CHAPTER 2

Measuring Population Health

Learning Objectives

Given an ecological perspective of the varied influences on the health status of populations, incorporate appropriate measures of health and illness (including risk factors) into a population or community health needs assessment activity. Key aspects of this competency expectation include being able to

- Articulate a definition of health consistent with that of the World Health Organization
- Identify four or more categories of factors that influence health
- For each of these categories, specify three or more specific factors that influence health
- Identify several categories of commonly used measures of health status
- For each of these categories, identify three or more commonly used measures
- Describe major trends in health status for the United States over the past 100 years
- Access and utilize comprehensive and current national data on health status and factors influencing health in the United States
- Utilize information on factors that influence health and measures of health to develop community health priorities and effective interventions for improving community health status

The 21st century began much as its predecessor did, with immense opportunities to advance the health of the public through actions that ensure conditions favorable for health and quality of life. All systems direct their efforts toward certain outcomes; they track progress by ensuring that these outcomes are clearly defined and measurable. In public health, this calls for clear definitions and measures of health and quality of life in populations. That task is the focus of this chapter. Key questions to be addressed are:

- What is health?
- What factors influence health and illness?
- How can health status and quality of life be measured?
- What do current measures tell us about the health status and quality of life of Americans in the early decades of the 21st century?
- How can this information be used to assess population and community health status and develop effective public health interventions and public policy?

The relevance of these questions resides in their focus on factors that cause or influence particular health outcomes. Efforts to identify and measure key aspects of health and factors influencing health have relied largely on traditional approaches over the past century, although there are signs that this pattern may be changing. The key questions identified above will be addressed slightly out of order, for reasons that should become apparent as this chapter unfolds.

HEALTH IN THE UNITED STATES

Many important indicators of health status in the United States have improved considerably over the past century, although there is evidence that health status could be even better than it is. At the turn of the 20th century, nearly 2% of the U.S. population died each year. The crude mortality rate in 1900 was about 1,700 deaths per 100,000 population. Life expectancy at birth was 47 years. Additional life expectancy at age 65 was another 12 years. Medicine and health care were largely proprietary in 1900 and of questionable benefit to health. More extensive information on the health status of the population at that time would be useful, but very little exists.

Indicators of health status improved in the United States throughout the 20th century.[1] Between the years 1900 and 2000, the crude mortality rate was cut in half to 872 per 100,000. By the year 2000, life expectancy at birth was nearly 77 years and life expectancy at age 65 was another 18 years.

The leading causes of death also changed dramatically over the 20th century, as demonstrated in **Figure 2-1** depicting causes of death in 1900 and 2000. In 1900, the 10 leading causes of death were influenza and pneumonia, tuberculosis, diarrhea and related diseases, heart disease, stroke, chronic nephritis, accidents, cancer, perinatal conditions, and diphtheria. By the year 2000, tuberculosis, gastroenteritis, and diphtheria dropped off the list of the top 10 killers, and deaths from influenza and pneumonia fell from first to seventh position on the list. Diseases of aging and other chronic conditions superseded these infectious disease processes as changes in the age structure of the population, especially the increase in persons over age 65, resulted in higher overall crude rates for heart disease and cancer and the appearance of diabetes, Alzheimer's disease, chronic kidney conditions, and septicemia on the modern list of the top 10 killers.

Changes in crude death rates substantially understate the gains in life expectancy realized for all age groups over the 20th century. On an age-adjusted basis, improvements were even more impressive. Age-adjusted mortality rates fell about 75% between 1900 and 2000, with infant and child mortality rates 95% lower, adolescent and young adult mortality rates 80% lower, rates for 25–64 year-old adults lower by 60%, and rates for adults older than age 65 falling 35%.

These gains were not solely the result of better prevention and control of infectious diseases and advances in antibiotics and vaccinations in the first half of the century. During the second half of the 20th century, overall age-adjusted mortality rates fell about 50%, while infant mortality rates declined more than 75%. During that period, mortality rates among children and young adults (ages 1–24 years) and adults 45–64 years were reduced by more than one-half. Mortality rates among adults 25–44 years fell more than 40%, and rates for elderly persons (age 65 and older) fell about one-third. **Figure 2-2** demonstrates that age-adjusted mortality rates continued to fall faster than overall crude mortality rates through the first decade of the 21st century.

