

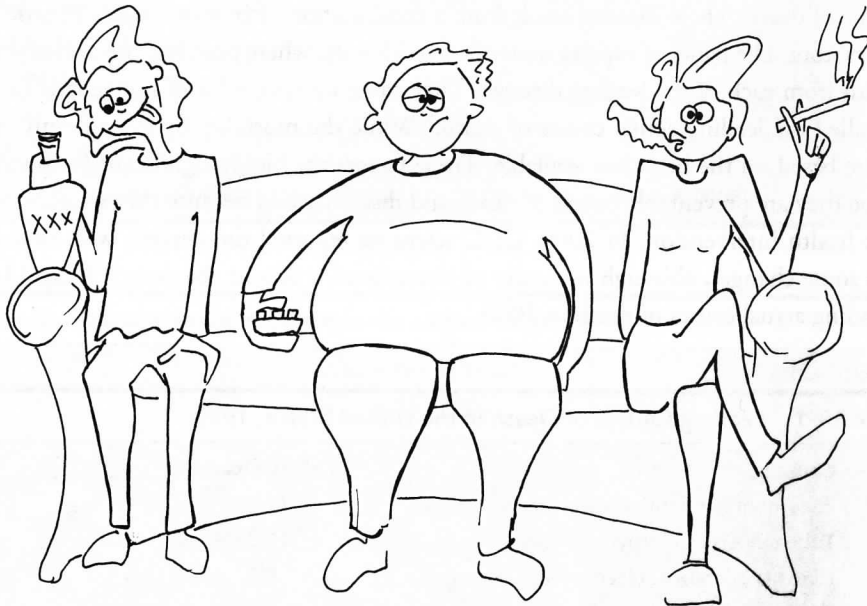
INTRODUCTION TO Public Health

Third Edition



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Do People Choose Their Own Health?



The Leading Causes of Death

Early successes of public health, in its mission to prevent death and disability, often came from focusing on specific diseases or groups of diseases, seeking particular causes, and finding ways to interrupt the cause-and-effect relationships. This approach was validated in the early 20th century by victories over infectious diseases. Public health professionals learned to break the chains of infection, most often by removing etiologic agents (bacteria, viruses, parasites) from the environment (water, food) or by developing vaccines to immunize potential hosts.

As infectious diseases were brought under control and as chronic diseases became more significant as causes of death and disability, it became increasingly apparent that the challenges faced by public health regarding chronic diseases would be more complex. Compare the lead-

ing causes of death in the United States in 1900 with those in 2006, as shown in Tables 13-1 and 13-2. The top three killers of 1900, which were of infectious origin, have moved down or disappeared from the 2006 list, while heart disease has moved from fourth to first and cancer from eighth to second. The diseases at the top of the 2006 list have complex causes and most have no clear etiologic agent. Despite decades of biomedical research, there are no vaccines or environmental solutions to the problems of cancer and heart disease.

In 1990 a group of public health experts from the Centers for Disease Control and Prevention (CDC) decided that they should look at the data in a different way. They observed that the leading causes were not, in fact, root causes but were merely the diagnoses identified at the time of death. These diseases result from a combination of inborn (largely genetic) and external factors. The panel of experts undertook to identify, where possible, the underlying causes of death from each of the leading diseases. They came up with a list of nongenetic factors that they called the leading actual causes of death.¹ While the mortality figures are only estimates, they are based on the best data available. These factors are highly significant for public health because they are preventable causes of death and disability and because they provide targets for public health intervention. In 2000, CDC scientists repeated the analysis with new data and found some changes, although the order of importance is almost the same.² Table 13-3 shows the leading actual causes of death in 2000.

Table 13-1 Leading Causes of Death in the United States, 1900

Cause	% of All Deaths
Pneumonia and influenza	11.8
Tuberculosis (all forms)	11.3
Diarrhea, enteritis, ulceration of intestines	8.3
Diseases of the heart	8.0
Intracranial lesions of vascular origin	6.2
Nephritis	5.2
All accidents	4.2
Cancer and other malignant tumors	3.7
Senility	2.9
Diphtheria	2.3

Source: National Center for Health Statistics, "Leading Causes of Death, 1900-1998," page 67. www.cdc.gov/nchs/data/dvs/lead1900_98.pdf (Accessed November 8, 2009).

