Corti EC. *A History of Smoking*. Translated by Paul England. London: George G. Harrap & Co., 1931.

Cowell MJ. An insurance company perspective on smoking. *New York State Journal of Medicine* 1985; 85(7):307–9.

Crawford R. Individual responsibility and health politics in the 1970s. In: Reverby S, Rosner D, editors. *Health Care in America: Essays in Social History*. Philadelphia: Temple University Press, 1979:247–68.

Creek L, Capehart T, Grise V. *U.S. Tobacco Statistics, 1935–92*. Statistical Bulletin No. 869. Washington: US Department of Agriculture, Economic Research Service, Commodity Economics Division, 1994.

Davis FJ. Beliefs, values, power, and public definitions of deviance. In: Davis FJ, Stivers R, editors. *The Collective Definition of Deviance*. New York: Free Press, 1975:50–9.

DiFranza JR, Savageau JA, Aisquith BF. Youth access to tobacco: the effects of age, gender, vending machine locks, and "It's the Law" programs. *American Journal of Public Health* 1996;86(2):221–4.

Dillow GL. Thank you for not smoking: the hundred-year war against the cigarette. *American Heritage* 1981; 32(2):94–107.

Doll R, Hill AB. Smoking and carcinoma of the lung. *British Medical Journal* 1950;2(4682):739–48.

Doll R, Hill AB. A study of the aetiology of carcinoma of the lung. *British Medical Journal* 1952;2(4797): 1271–86.

Duis PR. Cigarettes and sin. *Chicago* 1983;32(9):142–5.

Environmental Protection Agency. *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders*. Washington: Environmental Protection Agency, Office of Research and Development, Office of Air and Radiation, 1992. Publication No. EPA/600/6-90/006F.

Ernster VL. Mixed messages for women: a social history of cigarette smoking and advertising. *New York State Journal of Medicine* 1985;85(7):335–40.

Fass PS. *The Damned and the Beautiful: American Youth in the 1920's*. New York: Oxford University Press, 1977.

Fielding JE. Health promotion and disease prevention at the worksite. *Annual Review of Public Health* 1984; 5:237–65.

Fortune. The uproar in cigarettes. *Fortune* 1953;48(6): 130–3, 161–2, 164.

Fox RW, Lears TJ, editors. *The Culture of Consumption: Critical Essays in American History, 1880–1980*. New York: Pantheon Books, 1983.

Freidson E. *Profession of Medicine: A Study of the Sociology of Applied Knowledge*. New York: Dodd, Mead & Company, 1974.

Fritschler AL. *Smoking and Politics: Policy Making and the Federal Bureaucracy*. 4th ed. Englewood Cliffs (NJ): Prentice Hall, 1989.

Gehman JM. *Smoke Over America*. Paterson (NJ): Beoma Publishing House, 1943.

Goldstein MS. *The Health Movement: Promoting Fitness in America*. New York: Twayne Publishers, 1992.

Goodin RE. *No Smoking: The Ethical Issues*. Chicago: University of Chicago Press, 1989.

Gottsegen JJ. *Tobacco: A Study of Its Consumption in the United States*. New York: Pitman Publishing Corporation, 1940.

Hamilton JL. The demand for cigarettes: advertising, the health scare, and the cigarette advertising ban. *Review of Economics and Statistics* 1972;54(4):401–11.

Harper's Weekly. The cigarette and its users. *Harper's Weekly* 1910;54(2804):25.

Hilts PJ, Collins G. Documents disclose Philip Morris studied nicotine's effect on body. *New York Times*, June 8, 1995;Sect A:1 (col 1).

Hirayama T. Non-smoking wives of heavy smokers have a higher risk of lung cancer: a study from Japan. *British Medical Journal Clinical Research Edition* 1981;282(6259):183–5.

Hitchens C. Smoke and mirrors. *Vanity Fair* 1994; 57(10):88, 90, 95.

Hwang SL. Drag queens: Paula puffs and her fans watch, enraptured. *Wall Street Journal*, Jan 31, 1996;Sect A:1 (col 4).

Hygeia. Tobacco and physical efficiency. *Hygeia* 1928; 6(1):46.

Iglehart JK. Health policy report: health care and American business. *New England Journal of Medicine* 1982;306(2):120–4.

Iglehart JK. Health policy report: smoking and public policy. *New England Journal of Medicine* 1984;310(8): 539–44.

Jacobson PD, Wasserman J, Raube K. *The Political Evolution of Anti-Smoking Legislation*. Santa Monica (CA): RAND, 1992.

Johnson WM. The effects of tobacco smoking. *American Mercury* 1932;25(100):451–4.

Junod SW. Early tobacco regulation: myth and reality. *FDLI Update* 1997;4:6, 8.

Klein R. *Cigarettes Are Sublime*. Durham (NC): Duke University Press, 1993.

Kluger R. *Ashes to Ashes: America's Hundred-Year Cigarette War, the Public Health, and the Unabashed Triumph of Philip Morris*. New York: Alfred A. Knopf, 1996.

Koop CE. A smoke-free society by the year 2000. *New York State Journal of Medicine* 1985;85(7):290–2.

Lander M. *The Tobacco Problem*. 6th ed., enlarged. Boston: Lee and Shepard, 1885.

Laqueur T. Smoking and nothingness. *New Republic* 1995;213(12–13):39–48.

Leonard J. Culture watch: confessions of a tobacco fiend. *Nation* 1994;258(16):553–5.

Levin ML. The occurrence of lung cancer in man. *Acta-Unio Internationalis Contra Cancrum* 1953;9:531–41.

Literary Digest. Cigarets for grown-up Kansans. *Literary Digest* 1927;92(9):12.

Lynch BS, Bonnie RJ, editors. *Growing Up Tobacco Free: Preventing Nicotine Addiction in Children and Youths*. Washington: National Academy Press, 1994.

Lynn (Mass.) Evening News. The cigarette in war [editorial]. *Lynn (Mass.) Evening News*, Jan 5, 1915:4 (col 1).

McAdam D. Culture and social movements. In: Laraña E, Johnston H, Gusfield JR, editors. *New Social Movements: From Ideology to Identity*. Philadelphia: Temple University Press, 1994:36–57.

Miller LM. Lung cancer and cigarettes—the latest findings. *Reader's Digest* 1962;80(482):45–50.

Molotsky I. Surgeon General links smoking to lung disease in nonsmokers. *New York Times*, May 24, 1984; Sect A:1 (col 2).

Morgan ES. *American Slavery, American Freedom: The Ordeal of Colonial Virginia*. New York: W.W. Norton & Company, 1975.

Moss GD. *Vietnam: An American Ordeal*. Englewood Cliffs (NJ): Prentice Hall, 1990.

National Institute for Occupational Safety and Health. *Environmental Tobacco Smoke in the Workplace: Lung Cancer and Other Health Effects*. Current Intelligence Bulletin 54. Cincinnati (OH): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety and Health, 1991. DHHS Publication No. (NIOSH) 91-108.

National Research Council. *Environmental Tobacco Smoke: Measuring Exposures and Assessing Health Effects*. Washington: National Academy Press, 1986.

National Woman's Christian Temperance Union. *Minutes of the National Woman's Christian Temperance Union, at the Eleventh Annual Meeting in St. Louis, Missouri, October 22d to 25th, 1884*. Chicago: Woman's Temperance Publication Association, 1884.

National Woman's Christian Temperance Union. *Minutes of the National Woman's Christian Temperance Union, at the Seventeenth Annual Meeting, Atlanta, Georgia, November 14th to 18th, 1890*. Chicago: Woman's Temperance Publishing Association, 1890.

National Woman's Christian Temperance Union. *Report of the National Woman's Christian Temperance Union, Twenty-Fourth Annual Meeting Held in Music Hall, Buffalo, New York, Oct. 29 to Nov. 3, 1897*. Chicago: Woman's Temperance Publishing Association, 1897.

National Woman's Christian Temperance Union. *Forty-Eighth Annual Report of the National Woman's Christian Temperance Union*. Convention; Aug 18–23, 1921; San Francisco.

National Woman's Christian Temperance Union. *Report of the Fifty-Fifth Annual Convention of the National Woman's Christian Temperance Union*. Convention; Sept 19–25, 1929; Indianapolis (IN).

National Woman's Christian Temperance Union Publishing House. *Facts Concerning Tobacco* [pamphlet]. Evanston (IL): National Woman's Christian Temperance Union Publishing House, 1925.

Nelson DE, Giovino GA, Emont SL, Brackbill R, Cameron LL, Peddicord J, Mowery PD. Trends in cigarette smoking among US physicians and nurses. *Journal of the American Medical Association* 1994;271(16): 1273–5.

Neuberger MB. *Smoke Screen: Tobacco and the Public Welfare*. Englewood Cliffs (NJ): Prentice-Hall, 1963.

Newsweek. Secondhand smoke and lung cancer. *Newsweek* 1981;97(4):63.

New York Times. Indiana's cigarette ban. *New York Times*, Apr 20, 1905:1 (col 4).

New York Times. Anti-smokers incorporate. *New York Times*, Aug 3, 1911:16 (col 3).

New York Times. Surgeons laud cigarette. *New York Times*, July 13, 1918:4 (col 4).

New York Times. Seeking no law to ban tobacco. *New York Times*, Nov 23, 1919:2 (col 3).

New York Times. Miss Gaston seeks presidency on an anti-tobacco platform. *New York Times*, Jan 10, 1920:1 (col 4).

New York Times. Says cigarettes aided in climbing Everest. *New York Times*, Nov 21, 1922:21 (col 3).