Gains for adult age groups in recent decades have outstripped those for younger age groups, a trend that began about 1960 as progress accelerated toward reduction of mortality from injuries and certain major chronic diseases that largely affected adults. Over the second half of the 20th century, dramatic reductions in the death rates for heart disease, stroke, unintentional injuries, influenza and pneumonia, and infant mortality have been joined by more recent reductions in rates for human immunodeficiency virus (HIV) infections, liver diseases, and suicide. On the other hand, death rates have increased for diabetes, Alzheimer's disease, and chronic lung and kidney conditions, signaling the new morbidities associated with longer life spans. Homicide rates have improved somewhat over the past decade but still reflect a substantial increase since 1950.[1]

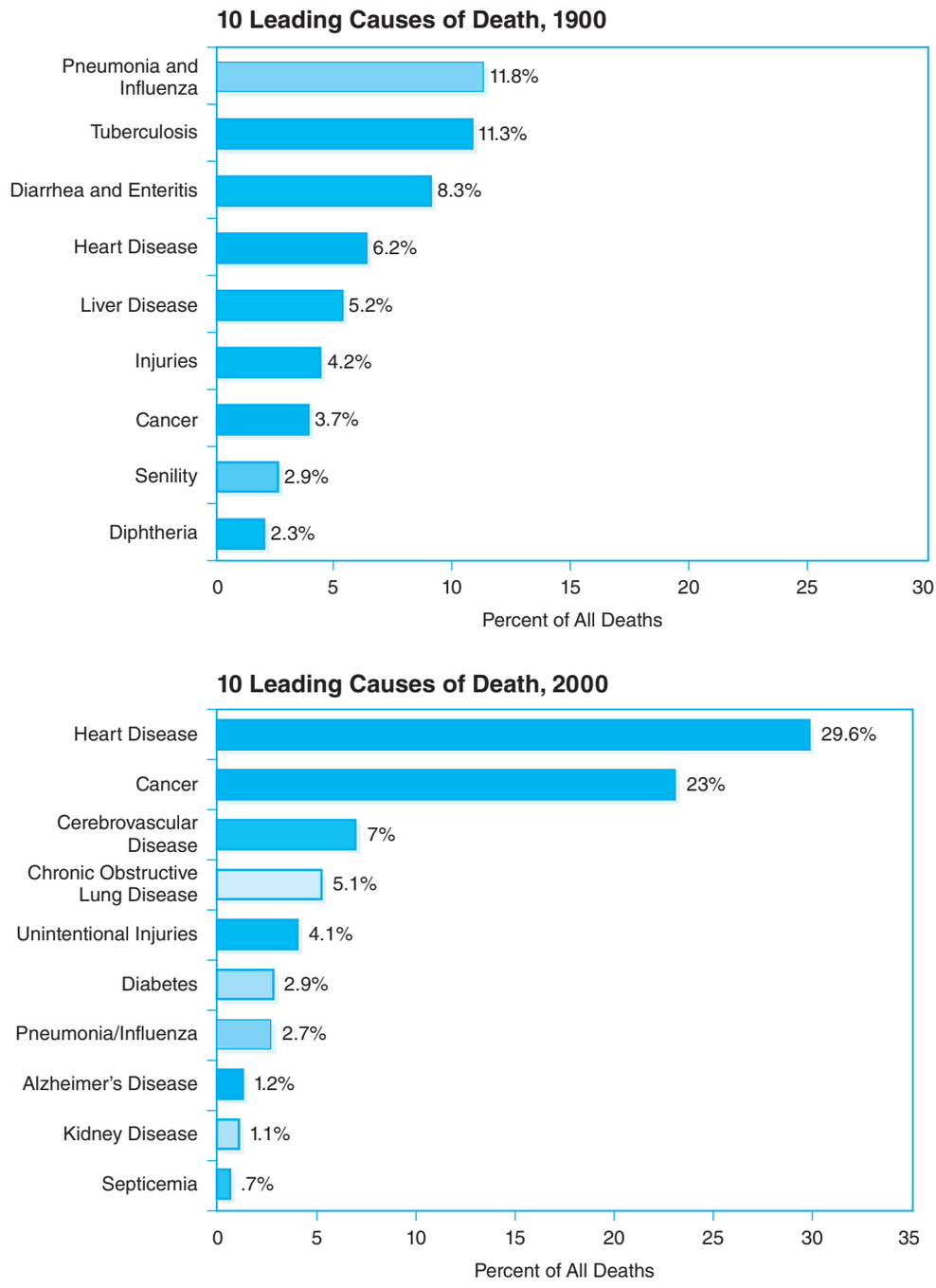
Despite this progress, considerable disparities persist for many of the major causes of death. Differences among races are notable, but there are also significant differences by gender for the various causes of death. These differences are often dramatic and run from top to bottom through the chain of causation. Disparities are found not only in indicators of poor health outcomes, such as mortality, but also in the levels of risk factors in the population groups most severely affected. A sobering example of these disparities is reflected in the 12-year difference in life expectancy between white females and black males.

