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Chapter 14

How Psychosocial Factors Affect Health Behavior

KEY TERMS

Ecological model

Health belief model

Self-efficacy

Socioeconomic status
(SES)

Social support

Stress

Transtheoretical model

While individual behavior plays a major role in determining a person's health, many factors influence individual behavior. Humans are social creatures, and their behavior is strongly affected by their social environment. This accounts, at least in part, for the fact that diseases tend to be distributed in the population according to certain patterns: Certain groups have characteristic disease patterns that remain constant over time even when individuals in the group change. From a public health perspective, it may be more efficient to try to change the social environment that influences people to behave in unhealthy ways than to try to change people's behavior one individual at a time.

Another reason to consider the social environment in studying health behavior is that when the focus is on the individual, the conclusion is likely to be that the person is to blame for his or her illness. Unhealthy behaviors may be maintained and reinforced by aspects of the social environment that are beyond the individual's control. It may be more appropriate for public health intervention programs to focus on these social aspects or at least consider them in designing programs aimed at promoting healthy behavior.

Demographic factors—including race, gender, and marital status—are consistently found to influence health. Statistics show that most ethnic minorities in the United States have significantly higher mortality rates from most diseases than whites. Males have

higher mortality rates than females at all ages, although females tend to suffer more from chronic illness. Married people are in general healthier than people who are not married, whether single, separated, widowed, or divorced. The reasons for these differences are believed to be primarily social.

The most important predictor of health is **socioeconomic status (SES)**, a concept that includes income, education, and occupational status, factors that tend to be strongly associated with each other. SES accounts in part, though not entirely, for the health differences by race, sex, and marital status. For example, blacks tend to be less healthy than whites, and they generally have lower SES than whites. However, even wealthy, educated blacks have higher mortality rates than whites of comparable SES.¹

Groups with the lowest SES have the highest mortality rates, a fact that is true in many different countries and has been true for centuries, for reasons known and unknown.² In London in 1665, the poor were more likely to die in the plague epidemic because of poor nutrition and sanitation and because they could not flee the city to escape infection as the wealthy did. In the United States today, the health of the poor is threatened by the adverse environmental conditions of the inner cities, such as lead paint and air pollution, crime, and violence. Poor people also have poorer nutrition, less access to medical care, and more psychological stress.

It is not only the effects of poverty that account for socioeconomic variations in health, however. The association is seen at all levels of the socioeconomic scale, the very rich being healthier than the rich, who are healthier than the middle class, and so on. In a study of British civil servants called the Whitehall Study, mortality rates over a 10-year period were compared across four employment grades. Top administrators were compared with executives and professionals, the clerical staff, and unskilled laborers.³ As seen in (FIGURE 14-1), higher employment status was associated with a lower risk of dying.

Part of the reason that people with higher SES are healthier seems to be that people with more education behave in healthier ways. For example, in 2013, 25.8 percent of Americans without a high school diploma smoked, while of those with a bachelor's degree or higher, only 7.7 percent smoked. Those with more education were also more physically active.⁴ (Tables 52,63) Similarly, the Whitehall Study questioned subjects about their habits and found that those in higher employment grades were less likely to smoke, more likely to exercise, and more likely to eat a healthful diet that included skim milk, whole grains, and fresh fruits and vegetables.³

Variable access to medical care is another factor that has been blamed for some of the socioeconomic differences in health. In the United States, where 15 percent to 20 percent of the population—mostly those in low socioeconomic groups—lacks health insurance, it was often argued that universal health insurance could reduce health inequalities. However, the SES differences in mortality are also seen in Britain, Scandinavian nations, and other countries that have national health programs. The British civil servants in the Whitehall Study all had the same medical coverage by the National Health Service; yet the mortality risks were still higher at lower employment grades, even when behavioral factors were taken into consideration.

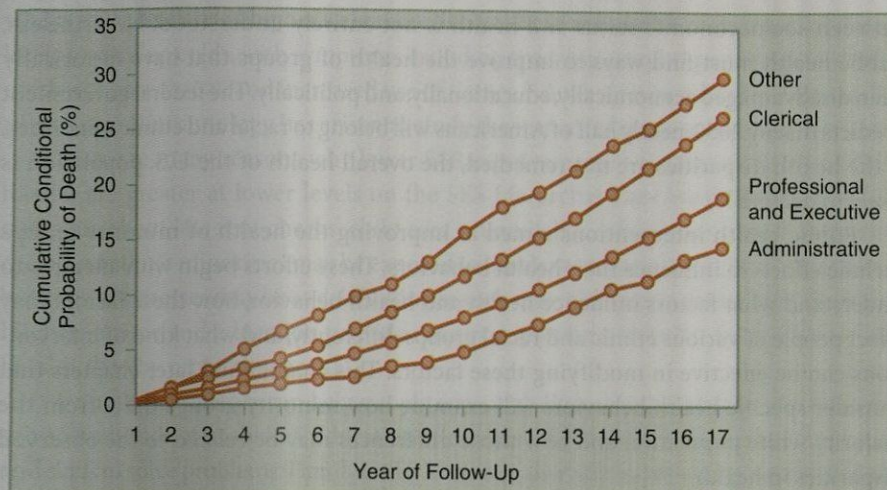


FIGURE 14-1 Mortality from All Causes by Year of Follow-Up and Grade of Employment, in Whitehall (U.K.) Male Civil Servants, Initially Aged 40–64

Reproduced from M. G. Marmot, M. J. Shipley, and G. Rose, "Inequalities in Death—Specific Explanations of a General Pattern?" *The Lancet*, 323:1003–1006, 1984, with permission from Elsevier.

Health of Minority Populations

Race and ethnicity have been seen to profoundly affect health in the United States. Most data on health status of different population groups show that the health of black Americans, the largest racial minority, constituting about 17 percent of the population, is poorer than that of white Americans. Hispanics are a heterogeneous group, and their health status varies among different subgroups. American Indians generally have poorer health indicators than whites, while Asian Americans have better health status.

While the overall health of the U.S. population has improved over the past decades, health disparities among racial and ethnic groups have persisted. Life expectancy at birth in 2013 was 79.1 for whites and 75.5 for blacks.^{4(Table 16)} The infant mortality rate of blacks was more than double that for whites, and the rate for American Indians/Alaska Natives was 1.6 times higher than that of whites.^{4(Table 11)} Mortality from diabetes is almost twice as high in blacks as in whites and 1.8 times as high in American Indians as in whites.^{4(Table 18)} Black men die of prostate cancer at 2.3 times the rate of white men.⁵ The death rate from HIV/AIDS is almost 7 times higher among black men than white men, and 14 times higher for black women than white women, way out of proportion to their percentage of the population.^{4(Table 29)}

The health disparities may be accounted for in part by the lower SES of blacks, who live in households with median incomes \$17,000 less than the average for the nation.⁶ Over 27 percent of blacks were living in poverty in 2013, as compared with 9.6 percent of non-Hispanic whites.⁶ Blacks have less education on average than whites, and they have higher unemployment rates. The reasons for the socioeconomic disparities are complex and somewhat inaccessible to public health interventions. Moreover, the relationship

between socioeconomic status and health is not entirely understood. Nevertheless, public health must find ways to improve the health of groups that have historically been disadvantaged economically, educationally, and politically. The federal government predicts that by 2050, nearly half of Americans will belong to racial and ethnic minorities. If the health disparities are not remedied, the overall health of the U.S. population is likely to decline.⁷

Public health interventions aimed at improving the health of minority groups include efforts to influence their health behaviors. These efforts begin with attempts to understand what factors influence health and health behavior, how these factors may affect people of various ethnic and racial groups differently, and what kind of interventions can be effective in modifying these factors. This chapter and later chapters that consider specific health behaviors will examine how minority groups differ from the majority white population and how those differences may be related to the observed disparities in health.

Stress and Social Support

A number of psychological factors have been found to influence health, some of which may have a role in the health effects of SES. One of these factors is **stress**, which is due to the adverse physical and social conditions associated with lower SES, which may act both directly, by affecting physiological processes, and indirectly, by influencing individual behavior. Early evidence of the health effects of stress came from observations that widows and widowers seemed to have an unusually high risk of dying soon after the death of their spouses. Several studies in the 1960s and 1970s found that mortality rates of survivors are 40 percent to 50 percent higher during the six months after the death of a spouse compared to the mortality of married people of the same age. These studies were expanded to include the effects of other stressful life events such as death of other family members, divorce, and loss of a job, all of which were found to increase the risk of illness or death.⁸

Stress is well established as a contributor to heart disease, a relationship that has been demonstrated in a variety of epidemiologic studies. A particularly convincing example is a study of the male employees of two banks. At first, the two groups were similar, but one bank changed its management policies to become commercial. The employees of the commercial bank had to deal with considerable competition, risk, and responsibility for investing funds; employees of the other bank, a semipublic savings bank, had less competition and fewer responsibilities. Over a 10-year period, the employees of the commercial bank were found to have 50 percent higher rates of heart attacks and sudden death.⁹

Experiments on animals ranging from rats to baboons have found that various psychosocial stresses induce physiological changes such as decreased immune response and increased atherosclerosis. A 1991 experiment on humans demonstrated that stress suppresses the immune response in humans also. In that experiment, investigators measured levels of psychological stress in 420 healthy volunteers, then administered nasal drops containing cold viruses to all but a small control group. They found that the subjects

whose stress levels were higher were more likely to be infected with cold viruses and more likely to develop colds, with symptoms including sneezing, coughing, eye watering, nasal discharge, sore throat, and increased use of tissues.¹⁰ A whole new field of research called psychoneuroimmunology has arisen to study the impact of stress on health.