New York Times. Smoking beneficial, says Paris doctor; nicotine forms anti-microbe chemicals. *New York Times*, Mar 22, 1923:1 (col 6).

New York Times. Going up in smoke. *New York Times*, Sept 24, 1925:24 (col 3).

New York Times. Dr. Pease resumes fight on tobacco. *New York Times*, Sept 20, 1928:7 (col 5).

New York Times. Collins urges control of tobacco advertising. *New York Times*, Nov 20, 1962:71 (col 4).

(New York) Tobacco Leaf. The war and the cigarette. *(New York) Tobacco Leaf*, Dec 31, 1914:6 (col 2).

Nissenbaum S. *Sex, Diet, and Debility in Jacksonian America: Sylvester Graham and Health Reform*. Westport (CT): Greenwood Press, 1980.

Norr R. Cancer by the carton. *Reader's Digest* 1952; 61(368):7–8.

Numbers RL. *Prophetess of Health: A Study of Ellen G. White*. New York: Harper & Row, 1976.

Outlook. The anti-cigarette crusade. *Outlook* 1901;67(11): 607–8.

Patterson JT. *The Dread Disease: Cancer and Modern American Culture*. Cambridge (MA): Harvard University Press, 1987.

Pearl R. Tobacco smoking and longevity. *Science* 1938;87(2253):216–7.

Pertschuk M. *Giant Killers*. New York: W.W. Norton & Company, 1986.

Petersen LR, Helgerson SD, Gibbons CM, Calhoun CR, Ciacco KH, Pitchford KC. Employee smoking behavior changes and attitudes following a restrictive policy on worksite smoking in a large company. *Public Health Reports* 1988;103(2):115–20.

Porter EO. The cigarette in the United States. *Southwestern Social Science Quarterly* 1947–48;28(1):64–75.

Rigotti NA, Pashos CL. No-smoking laws in the United States: an analysis of state and city actions to limit smoking in public places and workplaces. *Journal of the American Medical Association* 1991;266(22):3162–7.

Samuels B, Glantz SA. The politics of local tobacco control. *Journal of the American Medical Association* 1991;266(15):2110–7.

Schauffler HH. Health insurance policy and the politics of tobacco. In: Rabin RL, Sugarman SD, editors. *Smoking Policy: Law, Politics, and Culture*. New York: Oxford University Press, 1993:184–207.

Schmidt RW. The U.S. experience in nonsmokers' rights. *American Lung Association Bulletin* 1975;61(10): 11–4, 16.

Schudson M. *Advertising, the Uneasy Persuasion: Its Dubious Impact on American Society.* New York: Basic Books, 1984.

Schudson M. Symbols and smokers: advertising, health messages, and public policy. In: Rabin RL, Sugarman SD, editors. *Smoking Policy: Law, Politics, and Culture.* New York: Oxford University Press, 1993:208–25.

Schwarz RW. *John Harvey Kellogg, M.D.* Nashville (TN): Southern Publishing Association, 1970.

Shammas C. *The Pre-industrial Consumer in England and America.* New York: Oxford University Press, 1990.

Signorielli N. *Mass Media Images and Impact on Health: A Sourcebook.* Westport (CT): Greenwood Press, 1993.

Sinclair A. *Era of Excess: A Social History of the Prohibition Movement.* New York: Harper & Row, 1962.

Smith JSH. Cigarette prohibition in Utah, 1921–23. *Utah Historical Quarterly* 1973;41(4):358–72.

Sobel R. *They Satisfy: The Cigarette in American Life.* Garden City (NY): Anchor Press/Doubleday, 1978.

Starr P. *The Social Transformation of American Medicine.* New York: Basic Books, 1982.

State v. Goodrich, 113 N.W. 388 (Wis. 1907).

Steinfeld J, Griffiths W, Ball K, Taylor RM, editors. *Smoking and Health. II. Health Consequences, Education, Cessation Activities, and Governmental Action.* Proceedings of the 3rd World Conference on Smoking and Health; June 2–5, 1975; New York. Washington: US Department of Health, Education, and Welfare, Public Health Service, National Institutes of Health, National Cancer Institute, 1976. USDHEW Publication No. (NIH) 77-1413.

Stephanopoulos G. Press Briefing, Feb 2, 1993; <gopher://gopher.tamu.edu:70/00//.data/politics/ 1993/steph.202>; accessed: September 3, 1996.

Stewart GG. A history of the medicinal use of tobacco, 1492–1860. *Medical History* 1967;11(3):228–68.

Styron W. Cigarette ads and the press. *Nation* 1987; 244(9):283–6.

Sullum J. What the doctor orders. *Reason* 1996;27(8): 20–7.

Talbott JH. Smoking and lung cancer. *Journal of the American Medical Association* 1959;171(15):2104.

Tate C. *Cigarette Wars: The Triumph of "The Little White Slaver."* New York: Oxford University Press, 1999.

Tennant RB. *The American Cigarette Industry: A Study in Economic Analysis and Public Policy.* New Haven (CT): Yale University Press, 1950.

Tennant RB. The cigarette industry. In: Adams W, editor. *The Structure of American Industry.* 4th ed. New York: Macmillan Company, 1971:216–55.

Tobacco Education and Research Oversight Committee. *Toward a Tobacco-free California: Mastering the Challenges, 1995–1997.* Sacramento (CA): Tobacco Education and Research Oversight Committee, 1995.

Tobacco Institute. Major new initiatives to discourage youth smoking announced: efforts focus on access, marketing and education [news release]. Washington: Tobacco Institute, Dec 11, 1990.

Tobey JA. Tobacco and health. *Scribner's Magazine* 1930;88(4):420–5.

Troyer RJ. The surprising resurgence of the smoking problem. In: Best J, editor. *Images of Issues: Typifying Contemporary Social Problems.* New York: Aldine de Gruyter, 1989:159–76.

Troyer RJ, Markle GE. *Cigarettes: The Battle over Smoking.* New Brunswick (NJ): Rutgers University Press, 1983.

US Department of Agriculture. *Tobacco: Situation and Outlook Report.* Washington: US Department of Agriculture, Economic Research Service, 2000. TBS-246.

US Department of Health and Human Services. *The Health Consequences of Involuntary Smoking. A Report of the Surgeon General.* Rockville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Health Promotion and Education, Office on Smoking and Health, 1986. DHHS Publication No. (CDC) 87-8398.

US Department of Health and Human Services. *The Health Consequences of Smoking: Nicotine Addiction. A Report of the Surgeon General.* Rockville (MD): US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Health Promotion and Education, Office on Smoking and Health, 1988. DHHS Publication No. (CDC) 88-8406.

US Department of Health and Human Services. *Reducing the Health Consequences of Smoking: 25 Years of Progress. A Report of the Surgeon General.* Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Health Promotion and Education, Office on Smoking and Health, 1989. DHHS Publication No. (CDC) 89-8411.

US Department of Health and Human Services. *Preventing Tobacco Use Among Young People. A Report of the Surgeon General.* Atlanta: US Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 1994.

US Department of Health, Education, and Welfare. *Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service.* Washington: US Department of Health, Education, and Welfare, Public Health Service, 1964. PHS Publication No. 1103.

US House of Representatives, Committee on Interstate and Foreign Commerce. *Cigarette Labeling and Advertising—1969* (Parts 1, 2, 3), hearings Apr 15–May 1, 1969. Washington: US Government Printing Office, 1969. Serial No. 91-10, 91-11, 91-12.

US Senate, Consumer Subcommittee of the Committee on Commerce. *Reviewing Progress Made Toward the Development and Marketing of a Less Hazardous Cigarette,* hearings Aug 23–5, 1967. Washington: US Government Printing Office, 1968. Serial No. 90-52.

Walsh DC, Gordon NP. Legal approaches to smoking deterrence. *Annual Review of Public Health* 1986;7: 127–49.

Walsh JJ. Cigarettes and pathology. *Commonweal* 1937;25(24):665.

Warfield F. Lost cause: a portrait of Lucy Page Gaston. *Outlook and Independent* 1930;154(7):244–7, 275–6.

Warner KE. Cigarette advertising and media coverage of smoking and health. *New England Journal of Medicine* 1985;312(6):384–8.

Warner KE. Effects of the antismoking campaign: an update. *American Journal of Public Health* 1989;79(2): 144–51.

Waxman HA. The Comprehensive Smoking Education Act. *New York State Journal of Medicine* 1985;85(7): 363–5.

Wessel CA. The first sixty billions are the hardest for cigarette industry. *Printers' Ink* 1924;126(5):3–6, 137–46.

Whiteside T. *Selling Death: Cigarette Advertising and Public Health.* New York: Liveright, 1971.

Whorton JC. *Crusaders for Fitness: The History of American Health Reformers.* Princeton (NJ): Princeton University Press, 1982.

Wynder EL, Graham EA. Tobacco smoking as a possible etiologic factor in bronchiogenic carcinoma: a study of six hundred and eighty-four proved cases. *Journal of the American Medical Association* 1950; 143(4):329–36.

Young WW. *The Story of the Cigarette.* New York: D. Appleton and Company, 1916.

Zimring FE. Comparing cigarette policy and illicit drug and alcohol control. In: Rabin RL, Sugarman SD, editors. *Smoking Policy: Law, Politics, and Culture.* New York: Oxford University Press, 1993:95–109.

Zola IK. Medicine as an institution of social control. *Sociological Review* 1972;20(4):487–504.