Table 13-2 Leading Causes of Death in the United States, 2006

Cause	Number of Deaths	% of All Deaths
Diseases of heart	631,636	26.0
Malignant neoplasms (cancer)	559,888	23.1
Cerebrovascular diseases	137,119	5.7
Chronic lower respiratory diseases	124,583	5.1
Unintentional injuries	121,599	5.0
Diabetes	72,449	3.0
Alzheimer's disease	72,432	3.0
Influenza and pneumonia	56,326	2.3
Kidney diseases	45,344	1.9
Septicemia	34,234	1.4

Source: National Center for Health Statistics, page 1.

www.cdc.gov/nchs/data/dvs/LCWK1_2006.pdf May 19, 2009 (Accessed November 8, 2009).

Table 13-3 Actual Causes of Death in the United States, 2000

Cause	Number of Deaths	% of All Deaths
Tobacco	435,000	18.1
Poor diet and physical inactivity	365,000	15.2
Alcohol consumption*	85,000	3.5
Microbial agents	75,000	3.1
Toxic agents	55,000	2.3
Motor vehicle	43,000	1.8
Firearms	29,000	1.2
Sexual behavior	20,000	0.8
Illicit drug use	17,000	0.7

*16,653 deaths from alcohol-related crashes are included in both alcohol consumption and motor vehicle death categories.

Source: A.H. Mokdad, J.S. Marks, D.F. Stroup, and J.L. Gerberding, "Actual Causes of Death in the United States, 2000," *Journal of the American Medical Association* 291 (2004): 1238-1245; 298, Table 1.

Tobacco was found to be the leading actual cause of death in the United States. According to the study, tobacco accounts for 30 percent of all cancer deaths and 21 percent of cardiovascular disease deaths. In addition, it causes chronic obstructive lung disease, infant deaths due to low birth weight, and burns due to accidental fires. Of the 435,000 deaths attributed to tobacco smoking, 35,000 were caused by second-hand smoke (see Chapter 15).

Poor diet and physical inactivity are listed as the second most important actual cause of death. These two factors are closely related to each other, with overeating and inactivity combining to lead to obesity. Dietary fat, sedentary behavior, and obesity have all been associated with heart disease, stroke, several forms of cancer, and diabetes. The number of deaths attributed to this factor increased by 22 percent from the 1990 estimates, the largest change among all actual causes of death. The prevalence of overweight and obesity among Americans increased dramatically during the 1990s and continues to increase, as discussed in Chapter 16.

In 2005, an analysis by scientists from the CDC and the National Cancer Institute found fault with the calculations of obesity as a leading cause of death.³ The new calculations, using different statistical methods, led to the conclusion that being moderately overweight was actually protective, especially in older people, although obesity still caused premature deaths. The publication of this study prompted great glee among critics of the “health police” and libertarians who object to being told what to do by the government. It is not clear why this analysis produced such different conclusions from the previous ones. The evidence is still strong that excess weight increases risks for heart disease, diabetes, high blood pressure, and some kinds of cancer. One possible explanation for the new findings is that medical care has become increasingly effective in preventing deaths from these diseases. Despite the controversy, public health professionals continue to regard excess weight and obesity as a major threat to people’s health. Chapter 16 discusses evidence for the impact of the “obesity epidemic” and public health approaches to combat it.

Misuse of alcohol was listed as the third actual cause of death, causing 35 percent to 40 percent of motor vehicle fatalities, as well as chronic liver disease and cirrhosis, home injuries, drowning, fire fatalities, job injuries, and 3 percent to 5 percent of cancer deaths.²

Number four on the list—microbial agents—encompasses the top three killers of 1900. The fact that mortality from infectious diseases has become so much less significant is testimony to public health’s successes, described in Parts II and III. As discussed previously, however, infectious diseases have by no means been conquered, and they could move to a higher position on the list in the future.

The fact that toxic agents—the environmental threats discussed in Part V—are listed fifth as an actual cause of death is evidence of successes in environmental health. The list’s authors call this figure the most uncertain; environmental threats may actually belong farther up the list.

Certainly, environmental pollution is much more significant as a cause of death in the former Soviet Union, where environmental health has not been given the priority it has in the United States (see the Prologue).