There are many reasons why lower SES exposes people to greater life stress. Daily hassles are greater at lower levels on the SES hierarchy: Cars break down, landlords complain about late rent checks, child care is unreliable, officials are rude. Members of racial and ethnic minorities may be exposed to incidents of racial prejudice. These minor but constant stresses may be as debilitating as such major life events as deaths in the family. Higher income and education provide resources that help to buffer the impact of life's hassles, thereby protecting health.

A number of factors can help people cope with life's stresses. Money, of course, can solve a multitude of problems. Education is important because it provides the information and skills to solve problems. Family and friends can also help by providing both emotional and instrumental assistance. In fact, **social support** has proven to be surprisingly significant in determining an individual's health.

Early evidence for the influence of social support on health came from an epidemiologic cohort study conducted on residents of Alameda County in California. Persons aged 30 to 69 were surveyed in 1965 on their physical, mental, and social well-being as well as their health-related habits such as exercise and the use of cigarettes and alcohol. They were also asked about their social networks, such as marital status, number of close friends and relatives, church membership, and affiliation with other organizations. Death certificates were then monitored over the next 9 years to assess mortality rates and, in 1974, a follow-up survey was conducted on survivors to assess their health status.¹¹

The study, as expected, found a strong association between certain unhealthy behaviors and higher mortality rates. More surprising, the study also found that an individual's health status and risk of dying were strongly associated with the extent and nature of his or her social network. This was true for both men and women and for individuals of high SES and low SES. The association remained true even after unhealthy behaviors were taken into consideration. Throughout the socioeconomic spectrum, men and women with few social contacts had mortality rates two to three times higher than those with many social connections.

Many more recent studies have supported the conclusions of the Alameda County study. Absence of social support has been related to an increase in coronary heart disease, complications in pregnancy and delivery, suicide, and other unhealthy outcomes.¹² Why social support should have such a broad and consistent effect on health is very poorly understood. It probably acts in part through its ability to buffer stress. A better understanding of the relationship between social support and health may come from research in the field of psychoneuroimmunology.

Psychological Models of Health Behavior

While public health does not have much power to change people's SES, stressful life events, or social networks, it is hoped that understanding how these factors affect health may

permit more effective interventions to promote healthier behavior. With this goal, social and behavioral scientists have proposed various theories and models attempting to explain how psychosocial factors affect health-related behavior. Some of these theories focus on individual psychology, while others attempt to explain the effect of the social environment on individual behavior. The goal of these analyses is to understand the most effective ways to promote healthier behavior.

The classic frame of reference for understanding health behavior, and especially behavior change, is the **health belief model**. Assuming that people act in rational ways, the health belief model specifies several factors that determine whether a person is likely to change behavior when faced with a health threat. These factors are (1) the extent to which the individual feels vulnerable to the threat, (2) the perceived severity of the threat, (3) perceived barriers to taking action to reduce the risk, and (4) the perceived effectiveness of taking an action to prevent or minimize the problem.

Based on the health belief model, the public health approach to changing behavior would be to convince people that they are vulnerable, that the threat is severe, and that certain actions are effective preventive measures. For example, surveys of low-income minority women who had not had mammograms found that many had misperceptions about the disease. Some women underestimated their susceptibility to breast cancer (factor 1); others were embarrassed or afraid of the pain or radiation involved in a mammogram (factor 3); and others felt that cancer was not curable and therefore there would be no point in diagnosing it early (factor 4). Screening rates among these women could be improved by counseling that included personally tailored messages that addressed the women's beliefs and concerns.¹³

Another important concept in understanding health behavior is **self-efficacy**, the sense of having control over one's life. People who are confident that they can control their lives are said to have high self-efficacy. People who believe their lives are subject to chance or external forces are said to have low self-efficacy. Self-efficacy is often added as a fifth factor in the health belief model. People are more likely to adopt healthy behavior if they are confident that they have the ability to do so.¹³

A sense of control is beneficial for health in a number of ways. Clearly, it reduces stress. A number of studies in both humans and animals have shown that an individual's perception of the stressfulness of an adverse event can be reduced by two factors: knowledge of when the stressful event will occur and the ability to regulate the timing and intensity of the event. This knowledge and ability give the individual a sense of control, or self-efficacy. The lowest self-efficacy is seen in people (or animals) who have experience of being unable to avoid noxious events, especially if they have repeatedly tried and failed. They may develop a pattern of "learned helplessness," a pattern described as a "numbed acceptance of a negative situation, so that an individual no longer tries to change that situation for the better because he or she does not expect those efforts to make any difference."^{14(p.44)}

A number of studies have shown that people with high self-efficacy are more likely to engage in health-promoting behavior than those with low self-efficacy. An attitude of learned helplessness is common in people who have repeatedly tried and failed to quit smoking or lose weight.

A great deal of research has been focused on how to increase people's self-efficacy, thereby helping to motivate them to practice healthy behaviors. An individual's self-efficacy is increased by previous successful performance of the behavior in question. It may also be increased by seeing others successfully perform the behavior, especially if the observed behavior is being performed by someone similar to themselves. For example, the most successful school drug prevention programs include role-modeling, small group exercises, and skills practice to teach students how to identify and resist internal and external pressures to use drugs. These programs have been found to be much more effective in enhancing students' self-efficacy to resist drugs if they are led by older teens, with whom they can identify, rather than by adult health educators.¹⁵

A theory that has proved widely useful in health education is the **transtheoretical model**, which envisions change—for example, smoking cessation or adopting a healthy diet—as a process involving progress through a series of five stages: precontemplation, contemplation, preparation, action, and maintenance. People in the precontemplation stage have no intention to change their behavior; the first step in getting them to change involves consciousness-raising to increase their awareness that their behavior is unhealthy and should be changed. In the second, contemplation stage, the person is more aware of the benefits of change, but is also very aware of the difficulties and barriers to change and still is not ready to take action. The third step is preparation, when a person has decided to make the change and has planned concrete actions he or she could take, such as signing up for a class, discussing the plan with their physician, or buying a self-help book. The fourth step, action, requires that individuals actually modify their behavior by abstaining from smoking or adhering to a healthier diet. Finally, maintenance is the stage in which people have achieved the healthier behavior but must strive to prevent relapse.¹⁶ Knowing which stage an individual has reached can help a physician or health educator move him or her along to the next stage.

The health belief model and the transtheoretical model are not contradictory; they are merely alternative ways of looking at what may be the same psychological factors. Both models can be useful in designing public health messages aimed at changing behavior.

Ecological Model of Health Behavior

In accordance with the recognition that individual beliefs and behaviors occur in a social context and that health promotion may be more effectively achieved through changing the social environment, so-called ecological models have been proposed for understanding health behavior.¹⁷ An **ecological model** looks at how the social environment, including interpersonal, organizational, community, and public policy factors, supports and maintains unhealthy behaviors. The model proposes that changes in these factors will produce changes in individual behavior.

The ecological model, illustrated in (**FIGURE 14-2**), describes five levels of influence that determine health-related behaviors; each level is a potential target for health promotion intervention. The first level—*intrapersonal* factors—encompasses the knowledge, attitudes, and skills of the individual. This is the level that has been explored by the psychological theories discussed earlier in this chapter. The second through fifth levels—interpersonal relations, institutional factors, community factors, and public

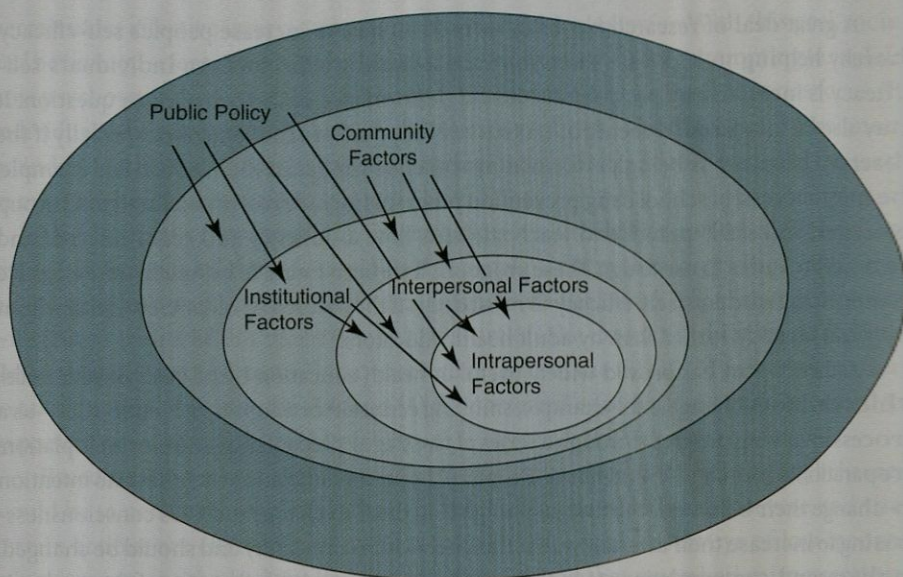


FIGURE 14-2 Ecological Model

policy—each have an impact on individual behavior both directly and indirectly, by interaction with the factors at other levels of influence.