Chapter 3
Effective Educational Strategies to Prevent Tobacco Use Among Young People

Introduction

Trends in Tobacco Use Among Young People

Smoking prevalence among youth underwent a sustained and substantial decline for about a decade from the mid-1970s to the mid-1980s. The Monitoring the Future study, funded by the National Institute on Drug Abuse, has assessed the substance use behaviors of large representative samples of high school seniors annually since 1975 (Giovino et al. 1994; Johnston et al. 1994). The data from this multiyear study have shown that daily cigarette smoking reached a peak of about 29 percent among high school seniors in 1977. Daily smoking then declined steadily until 1986, falling below 19 percent, but has shown little change since. Detailed analyses of trends in smoking by adolescents in 1974–1991, based on Monitoring the Future data and two other national health behavior survey series, also have shown consistent evidence that smoking prevalence among adolescents has generally been stable since about 1985 (Nelson et al. 1995). In 1997, daily cigarette smoking in the month before the survey was reported by 24.6 percent of high school seniors, the highest level since 1979, when 25.4 percent reported daily smoking. Long-term trends show that daily smoking among seniors was at a 25-year high of 28.8 percent in 1976 and 1977, declined to 21.3 percent in 1980, varied in the range of 18–21 percent from 1980 to 1991, and decreased to 17.2 percent in 1992. After that, seniors' daily cigarette use increased steadily to reach 24.6 percent in 1997, then decreased to 22.4 percent in 1998 and remained statistically unchanged at 23.1 percent in 1999 (Johnston et al. 1999). A recent report with more current prevalence estimates and trend data from 1991 through 1997 shows that current cigarette use increased overall and for white, black (the racial/ethnic terms "black" and "African American" are both used in this report, according to the usage in the study cited), and Hispanic high school students (Centers for Disease Control and Prevention [CDC] 1998). Even so, the prevalence of smoking among African American high school seniors was lower than that for Asian Americans/Pacific Islanders and for American Indians/Alaska Natives (US Department of Health and Human Services [USDHHS] 1998).

Although the decade-long decline in smoking prevalence among young people stalled in the mid-1980s, it has persisted among all major adult population groups in the United States (Giovino et al. 1994).

Changes in prevalence among young people thus do not seem to be closely linked to changes among adults (Reid et al. 1992) and may be more heavily influenced by other social forces. Downward trends in smoking by adults may, for instance, be partly the result of the continued accumulation of scientific knowledge about the long-term health consequences of smoking and of secondary exposure to cigarette smoke (USDHHS 1989; Environmental Protection Agency 1992). That no such downward trend was observed among most groups of adolescents in the past decade may reflect other factors: prices of tobacco products decreased (see Chapter 6); during the 1980s, public education efforts to prevent tobacco use among young people diminished; and youth-oriented marketing by cigarette manufacturers intensified (Nelson et al. 1995). Moreover, because of the highly addictive nature of cigarette smoking, the recent increases in prevalence of smoking among young people could carry over into their adulthood and eventually arrest or reverse the long-term declines that have persisted for decades (CDC 1994a; Giovino et al. 1994).

In a similar vein, a major portion of tobacco consumption at the beginning of the 20th century was in the form of spitting tobacco. The emergence of machine-made cigarettes as the dominant form of tobacco use in the 1930s (see Chapter 2) was accompanied by a 38.4-percent decline in total smokeless tobacco production from 150.2 million to 92.5 million pounds between 1944 and 1968.

In the early 1970s, however, the market for smokeless tobacco reemerged. Between 1970 and 1981, the production of fine-cut tobacco, used in the manufacture of moist snuff, increased threefold from 4.8 million to 15.2 million pounds (USDHHS 1986). Sales of moist snuff have increased every year since the Federal Trade Commission (FTC) began monitoring it, from 36.1 million pounds in 1986 to 55.3 million pounds in 1997 (FTC 1999). Loose leaf chewing tobacco has seen a slight decline in sales over this period, from 65.7 million pounds in 1986 to 51.8 million pounds in 1997.

The growth in the sales of moist snuff has been attributed to a smokeless tobacco advertising and marketing campaign that encourages young nonusers to experiment with low nicotine starter products with the intent of graduating new users to higher nicotine brands as dependence progresses (Connolly 1995).

The basis and success of this "graduation" strategy is supported by laboratory and epidemiologic data as well as tobacco industry documents. Smokeless tobacco manufacturers appear to be able to manipulate the nicotine-dosing characteristics of their products and have developed moist snuff products with a wide range of bioavailable nicotine (Henningfield et al. 1995; Djordjevic et al. 1995; Food and Drug Administration 1996; Tomar and Henningfield 1997). A national longitudinal study found that young males were twice as likely to switch from a brand with low or medium nicotine delivery to a high nicotine delivery product than to switch in the opposite direction (Tomar et al. 1995). Advertising and promotional expenditures have increased for nearly every year between 1986 and 1997, from $76.7 million to $150.4 million (FTC 1999). In 1997, $103.6 million was spent for advertising and promotion of moist snuff.

Smokeless tobacco use is primarily a male behavior. Use of snuff and chewing tobacco by young males increased sharply through the 1970s and early 1980s. Data from the National Health Interview Survey indicate that the prevalence of smokeless tobacco use among males aged 18–24 years increased from 2.2 percent in 1970 to 8.9 percent in 1987 and declined slightly to 8.4 percent in 1991 (Giovino et al. 1994). Based on CDC's Youth Risk Behavior Survey, the prevalence of past-month smokeless tobacco use remained at about 20 percent among high school males during most of the 1990s (CDC 1992; Kann et al. 1995). Recent data indicate that smokeless tobacco use may be starting to decline among high school males (CDC 1998).

More vigorous steps are clearly required to prevent young people from beginning to use tobacco products. This chapter considers the effect of educational programs in such prevention. Throughout the discussion, the term "education" is used to encompass the range of activities that impart knowledge, alter perceptions, and modify behavior.

Reasons Young People Smoke

The public health importance of smoking among young people has generated a substantial amount of research on why they take up the habit. The results of these efforts have provided several consistent insights that have been reviewed in detail and summarized in recent reports (Lynch and Bonnie 1994; USDHHS 1994).

Development of tobacco addiction is a staged process that requires several years to progress from initiation to acquisition of an established habit (Leventhal and Cleary 1980; McCarthy 1985; see also Flay 1993).

The initial stages are consistently associated with a well-defined group of risk factors. Early adolescence (aged 11–15 years, or 6th–10th grades) is the period when people are most likely to try smoking for the first time. Especially at risk are adolescents whose parents or guardians smoke or have lower levels of income and education (USDHHS 1994).

Young people's perceptions of smoking behaviors in proximal and wider social environments are among the most powerful psychosocial forces influencing whether they begin to smoke (USDHHS 1994). Cigarette smoking among friends, peers, siblings, and others from the young person's immediate environment is consistently associated with smoking initiation. The influence of friends and peers seems to be especially powerful in the early stages of developing a smoking habit. Perceptions of the larger social environment also seem to have considerable influence on smoking decisions. Adolescents tend to overestimate the prevalence of smoking among people their own age and among adults. Such perceptions—and in general, susceptibility to becoming a smoker—are likely to be strongly influenced by the effects of advertising (Evans et al. 1995). Young people who perceive high levels of smoking among their peers and who report that peers are more likely to approve of cigarette smoking are more likely to become smokers themselves.

These external influences are likely supported or opposed by internal, personal factors. The personal factors most often associated with smoking initiation include the young person's belief that cigarette smoking is linked with positive functions, such as having a positive social image and bonding with a peer group. Among young women, smoking may be viewed as a means of weight control (French et al. 1994). Adoption of such perceptions may reflect, in part, the influence of a larger social environment in which smoking is presented through local and mass media as an adventurous and glamorous adult behavior. Thus, smoking provides some young people a perceived transition from childhood to adulthood (USDHHS 1994).

These findings, summarized in the 1994 Surgeon General's report *Preventing Tobacco Use Among Young People*, strongly suggest that tobacco use is socially learned by children and adolescents and that it tends to have socially relevant meanings for them (USDHHS 1994). Smoking prevention programs should thus address the most salient psychosocial dimensions that can influence a young person to not begin smoking. These dimensions include enabling the young to cope with direct social pressure to smoke from their friends and peers and correcting or preventing misperceptions about the social effects and short-term

health consequences of smoking, about peers' and adults' attitudes toward smoking, and about smoking prevalence.

Educational Models for Smoking Prevention

During the past two decades, several different theoretical orientations and program objectives have emerged for educational approaches to smoking prevention. Several changes have influenced these events: research and evaluation results that highlighted the ineffectiveness of the models used in earlier programs, the accumulation of consistent research characterizing the process of smoking initiation, advances in theories of human behavior, and promising results obtained from initial tests of newer educational models. Another important change is the expansion from relatively simple strategies and educational techniques to more complex plans that use multiple educational channels. Complex sociobehavioral problems are thus being addressed with more intensive educational strategies.

The earliest group (mostly from the 1960s and 1970s) of evaluated programs designed to prevent adolescents from beginning to smoke was based on an information deficit model (USDHHS 1994). This approach assumed that adolescents, as rational creatures, would refrain from cigarette smoking if they were supplied with adequate information demonstrating that this habit causes serious harm to the body. The educational techniques associated with these programs included lectures, demonstrations, films, posters, and books intended to raise levels of awareness and comprehension of health effects. Many programs based solely on this objective did increase knowledge among children and adolescents, as intended, but the programs were consistently found to be ineffective in dissuading young people from smoking (Goodstadt 1978; Thompson 1978; Kinder et al. 1980; Schaps et al. 1980, 1981). Although this approach alone was clearly inadequate, information about the health and social consequences of smoking was retained as an important component of later developments in smoking prevention education.