OUTSIDE-THE-BOOK THINKING 2-1

Examine each of these Web sites. Which ones are most useful for the major topics examined in this chapter? Why?

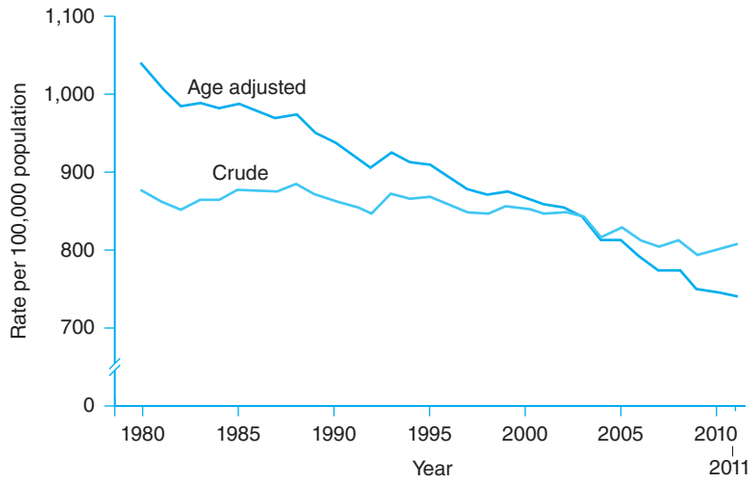
- Healthfinder (www.healthfinder.gov), a Department of Health and Human Services (DHHS)-sponsored gateway site that provides links to more than 550 Web sites (including more than 200 federal sites and 350 state, local, not-for-profit, university, and other consumer health sources), nearly 500 selected online documents, frequently asked questions on health issues, and databases and Web search engines by topic and agency
- Fedstats (fedstats.sites.usa.gov/), a gateway to a variety of federal agency data and information, including health statistics
- National Center for Health Statistics (NCHS) (www.cdc.gov/nchs/index.htm), an invaluable resource for data and information, especially "Health, United States," which can be downloaded from this site
- Centers for Disease Control and Prevention (CDC) Mortality and Morbidity Weekly Report (www.cdc.gov/mmwr/) and MMWR morbidity and mortality data by time and place (www.cdc.gov/mmwr/distrnds.html)
- U.S. Census data (www.census.gov), the best general denominator data anywhere

FIGURE 2-1 The 10 Leading Causes of Death as a Percentage of All Deaths in the United States, 1990 and 2000



Reproduced from the Office of Disease Prevention and Health Promotion. *Healthy People 2010: Understanding and Improving Health*. Rockville, MD:ODPHP; 2000 and National Center for Health Statistics. *Health, United States*, 2002. Hyattsville, MD: NCHS; 2002.

FIGURE 2-2 Crude and Age-Adjusted Mortality Rates, United States, 1980–2011



Reproduced from Centers for Disease Control and Prevention, National Center for Health Statistics, National Vital Statistics System.

There is also evidence that disability levels are declining in the general population over time. Disability levels among individuals aged 55–70 years who were offspring of the famous Framingham Heart Study cohort were substantially lower, in comparison with their parents' experience at the same age.[2] In addition, fewer offspring had chronic diseases or perceived their health as fair or poor. Self-reported health status and activity limitations because of chronic conditions changed little during the 1990s, and injuries with lost workdays steadily declined during the 1990s.

In sum, U.S. health indicators tell two very different tales. By many measures, the American population has never been healthier. By others, much more needs to be done for specific racial, ethnic, and gender groups. The gains in health status over the past century have not been shared equally by all subgroups of the population. In fact, relative differences have been increasing. This widening gap in health status creates both a challenge and a dilemma for future health improvement efforts. The greatest gains can be made through closing these gaps and equalizing health status within the population. Yet the burden of greater risk and poorer health status resides in a relatively small part of the total population, calling for efforts that target those minorities with increased resources. An alternative approach is to continue current strategies and resource deployment levels in order to sustain steady overall improvement among all groups in the population. This strategy, however, is likely to continue or worsen existing gaps. In the early years of the new century, the major health challenge facing the United States appears to be less related to the need to improve population-wide health outcomes than the need to eliminate or reduce disparities. This challenges the nation's commitment to its principles of equality and social justice as addressing inequities in measures of health and quality of life requires a greater understanding of health and the measures used to describe it than afforded by death rates and life expectancies.

