 (87)	11.7 (617)
Few	27.1 (257)	47.4 (475)	55.9 (504)	54.1 (447)	53.4 (404)	56.5 (472)	48.5 (2,559)
Many	19.8 (188)	22.0 (221)	18.5 (167)	20.4 (169)	20.5 (155)	21.8 (182)	20.4 (1,082)
All	39.2 (372)	18.8 (189)	14.3 (129)	14.5 (120)	14.6 (110)	11.3 (94)	19.2 (1,014)
Total	100.0 (949)	100.0 (1,003)	100.0 (902)	100.0 (827)	100.0 (756)	100.0 (835)	100.0 (5,272)
1996							
None	10.0 (98)	12.1 (112)	11.2 (114)	11.5 (121)	10.2 (91)	9.7 (84)	10.8 (620)
Few	28.9 (283)	39.7 (367)	49.0 (498)	53.3 (563)	56.4 (505)	57.3 (498)	47.3 (2,714)
Many	21.6 (212)	25.6 (237)	24.0 (244)	22.4 (237)	22.1 (198)	23.7 (206)	23.2 (1,334)
All	39.5 (387)	22.5 (208)	15.8 (161)	12.8 (135)	11.4 (102)	9.3 (81)	18.7 (1,074)
Total	100.0 (980)	100.0 (924)	100.0 (1,017)	100.0 (1,056)	100.0 (896)	100.0 (869)	100.0 (5,742)

Table 6-6 (continued)

	Grade Level						Total
	7th % (n)	8th % (n)	9th % (n)	10th % (n)	11th % (n)	12th % (n)	
Educational Performance[†]	***						
1993							
Below Average	6.3 (59)	9.8 (99)	11.3 (103)	10.3 (85)	10.6 (80)	5.7 (48)	9.0 (474)
Average	25.9 (244)	27.3 (275)	46.0 (419)	38.2 (317)	42.9 (324)	44.8 (375)	37.0 (1,954)
Above Average	67.8 (638)	62.9 (634)	42.6 (388)	51.5 (427)	46.5 (351)	49.5 (414)	54.0 (2,852)
Total	100.0 (941)	100.0 (1,008)	100.0 (910)	100.0 (829)	100.0 (755)	100.0 (837)	100.0 (5,280)
1996							
Below Average	7.1 (71)	10.3 (96)	11.2 (115)	11.1 (118)	8.3 (74)	7.8 (69)	9.4 (543)
Average	26.6 (266)	30.2 (282)	33.2 (340)	42.1 (447)	41.3 (370)	45.6 (401)	36.3 (2,106)
Above Average	66.3 (664)	59.5 (556)	55.6 (570)	46.8 (498)	50.4 (451)	46.5 (409)	54.3 (3,148)
Total	100.0 (1,001)	100.0 (934)	100.0 (1,025)	100.0 (1,063)	100.0 (895)	100.0 (879)	100.0 (5,797)
Plans after High School	***	***	*	***	*	***	
1993							
Go to work	8.1 (77)	5.7 (58)	7.6 (69)	5.7 (47)	5.4 (41)	7.0 (59)	6.6 (351)
Armed forces	2.9 (28)	5.0 (51)	3.5 (32)	4.9 (41)	2.4 (18)	4.0 (34)	3.8 (204)
College	82.3 (784)	80.7 (817)	79.5 (725)	80.5 (668)	81.7 (618)	83.2 (701)	81.3 (4,313)
Other/unsure	6.7 (64)	8.6 (87)	9.4 (86)	8.9 (74)	10.4 (79)	5.8 (49)	8.3 (439)
Total	100.0 (953)	100.0 (1,013)	100.0 (912)	100.0 (830)	100.0 (756)	100.0 (843)	100.0 (5,307)
1996							
Go to work	6.5 (65)	7.8 (73)	10.7 (110)	6.3 (67)	9.4 (84)	6.4 (56)	7.8 (455)
Armed forces	8.2 (82)	9.2 (86)	5.0 (51)	6.5 (69)	4.6 (41)	4.8 (42)	6.4 (371)
College	75.6 (758)	73.9 (691)	73.8 (757)	76.1 (809)	79.1 (710)	79.6 (698)	76.2 (4,423)
Other/unsure	9.8 (98)	9.1 (85)	10.5 (108)	11.1 (118)	7.0 (63)	9.2 (81)	9.5 (553)
Total	100.0 (1,003)	100.0 (935)	100.0 (1,026)	100.0 (1,063)	100.0 (898)	100.0 (877)	100.0 (5,802)