The second level of influence, *interpersonal* relations—including family, friends, and coworkers—has very important effects on health-related behavior. Families, of course, are the origin of many health behaviors, especially habits learned early in life such as tooth brushing, exercising, and eating patterns. In the teen years, pressure from peers becomes more significant in influencing individual behaviors, such as smoking, using alcohol and drugs, and engaging in other risk-taking behavior. On the positive side, family and peer relationships provide the social support discussed earlier in this chapter.

Application of the ecological model at the interpersonal level would lead to different strategies in a teen drug prevention program depending on the nature of the teens' social relationships. A teen who belongs to a dense, homogeneous network will be more influenced by the norms and values of that group than a teen who relates individually to a number of separate individuals. In the close-knit group, drug prevention programs would have to focus on changing the norms about drug use within the existing network. When social networks are more loosely organized, the program might focus on creating drug-free networks, encouraging teens to associate with those networks, and reducing the desirability of membership in drug-using networks.

The third level of influence is significant because people spend one-third to one-half of their waking lives in *institutional* settings, especially schools and workplaces, which may have profound effects on their health and health-related behavior. In the workplace, employees may encounter hazardous chemicals or risks from injuries and accidents. Stress may be a problem. Alternatively, organizations may provide a corporate culture that supports positive behavior change. Workplace or school cafeterias may provide

health-conscious menus; exercise facilities may be available and their use encouraged; smoking restrictions may prevail. Schools and workplaces provide ideal settings for public health intervention.

The larger *community*—the fourth level—can be a significant influence on behavior. Organizations can work together in a community to jointly promote healthy goals. An understanding of community organization and networks can offer insight into promising avenues for health promotion. For example, churches are the social centers for many black and rural communities and may provide a focal point for health-related interventions. Conversely, community factors may sabotage public health efforts to promote healthy behavior. In the South, where tobacco is a pillar of local economies, public health advocates may find it difficult to even raise the issue of the health consequences of smoking.

At the fifth level, *public policy* encompasses the regulations and limitations on behavior that have been discussed previously. These are the most explicit and controversial measures that local, state, and national governments take to promote healthy behaviors. Such measures include smoking restrictions, age limits on alcohol sales, seat-belt laws, and so forth.

Health Promotion Programs

As social and behavioral scientists gain a better understanding of how people's behavior is affected by their own beliefs and by the various levels of influence in their social environment, theories such as the health belief model and the ecological model are being used to design more effective public health and disease prevention programs. A good example is provided by an AIDS prevention program targeted at gay men in San Francisco in the mid-1980s.¹⁸ Prevention of infection through behavior change was and is still the most effective approach to AIDS control because there is as yet no biomedical solution to the problem—no vaccine and no proven cure.

In the 1980s, San Francisco was the city with the second highest number of AIDS cases in the United States. Most of the cases occurred in gay men, and the primary means by which the virus was transmitted was by sexual intercourse between men. Almost as soon as this was understood, a prevention campaign was launched by the city health department in collaboration with community-based AIDS organizations and a research group from the University of California. They mounted an intensive media effort to inform at-risk individuals about the practice of safer sex. However, researchers understood that merely providing knowledge was not sufficient to change people's behavior. By interviewing small groups of gay men, they identified key beliefs that must be addressed if the messages were to be acted on by the target population.

This approach combines elements of three theories discussed above: the health belief model, self-efficacy, and the ecological model. The campaign's goals were to promote the following beliefs among high-risk individuals:

1. Belief in personal threat (i.e., "I am susceptible to infection").
2. Belief in response efficacy (i.e., "There is something I can do that will lessen the threat of infection").

3. Belief in personal efficacy (i.e., "I am capable of making these changes").
4. Belief that new behaviors are consistent with group norms (i.e., "My peers support new behaviors").¹⁸

The first belief was relatively easy to achieve because of the extensive publicity about AIDS in the general media. News and entertainment media aimed at gay men, including gay newspapers, comic books and leaflets, and telephone hot lines could be used to focus more on the second and third beliefs. Gay organizations held small group training sessions to teach skills in the use of condoms as well as interpersonal communication skills such as the ability to negotiate safer sex practices with prospective sex partners; this helped to enhance perceptions of self-efficacy among those at risk. To achieve the fourth belief, messages sought to encourage the perception that low-risk behaviors could be pleasurable and satisfying.

The first three elements of the campaign targeted individual health beliefs and self-efficacy. The fourth element addressed interpersonal and community influences. The campaign targeted community influences by providing educational programs for bartenders in establishments frequented by gay men. Condoms were made widely available in bars and small group meetings and were distributed by volunteers on street corners. The public policy, government level of influence was brought in through provision by the city of free, confidential testing for the human immunodeficiency virus (HIV) antibody. Because public bathhouses were a frequent site of high-risk behavior, there was pressure on the city government to close them, as was done in New York City. However, the campaign as a whole was so successful in changing the behavior of gay men that business at the bathhouses fell off, and public health officers were satisfied with merely posting warnings to the clientele about safe sex.¹⁹

The San Francisco AIDS prevention program was highly successful. Surveys done between 1984 and 1988 found that gay men had dramatically reduced their high-risk sexual behaviors during that period. For example, the percentage of men who reported engaging in unprotected receptive anal intercourse—the behavior most likely to transmit HIV—fell from 44 percent to 3 percent over the four years of the study.²⁰ When rates of seroconversion among gay men from HIV-negative to HIV-positive were analyzed, the researchers found that the behavior changes had paid off: Between 1982 and 1986, seroconversion rates fell from 13 percent to only 1 percent.

The early success of AIDS prevention programs among gay men, in the rest of the country as well as in San Francisco, was attributable largely to the fact that the gay community was in general well educated and politically astute. The epidemic's potential victims tended to be of high SES, motivated to preserve their health and able to mobilize resources to cope with the impending threat. Thus, they were more receptive to the health promotion campaign than other groups at risk for HIV. However, the success at reducing high-risk behavior has not been maintained. Ongoing studies of gay men in San Francisco found that the prevalence of unprotected anal intercourse had increased from 31 percent in 1998 to 46.6 percent in 2011.^{21,22} Despite continuing HIV prevention programs, the

prevalence of HIV-positive status among gay men in San Francisco has stabilized at about 24 percent.²¹

Public health workers attribute the resurgence of sexual risk behaviors to the advent of highly active antiretroviral therapy in 1995. Because of the remarkable effectiveness of the new drug treatments, many younger gay men saw HIV infection as a less severe threat (a factor in the health belief model) than did older gay men. The growing number of infected individuals, who are living longer because of therapy, and the persistence of unsafe sexual behaviors have led to a high rate of new infections, which more than replace the number of gay men who die from AIDS, which remains stable.²¹

Researchers in San Francisco believe that high rates of infection will persist in that community and stress the need for intensification of effective prevention strategies. In other parts of the country, different approaches may be necessary to reach high-risk groups. For example, among blacks—the population with the highest prevalence of HIV—men who have sex with men (MSM) often do not identify as gay. Thus prevention messages targeted at them might need to be different from those used in San Francisco.²³ A large number of studies have been done on behavioral interventions for HIV prevention and their effectiveness at reducing risky sexual behaviors. Evidence has shown effectiveness for individual person-to-person counseling, group-level programs that include a skill-building component delivered by other MSM, and to a lesser extent, community-level programs that can motivate and reinforce behavior change. There is little evidence, however, on how to reach minority MSM who do not regard themselves as part of the gay community. Other high-risk groups that need targeted programs include black women, who may be at risk of infection because of heterosexual intercourse with bisexual black men, and intravenous drug users.

Unfortunately, health promotion and disease prevention programs cannot be done once and for all. They must be repeated for every generation and every new at-risk group.

Changing the Environment

As more is being learned about what influences people to behave the way they do, many advocates believe that public health programs, to be effective, must concentrate less on individual behavior and more on changing the environment—both the social environment and the physical environment—to make it easier for people to behave in healthy ways. For example, there are many fewer deaths from motor vehicle crashes now than there were three decades ago. This public health success comes less from educational programs about safe driving than it does from safer design of highways and automobiles.