HEALTH, ILLNESS, AND DISEASE

Relationships among health outcomes and the factors that influence them are complex, often confounded by different understandings of the concepts in question and how they are measured. Health is difficult to define and more difficult yet to measure. For much of history, the notion of health has been negative. This was due in part to the continuous onslaught of epidemic diseases. With disease a frequent visitor, health became the disease-free state. One was healthy by exclusion.

As knowledge of disease increased and methods of prevention and control improved, health has come to be considered from a more positive perspective. The World Health Organization (WHO) seized this opportunity in its 1946 constitution, defining health as not merely the absence of disease but a state of complete physical, mental, and social well-being.[3] This definition of health emphasizes that there are different, complexly related forms of wellness and illness, and suggests that a wide range of factors can influence the health of individuals and groups. It also suggests that health is not an absolute concept.

Although health and well-being may be synonyms, health and disease are not necessarily opposites. Most people view health and illness as existing along a continuum and as opposite and mutually exclusive states. However, this simplistic, one-dimensional model of health and illness does not comport very well with the real world. A person can have a condition or injury and still be healthy and feel well. There are many examples, but certainly Olympic wheelchair racers would fit into this category. It is also possible for someone without a specific disease or injury to feel ill or not well. If health and illness are not mutually exclusive, then they exist in separate dimensions, with wellness and illness in one dimension and the presence or absence of disease or injury in another.

These distinctions are important because disease is a relatively objective, pathologic phenomenon, whereas wellness and illness represent subjective experiences. This allows for several different states to exist: wellness without disease or injury, wellness with disease or injury, illness with disease or injury, and illness without physical disease or injury. This multidimensional view of health states is consistent with the WHO delineation of physical, mental, and social dimensions of health or well-being. Health or wellness is more than the absence of disease alone. Furthermore, one can be physically but not mentally and socially well.

With health measurable in several different dimensions, the question arises as to whether there is some maximum or optimal end point of health or well-being or whether health is something that can always be improved through changes in its physical, mental, and social facets. This suggests that the goal should be a minimal acceptable level of health, rather than a state of complete and absolute health. Due in part to these considerations, WHO revised its definition in 1978, calling for a level of health that permits people to lead socially and economically productive lives.[4] This shifts the focus of health from an end in itself to a resource for everyday life, linking physical to personal and social capacities. It also suggests that it will be easier to identify measures of illness than of health.

Disease and injury are often viewed as phenomena that may lead to significant loss or disability in social functioning, making one unable to carry out one's main personal or social functions in life, such as parenting, schooling, or employment. In this perspective, health is equivalent to the absence of disability; individuals able to carry out their basic functions in life are healthy. This characterization of health as the absence of significant functional disabilities is perhaps the most common one for this highly sought state. Still, this definition is a negative one in that it defines health as the absence of disability.

The concept of well-being advanced in the WHO definition goes beyond the physical aspects of health that are the usual focus of measurements and comparisons. Including the mental and social aspects of well-being or health legitimizes the examination of factors that affect mental and social health. Together, these themes underscore the need to consider carefully what is being measured in order to understand what these measures tell us about health, illness, and disease states in a population and the factors that influence these outcomes.

MEASURING HEALTH

The plethora of information on health outcomes suggests that measuring the health status of populations is a simple task. However, although often interesting and sometimes even dramatic, the commonly used measures of health status fail to paint a complete picture of health. Many of the reasons are obvious. The commonly used measures actually reflect disease and mortality, rather than health itself. The long-standing misperception that health is the absence of disease is reinforced by the relative ease of measuring disease states, in comparison with states of health. Actually, the most commonly used indicators focus on a state that is neither health nor disease—namely, death.