* Indicates significance for 1993 to 1996 at $p < 0.05$ ** Indicates significance for 1993 to 1996 at $p < 0.01$ *** Indicated significance for 1993 to 1996 at $p < 0.001$ [†] Students reporting usual grades of As, As and Bs, or Bs were categorized as above average; Bs and Cs or Cs were categorized as average; Cs and Ds, Ds, or Ds and Fs were categorized as below average.

While there was no change in overall proportion with friends who smoke, 8th and 9th graders were more likely to increase in the frequency of reporting that none of their friends smoked. Similarly, for lower grades, the proportion reporting that all of their friends disapproved increased over time. While nonsignificant, the direction was reversed for 11th and 12th grades. These changes should produce declines in smoking from 1993 to 1996 among lower grades (Table 6-6).

CHANGES IN LIFETIME AND CURRENT SMOKING ASSOCIATED WITH CORRELATES Results of analyses conducted to detect changes in lifetime and current smoking (overall, females, males) by friends who smoke, friends who disapprove, educational performance, and post high school plans can be examined in Tables 6-2 through 6-4. Changes from 1993 to 1996 for both lifetime and current smoking are associated with differing levels of these variables.

Correlates Associated with Decreases in Smoking Those who reported that none of their friends smoked were significantly less likely to have ever smoked in 1996 than in 1993, with similar patterns for males and females, but only the difference for males reached significance. Those who responded that all of their friends disapproved of smoking were significantly less likely to smoke (either current or lifetime) in 1996 than in 1993. Again, the direction of change was similar for females and males, but only the changes for males reached significance. Males whose grades were above average or who planned to go to college were significantly less likely to report lifetime smoking in 1996 than in 1993.

Correlates Associated with Increases in Smoking Those who reported that many of their friends smoked were significantly more likely to have smoked in the past month in 1996 than in 1993. A similar result was obtained for those who planned to go to work after high school. Girls with many friends who smoked exhibited increases in lifetime smoking, while boys remained flat on this measure. Girls who planned to go to work increased significantly in current cigarette smoking from 1993 to 1996 (38.3 percent to 63.9 percent), while boys did not (51.6 percent to 54.4 percent). This is of concern in that the number of girls planning to go to work increased by 50 percent during this time. When a few friends disapproved of smoking, significant increases were observed from 1993 to 1996 on current smoking (overall, for females, and for males). While girls who reported that a few of their friends disapproved were also significantly more likely to report increases in lifetime smoking in 1996 than in 1993, corresponding lifetime use among boys remained flat.

To summarize, current smoking rates were virtually unchanged for 7th through 12th graders in Massachusetts from 1993 to 1996 (*i.e.*, 29.5 percent to 30.5 percent; Table 6-2) and were compatible with changes in the overall percentage answering that many or all of their friends smoke (*i.e.*, 39.8 percent to 40.2 percent; Table 6-5).

Changes in current smoking within each of these grades, though not significant, are consistent with and directionally supportive of program impact. As mentioned earlier, the reductions in smoking for the combined sample of 7th, 8th, and 9th grade students were significant overall, for boys, and for Hispanic students on lifetime use, and for boys and African American students on current use.