Similarly, the San Francisco HIV researchers suggest that social biases against homosexuality may contribute to the AIDS epidemic. They propose that recognition of same-sex marriage might encourage more stable relationships among gays, reduce the number of sexual partners by each individual, and thereby reduce the individual's risk of being infected. Public policy affects risk of HIV infection among intravenous drug users by providing access to needle exchange programs, which are illegal in some communities.

Environmental factors influence people's diet and activity patterns, which are the second most important factor in Americans' poor health. The government recommends

that people eat five servings daily of fresh fruit and vegetables, but educating people who live in poor areas of the inner city will not help improve their diets if they do not have access to supermarkets or produce stands. Similarly, federal policies that since World War II have favored a suburban lifestyle must bear much of the blame for Americans' lack of exercise: People live in their cars because most places are not within walking distance.

The environmental perspective forces people to think of public health problems as social and political issues that require collective action. Instead of blaming smokers for lack of will power, public opinion has shifted its focus to the tobacco industry and the enormous resources the industry has put into making their product attractive to young people, a way of thinking that has led to a remarkable change in public attitudes toward smoking. People take action, as black activists did against the alcoholic beverage industry when it began aggressively marketing high-powered malt liquors to young black males.²⁴ This approach may lead to confrontations with very powerful economic interests, and it will not always be successful. However, when whole communities become involved, it has the potential of being the most effective way to bring about major changes in health and behavior.

Conclusion

Because health is so strongly affected by behavior, it is important for public health advocates to understand what influences people to behave in healthy or unhealthy ways. The social and behavioral sciences offer insights into why people behave as they do, and they provide a basis for developing interventions aimed at persuading people to change their behavior.

There is evidence that factors such as race, gender, marital status, and especially SES influence health, and the reasons for these differences are likely to be social. Life expectancy, infant mortality, and mortality rates from a variety of diseases vary profoundly among different racial and ethnic groups. Stress, which may be brought on by social factors, has an adverse effect on health for a number of reasons. Social support has been found to have a positive effect on health, probably in part by providing a buffer against stress. The health of black Americans tends to be poorer than that of the white majority. Health data on the population is usually analyzed by race and ethnicity, and public health efforts focus on understanding the disparities and trying to eliminate them.

Theories of health behavior include the health belief model and the theory of self-efficacy. Both theories focus on the individuals' attitudes and beliefs as determinants of their behavior. The transtheoretical model of stages of change can be used in health education programs to promote behavior change. A broader perspective is provided by the ecological model of health behavior. This model considers all the levels of influence that may affect the individual's attitudes and beliefs, including interpersonal relationships such as family and friends, institutional influence such as school and work, the larger community and its values and beliefs, and public policy including laws and regulations.

The most effective public health intervention programs influence people's beliefs at several levels with the goal of creating a social environment favorable to healthy behavior. The San Francisco AIDS prevention program is an example of an effective program that succeeded in significantly reducing the transmission of HIV early in the epidemic. Evidence shows, however, that in order to maintain the success of such a program, intensive public

health efforts must be maintained, both to prevent relapses into unhealthy behavior and to educate new generations of at-risk people.

Increasingly, public health advocates realize that the most effective ways of improving health-related behavior of individuals is to focus on involving whole communities in improving the social and physical environment to be more conducive to healthy behavior.

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Chapter 18

Maternal and Child Health as a Social Problem

KEY TERMS

Congenital anomalies

Contraception

Developmental disabilities

Family planning

Infant mortality rate (IMR)

Immunization

Maternal mortality rates

Prenatal care

Preterm birth

Prematurity

Special Supplemental Nutrition
Program for Women, Infants,
and Children (WIC)

Sudden infant death syndrome
(SIDS)

Supplemental Nutrition
Assistance Program (SNAP)

The health of pregnant women and children is traditionally one of the highest priorities of public health. In a society concerned with the welfare of its population, everyone should be guaranteed adequate conditions for the best possible start in life. The fetal and infant stages of development provide the foundations of good health throughout life. There is increasing evidence that conditions in utero and during early life play a powerful role in increasing individuals' susceptibility to the chronic diseases that plague American adults, including high blood pressure, obesity, cardiovascular disease, and diabetes.¹ Moreover, because children are the most vulnerable segment of the population, like canaries in the coal mine, they are the first to suffer from any adverse conditions that affect human health in general.

Children's health first became a public concern in the United States at the end of the 19th century, prompted by alarm at the high infant and child death rates in the summer from diarrheal diseases.² Heat, poor sanitation, and lack of refrigeration contributed to heavy microbial contamination of milk, which was sickening poor children. In 1893, New York City established milk stations that provided safe milk. Similar programs soon followed in other cities. The success of the milk programs in improving children's health inspired the formation of voluntary infant welfare societies with the mission of teaching

poor and immigrant mothers about nutrition and hygiene. The federal government got involved in 1912 with the establishment of the Children's Bureau, mandated to "investigate and report on all matters affecting children and child life."^{2(p.8)} In 1921, Congress first provided grants to states to develop health services for mothers and children. During the same period, advocates for child health and welfare were fighting to protect children from oppressive and exploitive labor, which was not regulated by the federal government until the 1930s.

Child health programs have, since the beginning, been plagued by a basic philosophical and political conflict: Society's responsibility for the well-being of infants and children was sometimes in conflict with the presumed right of parents to provide for, or neglect, their own children.³ Until the 20th century, children were regarded as the property of their parents. Passage of the 1912 legislation establishing the Children's Bureau reflected a new view that children were a national resource and that their health and vigor were important for the progress of society. In recent decades, children have increasingly been viewed as having rights on their own, independent of their parents or their prospective role in society. Current controversies concerning the role of government in the protection of children—issues that range from the removal of children from abusive parents to medical treatment for the children of Christian Scientists—are a continuation of a century-long tradition of conflict.

Maternal and Infant Mortality

The **infant mortality rate (IMR)** is a gauge of a society's attention to children's health and is, in fact, an indicator of the health status of a population as a whole. This rate is a particular concern for American public health professionals because the infant mortality rate in this country is very high compared with that of other industrialized countries. As shown in (Table 18-1), the United States ranks 27th after many industrialized Asian and European countries. Sweden and Japan, for example, both have infant mortality rates less than half of that in the United States.

The infant mortality rate, defined as the number of infant deaths within the first year of life for every 1000 live births, has been declining in the United States over the course of the century, as seen in (FIGURE 18-1). The rate fell from 100 in 1915 to 6.0 in 2012.^{4(Table 11)} Reasons for the decline include improved socioeconomic status (SES), housing, and nutrition; immunization; clean water and pasteurized milk; antibiotics; and better prenatal care and delivery. The availability of family planning services and legalized abortion in the United States contributed to the lowering of IMR during the 1970s because wanted babies are more likely to thrive than unwanted ones.⁵ Progress in recent years is largely credited to technological advances in caring for premature infants and infants with low birth weight.

A very disturbing feature of the trends in infant mortality in the United States is the disparity according to race. The IMR for black Americans is more than double that for white Americans. While the high infant mortality among blacks accounts in part for this country's dismal showing on an international scale, the rate for white Americans is worse than that of 25 other countries seen in Table 18-1.

Table 18-1 Infant Deaths (per 1000 live births) in OECD Countries, 2011

Sweden	2.1	Austria	3.6
Japan	2.3	Germany	3.6
Finland	2.4	Netherlands	3.6
Norway	2.4	Australia	3.8
Czech Republic	2.7	Switzerland	3.8
Italy	2.9	United Kingdom	4.3
Portugal	3.1	Poland	4.7
South Korea	3.2	Canada	4.8
Spain	3.2	Hungary	4.9
Belgium	3.4	Slovak Republic	4.9
Greece	3.4	New Zealand	5.2
Denmark	3.5	United States	6.1
France	3.5	Chile	7.7
Ireland	3.5	Turkey	7.7
Israel	3.5	Mexico	13.7

Data from U.S. Centers for Disease Control and Prevention, *Health, United States 2014*, Table 14.

Maternal mortality rates also declined dramatically in the United States during the 20th century, so that today the death of a woman in childbirth is a very rare event. Between 1998 and 2011, an average of 14.6 women have died each year from causes related to childbirth for every 100,000 live births, as compared with 850 in 1900. Like IMRs, maternal mortality rates are significantly higher for black women than for white women—three to four times higher.^{6,7}

Infant Mortality—Health Problem or Social Problem?

“Infant mortality is not a health problem; it is a social problem with health consequences,” in the words of a former director-general of the World Health Association.^{8(p.473)} In seeking reasons to explain the high IMR in the United States, epidemiologists find that the number one risk factor for infant mortality is poverty. The generally lower SES of African Americans in the United States accounts in large part, but not entirely, for their higher IMR. There are a variety of reasons—environmental, nutritional, behavioral, medical, and social—that poverty leads to high infant mortality. These same factors that raise the risk of infant death also have a more general harmful impact on the health of the children that survive, leading to increased rates of chronic illness and disability, both physical and mental.