Firearms, sexual behavior, motor vehicles, and the illicit use of drugs round out the list. The authors, recognizing that some deaths may have multiple causes, choose what they believe to be the most significant. For example, they attribute most AIDS deaths to sexual behavior or drug use, although they recognize of course that a microbial agent is involved. The number of deaths attributed to these actual causes has declined since 1990 because of improved treatments for human immunodeficiency virus (HIV). Deaths from alcohol-related motor vehicle crashes have also declined since 1990, largely due to better enforcement of drunk-driving laws.²

These nine actual causes of death account for approximately 50 percent of all deaths in the United States. The other half includes genetic factors, which were specifically excluded from the analysis, and other less clearly identifiable causes. Lack of access to health care was cited as a significant factor. Presumably, many deaths could legitimately be attributed to old age. The nine identified factors are of particular public health significance because they cause premature deaths; they are often preceded by impaired quality of life; and many could be prevented by public health measures.

In trying to prevent premature death and disability, public health must focus on these nine factors. Two of them—microbial agents and toxic agents—have traditionally been public health issues. The other seven are rooted in the behavioral choices of individuals. This is the biggest challenge now faced by public health. How can people be persuaded to behave in healthier ways in a democratic society, where every step is fraught with political, economic, and moral controversy?

There are two obvious approaches that the government has traditionally taken to promote healthy behavior: education and regulation. Both of these approaches have had successes and both have had failures. Both continue to be important components of public health's struggle to accomplish its mission.

Education

Most simply, education informs the public about healthy and unhealthy behavior. Many people who are concerned about their health and that of their families do in fact adjust their behavior in accordance with new information. For example, the 1964 surgeon general's report called *Smoking and Health*,⁴ the first authoritative statement from the federal government that smoking

caused cancer and other life-threatening diseases, had a significant impact on the prevalence of smoking in the United States, as discussed in Chapter 15. Many people quit the habit after learning the information, and the prevalence of smoking began to decline for the first time after 1964.

Information on healthful eating habits has traditionally been provided by the federal government. In the early 20th century, concern focused on nutritional deficiencies, and the government conducted research on requirements for various vitamins and minerals, leading to listings of recommended dietary allowances or daily values. The educational process was furthered by Food and Drug Administration (FDA) requirements for labeling of prepared foods, which must accurately identify the percentage of the daily value provided by each serving (see Chapter 23).

While the prevention of nutritional deficiencies is still a valid concern, especially among the poor, the focus of government educational programs on nutrition has shifted to the prevention of the major killers—cancer, cardiovascular disease, and diabetes, which tend to be associated with nutritional excesses. Research over the past several decades has led to a greater understanding of the importance of overall dietary pattern in the onset of these diseases. The government's educational efforts have stressed the importance of eating less fat (especially saturated fat), less salt, and more fruits, vegetables, and grains. The FDA has revised its labeling requirements to provide consumers with the information that will allow them to follow its guidelines. There is evidence that Americans have responded to the message that they should cut down on fat in their diet and that this behavior may have helped bring down the high rates of heart disease over the past thirty years (see Chapter 4).

Results of efforts to modify dietary and smoking behaviors, while showing some success, also illustrate the limitations of the educational approach. The impact of both messages has been limited. While the percentage of Americans who smoke has declined, almost one in five adults maintains the habit despite widespread knowledge about the dangers of tobacco.⁵ Evidence of dietary improvement is difficult to verify, since surveys of people's eating habits are notoriously unreliable. While the decline in heart disease is encouraging, the prevalence of obesity has increased, casting doubt on the extent to which Americans have really improved their eating habits.

Educational efforts to modify health-related behavior can be controversial, even when the messages seem benign and obvious. For decades the tobacco industry used all its political and economic power to dispute the evidence that smoking was harmful, as discussed in Chapter 15. Even the government's policy on diet has generated opposition, for example, from the meat industry, which has fought to delay the release of proposed recommendations that people eat less meat and more fruits, vegetables, and grains—recommendations that, if widely followed, would financially harm the industry.⁶ Similarly, the sugar industry has fought government recommendations that people should reduce sugar in the diet.⁷

The educational messages most guaranteed to generate controversy, however, are those concerning sexual behavior. American attitudes about sex are notoriously ambivalent. Though movies and television shows frankly depict sexual activity, many people are puritanically reluctant to talk about how people can protect themselves against the natural consequences of that activity: unintended pregnancy and sexually transmitted diseases. For example, the tenure of Joycelyn Elders as President Clinton's surgeon general was extremely controversial because she spoke out openly on these issues, recommending condom use and masturbation, until she was forced by political pressures to resign her office.