The limitations of this approach led to efforts in the 1970s to identify a more complex set of personal factors related to cigarette smoking by young people. Once these factors were identified, educational programs could be developed to try to modify them. Studies conducted during these years often observed that the use of cigarettes was associated with negative or

antisocial patterns of adolescent behavior (USDHHS 1994). Educators interpreted these patterns as reflecting reduced levels of perceived self-worth and poor attitudes toward family, school, and community; these factors were hypothesized to be the root causes of smoking initiation. Various educational strategies to address these broad educational targets included programs focused on clarifying values, building self-esteem, and developing general skills for decision making, communication, and assertiveness.

Such efforts to prevent smoking initiation by helping young people develop stronger intrapersonal resources and general social competence have been collectively referred to as the affective education model. Evaluations of these programs, however, demonstrated that they were not much more effective in reducing cigarette smoking among young people than programs based on the information deficit model (Schaps et al. 1981; Durell and Bukoski 1984; Hansen 1992). The affective education strategy did mark the beginning of promising trends in designing education programs to prevent smoking: many programs began more directly incorporating results from research about factors found to influence smoking initiation and began including more powerful theoretical models of behavior change.

By the mid-1970s, results of analytic and theoretical research began to highlight a complex set of psychosocial factors associated with smoking initiation. Numerous studies had consistently found that smoking experimentation by the young was associated with peer smoking, smoking by others in the immediate social environment, and other social and psychological factors (USDHHS 1994). Although the resulting psychosocial intervention programs were developed through several different conceptual perspectives, they tended to share a core set of components that compose what is generally called the social influences model (USDHHS 1991). This model focuses on the development of social skills to resist social influences that encourage smoking.

The initial efforts to design programs based on these findings used a public health model: the problem was conceptualized as a social contagion in which the habit spread through a population by passing from one person to another. This concept directed program efforts toward strengthening the resistance of nonsmoking adolescents to the behavior of their smoking peers. For example, Evans and colleagues (1978) at the University of Houston used methods derived from communications and social learning theories to try "inoculating" young people against peer influences to smoke cigarettes; the study group of adolescents was

shown videotaped models of credible peers who successfully resisted such influences (McGuire 1964).

This approach was developed further in small-scale studies that added other objectives and used other educational technologies (Botvin et al. 1980; McAlister et al. 1980; Perry et al. 1980). The appeal of the overall conceptual approach and the generally positive results of this initial group of studies stimulated a sustained evolution of the approach through several stages of development; the result was a generally recognized social influences model for school-based programs to prevent smoking (Flay 1985).

The main goal of this approach was to equip younger adolescents with specific skills and other resources that would help them resist direct and indirect social influences to try smoking cigarettes. The specific objectives usually included having the young person learn the short-term negative social and health consequences of smoking and the advantages of remaining a nonsmoker; learn that a relatively small proportion of young people and adults are regular smokers; recognize the social influences in the immediate environment and from the wider community and culture that promote smoking; and develop specific skills for managing direct social pressures from friends and peers, as well as indirect pressures from adult modeling, the mass media, and tobacco industry marketing. Although representing a significant departure from previous approaches, this model retained the provision of information on the negative short-term consequences of smoking (from the information deficit model) and continued to emphasize the development of social competencies (from the affective education model).

Social influences strategies have typically been applied through school-based programs for students in sixth through eighth grades (primarily during early adolescence). These programs have taken various formats, used different delivery methods, and been offered to diverse student populations.

By the mid-1980s, detailed analyses of research results indicated that social influences programs were consistently more effective than programs based on the information deficit or affective education models in preventing cigarette smoking (Tobler 1986, 1992; Rundall and Bruvold 1988; Hansen 1992; Bruvold 1993). Some reviewers, however, wondered whether this evidence was strong enough to justify developing public policies that would make these school-based programs a large-scale, key component of policies to prevent tobacco use (Flay 1985; Cleary et al. 1988; Kozlowski et al. 1989).

Concern focused on the quality of the effects achieved, the quality of the evaluation research that provided the evidence, and the generalizability of the programs. The programs' effects reported up to the mid-1980s were not consistently achieved, were of short duration, and tended to be small. For example, Drug Abuse Resistance Education (D.A.R.E.), a drug resistance program that included but was not primarily focused on tobacco use, has been in wide use since the mid-1980s. A recent meta-analysis of published and unpublished results concluded that the program's effect on tobacco use was small at best (Ennett et al. 1994). Limitations in evaluation methods—such as outcome measurement, attrition effects, consistency between assignment and analysis units, and completeness of reported effects on total populations—precluded drawing clear conclusions about program effectiveness. These reviewers also were concerned that the programs might be too complex to be carried out in most schools by most classroom teachers. Since 1990, many of these questions have been addressed by research on these educational strategies (Graham et al. 1991).

Recent Research on Educational Strategies for Smoking Prevention

Most early research programs on smoking prevention were located exclusively in school settings. Schools provide direct access to target populations and have a mission consistent with smoking prevention education. Schools, however, have some inherent limitations that reduce their usefulness as exclusive channels for such education; the obvious one is that school programs cannot reach individuals who leave school. This section reviews shorter-term and longer-term studies of the effects of school-based smoking prevention programs (Table 3.1). The section also reviews studies of prevention programs that have tried to

enhance such programs by combining them with educational activities directed toward young people through parents, community programs, and the mass media or by combining them with programs that targeted multiple substances.

Shorter-Term Follow-Up of School-Based Programs

The group of studies summarized in this subsection evaluated programs that were based, with few exceptions, exclusively on educational experiences provided in school classrooms. These studies generally have addressed methodological problems commonly found in earlier evaluations of smoking prevention efforts. Improvements include use of biochemical measures to enhance the accuracy of self-reported smoking behavior, attention to validity issues related to attrition, and improved consistency between units of assignment to treatment and units of analysis. Most of this initial group of studies also improved on earlier reports by using more diverse study populations to test these programs and by following participants into the first year of high school to assess smoking prevention effects at an intermediate stage of adolescent development. The studies described and analyzed in this subsection thus represent the current state of the art in the evaluation of school-based smoking prevention.

Project Towards No Tobacco Use

Project Towards No Tobacco Use (Project TNT) was designed to assess the relative effectiveness of three main components of most smoking prevention programs based on the social influences model (Sussman et al. 1993b, 1995). The investigators developed separate classroom curricula to address each of these components (Sussman 1991; Sussman et al. 1993a). The first curriculum provided social skills to help students more easily refuse direct offers of cigarettes from peers; the second provided methods to counteract the impact of indirect pressures to smoke cigarettes, such as smoking (real or perceived) by peers or adults, tobacco industry advertising, and exaggerated notions of the actual prevalence of smoking among peers and adults; and the third improved knowledge of the short-term and long-term negative effects of smoking. A fourth curriculum addressed all three of these areas and was similar to the social influences model used with many other school-based smoking prevention programs. Each curriculum included 10 lessons designed for

seventh-grade students. The curricula were delivered on 10 consecutive school days by trained health educators employed by the project. A control group received the standard curriculum.

The study included seventh graders from 48 junior high schools in 27 southern California school districts. Students from 8 schools were assigned to receive one each of the four curricula; students from the remaining 16 schools were assigned to receive the standard education program provided by their schools. These populations were relatively diverse: about 40 percent were from minority ethnic groups. Student reports of smoking behavior were measured immediately after the curricula were completed in the seventh grade (n = 6,716) and one year later in the eighth grade (n = 7,052).

Analyses of these data indicated that the curriculum that combined all three main objectives drawn from the social influences model achieved the lowest increase in weekly smoking prevalence (defined as smoking one or more cigarettes per week); this increase was 64 percent lower than the increase in the control group. The curricula that focused on indirect pressures to smoke cigarettes and on negative consequences of smoking also were significantly more effective than the control condition. The curriculum that focused on refusal skills did not yield results significantly different from the comparison condition. Changes in psychosocial mediators of program effects were consistent with these results (Sussman et al. 1993a). Similar effects were obtained for smokeless tobacco use. A two-year follow-up survey, completed when the participating students were in ninth grade, showed that the combined curriculum continued to have a significant impact on weekly smoking rates after these students entered high school (Dent et al. 1995).

Know Your Body

The Know Your Body (KYB) program, a school-based effort to reduce risk factors for chronic disease among young people, addressed cigarette smoking status, dietary behaviors, and physical fitness through curricula for fourth- through ninth-grade students (Walter 1989; Walter and Wynder 1989). Program components included parent education and periodic student health examinations. Designed to meet the rapidly changing educational needs of young people in this age group, the six-year curriculum progressed from a focus on knowledge and beliefs to a focus on decision-making skills (Walter and Wynder 1989). In the fourth and fifth grades, the curriculum's component on smoking prevention concentrated on students'

Table 3.1. School-based and multifaceted educational strategies

Project name	Educational methods
School-based educational strategies with shorter-term follow-up	
Project TNT (Towards No Tobacco Use)	2 years; 10 class sessions delivered by project staff in grade 7
Know Your Body	6 years; multiple risk factor curriculum delivered weekly by classroom teachers in grades 4–9, plus parent education
SHOUT (Students Helping Others Understand Tobacco)	3 years; 18 class sessions in grades 7–8 delivered by project staff, plus telephone and mail contact in grade 9
School-based educational strategies with longer-term follow-up	
Life Skills Training Program	3 years; 30 class sessions delivered by teachers in grades 7–9
Minnesota Smoking Prevention Program	1 year; 5 class sessions in grade 7 delivered by teachers and peers
Waterloo Smoking Projects	3 years; 11 class sessions delivered by project staff in grades 6–8
Project ALERT	2 years; 11 class sessions delivered by teachers and peers in grades 7–8
Multifaceted educational strategies	
Class of 1989 Study (Minnesota Heart Health Program)	5 years; 17 class sessions delivered by teachers and peers in grades 7–9, plus related school courses and activities and very intensive community education directed toward adults
Midwestern Prevention Project	3 years; 15 class sessions delivered by teachers and peers in grades 6–7 or 7–8, plus parent education and participation in school curriculum, informational media, and community organization
University of Vermont School and Mass Media Project	4 years; 15 class sessions in grades 5–8 or 6–9 or 7–10 delivered by teachers, plus 540 television and 350 radio spot broadcasts each year