An extreme example of an environmental cause of infant mortality is the epidemic of birth defects in Minamata, Japan, caused by mercury contamination of the bay from an

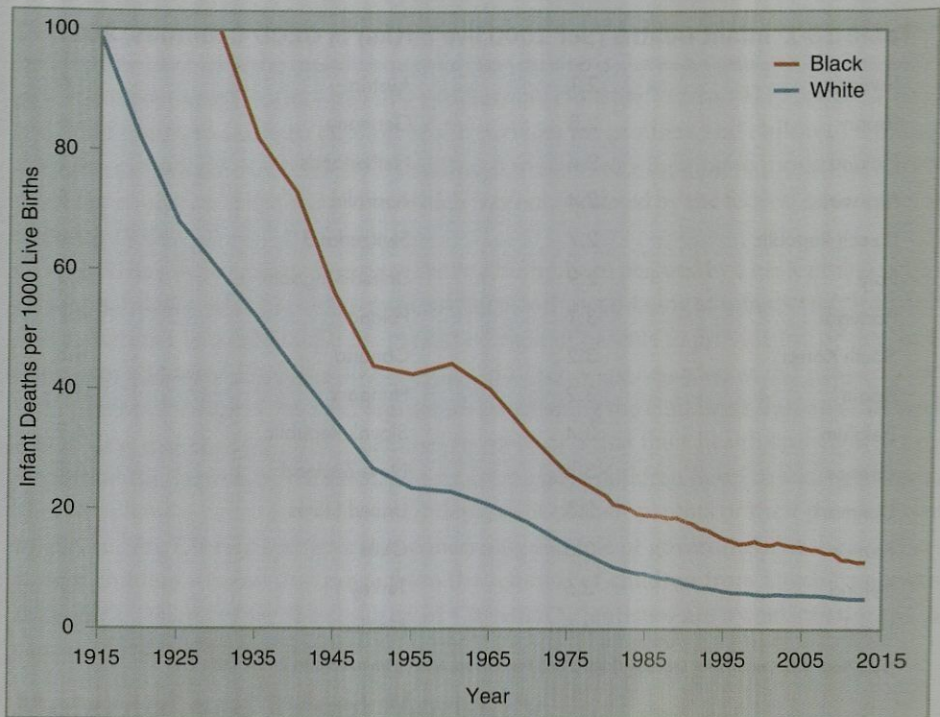


FIGURE 18-1 U.S. Infant Mortality Rates, 1915–2013. Note that data for Black are available starting in 1930.

Data from "Annual Summary of Vital Statistics: Trends in the Health of Americans During the 20th Century," *Pediatrics*, Bernard Guyer et al., 106 (6), December 2000; "National Vital Statistics Report, Deaths: Final Data for 1998," 48(11), 2000; and *Health, United States, 2014*, Table 12.

industrial source. Poor families are more likely to live in such industrial areas, exposing pregnant women and their fetuses to the harmful effects of polluted air and water. Lead, which is highly toxic to the developing nervous system, is a common contaminant in the American inner city, both from deteriorating paint and old plumbing. Other environmental chemicals known to harm the developing fetus are pesticides and organic solvents. More generally, to the extent that air or water pollution or substandard housing harm a mother's health, they harm her ability to give birth to a healthy infant. They may then cause further harm to a sickly infant who is brought home to an unhealthy environment.

Poverty may interfere with a prospective mother's ability to consume an adequate diet for nourishing her fetus. Poor women may lack the knowledge, time, or energy to prepare nutritious meals for themselves and their children. They may live in rural or inner-city areas where fresh fruits and vegetables are not readily available or are too expensive. Ignorance or lack of financial resources may carry over to how a baby is fed. Breastfeeding, which provides the best nutrition for an infant [unless the mother is infected with human immunodeficiency virus (HIV)], is less commonly practiced among poorly educated women than it is among those of higher SES.

Maternal behaviors that can harm the health of an infant include smoking, drinking alcohol, and the use of legal and illegal drugs. Women who smoke during pregnancy substantially increase their risk of giving birth to an infant of low birth weight. Moreover, infants are more likely to develop respiratory infections or die of sudden infant death syndrome (SIDS) when family members smoke in the home. Alcohol is a teratogen, and fetal alcohol syndrome is a risk for children of mothers who are problem drinkers. The use by inner-city pregnant women of illegal drugs, especially crack cocaine, became a major concern in the late 1980s and early 1990s. So-called crack babies were born addicted to the drug, suffered withdrawal symptoms after birth, and some sustained permanent neurological impairment. Unhealthy behaviors are not limited to poor women, of course: Affluent women may smoke, drink alcohol, use drugs, and eat unhealthy diets while pregnant. However, these behaviors are more common among poor women.

Social factors that contribute to high-risk pregnancies are those common in poor neighborhoods: young maternal age and low maternal education, out-of-wedlock birth, and violence. Teenage mothers are more likely to deliver premature infants than older women of the same SES, apparently for biological reasons.⁹ Poor women are more likely to be single mothers, thus lacking social support. Infants and children of poor families are at greater risk from violence, both the impersonal violence of the neighborhood and child abuse by family members. Poor children are also more likely to die from unintentional injuries, including fires and falls.

The lack of prenatal care has been linked with high risk of infant mortality. Poor women, who are more likely to lack access to medical care for financial and other reasons, are less likely to get prenatal care. However, it is not clear to what extent the lack of medical attention in itself contributes to the risk for poor women, since women who do not receive adequate prenatal care are likely to have other risk factors for infant mortality.¹⁰

Underlying and bound up with these factors that link poverty to infant mortality is the fact that poor women suffer higher levels of stress and lower levels of social support than most women of higher SES. According to one definition, stress is “a state that occurs when persons perceive that demands exceed their ability to cope.”^{11(p.19)} Poor women may find that even such modest demands as paying the rent and the food bill, getting to work, or finding daycare are too much. Poor housing increases stress when leaky plumbing, malfunctioning appliances, and infestations of vermin must be dealt with. A mother’s ability to cope with the needs of a sick child is limited when she has no health insurance, no transportation to a doctor’s office, and no one to help her care for other children in the family. A poor, young, single mother may not have the coping skills that might come from experience, education, and the support of the child’s father. To make matters worse, this mother is likely to seek stress relief through maladaptive behavior such as smoking, drug use, or entering into abusive relationships.

Preventing Infant Mortality

The United States has been successful in substantially reducing IMRs over the past several decades, as seen in Figure 18-1. However, much of this success is due to improved

medical treatments for highly vulnerable infants after they are born.¹² The disadvantages of the technological approach are obvious: It disrupts normal bonding between parents and infants; it leaves a significant number of the survivors with long-term **developmental disabilities**, even severe handicaps; and it is very expensive. The countries that have better IMRs than the United States are generally much less dependent on neonatal intensive care for achieving their successes.

The public health approach to the prevention of infant mortality focuses on two groups: pregnant women in general, most of whom are highly motivated to bear a healthy child and are receptive to information on how to avoid risks; and high-risk women—the poor, young, minority, unmarried women whose infants are most likely to suffer from their socioeconomic disadvantages. **Prenatal care** provides women with information on how to have a healthy pregnancy and bear a healthy child. Thus prenatal care is the most public health-oriented kind of care the medical profession provides. Prenatal visits also provide the opportunity to diagnose problems that need medical intervention. For example, bacterial infections of the genital tract increase a mother's risk of giving birth prematurely, and treatment with antibiotics can reduce that risk. The Centers for Disease Control and Prevention (CDC) recommends that all pregnant women should be screened for common infections and treated if infected.¹³ Beginning prenatal care as early as possible—preferably even before a woman conceives—greatly enhances a woman's prospects of bearing a healthy infant.

Prenatal care is especially important for the women with the lowest SES. Visits to a healthcare provider may be the only source of the education, services, and social support these women need. Most states recognize the importance of prenatal care and have tried to remove financial barriers by providing insurance or other sources of payment and by establishing prenatal clinics at health departments, hospital outpatient departments, and community health centers. In 2008, not quite 71 percent of pregnant women received prenatal care in the first trimester of pregnancy.¹⁴

A number of barriers remain that discourage the women at highest risk from seeking prenatal care, including lack of information about available services, inconvenient hours of service, rudeness and long waits at the clinics, inadequate transportation, and lack of child care for older children. The percentage of black and Hispanic women who receive prenatal care in the first trimester is significantly lower than that for white women (59.1 percent for blacks and 64.7 percent for Hispanics in 2008, compared with 72.2 percent for whites).¹⁴ Reaching women who do not seek early prenatal care requires active outreach programs including hotlines, community canvassing, and the provision of incentives to the expectant mother.¹² A new barrier arose in the wave of anti-immigrant sentiment and policies included in the 1996 federal welfare reform bill, which resulted in denial of prenatal care for immigrants in some states. From a public health perspective, this is a foolish and expensive policy, since the infants—U.S. citizens—born to these women will be more likely to be premature, unhealthy, and in need of neonatal intensive care. As of November 2013, 18 states had passed legislation that provides prenatal care to undocumented immigrants using federal or state funds.¹⁵

To be effective in reducing infant mortality, prenatal care for high-risk women should include a broad array of medical, educational, social, and nutritional services.