Schools are naturally a prime site for health education programs. The goal is to teach children from an early age how to live healthy lives, providing information, for example, on diet, exercise, and the dangers of smoking, alcohol use, and drug abuse. Studies have shown that school education programs are effective in teaching children the facts about health and safety. It is less clear, however, that they actually influence young people to behave in healthier ways.

Sex education in the schools is highly controversial. Opponents have argued for years that teaching young people about sex encourages them to indulge in immoral behavior. When AIDS came along, the controversy became more intense because it meant that sexual behavior could be a matter of life and death. Many proponents of explicit education about safe sex argue that young people have sex no matter what they are taught and that they should be informed about how to protect themselves. Opponents argue that condoms are only partially effective in preventing pregnancy and sexually transmitted diseases and that young people should be taught that they can protect themselves only by abstinence. This was the policy of the Bush administration, which allocated hundreds of millions of dollars of federal funds for abstinence-only education. Many of these programs commonly contained multiple scientific and medical inaccuracies. According to Richard Daines, the New York State Commissioner of Health, "the Bush administration's abstinence-only program is an example of a failed national health-care policy directive, based on ideology rather than on sound scientific evidence that must be the cornerstone of good public health-care policy."⁸

In fact, a number of studies have shown that students who have received comprehensive sex education in school delay initiation of sex, reduce the number of partners, and are more likely to use contraception when they do have sex.⁸ And while the use of condoms cannot guarantee protection against pregnancy and HIV transmission, condoms do reduce risk. Nevertheless, the controversy continues in many communities. The decision on what students should be taught about sex is made by local school boards and depends on "community standards."

An extension of the educational approach to changing behavior is the use of advertising to reinforce the public health message. Most people are subjected to large doses of media messages promoting unhealthy behavior, including cigarette ads in magazines, beer commercials on television, and movie portrayals of unsafe sex. The occasional public service announcements meant

to convey countervailing messages are feeble weapons in the battle for public health, although there is evidence that counter advertising about the dangers of smoking helped to reduce smoking rates in the 1960s, as discussed in Chapter 15. The “Just Say No” antidrug campaign during the Reagan administration was strong enough to make an impression; whether it persuaded people to change their behavior is doubtful. Recently there have been efforts to develop more effective approaches to conveying public health messages in the media. One of these was the successful Harvard School of Public Health campaign to persuade several television producers to write “designated drivers” into their sitcom scripts as a way of advocating an alternative to drinking and driving.⁹

Another variation on health education that has become popular with college administrators to curb high-risk student drinking is the social norms approach. This approach is based on an influential study from the 1980s, which surveyed students about their perception of the frequency and amount of drinking among their peers. It turned out that students generally believed that other students drank more than they actually did. The remedy to the misperception that “everyone is doing it” is to advertise the actual norms on campus. Institutions could reduce high-risk drinking by up to 20 percent over a relatively short period of time by conducting surveys on campus and advertising the results.¹⁰ Although use of the social norms approach is in an early stage, its proponents believe it can be used for a variety of other issues, such as tobacco prevention, seat-belt use, and prevention of high-risk sexual activity.

Health education messages may also be delivered by a medical professional during an office visit. Doctors who care for people with chronic diseases such as diabetes and asthma know that they can keep their patients healthier if they include a health education component in their treatment plans. Studies have shown that, while patients do not always follow the doctor’s orders, a physician’s recommendation can increase the likelihood that people will change their behavior.¹¹

As discussed in Chapter 1, public health’s mission is to prevent disease, while medicine traditionally focuses more on treatment and cure. However, the fact that the medical profession can—and often does—play an important role in communicating public health messages about healthy behavior means that public health has a role to play in educating medical providers about health risks and health-related behaviors.

Regulation

As discussed in Chapter 3, governments have always regulated people’s behavior by passing and enforcing laws. The regulatory approach is clearly warranted when its intent is to restrain people from harming others. Laws against murder and assault are in effect public health laws, and there is no question about their legitimacy. Traffic laws—also aimed at protecting public

health—are clearly accepted as necessary. Though not scrupulously obedient, everyone recognizes the importance of stopping at red lights, keeping to the right side of the road (in the United States), and driving at speeds appropriate to the conditions.