Design	Results*	Comment
5 conditions tested in 48 schools (n = 6,716)	64% less weekly smoking for full intervention group by end of grade 8 and 55% by end of grade 9	Very large short-term effect achieved by moderately intensive school program
2 conditions in 15 schools (n = 911)	73% less smoking by end of grade 9	Very large short-term effect achieved by very intensive school program with parent education
2 conditions in 22 schools (n = 3,655)	33% less monthly smoking by end of grade 9	Large short-term effect achieved by intensive school program supplemented with other contacts
3 conditions tested in 56 schools (n = 5,954)	18% less weekly smoking observed at grade 12	Large sustained effects achieved by very intensive school program
4 conditions tested in 18 schools (n = 7,030)	Program effects at grades 8 and 9 but not at grade 12	No long-term effects of less-intensive school program
2 conditions tested in 22 schools (n = 654)	Program effects at grades 8 and 9 but not at grade 12	No long-term effects of moderately intensive school program
3 conditions tested in 30 schools (n = 6,527)	Program effects less at grades 8 and not at grade 12	No long-term effects of moderately intensive school program
2 conditions tested in 13 schools (n = 2,401)	39% less weekly smoking by end of grade 12	Large sustained effects achieved by intensive school programs supported by intensive community programs
2 conditions tested in 42 schools (n = 5,065)	32% less monthly smoking after 1 year; 19% less monthly smoking by end of grades 9–10	Large short-term effects achieved by intensive school program supported by parent education, mass media, and community programs
2 conditions tested in 50 schools (n = 5,458)	40% less weekly smoking by end of grades 8–10; 31% less weekly smoking at end of grades 10–12	Large sustained effects achieved by intensive school program combined with intensive mass media intervention

*Results are reported relative to a comparison group.

health beliefs about smoking. Social influences, both direct and indirect, on decisions about smoking were addressed in the sixth through eighth grades. Psychological influences, such as stress and self-image, were addressed in the ninth grade.

The classroom program was delivered by the students' usual classroom teachers, who had been trained by project staff. The overall curriculum required about two hours per week throughout the school year. If the curriculum gave equal attention to each of the three targeted behavioral areas, the smoking component would include about 24 hours of class time per year over six years. The parent education component of the program included participation in students' homework from the curriculum, attendance at school meetings about the program, receipt of program newsletters, and self-assessment of risk factors for chronic disease.

The program was initially tested with students attending the fourth grade in 15 elementary schools from suburban communities near New York City (Walter et al. 1989). Students in eight schools received the KYB educational program, and students in the remaining schools received only measurement activities from the study. The follow-up survey in the ninth grade included 593 students (65 percent) from the original study cohort.

Analyses of these data showed that students who had received the program were significantly less likely than students not receiving the program to smoke cigarettes (verified through salivary cotinine measures). Smoking prevalence in the ninth grade was 73 percent lower among students who had received the program. This smoking prevention effect was stronger among boys than among girls. Favorable changes in health knowledge, dietary behavior, blood cholesterol, and obesity were also observed (Walter et al. 1988; Walter and Wynder 1989).

Project SHOUT

The Students Helping Others Understand Tobacco (SHOUT) project was designed to assess the effectiveness of a prevention program delivered to seventh through ninth graders by trained college undergraduates through classroom activities and telephone and mail support (Elder et al. 1993b). The program began with 10 class sessions distributed throughout the seventh-grade school year. Components focused on pressures to smoke, refusal skills, negative social and health consequences of smoking, decision making, and commitment to nonsmoking. In the eighth

grade, eight classroom sessions reviewed refusal skills and engaged students in community action projects, such as encouraging others to quit, writing letters about tobacco issues to mass media organizations and tobacco firms, and debating issues about tobacco use. Throughout the ninth grade, when students had transferred into secondary school, the college undergraduates trained by the program staff made four supportive telephone calls to each participant; 69 percent of participants were reached at least once (Elder et al. 1994a). Also during the ninth grade, five newsletters were mailed to students and two to their parents.

This program was initially tested in 22 southern California schools. Students from 12 schools received the SHOUT program, and students from the remaining schools did not. About 45 percent of the students were from minority ethnic groups. The effectiveness of the program was assessed through classroom and mail surveys conducted at the end of each of the three years. The ninth-grade survey included 2,668 members (73 percent) of the original study cohort.

By the end of the ninth grade, the prevalence of monthly smoking (defined as smoking one or more cigarettes per month) was about 33 percent lower among students who had received the program than among those who had not. The relative difference in the two groups' reported smoking increased each year and was statistically significant at the end of the ninth grade. The results at the end of the ninth grade were particularly encouraging, because program contact (via telephone calls and newsletters) was less costly. It was not possible to assess whether program effects had accumulated during the seventh and eighth grades. Results for ethnic subgroups were consistent with these overall results but were not always statistically significant. Similar effects for ninth graders were obtained for weekly cigarette smoking and for smokeless tobacco use. Assessments of cigarette refusal skills among students receiving and not receiving the program indicated that the program had positive effects on this mediator of smoking initiation at the end of the seventh grade but not subsequently (Elder et al. 1993a, 1994b). As was found with Project TNT, the results of the SHOUT program did not in general support a strong link between refusal skills and smoking behavior. In an extension of this program, newsletters and supportive telephone calls were offered again in 11th grade to a subset of the original intervention group. Results of an additional follow-up survey suggested positive effects of providing continued smoking avoidance support to students throughout the secondary school years (Eckhardt et al. 1997).

Longer-Term Follow-Up of School-Based Programs

The preceding group of studies did not address whether the observed prevention effects were permanent or whether they simply represented delays in smoking initiation from middle school to later high school years. Because few people begin smoking after high school, programs that prevent young people from smoking throughout the high school years are likely to prevent young people from ever becoming regular smokers.

Several studies of school-based programs to prevent smoking have followed participating students into the later years of high school to assess the durability of effects several years after the programs were implemented.

Life Skills Training Program

The Life Skills Training (LST) Program was designed to help adolescents develop a wide spectrum of personal and social skills, including those related to preventing cigarette smoking and the use of alcohol and other drugs (Botvin et al. 1990a). The core program consists of 12 curriculum units designed to be taught in 15 class periods to seventh graders. The problem-specific components of the LST Program are similar to those included in smoking prevention programs focused more directly on the social influences model. These components include offering practice in assertively resisting peer pressure to smoke and providing information about the negative short-term social consequences of cigarette use, the decreasing social acceptability of use, and the actual prevalence of use among adolescents and adults. Other program components address the development of generic personal and social competencies, such as communication skills and ways to develop personal relationships.

One of the notable strengths of this program is the relatively large number of separate trials reported by the investigators. The largest trial was conducted among students attending 56 suburban and rural schools in three geographic regions of New York (Botvin et al. 1990a). Students in 34 schools received the smoking prevention program, and students from the remaining schools did not. The smoking prevention program included the full 15-session LST Program in the seventh grade, followed by a 10-session booster program in the eighth grade and a 5-session booster in the ninth grade. These programs were delivered by the students' usual classroom teachers, who had been trained either through group workshops followed by monitoring, feedback, and reinforcement of implementation procedures or through use of a training videotape. This study thus tested whether program effectiveness could be maintained while using low-cost methods for disseminating the program to large numbers of schools, teachers, and students.

Analyses of reports from the 4,466 students surveyed at the end of the ninth grade (75 percent of the original cohort) showed that the prevalence of cigarette smoking was significantly lower among students who had received the LST Program than among those who had not. The relative difference in the smoking scores was about 10 percent. Results were similar for both teacher training conditions. The analyses indicated that most of the knowledge, attitude, and skill variables that were targeted as mediators of effects showed significant changes consistent with program objectives. Program recipients also had significantly lower levels of marijuana use and alcohol intoxication.

In a long-term follow-up of the LST Program, data were collected from school, telephone, and mailed surveys administered six years after the initial 56 public schools had been randomized to treatment and control conditions (Botvin et al. 1995). The 3,597 predominantly white, 12th-grade students sampled represented 60.4 percent of the initial 7th-grade sample. Among all students included in the 12th-grade follow-up, weekly cigarette smoking was reported by about 22 percent of those receiving the intervention and by 27 percent of those in the comparison condition, representing an 18-percent relative reduction in smoking prevalence. For the subset of students receiving a reasonably complete version of the program, the relative reduction in smoking prevalence was 26 percent. The study is unique in demonstrating effects of a prevention program that lasted through high school. The generalizability of these results to other populations and school settings is an important area for exploration.

Similar support for the effectiveness of the LST Program has been obtained from shorter-term studies of variations in implementation procedures and study populations. These studies have provided evidence for the effectiveness of booster sessions after the initial program delivery (Botvin et al. 1983) and have compared the use of peers and teachers as program facilitators (Botvin et al. 1990b). Other studies have replicated the short-term effectiveness of the program with African American and Hispanic adolescents (Botvin et al. 1989a,b, 1992). Components of the program also appear to have had positive effects when implemented outside the context of a research project (Bruvold 1990). These multiple tests of one approach to school-based smoking prevention provide a

well-rounded picture of the potential effectiveness of various approaches. The results also demonstrate that relatively intensive programs that address the core objectives of the social influences model in the context of a larger curriculum can reduce smoking prevalence in diverse target populations and school settings when the curriculum maintains a reasonable level of integrity to the program design.