However, political realities too often mean that, although major efforts are made to increase the number of women who receive prenatal care, the clinics that provide it are understaffed, rushed, and not financed adequately to provide the services that could really make a difference in the health of the mother and infant.

Congenital Malformations

The leading specific causes of infant mortality, according to the listings on death certificates, are the following: congenital malformations, disorders related to short gestation and low birth weight, and sudden infant death syndrome (SIDS).^{16,17} **Congenital anomalies**, which account for more than 20 percent of infant deaths, are preventable in many cases. Some disorders, such as Tay-Sachs disease, hemophilia, and Down syndrome, have a well-known genetic basis and can be prevented by genetic screening and/or prenatal diagnosis. Newborn screening programs are designed to identify infants born with defects in body chemistry such as phenylketonuria and hypothyroidism that can be remedied by early diagnosis and treatment. Other congenital anomalies may be caused by known environmental exposures, such as tobacco smoke, viruses, heavy metals, or the use of legal or illegal drugs. Public health intervention includes Food and Drug Administration (FDA) regulation of teratogenic drugs such as thalidomide or warnings to pregnant women such as those required on alcoholic beverage containers and on the packaging of legal teratogenic drugs such as the acne drug Accutane or the epilepsy drug Dilantin. Infection with the rubella virus—German measles—once a common cause of deafness and mental retardation, is prevented by immunization. However, the causes of more than 70 percent of birth defects are unknown. It is believed that many defects are caused by a combination of genetic and environmental factors.

In an attempt to identify causes, the CDC is coordinating the National Birth Defects Prevention Study, a case-control study of babies born between 1997 and 2011.^{18,19} Mothers of more than 30,000 infants with birth defects were interviewed about their own health, pregnancy history, diet, medication and substance use, work history, drinking water sources, and other questions thought to be relevant. They were also asked to provide DNA samples, which can help identify the role of genetics. The control group of 10,000 infants were chosen at random from birth certificates of live-born infants with no major birth defects, and their mothers were similarly interviewed and asked for DNA samples. Among the study's findings to date are that women who are obese are at much higher risk for bearing a child with a broad range of birth defects. Smoking during pregnancy increases the risk of premature birth and certain birth defects such as cleft lip and cleft palate. Drinking alcohol during pregnancy may cause fetal alcohol syndrome. Prescription pain medications increase the risk of congenital heart defects and neural tube defects. Most common antibiotics do not appear to increase risks.

Nutritional factors are known to contribute to the risk of some defects. Two of the most severe are the neural tube defects—*anencephaly* (a lethal condition in which all or most of an infant's brain is missing) and *spina bifida* (protrusion of the spinal cord from the spinal column accompanied by paralysis of the lower body)—which may be caused in part by a deficiency in folic acid, a B vitamin present in green leafy vegetables, dried

beans, liver, orange juice, and grapefruit juice. The damage occurs early in the pregnancy, when the developing spinal column is being formed. Dietary supplementation with folic acid has been shown to reduce the incidence of these neural tube defects by 50 percent or more, but the supplementation must happen during the first month of pregnancy, even before the woman may recognize she is pregnant.²⁰ Public health campaigns to encourage all women of childbearing age to take folic acid supplements have had only modest success, and poor, high-risk women are probably the least likely to comply with the recommendation. In order to remedy the problem, the FDA decided to require that foods such as flour, corn meal, pasta, and rice be fortified with folic acid, effective January 1, 1998. As a result of the fortification, the number of affected pregnancies in the United States declined by about 20 percent by 2000 but has stabilized since then.²⁰ The amount of folic acid used for fortification is not sufficient to provide a maximum protective effect and young women are still advised to take supplements.

Preterm Birth

An analysis by CDC scientists, published in 2006, proposed that preterm birth is responsible for many more infant deaths than are indicated on the death certificates. The scientists noted that 6 of the 11 leading causes listed on the death certificates, including three separate diagnoses involving respiratory distress, are entirely attributable to **preterm birth**. When this information is taken into account, **prematurity**—disorders of short gestation and low birth weight—becomes the leading cause of infant death, causing over one-third of these deaths. Thus reducing infant mortality rates in the United States will require “a comprehensive agenda to identify, to test, and to implement effective strategies for the prevention of premature births.”^{21(p.1573)} The percentage of infants born prematurely amounted to 11.4 percent of all births in 2013.²² Black infants are almost twice as likely to be born too small as are white and Hispanic infants. Preterm births have been declining since 2006 in both black and white infants, and the disparity has also decreased somewhat. One factor contributing to the higher rate of too-small black infants is that the rate of births to black teenage girls is more than twice the rate in white teenagers. However, Hispanic teenage girls have babies at an even higher rate than blacks, and their infants tend to be born on time.

While the causes of premature labor and delivery are not well understood, many of the environmental, behavioral, nutritional, and social factors previously discussed can contribute. In trying to understand how to reduce the mortality and disability caused by preterm births, scientists classify preventive measures as primary, secondary, or tertiary.²³ In the United States, most of the efforts have been focused on tertiary prevention, aimed at improving the outcomes for infants born prematurely, and requiring expensive use of neonatal intensive care. Secondary prevention is aimed at identifying women at risk of giving birth too early and reducing their risk. For example, maternal smoking causes a 25 percent increased risk of preterm birth; the CDC monitors the prevalence of smoking among pregnant women, which has declined significantly since 1990 but is still over 10 percent.^{14(Table 8)} In fact, a state-by-state survey found in 2010 that 30.5 percent of pregnant women in West Virginia smoked during the

last three months of pregnancy.²⁴ Other risk factors include previous preterm births, carrying more than one fetus, obesity, diabetes, and bacterial infections of the genital tract. Recent evidence suggests that gum disease is associated with preterm births, and that periodontal treatment may reduce the risk.²⁵ Some of these factors can be helped by timely prenatal care. However, as many as half of preterm infants in the United States are born to women considered to be low risk.

Primary prevention of preterm birth is, from a public health perspective, the most desirable strategy. Many European countries accomplish this by providing social and financial support for low-risk pregnant women, but this might be politically difficult to implement in the United States.²³ Preterm birth, of the various causes of infant mortality, is clearly a social problem rather than a health problem, as discussed earlier in this chapter. The reason the United States has such a poor record in preventing infant mortality is that we have tried to approach it as a medical problem.

Sudden Infant Death Syndrome

Sudden infant death syndrome (SIDS), the third leading cause of infant death overall, is also not well understood. Almost always the death is unexpected; usually the infant appeared to be healthy before he or she died, and an autopsy fails to establish the cause of death. While SIDS is more common in infants of low birth weight and in infants of smokers or drug users, it is not limited to infants with these risk factors.²⁶ Until recently, because of the lack of understanding about the causes of SIDS, there was not much parents could do to reduce the risk. Then, in the early 1990s, studies done in New Zealand, Australia, and the United Kingdom reported that SIDS occurred more frequently in infants that were sleeping on their stomachs. The American Academy of Pediatrics and the National Institute of Child Health and Human Development began a "Back to Sleep" campaign, now called the "Safe to Sleep" campaign, to educate maternity wards, doctors and nurses, and parents that infants should be put to sleep on their backs. Since the campaign was launched, the number of deaths from SIDS has declined dramatically: By 2013, the SIDS death rate had fallen to less than one third of what it was in 1990.²⁷ There is still room for improvement: Surveys of infant sleeping positions have found that use of the back sleeping position varies widely and was least common among young women, black women, and women with less education and lower incomes.²⁸ The SIDS death rates for black and American Indian infants are more than double the rate for white infants. Public health agencies and medical care providers are working with minority communities to educate them about the importance of putting infants to sleep on their backs. Other factors that increase the risk of SIDS are soft bedding, being overheated, and bed sharing.

SIDS is a diagnosis of exclusion, meaning that any unexplained death is thoroughly investigated and SIDS is listed as the cause of death only if no other explanation is found. Law enforcement officials participate in the investigation, which includes an autopsy as well as interviews with family members and other caregivers. The CDC publishes guidelines recommending how these investigations should be done, with the aim of better understanding causes and risk factors for SIDS.

Family Planning and Prevention of Adolescent Pregnancy

Because pregnancy is not good for the health of either a teenager or her infant, preventing adolescent pregnancy is a high public health priority. In addition to the health risks, pregnancy during the teen years has many harmful consequences, including interference with the young mother's education and career prospects, economic hardship, and interference with the formation of a strong family unit. Thus adolescent pregnancy, and all the accompanying socioeconomic consequences, increases the health risks to the child for all the reasons previously described as causes of infant mortality. Teenage mothers are less likely to seek prenatal care than older women and are more likely to have no care at all. They are more likely to smoke and less likely to gain adequate weight during pregnancy. Infants of teenage mothers are at greatly increased risk of low birth weight, serious and long-term disability, and dying during the first year of life. These children are more likely to have lower school achievement, drop out of high school, be incarcerated, themselves become parents as teens, and face unemployment as young adults.²⁹

Rates of adolescent pregnancy in the United States have declined since the 1950s, but in those days, social pressure forced marriage on many girls who became pregnant, producing a more stable economic and family environment for the young child. Today, most teenage mothers are unmarried, and a large increase in adolescent births in the late 1980s alarmed public health advocates and policy makers.³⁰ However, after peaking in 1991, rates have declined steadily through 2013.^{4(Table 4),31} Birth rates have consistently been higher among black and Hispanic teenagers than among white teenagers, and rates have been lowest among Asian Americans and Pacific Islanders. U.S. adolescent pregnancy rates are the highest in the industrialized world.