Most states have laws concerning alcohol and tobacco use aimed at protecting the public's health. Laws against drunk driving are clearly justified as a means of protecting others. Laws that regulate smoking in indoor public places are also justified on the basis that smokers create a health hazard by polluting the air that others must breathe. Most adults agree with laws aimed at preventing children and teenagers from behaving in ways that may harm their health, such as restrictions on access to alcohol and tobacco. The greatest controversy about governmental attempts to regulate behavior arises when these efforts are perceived as interfering with a mature individual's freedom to take risks with his or her own health. Laws requiring seat-belt use or motorcycle helmets, accordingly, are less well accepted than speed limits.

Controversy over public health laws is not new, as discussed in Chapter 2. In the 19th century, major controversies raged in Britain and the United States over laws requiring immunization against smallpox. In the United States the matter was decided in the 1905 Supreme Court decision *Jacobson v. Commonwealth of Massachusetts*, which upheld that state's right to require vaccination "for the common good."¹²

Another hot issue in the 19th century, both in Britain and the United States, was the control of venereal diseases, a campaign fraught with moral and social implications that presaged more recent controversies over AIDS. In Britain, a series of Contagious Diseases Acts were passed in the 1860s and 1870s, providing for compulsory medical examinations of known and suspected prostitutes and detention of those found to carry disease. Such laws were justified by arguing that venereal diseases were a national defense issue: military recruits affected by syphilis and gonorrhea would be unfit for service. Proponents also argued that irresponsible men, infected by prostitutes, carried diseases home to their innocent wives. It was especially urgent to prevent the spread of syphilis, which can be transmitted from an infected woman to her fetus during pregnancy, causing severe damage to the child. In the United States, most states adopted laws that required couples to be certified free of disease before they could obtain a marriage license.¹³

Many of the themes that occurred in the debates over venereal disease control have recurred today in debates about AIDS prevention, as described in the Prologue and Chapter 2. In fact, two states passed laws in the 1980s requiring premarital screening for HIV infection—similar to the old requirement for syphilis testing. However, these laws were soon repealed, as the syphilis laws have been. Changes in social norms mean that premarital screening occurs too late to protect women—or men—against sexually transmitted diseases. The conflict between, on the one hand, the protection of the privacy and freedom of the infected individual and, on the other hand, the protection of the health of potential "innocent" victims is the same with AIDS as it was with syphilis. However, the political power of gay men, the group most affected by

AIDS in the early days of the epidemic, was much stronger than was the power of prostitutes in the 19th century. The gay community fought against many proposals designed to prevent the spread of the virus. For example, legal battles were fought in San Francisco and New York over the closing of gay bathhouses, which were the site of many unsafe sexual practices. New York State's 1985 decision to close the bathhouses in New York City was upheld by the courts. In San Francisco, legal action by the gay community forced an overturn of the city's order to close the bathhouses. However, the court ordered bathhouse owners to hire monitors to prevent high-risk sexual activity.¹⁴

Does Prohibition Work?

The most ambitious attempt by the U.S. government to regulate the behavior of its citizens was Prohibition, passed by a constitutional amendment in 1919 that was repealed fourteen years later. Common wisdom holds that Prohibition was a failure, but today's society treats "recreational" drugs—marijuana, heroin, cocaine—in much the same way that the Eighteenth Amendment treated alcohol, and few public health leaders are willing to call for an end to the "war on drugs." In fact, the Prohibition approach to regulating behavior appears to have mixed results, combining success and failure in a complex way.

The movement to legally ban alcohol became a moral crusade in the late 19th century, with prohibitionists blaming alcohol for all the ills of society. According to the rhetoric, drinking drove men to violence, especially against their wives and children; drunkards were a threat to public safety; and drunkenness itself was looked on as a sin and a crime. In fact, public disapproval had convinced many people to cut down on or quit their use of alcohol, and consumption had declined even before the Eighteenth Amendment was approved.¹⁵ During Prohibition, the rate of cirrhosis of the liver declined to half that of 1910. Despite the image of the Roaring Twenties—with speakeasies, flappers, and bathtub gin—consumption of alcohol fell by two-thirds.¹⁶ However, it was also true that flouting of the law became socially acceptable, and organized crime flourished.

The debate about Prohibition resurfaces occasionally in the context of illegal drugs. In an exchange of letters published in the *Wall Street Journal* in 1989, two prominent conservatives debated whether the war on drugs was doing more harm than good.^{17,18} The economist Milton Friedman argued that while drugs are "tearing asunder our social fabric, ruining the lives of many young people, and imposing heavy costs on some of the most disadvantaged among us," much of the harm results from the fact that the drugs are illegal.¹⁷ The illegality drives up the price of the drugs, providing a financial incentive to drug dealers, causing desperate addicts to

commit crimes to pay for their addiction, and corrupting law enforcement officials tempted by bribery. Removing the "obscene profits" from the drug market, Friedman wrote, would reduce the motivation of drug pushers to recruit future addicts among vulnerable young people.