Minnesota Smoking Prevention Program

Two replications of a smoking prevention program based on the social influences model were combined into a single study of long-term effects, the Minnesota Smoking Prevention Program (Arkin et al. 1981; Murray et al. 1984). The core program contained units that identified social pressures to smoke, offered practice in skills to resist direct social pressures, provided information about actual levels of smoking among peers and adults, and provided information about the negative short-term social and physiological consequences of smoking. These objectives were addressed in five class periods delivered throughout the seventh grade; no additional educational components were offered in later grades. Both replications of the program compared the relative effectiveness of same-age peer leaders and adult leaders.

The two studies included 7,030 seventh-grade students participating in baseline surveys in 18 suburban Minnesota schools. In the first study, students received a social influences program led by adults or by peers or received an adult-led program of similar length on the long-term health consequences of smoking. In the second study, conducted a year later, seventh-grade students from the same 18 schools received the adult-led or peer-led social influences program, the adult-led health consequences program, or no specific smoking prevention program.

Results from the first study indicated that among students who were nonsmokers at the start of seventh grade, those who received the peer-led smoking prevention program were significantly less likely than those who received the adult-led programs to have tried smoking by the end of the eighth grade; similar results were seen for students who at the start had already tried smoking (Murray et al. 1984). Results from the second study indicated that at the end of the eighth grade, students who were initially nonsmokers and who received any of the test programs were significantly less likely than similar students from the schools receiving no program to have tried smoking (Murray et al. 1987). In the first study, differences among treatment groups had diminished by the ninth grade and

were not statistically significant. In the second study, students who had initially tried smoking and who received the peer-led programs had a significantly lower smoking prevalence than students receiving the adult-led health consequences program (Murray et al. 1987). Modest effects of a peer-led program were detected in an 11th-grade follow-up conducted for the second study (Murray et al. 1988).

The investigators surveyed members of the original study cohorts when the first study participants were one year beyond high school and the second study participants were in the 12th grade (Murray et al. 1989). Those still attending school in their original districts participated in a classroom survey, and others were interviewed by telephone; participation exceeded 90 percent in both studies. Responses indicated that the programs had no lasting differential effects on smoking behavior.

Waterloo Smoking Projects

The Waterloo Smoking Projects (WSP) in Canada tested a social influences program designed to follow students from the sixth through eighth grades. The program included three main components common to social influences curricula (Best et al. 1984). The first component provided information on negative consequences of smoking, on smoking prevalences in the general population, and on social influences to smoke. The second component provided practice in skills to resist direct social pressures to smoke. The third component focused on decision making and public commitment to not smoke. These topics were delivered in six sessions during the first three months of the sixth grade. Information about social influences was reviewed in two booster sessions later in the sixth grade. Two additional booster sessions in the seventh grade and one in the eighth grade featured student presentations and discussions about smoking pressures and decisions. All sessions were presented by graduate students who were members of the project staff.

The evaluation design for this study provided methodologically stronger evidence for potential longer-term effects than previous follow-up studies of school-based programs. The WSP was tested with students from 22 schools in two school districts in southwestern Ontario (Flay et al. 1985). Students from half the schools received the program, and students from the other half did not. The schools were located in urban, suburban, and rural areas. The study sample included 654 students tested at the sixth-grade baseline classroom survey.

At the end of the seventh grade, 18 months after the baseline survey, results were reported for the 498 students (76 percent) who had been present for all cross-sectional analyses at each time point. The analyses showed reduced experimentation with smoking in the entire target population receiving the program and reduced consumption among students who were regular smokers before involvement in the program (Flay et al. 1985). Longitudinal analyses showed significantly less smoking among program recipients who had already tried smoking before starting the program. Psychosocial mediators, such as knowledge and perceived control, showed changes throughout the target population that were consistent with program objectives (Flay et al. 1983).

Results at the end of the eighth grade were reported for the 439 students (67 percent) who had participated in all six school surveys administered through that time (Best et al. 1984). These analyses indicated that the program significantly reduced the amount of experimental smoking among the subgroup that at the baseline survey had reported never smoking. Effects that had been detected at the end of the seventh grade among students with more smoking experience were still apparent but no longer statistically significant.

The project surveyed original cohort members at the 12th grade by classroom survey, mailed questionnaire, and telephone interview. This effort yielded long-term follow-up data for 560 members (86 percent) of the original study cohort (Flay et al. 1989). There were no program effects at the 12th grade for any smoking level in the overall study sample or for any subgroups defined by initial level of risk.

Project ALERT

The Adolescent Learning Experiences in Resistance Training (ALERT) school program was based on a social influences model that included many features common to this type of program (Ellickson et al. 1993a). The overall goal was to provide young people with the motivation and skills needed to avoid substance use, including alcohol and marijuana as well as cigarettes. The motivational component focused on reducing barriers to resisting social pressures, such as normative beliefs that most young people and adults smoke, that this behavior is widely acceptable and approved, and that smoking has positive physical and social consequences. The skill component focused on practicing skills to resist direct social pressures to smoke. Eight sessions covering these objectives were delivered one week apart during the seventh grade;

three booster sessions reviewed the main points during the eighth grade.

This program was tested with students from 30 schools in eight school districts located in urban, suburban, and rural communities of California and Oregon (Ellickson and Bell 1990). In the initial school survey, about 33 percent of these students were from minority ethnic groups. Students in 20 schools received the ALERT curriculum, and students in the other 10 schools did not. In 10 of the program schools, the curriculum was delivered by classroom teachers alone; in the other 10 program schools, teachers were assisted by older peer leaders recruited from nearby high schools.

The initial assessment of this program was reported for follow-up school surveys completed 15 months after the baseline survey. After substantial follow-up effort, about 60 percent of the baseline cohort of 6,527 students were included in these reports (Ellickson and Bell 1990). Among students in the treatment group who had experimented with smoking before the program, smoking was reduced by about 20 percent. Among students who had never smoked, however, the program did not achieve a statistically significant reduction. Psychosocial risk factors targeted by the program, including beliefs about the consequences of use and perceived norms for cigarette smoking, showed changes consistent with program objectives (Ellickson et al. 1993a). These findings were generally consistent across school districts in various geographic regions with differing ethnic and socioeconomic profiles; the results were not affected by whether an older peer assisted in delivering the program.

An additional follow-up of these students was reported at the ninth grade, two years after the baseline survey (Bell et al. 1993). These analyses included about 75 percent of the baseline sample. Earlier effects on psychosocial risk factors persisted, but program effects on cigarette smoking and other substance use behaviors had disappeared at this time (one year after the end of the program).

A final follow-up survey was completed in the 12th grade, five years after the baseline survey and four years after completion of the program; 57 percent of the baseline sample were included in these analyses (Ellickson et al. 1993b). By the end of high school, the program had no detectable effect on cigarette smoking or other substance use behaviors; most program effects on cognitive risk factors had also disappeared by this time. Similar to the other longer-term follow-up studies, these outcomes indicated that program effects eroded rapidly when the program ended and that no effects on smoking behavior or related beliefs were detectable at a later time.

Summary of Recent School-Based Research Studies

These reports reflect a high level of consistency in approaches taken to prevent smoking initiation and in the results obtained. All studies used some form of multiple-session school curriculum that was based on the social influences model and was delivered through classroom activities beginning in the sixth or seventh grade; all included a similar set of core curriculum components; and all reported achieving significant differences in smoking behaviors for one year or more after the program was initiated. For most programs, significant differences were reported through the ninth grade (the first year of high school and more than two years after program initiation).

Some specific features of these results strengthen the case for the effectiveness of school-based social influences curricula. The magnitude and scope of the effects achieved across studies were generally more impressive than those reported by earlier studies. The size of the reduction in smoking achieved at the eighth and ninth grades and the duration of these effects were larger than those of the short-term follow-up studies. Most of these studies also reported substantial effects on theory-based psychosocial mediators of cigarette smoking that were targeted for change by the programs, such as relevant knowledge, attitudes, skills, and perceived norms. These results thus indicated important and persistent effects (at least for several years) across a wide range of outcomes anticipated by the theoretical approach. As discussed later in this section, however, the effects did not persist in the longer term.

Programs that were successful in achieving prevention effects through the ninth grade tended to include a larger number of educational contacts with students over a longer time period than most earlier programs. For example, Project ALERT included 11 class sessions over two years; SHOUT included 18 class sessions, four telephone contacts, and five newsletters over three years; the LST Program included 30 class sessions over three grades; and the KYB program included an even larger number of class sessions over six school years. These relatively intensive programs successfully deterred young people from smoking cigarettes and using other substances during the periods that these curricula were provided. Comparable programs with smaller numbers of contacts over a more limited time have reported achieving a less sustained effect on smoking initiation (Biglan et al. 1987; Ary et al. 1990). These observations suggest a dose-response relationship between how much the students

are exposed to the social influences program and how effective the program is in preventing students from smoking. These results suggest that larger numbers of educational contacts over a longer period of time may yield larger and more enduring smoking prevention effects. This conclusion is strongly supported by the long-term reductions in cigarette smoking prevalence achieved by the relatively intensive LST Program.