While both boys and girls increased in the percentage of those planning to go to work, the overall increase in this category was driven almost entirely by girls, and this increase was associated with significant increases in current smoking overall and among those girls planning to go to work.

Those reporting that few of their friends disapproved of smoking were more likely to show increases in current and lifetime smoking. This was also true for girls. This effect was mitigated somewhat by the decline in those reporting that few of their friends disapproved.

**IMPACT OF PERCEIVED
INCREASING CIGARETTE
PRICES**

The price of cigarettes has been shown to impact smoking in both youths and adults (Chaloupka and Wechsler, 1997; Harris and Chan, 1999), with increases in premium brands more predictive of declines in youth smoking than price changes in generic or discount brands (Harris and Chan, 1999). In the 1993 and 1996 MPS, youths were asked if "price increases have affected your buying cigarettes."⁶ Responses included the following: No, I don't smoke; No, I don't buy my own cigarettes; No, I buy the same number of packs as usual; No, the price of my brand did not increase; No, I switched to a cheaper brand; Yes, I buy fewer packs; Yes, I tried to quit smoking; Yes, I quit smoking. Results on this item were similar for both years. In 1996, 81.8 percent of youths either didn't smoke or didn't buy their own cigarettes and another 1.1 percent did not think their brand increased in price. Of the 17 percent remaining, close to one-third of those buying their own cigarettes and perceiving a price increase either tried to quit or actually quit. No behavior change was reported by 10.2 percent of respondents. Of the 6.8 percent who reported a change, quitting (3.2 percent) and attempting to quit (1.9 percent) were reported most often, while buying fewer packs (1.2 percent) was the next most frequent response. Very few reported switching to a cheaper brand (0.5 percent).

6. During this interval, actual cigarette prices did not increase in Massachusetts.

CONCLUSIONS The effect of a large cohort of junior high school smokers advancing into high school could overwhelm a prevention program that is based on de-normalization of smoking. What is promising is that the tremendous pressure that this smoking cohort might have exerted on younger students appears to have been mitigated by the tobacco control work in Massachusetts.

Data are consistent with MTCP effectiveness in changing social norms and are supportive of behavior change in younger grades, among males, among African Americans, and possibly among girls. While current smoking rates for youths have increased nationally, rates in Massachusetts have remained flat. From 1993 to 1996, all grades showed increases in the proportion of youths reporting that many of their friends disapprove of smoking. This is consistent with success in changing social norms, yet is mitigated somewhat by a reduction in those reporting that all friends disapprove (occurring mostly in upper grades, which also report the highest rates of current smoking). In contrast, current smoking decreased in lower grades and among males, where decreases in all friends disapproving did not occur. Furthermore, the 9th graders in the 1997 MYRBS high school survey showed some non-significant declines which, if continued into 11th grade, will be documented by the recently administered 1999 MYRBS. Girls appear to be at higher risk from environmental pressures (*i.e.*, below average grades, going to work after high school) and, more importantly, from the impact of these pressures on smoking rates (approximately 6 percent of the population of girls are responsible for 12 percent of the current smoking rate). Future programming may need to be more responsive to girls in this particular subset. While overall smoking rates for girls have not shown the same decline as for boys, it is notable that rates for girls have not increased. This fact suggests that the existing program may provide some protective effects for girls.

The effectiveness of the first few years of MTCP programming may not become detectable until the students who were in 4th and 5th grades in 1994 reach 9th and 10th grades in 1999. We can then determine any difference in their uptake process. The results of a successful program to de-normalize tobacco use may not be evident in the high school population until the present cohort of high school smokers—who began as most addicted smokers in junior high school—are out of high school and in their mid-20s. Older youths and young adults who smoke can continue to benefit from MTCP efforts as they become exposed to increased smoking restrictions in work and social settings. We are cautiously optimistic that the MPS conducted in November and December of 1999 and January of 2000 will continue to document significant progress in the area of youth smoking.

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