Opposing this view was William Bennett, who was the leader of the first President Bush's drug-control efforts. Bennett admitted that the war on drugs is costly, but argued that the cost of not enforcing laws against drugs would be higher. He claimed that after repeal of Prohibition, the consumption of alcohol soared by 350 percent and asked if the country could afford such a dramatic increase in drug use. He blamed current levels of drug use for lost productivity, rising health insurance costs, flooding of hospitals with drug overdose emergencies, and drug-related accidents. He disputed the argument that addicts turn to crime to support their habit, claiming that many addicts were criminals before they turned to drugs.¹⁸

The argument has not been resolved. In 2001, the National Academy of Sciences published a report suggesting that the Prohibition-like approach may not be working. The report stated that, although the federal government spends some \$17 billion each year on drug enforcement programs, there is little information on the effectiveness of these programs. The number of people arrested and incarcerated for drug offenses increased throughout the 1980s and 1990s, despite a lack of evidence that this approach helped to deter illegal drug use. "It is unconscionable for the country to continue to carry out a public policy of this magnitude and cost without any way of knowing whether and to what extent it is having the desired effect," the report concluded.^{19(p.279)}

Other arguments against the war on drugs were put forward by Nicholas Kristof in a 2009 *New York Times* column entitled "Drugs Won the War." Kristof notes that the United States incarcerates people at a rate nearly five times the world average, adding up to 500,000 people in 2009. The prohibition approach is expensive, costing federal, state, and local governments some \$44.1 billion annually. Drug prohibition also raises prices, empowering criminals at home and terrorists abroad. The Mexican government is engaged in a vicious war against the drug cartels, which supply drugs mainly to the American market. And the Taliban in Afghanistan support themselves largely by the opium trade.²⁰

Although it seems unlikely that the United States will abandon the war on drugs completely, President Obama's drug czar, Gil Kerlikowske, has declared an intention to shift the emphasis more toward treatment rather than imprisonment, more consistent with the public health approach. Evidence on the effectiveness of treatment and prevention programs is also thin, however. The most widespread prevention program used in the United States, the school-based D.A.R.E. (Drug Abuse Resistance Education) program, which has a "zero-tolerance strategy," has been found to have little impact on drug use.¹⁹

Chapter 14 undertakes a more theoretical discussion of what influences people to behave in the ways that they do. It is clear that, to be effective, public health must expand beyond the traditional approaches of education and regulation in its attempt to change people's unhealthy behaviors. Chapter 15 discusses ways in which a combination of education and regulation is being used to change people's behavior in relation to the substance that tops the list of hazards to health: tobacco smoking.

Conclusion

As infectious diseases have become less predominant causes of death in the United States, a major focus of public health programs has shifted to people's behavior. An analysis conducted by a group of public health leaders has concluded that the top three actual causes of death are smoking, poor diet and physical inactivity, and alcohol consumption. Other behavioral factors that are among the top nine causes of death are firearms, sexual behavior, motor vehicles, and the illicit use of drugs. For public health to significantly reduce the death rates beyond what it can achieve in controlling infectious diseases, it must find ways to promote behavioral change.

Two approaches that government has traditionally taken to persuade people to change their behavior are education and regulation. Education about health includes simply informing people about risks, which can be an effective strategy when new knowledge becomes available, as occurred with the 1964 surgeon general's report called *Smoking and Health*. Food labeling is also part of an educational effort to encourage Americans to eat a healthier diet. Regulation is another effective approach to promoting behavioral change, although it is often unpopular. Historically, the most ambitious attempt to regulate Americans' behavior was Prohibition, which did in fact improve their health by reducing the rate of cirrhosis of the liver. Whether the Prohibition-like approach currently used for control of illegal drugs is effective has not been demonstrated.

Research in the social and behavioral sciences has led to the development of theories of why people behave as they do and how they can be influenced to change their behavior. The evidence indicates that health promotion programs are most effective when they target individuals at many different levels of influence. Chapter 14 discusses some of the theories of health behavior. In the chapters that follow, as several specific problematic health behaviors are addressed, there will be examples of programs aimed at changing those behaviors.

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