The results were also obtained within a wide range of curriculum formats. Some of the recent social influences programs have tried to reduce the prevalence of several substance use behaviors often linked in the behavioral development of young people. These programs have included efforts within the same curriculum to prevent the use of smokeless tobacco, marijuana, and alcohol, as well as cigarettes. Including several substances in the program objectives, as might often be the case in ordinary school programs to prevent substance abuse, does not appear to have reduced the potential effectiveness of these programs in reducing cigarette smoking. In several cases, the positive effects on smoking behavior were also observed for other substance use behaviors. Similarly, social influences programs have been successful in diminishing smoking behavior when they have been incorporated in a larger health education program that successfully addressed other health behaviors, such as diet and physical activity. The success of programs under this broad diversity of curriculum formats increases confidence in the theoretical relevance and generalizability of this approach.

These studies also tested the social influences model under various implementation conditions. Successful programs were reported from a diverse group of geographic areas and with urban, suburban, and rural populations. A much wider mix of ethnic student populations has been involved in these than in earlier studies. Some studies reviewed here have reported favorable program effects for African American and Hispanic adolescents; similar programs have demonstrated positive effects for American Indian adolescents (Schinke et al. 1988, 1994; Moncher and Schinke 1994). Successful programs also used various personnel to deliver the programs. These included programs delivered by students' usual classroom teachers with or without intensive training, programs delivered with and without the assistance of peer leaders, programs delivered by college undergraduate or graduate students, and programs delivered by professional staff members of the research team. These diverse characteristics of successful programs further support the generalizability of the social influences model.

The more recent studies can be interpreted with much greater confidence than was possible with the pioneering studies reviewed a decade ago because of improvements in study design, measurement, and data analysis methods. Internal validity has been improved by including larger numbers of schools and students in study samples to enable investigators to account for school-level effects on smoking behavior (Murray and Hannan 1990). This approach also has improved external validity by providing for tests of programs with more diverse populations and placing program activities farther from the direct control of the chief investigators. In general, these reports have thus provided stronger demonstrations than were previously available of the benefits of social influences programs over other school health education programs for preventing smoking. The reports also provide greater assurances that the results obtained could be achieved in many types of classrooms if this curriculum approach was implemented with a reasonable level of fidelity.

The primary limitation of this promising record of success is its generally short-lived nature. Three of the studies that followed participants through the 12th grade consistently found that effects had faded over the high school years. The fourth, the LST Program, demonstrated a statistically significant impact through the 12th grade (Botvin et al. 1995). Thus, although the majority of programs based on the social influences model did not permanently protect young people from pressures or desire to begin smoking, the evidence shows that all of these programs successfully delayed this initiation for several years and that the most intensive of these programs reduced smoking prevalence through the end of high school. These results demonstrate that larger-scale implementation of intensive interventions based on this model can achieve long-term reductions in cigarette smoking among young people.

Further suggestions for overcoming this duration limitation may be drawn from these recent school-based studies. The studies provide evidence not only for the importance of overall program intensity, or the amount of exposure to the program (discussed earlier), but also for the effectiveness of programs that target a relatively broad array of educational modalities for smoking prevention. The LST Program addresses a spectrum of developmental concerns in addition to using a core unit on resistance to social influences that promote smoking; this curriculum has been shown to be effective with a wide range of populations. The KYB program achieved smoking prevention effects with a curriculum that was embedded in a larger program to change health behaviors. The SHOUT program included classroom-based community action and advocacy components in addition to conventional units based directly on the social influences model. Such broader approaches within school settings thus seem to be effective in addressing the diversity of smoking prevention needs among adolescents.

This perspective receives additional support from a series of studies that have tried to identify more precisely the strengths of the social influences model by testing main components separately. The design of the Project TNT program evaluation provided a direct comparison between the effects of four curricula focused on skills training for resisting peer pressures, on social norms about the prevalence and acceptability of smoking, on knowledge of the negative consequences of smoking, or on a combination of the three elements. Contrary to theory-based expectations, the social skills curriculum did not perform as well as the social norms or negative consequences curriculum; the combined curriculum had the best results (Sussman et al. 1993b). A similar study found that a curriculum based on correcting erroneous normative perceptions was more effective than a curriculum on training in resistance skills; the results also suggested that a combined curriculum addressing a variety of educational needs about social influences on smoking was more effective than curricula focused on individual components of the model (Hansen and Graham 1991).

These studies thus indicate that attempts to reduce the scope of smoking prevention programs to skills training alone are likely to be ineffective. Although school programs are well suited to provide skills training through direct modeling and practice, as well as to convey knowledge about the consequences of smoking, they may not be as well equipped to influence young people's perceptions of the prevalence and acceptability of cigarette smoking among their wider peer group and adult society. As is discussed in the next section, more complex and intensive programs combining interventions within and outside of schools may be needed to overcome the powerful prosmoking cultural images fostered by the larger social environment.

Research on Multifaceted Programs

Another group of recent studies has expanded the traditional school-based scope of educational methods to prevent smoking. To counteract the multiple sources of social influences that promote smoking initiation, these projects enlist the positive influences of parents, community organizations,

and the mass media in addition to offering strong school programs based on the social influences model. Relatively few examples of this new direction for smoking prevention efforts have been reported. Educational objectives for these programs have generally been developed directly from programs that have school-based components only, but specific strategies reflect various approaches, as might be expected when new techniques are being developed. Results provide good evidence that these multifaceted educational programs can achieve substantial smoking prevention effects that persist throughout the high school years more consistently than programs based only in schools.

Minnesota Heart Health Program: Class of 1989 Study

The Class of 1989 Study of the Minnesota Heart Health Program (MHHP) tested the efficacy of a school-based smoking prevention program conducted in the context of a wide range of associated school and community programs designed to improve health behaviors. These programs focused collectively on the overall goal of reducing the risk of cardiovascular disease among the adults of the targeted communities (Perry et al. 1992).

Smoking prevention programs were provided in the seventh through ninth grades. The main component of this multifaceted effort was based on the Minnesota Smoking Prevention Program (discussed in the previous section), which was one of the early successful designs for a social influences program (Perry and Jessor 1985). The Class of 1989 Study used a seven-session program delivered in weekly sessions during the seventh grade by peer leaders assisted by teachers (Perry et al. 1986). This program was followed by a two-session unit in the eighth grade that addressed smoking and exercise and by an eight-session unit in the ninth grade to prevent smoking and drug abuse. Similar curriculum units on eating and exercise behaviors were added to the school curriculum after the smoking prevention unit in the seventh grade (Perry et al. 1988).

These classroom components were supported in school by the development of health councils through which students participated in other projects related to the overall community program theme of cardiovascular risk reduction. Altogether, the students in the Class of 1989 Study participated in five years of educational programs that were provided through their schools and were focused on smoking and other health behaviors.

The school-based educational components were complemented and supported over the entire program period by community education and organization activities intended to reduce three cardiovascular risk factors—cigarette smoking, high levels of serum cholesterol, and elevated blood pressure—in adults of the targeted communities (Mittelmark et al. 1986; Perry et al. 1992; Luepker et al. 1994). The activities included individual risk factor screening and education, which was received by more than 60 percent of all adults; direct education sessions that were conducted in various community settings, which engaged more than 30 percent of all adults; food labeling education in grocery stores and restaurants; intensive mass media education; continued education of health professionals; and community organization to engage citizens, health professionals, and community leaders in developing and carrying out annual community education plans. Although the MHHP did not demonstrate a significant impact on adults (Luepker et al. 1994), a set curriculum and face-to-face training were found to increase the participation of teachers (Perry et al. 1990a).

The effect of these interventions on the smoking behavior of the targeted students was assessed through an evaluation design in which students from one community received these direct and indirect interventions and students from a matching community did not (Perry et al. 1992). At baseline, the target population consisted of all sixth graders attending the 13 elementary schools in these two communities. Longitudinal analyses at each annual follow-up considered students who had been present since the baseline surveys. The 12th-grade survey included 45 percent of the original cohort of 2,401 students. Cross-sectional analyses included all students participating in each survey.

Cohort analyses comparing weekly smoking prevalence and amount of smoking showed that students in the two communities did not differ significantly at the sixth-grade survey, which was administered before exposure to any substantial amount of program activities. Significant differences appeared at the seventh-grade survey, which was administered after completion of the core components of the smoking prevention program. Weekly smoking prevalence was about 40 percent lower in the treatment community cohort. Similar effects were found in the cross-sectional analyses. These significant differences were maintained through the 12th-grade survey, three years after the end of direct smoking prevention education and one year after the end of general community education.

This study was one of the first demonstrations in the United States that the effects of educational programs to prevent smoking could be maintained

through late adolescence—and thus, theoretically, through life. Longer-term community programs supporting these school-based components appeared to play a key role in maintaining positive effects.

Midwestern Prevention Project

The Midwestern Prevention Project (MPP), a three-year school-based program for preventing substance use, was supported by several community interventions explicitly designed for this purpose (Pentz et al. 1989a). The school program consisted of 10 classroom sessions in the sixth or seventh grade (depending on the year of transition into middle school) and is the same as that reported by Hansen and Graham (1991). These sessions emphasized the negative consequences of cigarette, alcohol, and marijuana use; corrected misperceptions on actual levels of use among peers and adults; discussed direct and indirect pressures to use substances; practiced skills to resist pressures for substance use; and obtained public commitments to avoid substance use. These activities were presented by classroom teachers with the assistance of peer leaders. Ten homework sessions that involved parents' participation accompanied the school program. These sessions emphasized clarifying family rules on substance use, practicing techniques for avoiding substance use, and learning ways to counteract media and community influences to use substances. The mass media component of this program occurred throughout all three years of program effort and was equally available to program and control group students. Media messages focused on news coverage of program activities through newspaper articles, brief television news segments, and radio and television talk show interviews with project staff.