Unintended pregnancy in older women is also a matter of concern to public health because it is more likely to lead to poorer health outcomes for mother and child. Some unintended pregnancies are merely mistimed, but many are unwanted, leading to some of the same risks as occur in teenage pregnancies. Surveys have shown that only about half of the pregnancies among American women are planned. A frequent consequence of unintended pregnancy is induced abortion. In the United States, there is approximately one abortion for every four live births.³² This is a decrease from the ratio of more than one in three live births in the 1980s. From a public health perspective, every pregnancy should be an intended pregnancy.

Adequate access to **contraception** could go a long way toward reducing rates of unintended pregnancy and abortion. Americans' ambivalent feelings about sex probably contribute to the fact that many women lack access to comprehensive family planning services. Even private health insurance plans often do not provide coverage for contraception. Unmarried women, poor women, adolescents, and black women are especially likely to encounter difficulty in obtaining and paying for services. President Obama's Affordable Care Act requires new health insurance plans to cover birth control without a deductible or co-payment, a measure that should help prevent many unintended and unwanted pregnancies. Older plans are exempt from the requirement, however, and plans offered by

religious organizations are also exempt. As of July 1, 2015, 28 states require insurance policies that cover prescription drugs to provide coverage of the full range of FDA-approved contraceptive drugs and devices.³³

Female sterilization and vasectomy for men are the most effective methods of contraception and are commonly used in the United States, but they are permanent and thus inappropriate for young people. Other highly effective methods—for women—are intrauterine devices (IUD) and some hormonal implants and patches. These methods have a failure rate of less than 1 pregnancy per 100 women per year. Equally effective when used correctly are combination oral contraceptives—“the pill”—and other hormonal contraceptives, such as Depo-Provera shots and the hormone-laden vaginal ring. Pills must be taken every day, however, and the other hormonal methods must be renewed at regular intervals. The effectiveness of hormonal methods may be reduced in women who are taking certain medications and supplements.³⁴

All of these methods have drawbacks, although the health risks tend to be overestimated by the general public. Barrier methods, including the male and female condoms and the female diaphragm, can be fairly effective if used correctly (failure rates of 2 to 6 pregnancies per 100 women per year) and condoms have the added advantage of reducing the risk of sexually transmitted diseases. However, barrier methods are often used inconsistently and incorrectly. Spermicides used alone (foams, creams, and jellies) have failure rates of 15 pregnancies per 100 women per year for perfect use and much worse for typical use. The cervical cap has a failure rate of 14 pregnancies per 100 women who have never been pregnant, but is much less effective in women who have given birth.³⁴

The “morning after pill,” a form of emergency contraception, can be taken up to five days after unprotected intercourse to prevent pregnancy. It works by preventing the release of a woman’s egg for longer than usual and is at least 85 percent effective. There was considerable controversy in the 2000s about whether these medications should be available without a prescription, especially to teenage girls, but now most brands are available over the counter.^{34–36} The availability of emergency contraception presumably contributes to the reduction in the number of abortions in recent years. Insertion of an IUD within five days of unprotected intercourse is 99.9 percent effective as an emergency contraceptive. It is relatively expensive and needs to be inserted by a healthcare provider, but it can be left in place for years to serve as ongoing birth control.

Public health programs specifically aimed at preventing teenage pregnancy include comprehensive sex education in the schools, which has been found to be effective in delaying young people’s initiation of intercourse and increasing their use of contraception when they do have sex.³⁷ There is considerable controversy about the exact message that should be conveyed in pregnancy prevention programs. The federal welfare reform bill that was implemented in 1998 included funding for programs that teach sexual abstinence only. Many states were reluctant to apply for the money because they believe such programs are much less effective than those that include education on contraception as well. A 2004 congressional review found that commonly used abstinence-only curricula contained “multiple scientific and medical inaccuracies.”^{37(p.2014)} For example, they teach that condoms are ineffective.

Some programs encourage teenagers to sign virginity pledges; studies have shown that those who do sign may delay sex, but when they do initiate intercourse they are less likely to use protection.³⁸

Abstinence-only advocates took credit for the significant decline in adolescent pregnancy rates since 1991 described previously. However, despite hundreds of millions of dollars of federal funds spent on abstinence-only programs each year, studies have found no measurable impact on teen sexual behavior. An analysis of data from national surveys of young women ages 15 to 19 found that only 14 percent of the decline in pregnancy could be attributed to delayed initiation of sexual activity, while 86 percent of the decline was due to increased use of contraceptives.³⁹ The authors concluded that “abstinence promotion is a worthwhile goal, particularly among younger teenagers.”^{39 (p.155)} However, it is insufficient to help adolescents prevent unintended pregnancies and sexually transmitted diseases. “Public policies and programs... should vigorously promote provision of accurate information on contraception and on sexual behavior and relationships, support increased availability and accessibility of contraceptive services and supplies for adolescents, and promote the value of responsible and protective behaviors, including condom and contraceptive use and pregnancy planning.”^{39 (p.155)}

Nutrition of Women and Children

Since the establishment of milk stations in the 1890s, nutrition has been an important component of maternal and child health programs. At first, the emphasis was on breastfeeding and the safety of milk and baby foods. Public health is still concerned with promoting breastfeeding, which offers most infants the healthiest start in life, reducing risks of infectious diseases, ear infections, respiratory infections, obesity, and chronic diseases such as asthma and allergies. Medical and public health organizations recommend that infants be exclusively breastfed for the first six months of their lives and then breastfed with supplemental baby food at least until their first birthday. The CDC tracks rates of breastfeeding at discharge from the hospital, but data at six months is sparse. Rates of initiation of breastfeeding have increased, but they vary depending on age and education of the mothers, with rates of only 59 percent among women without a high school diploma, compared with 88.3 percent among those with a bachelor's degree. Only 50.7 percent of women under 20 years old initiate breastfeeding, and that rate falls to 26.6 percent after three months.^{5 (Table 10)}

During the Great Depression of the 1930s, the federal government established several food assistance programs to ensure adequate nutrition for poor families. They formed the basis of current federal programs, run by the U.S. Department of Agriculture (USDA), which originated in the 1960s.⁴⁰ The **Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)** provides vouchers for milk, fruit juice, eggs, cereals, and other nutritious foods for pregnant women, lactating mothers, infants, and children up to five years old. Nutrition education is also provided, and WIC centers often become a source of many support services for poor, young families. The USDA has evaluated the WIC program and found it to be effective in saving medical costs for the women and infants who participated.

The nutritional needs of older children are addressed through the School Meals Program. School lunches, provided at most schools, must meet certain nutritional standards, including offering a meat or meat alternative, fruit and/or vegetables, bread, and milk. Children from households with incomes at or below 185 percent of the poverty level receive the lunches free or at reduced prices. Children from families with higher incomes pay more. A more limited number of children receive free or reduced price school breakfasts, and some schools offer after-school snacks. There is also a Summer Food Service Program, which provides meals during school vacation periods.

A third federal program designed to help low-income families afford adequate food is the **Supplemental Nutrition Assistance Program (SNAP)**, formerly the Food Stamp Program. Based on the household's size and income, families are issued an electronic benefits transfer card that can be used like a credit card to buy nutritious foods at grocery stores. The Food Stamp Program, which cannot be used for alcohol, tobacco, or nonfood items, has come under fire, in part because of some well-publicized abuses. There are some limitations on immigrant families' eligibility to receive SNAP benefits.⁴¹

Despite food assistance programs, children are at risk of going hungry in the United States. USDA surveys found that 14.3 percent of households were food insecure in 2013, meaning that they had limited or uncertain access to nutritionally adequate foods. Families headed by single women with children and black and Hispanic households are the most likely to experience food insecurity. Poor nutrition increases children's risks of stunting, inadequate cognitive stimulation, iodine deficiency, and iron deficiency anemia. It also increases the risk of overweight and obesity, in that high-calorie processed foods are often less expensive than fresh, perishable foods such as fruits, vegetables, and low-fat dairy products.^{42,43}

While undernutrition is a real concern for the poorest American families, overeating is a more widespread problem, as discussed elsewhere in this text.