Despite the many problems with using mortality as a proxy for health, mortality data are generally available and widely used to describe the health status of populations. This is ironic because such data only indirectly describe the health status of living populations. Unfortunately, data on morbidity (illnesses, injuries, and functional limitations of the population) are neither as available nor as readily understood as are mortality data. This situation is improving, however, as new forms and sources of information on health conditions become more readily available. Sources for information on morbidities and disabilities now include medical records from hospitals, managed care organizations, and other providers, as well as information derived from surveys, businesses, schools, and other sources. Assessments of the health status of populations are increasingly utilizing measures from these sources. An excellent compilation of data and information on both health status and health services, *Health United States*, is published annually by the National Center for Health Statistics.[1] Much of the data used in this chapter is derived from this source.

Mortality-Based Measures

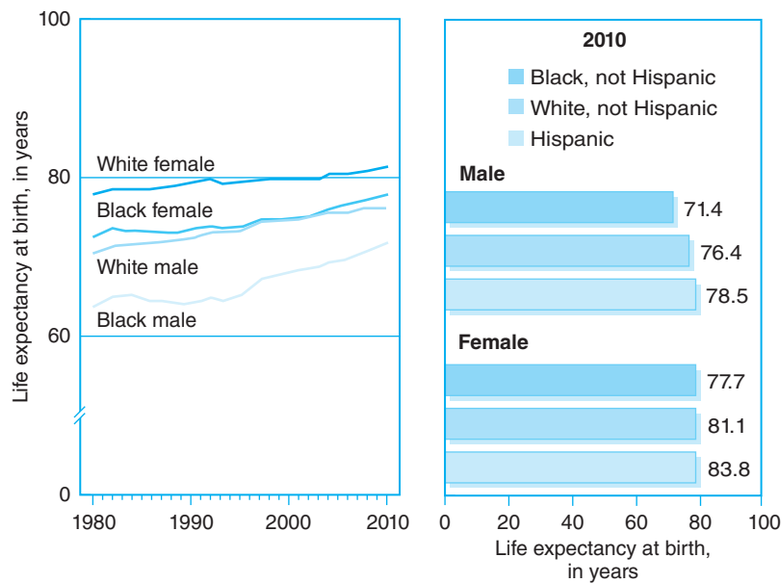
Although mortality-based indicators of health status are both widely used and useful, there are some important differences in their use and interpretation. The most commonly used are crude mortality, age-specific and age-adjusted mortality, life expectancy, and years of potential life lost (YPLL). Although all are based on the same events, each provides somewhat different information as to the health status of a population.

Crude mortality rates count deaths within the entire population and are not sensitive to differences in the age distribution of different populations. The mortality comparisons presented in Figure 2-2 comparing crude and age-adjusted death rates illustrate the limitations of using crude death rates to assess the mortality experience of the U.S. population. On the basis of these data, we might conclude that mortality rates in the United States had declined about 10% since 1980. However, because there has been an increasing proportion of population in the higher age categories over recent decades, these are not truly comparable populations. The 10% reduction actually understates the differences in mortality experience over this 30-year period after changes in the age structure of the population are controlled. The 10% reduction then becomes a 30% reduction! Because differences in the age characteristics of the two populations are a primary concern, we look for methods to correct or adjust for the age factor. Age-specific and age-adjusted rates do just that. The second half of the 20th century witnessed decreases of 50% or more for age-adjusted mortality rates for stroke, heart disease, infant deaths, tuberculosis, influenza and pneumonia, syphilis, unintentional injuries, HIV infections, and gastric, uterine and cervical cancers.[1] Improvements in age-adjusted mortality rates for the leading causes of death are continuing in the early years of the new century.[1]

Age-specific mortality rates relate the number of deaths to the number of persons in a specific age group. The infant mortality rate is probably the best-known example, describing the number of deaths of live-born infants occurring in the first year of life per 1,000 live births. Public health studies often use age-adjusted mortality rates to compensate for different mixes of age groups within a population (e.g., a high proportion of children or elderly). Age-adjusted rates are calculated by applying age-specific rates to a standard population (we now use the 2000 U.S. population). This adjustment permits more meaningful comparisons of mortality experience between populations with different age distribution patterns. Differences between crude and age-adjusted mortality rates can be substantial.