During the second year of the program (occurring in either the seventh or the eighth grade) for the target cohort, a five-session classroom booster program was combined with homework designed to keep parents actively engaged in prevention efforts (Pentz et al. 1989b). School administrators, parents, and students also planned and presented a parent education evening featuring communication skills and school policies on substance use (Rohrbach et al. 1995). During the third year of the program, community leaders received training in organizing task forces to prevent substance use. This program component, like the media component, was equally capable of influencing students in the program or the control group (Johnson et al. 1990).

The overall program was tested in 42 schools from eight communities in the Kansas City metropolitan area. About 21 percent of the students from these sixth- and seventh-grade target groups were from minority ethnic groups. Students from the target grades in these schools were assigned to the school and parent components (24 schools) or to a delayed-treatment control condition (18 schools). All students and parents were exposed to the mass media components and were potentially exposed to the effects of the community organization component beginning with the third program year. Effects were evaluated by using a one-third sample of the large sixth- and seventh-grade target group. This study sample was obtained through baseline surveys of all targeted students in 16 schools and through a one-fourth sample from the remaining schools (total n = 5,065).

Follow-up surveys combined sequential cross-sectional surveys, including all students present at a survey point, and longitudinal surveys of a subset of baseline cohort members. The one-year follow-up sample included 5,008 members of the target population, who were then in the seventh and eighth grades. Monthly cigarette use was about 32 percent lower among students who had received the combined school, parent, and mass media programs than among students who had received the mass media information only. Similar effects were observed among the subset of students tracked longitudinally (Dwyer et al. 1989).

Additional classroom surveys were completed with 3,875 students two years after baseline, when the students were in the eighth and ninth grades (Pentz et al. 1989b). Significant program effects on monthly and weekly smoking prevalence were maintained from the one-year follow-up, although the magnitude of the differences between program and control students was smaller. Similar results were obtained from the panel of students measured longitudinally (Pentz et al. 1989c).

The longitudinal panel from the original sample was followed up into the 9th and 10th grades (Johnson et al. 1990). The baseline sample included 1,607 sixth- and seventh-grade students, of whom 1,105 (69 percent) provided complete data at both baseline and the three-year follow-up. Analyses indicated a significant treatment effect for monthly cigarette smoking. Students receiving the entire program reported about 19 percent less monthly smoking than students who received only the mass media and community organization components.

University of Vermont School and Mass Media Project

The University of Vermont School and Mass Media Project (VSMM) evaluated the effects of supplementing a school-based smoking prevention curriculum with intensive mass media campaigns carefully targeted to the needs of adolescents. Both the school and the mass media programs shared a set of objectives consistent with the social influences model. These common objectives stated that adolescents exposed to the programs would perceive fewer advantages of smoking, perceive more disadvantages of smoking, acquire social skills to resist peer pressures to smoke, and perceive that most people their age do not smoke (Worden et al. 1988). Other objectives concerned with smoking cessation and awareness of tobacco industry marketing to young people were introduced as the target group matured.

The school program included grade-specific lesson plans and teaching materials, and classroom teachers received annual training. Curriculum content covered key elements of the social influences model, such as short-term social and health consequences, awareness of social pressures to smoke, skills for coping with peer pressures and other social pressures, and decision-making skills related to smoking behavior (Flynn et al. 1995). The three-grade study cohort received this program for four years, in either the 5th–8th grades, 6th–9th grades, or 7th–10th grades. The program required four class sessions for the units in the 5th–8th grades and three class sessions for the units in the 9th and 10th grades.

The mass media campaigns used the common objectives and data from high-risk young people in six predefined age and sex groups. High-risk students were defined as those who had previous smoking experience or who knew at least two people in their immediate social environment who smoked, such as parents, siblings, or friends. High-risk girls and boys from three age groups participated in diagnostic research activities on two occasions during the study to provide information needed to tailor the mass media campaign to their needs (Worden et al. 1988). These data were used to develop pilot mass media spots, which were assessed by small samples of high-risk students.

Mass media advertisements that clearly addressed the common educational objectives and were attractive to their intended target groups were produced for broadcast as 30- and 60-second television and radio spots. Spots targeted to the six specific target groups were broadcast on programs that school survey data had indicated were popular among these groups; 36 television and 17 radio spots were produced. An average of 190 television broadcasts, 350 cable television broadcasts, and 350 radio broadcasts of these spots was purchased per year for four years in each target community.

The evaluation design included four geographically separate but demographically matched metropolitan areas from three states (Flynn et al. 1992). Students in two communities received the mass media and school programs for four years. Students in the other two communities received only the school programs during these four years. The initial cohort included all students from the fourth through sixth grades from 50 elementary and middle schools; more than 99 percent of these students (n = 5,458) participated in the first school survey. Interventions and annual follow-up surveys were conducted for the next four years, beginning at the 5th–7th grades in the 1985–1986 school year and ending at the 8th–10th grades. A classroom and telephone follow-up survey attempted to reach all original cohort members during the 10th–12th grades.

Results after four years of the program concentrated on the 47 percent of the original cohort who were fully exposed to the program components (n = 2,540). These analyses indicated that significant hypothesized differences in mediators of program effects occurred in the media-school communities beginning at the end of the second program year and that the amount and prevalence of cigarette smoking were significantly reduced at the beginning of the third program year (Flynn et al. 1992; Worden et al. 1996). By the end of the four-year program period, alternative measures of smoking prevalence and intensity indicated that students in the media-school communities reported 34–41 percent less smoking than students in the school-only communities. Two years later, when the study cohort was in the 10th–12th grades, differences between smoking prevalences in the two groups continued to be statistically significant and of similar magnitude (Flynn et al. 1994). Among students who were at high risk for smoking in grades 4–6, further analyses showed that these interventions produced significant differences in weekly smoking prevalence at grades 10–12 (Flynn et al. 1997). Cost-effectiveness analyses indicated that the cost per student smoker averted as a result of these interventions was about $754 in 1996 dollars, and the cost per life year gained was about $696 (Secker-Walker et al. 1997).

These findings show that carefully targeted mass media campaigns can add to school programs a substantial and enduring effect on smoking prevention when the program efforts are sufficiently intensive

and the educational objectives for these two channels are closely coordinated. These interventions did not include a substantial program component directed toward parents or other adults in the community. The results provide powerful evidence of the influence of mass media messages on health behavior decisions made by young people.

Observations on Research on Multifaceted Educational Programs

These studies are notable because they all represent efforts to extend the impact of school programs by enlisting the influence, preferably throughout adolescence, of other powerful forces in the lives of young people and because their effects more consistently exceed those achieved by programs involving only the school (Table 3.1). This notion has added importance in view of the competition for curricular time within schools. The studies that were able to follow up study participants into the later high school years have provided the best evidence thus far that program effects can be extended when educational or other prevention strategies include multiple components and take place over longer terms. Because few people begin smoking after high school, these results suggest that long-term multifaceted programs can prevent significant proportions of young people from smoking not only during their junior and senior high school years but also for the rest of their lives.

The interventions used in these three studies were based on a common core of approaches. The main shared theme was that a strong school program was necessary to achieve substantial effects. The school component of the MHHP included 17 class sessions explicitly directed toward smoking prevention objectives over three school years; the MPP school program included 15 class sessions over two school years, as well as other school-based student activities; and the VSMM included 14–16 class sessions over four school years. The intensity of these school programs was similar to the intensity of successful school-only programs and approached that recommended by experts (Glynn 1989; CDC 1994b). A related theme was use of the social influences model in designing programs. The research groups that developed the MHHP and the MPP included investigators who were key contributors to the development of this model for school-based programs. The design of the VSMM program components also closely followed this model.

The third shared theme for these studies was their focus on entire communities. The MHHP was provided to, and evaluated in, all schools in a single moderate-sized community and was supported by communitywide mass media and organizational programs. Some components of the MPP were provided to students, parents, and community members in an entire large metropolitan area. The VSMM was provided to adolescents in two entire moderate-size metropolitan areas, and the same large groups were the focus of targeted media campaigns. The educational messages of the school-only programs, in contrast, generally did not reach beyond the walls of the selected school. Directing messages to entire communities of adults and adolescents may have increased the capacity of multifaceted studies to influence adolescents' normative perceptions of the prevalence and acceptability of cigarette smoking.

The importance of the school component was emphasized by results of a study conducted within the context of the Stanford Five-City Project. This study shared with the MHHP the goal of reducing cardiovascular risk factors in entire adult populations and shared many features of the programs for adults (Farquhar et al. 1990). The adolescent smoking feature of this study assessed whether reductions in cigarette smoking among adults (Fortmann et al. 1993) were reflected among adolescents. A seven-session smoking prevention program was provided to adolescents in 7th and 8th grades during the fourth program year (Telch et al. 1982; Winkleby et al. 1993), and a four-session cessation unit was provided to half of the 10th-grade classes (Killen et al. 1988). The effect of this combination of programs was assessed through cross-sectional population surveys conducted over a 10-year period. No statistically significant differences in smoking prevalence were detected among participants aged 12–15, 16–19, or 20–24 years.

The duration of the community programs in the MHHP was one year less than that of the Stanford study. The school programs in the MHHP, however, were much more intensive and of longer duration. Although differences in evaluation methods preclude direct comparisons, results suggested that the MHHP's substantial impact on the smoking behavior of adolescents in the Class of 1989 Study depended on the presence of a strong school-based program that was enhanced by the supportive community environment in which it was conducted. The Stanford study's lack of effects on adolescents suggested that intensive, communitywide programs to reduce health risks among adults would not be sufficient to change adolescent smoking unless these programs were combined with more intensive school programs. These contrasting results affirm that a strong school program is important to the success of educational strategies for prevention.