Children's Health and Safety

Deaths in childhood from infectious diseases have been vastly reduced because of widespread **immunization** programs. Virtually all children are vaccinated against diphtheria, tetanus, pertussis (whooping cough), polio, measles, rubella (German measles), mumps, and hepatitis B before they enter school, because most of these immunizations are required by law. However, many preschool children are at risk because they do not receive immunizations at the recommended ages. Well-baby care is almost as important as prenatal care for child health, but children of poor families often miss out on these visits to the doctor for the same reasons that their mothers missed prenatal visits, including lack of affordable health care.

In 1993, the federal government launched a childhood immunization initiative aimed at increasing vaccination coverage among children ages 19 months to 35 months. The federal government began to provide free vaccines for children who were uninsured or whose insurance did not cover vaccines. Public and private sector organizations and healthcare providers at the national, state, and local levels were enlisted to implement the goals of the initiative, in the hope of virtually eliminating many of the traditional

childhood diseases. In addition to the eight diseases listed above, eight more recent vaccines are covered by the Vaccines for Children Program: *Haemophilus influenzae* type b (spinal meningitis), varicella (chicken pox), pneumococcal disease, hepatitis A, influenza, meningococcal disease, rotavirus, and human papilloma virus.⁴⁴

The human papilloma virus (HPV) vaccine, approved by the FDA in 2008, has proven uniquely controversial. HPV is a group of sexually transmitted viruses that will, at some time in their lives, infect about half of all people who have ever had sex. Although some infections do not cause symptoms and are cleared by the immune system, others may lead to genital warts in men and women or cause cancers of the cervix or other genital organs. The new vaccine prevents infection with the types of the virus that cause most cervical cancers and genital warts. It is ineffective, however, in people who are already infected. Thus vaccination is recommended for 11- and 12-year-old girls, to reach them before they become sexually active, but they are approved for women up to age 26. The vaccine is also recommended for boys, in whom the virus can cause cancers of the throat, penis, and anus. Vaccinated boys and men will be less likely to spread HPV to their current and future partners. The HPV vaccine is expensive, with a cost of more than \$125 for each dose, and it is designed to be given as three doses within six months. The Vaccines for Children Program will pay for poor and uninsured young people to be vaccinated. Many states have considered making the vaccine mandatory.⁴⁵

The controversy about the HPV vaccine stems from several factors.⁴⁶ There is the question of whether the expense is justified to prevent a disease, cervical cancer, which is relatively rare in the United States. Because the vaccine prevents only 70 percent of cancer cases, women will continue to need regular Pap smears to screen for the disease. Moreover, it is unclear how long immunity persists, so there may be a need for booster shots. Some parents are reluctant for their daughters to be vaccinated because they fear it may encourage promiscuity. There is also concern about side effects of the vaccine. The greatest value of the vaccine would be in developing countries, where screening is rare and the death rate from cervical cancer is high, but the vaccine is too expensive to be used in third-world countries.

Immunization rates are tracked by the CDC. In 2013, over 80 percent of children aged 19 months to 35 months had received the recommended doses of the nine most highly recommended vaccines. Over 90 percent had received at least some doses of these vaccines. Only 0.7 percent had received no vaccinations.⁴⁷ In some past years, there have been shortages of some vaccines. Manufacturers have left the market or produced insufficient supplies because they concluded that profits were not high enough, and they feared lawsuits over possible side effects. That threat was removed by the National Childhood Vaccine Injury Act, passed by Congress in 1986, which provided that pharmaceutical companies cannot be sued over harm caused by a vaccine. As of January 12, 2015, the CDC reported no shortages of the recommended vaccines.⁴⁸

Other preventive services of concern to public health because they may be missed by children of low SES who do not get regular well-baby care include screening for tuberculosis, problems with vision and hearing, and scoliosis, or curvature of the spine. Because recognizing these problems as early as possible is important for ensuring a child's future health and ability to learn, these services are usually provided in schools. Diagnosing a

problem in a school screening program does not guarantee that the problem will be corrected, however. Children who are uninsured or underinsured may be unable to obtain treatment even after the problem is identified repeatedly.

Childhood asthma is a significant public health concern, affecting 9.3 percent of children. Prevalence is higher among blacks (16.0 percent) than whites (8.0 percent).⁴⁹ Asthma prevalence grew dramatically between 1980 and 1996 for reasons that are not well understood.⁵⁰ Since then, rates appear to have reached a plateau. Deaths from asthma are rare among children, but African American children have a risk four times higher than white children of dying from the disease. Environmental factors in the inner city are believed to be responsible, at least in part, for the increase in asthma prevalence. Because asthma can generally be controlled by medication when patients and their parents are educated about self-management techniques, hospitalizations, and deaths are thought to be due to lack of access to regular, appropriate medical care.

Although fluoridation of community water supplies and other sources of fluoride have reduced tooth decay among children by more than 50 percent since the 1960s, some children still suffer from painful and debilitating tooth decay. Poor children are especially likely to suffer from dental decay when the water is not fluoridated, and communities vary in the extent to which they provide dental services through clinics or local health departments. The CDC has identified fluoridation of drinking water as one of the ten great public health achievements of the 20th century. In 2012, 74.6 percent of the population served by public water systems received fluoridated water.⁵¹

The fact that most mothers now work outside the home, a major change from the norm in previous decades, means that young children are increasingly being cared for in day care centers. Suddenly, the need for safe and affordable day care has become a public health issue. Infectious diseases spread rapidly among young children, and adequate hygiene when changing diapers is especially important. There are also risks of injury because of an unsafe physical plant or play equipment, inadequate staffing, or unqualified caregivers. These risks can be reduced by state licensing of day care centers, requiring them to meet basic health and safety standards.

Injuries constitute the main risk to the life and health of children once they pass their first year. Public health efforts to prevent childhood injury include education and regulations that encourage use of seat belts, child safety seats, and bicycle helmets. The U.S. Consumer Products Safety Commission monitors toys and children's furniture for safety hazards, issuing warnings and ordering recalls of products that are found to be dangerous to children.

While maternal and child health services, like public health in general, focus on prevention of death and disability, there is a long tradition of public concern about the care of children with handicaps. Beginning in 1935, the federal government funded state "crippled children's programs" that provide diagnosis, treatment, and rehabilitative services for children with special needs, many of whom are also eligible for support through Social Security.² While in the past many of these children might have been institutionalized, current programs try as much as possible to keep them at home, supporting families and preparing disabled young people to live independent lives.

In order to better understand factors that influence children's health and development, Congress in 2000 authorized the National Institutes of Health (NIH), the CDC, and the Environmental Protection Agency to conduct the largest long-term study on children ever done in the United States. The National Children's Study was designed as a longitudinal cohort study, comparable to the Framingham Heart Study and the Nurses' Health Study. The plan was to follow 100,000 children, from before birth to age 21, to better understand the link between children's genes, the physical, chemical, and psychosocial environments in which they are raised, and their physical and mental health and development. The first volunteers were recruited in January 2009. However, by December 2014, after over \$1 billion had been spent, only 5,000 mother-infant pairs had been enrolled. Dr. Francis Collins, Director of the NIH, announced the study was being terminated. An advisory panel had criticized the study for poor design, inadequate management, and failed oversight. Dr. Collins said he intends to fund smaller studies that can answer some of the same questions.⁵²

Conclusion

Maternal and child health is one of the highest priorities for public health. In the United States, city, state, and local governments have for over a century conducted programs and enforced legislation aimed at protecting children and promoting their health.

Infant mortality is a gauge of society's attention to children's health and is often used as an indicator of the health status of a population as a whole. The United States compares poorly with other countries on infant mortality, ranking 27th overall. IMRs, along with other public health improvements, have greatly improved since the beginning of the 20th century. Like other indicators of health, infant mortality is higher among blacks than among whites and declines with increasing SES.

The three leading causes of infant mortality overall are congenital anomalies, low birth weight, and SIDS. Public health programs to prevent infant mortality because of congenital anomalies, or birth defects, include pre- and postnatal screening and diagnostic programs. They also include protection of pregnant women from exposure to environmental teratogens. Dietary supplementation with folic acid has been found to prevent some birth defects.

Low birth weight, caused by preterm birth, is closely linked to SES. Because pregnant adolescents are especially likely to give birth to infants of low birth weight, prevention of pregnancy in teenagers is a high priority for public health.

SIDS deaths declined dramatically during the 1990s after it was found that babies who were put to sleep on their stomachs were at increased risk of sudden death. An educational campaign about infant sleeping positions cut SIDS deaths by over 50 percent.

Adequate family planning services are important for public health. Pregnancy in adolescence is risky for both mothers and infants. Comprehensive sex education is effective in preventing teen pregnancy. Political conservatives promote abstinence-only programs, which are less effective than programs that include information on contraception. Unintended pregnancy also increases health risks in older women and their infants. While a variety of effective contraceptive methods are available, many women do not

have access to affordable family planning services. Nutrition is an important component of maternal and child health programs. The federal government has, since the 1930s, supported a number of programs that provide supplemental foods for pregnant women, infants, and children.

Other public health initiatives that have a significant impact on children's health include immunization requirements, fluoridation of community water supplies, and injury-prevention measures. Regular access to medical care is important for the health of children, but many poor and minority children do not have this access.

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