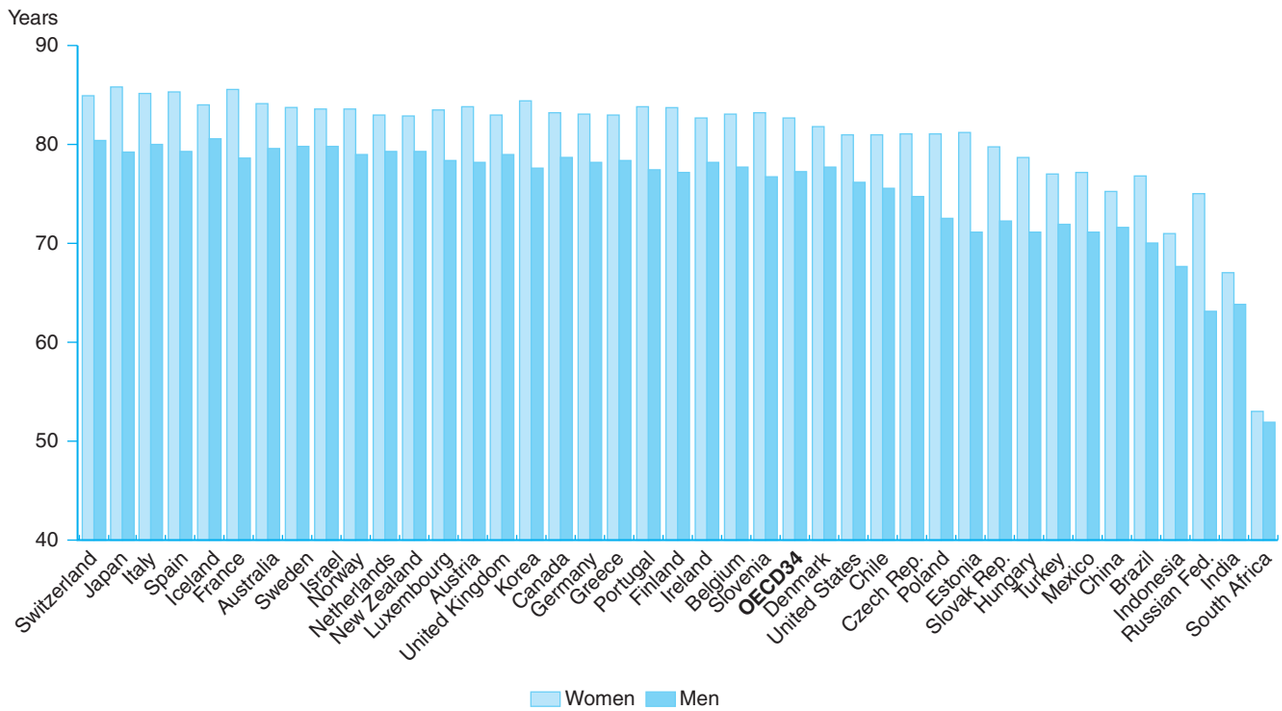
Life expectancy, also based on the mortality experience of a population, is a computation of the number of years between any given age (e.g., birth or age 65) and the average age of death for that population. **Figure 2-3** presents recent data and trends for life expectancy at birth in the United States; **Figure 2-4** provides international comparisons for life expectancy. Together with infant mortality rates, life expectancies are commonly used in comparisons of health status among nations. These two mortality-based indicators are often considered to be general indicators of the overall health status of a population. Infant mortality and life expectancy

FIGURE 2-3 Life Expectancy at Birth by Race and Gender, United States, 1980–2010



Reproduced from CDC/NCHS, *Health, United States, 2013*, Figure 1. Data from the National Vital Statistics System.

FIGURE 2-4 Life Expectancy at Birth, by Sex, United States and Selected Countries and Territories, 2011 (or Nearest Year)



Reproduced from OECD (2013), Health at a Glance 2013: OECD Indicators, OECD Publishing. Available at http://dx.doi.org/10.1787/health_glance-2013-en. [OECD: International Organization for Economic Cooperation and Development].

measures for the United States are lackluster in comparison with those of other developed nations. The figure presenting international comparisons of life expectancy at birth by gender suggests that the United States is far from being the healthiest nation in the world.

YPLL is a mortality-based indicator that places greater weight on deaths that occur at younger ages. Years of life lost before some arbitrary age (often age 65 or 75) are computed and used to measure the relative impact on society of different causes of death. If age 65 is used as the threshold for calculating YPLL, an infant death would contribute 65 YPLL, and a homicide at age 25 would contribute 40 YPLL. A death due to stroke at age 70 would contribute no years of life lost before age 65, and so on. Until relatively recently, age 65 was widely used as the threshold age. With life expectancies now exceeding 75 years at birth, YPLL calculations using age 75 as the threshold have become more common. Data on YPLL before age 75 is presented in **Table 2-1**, illustrating the usefulness of this approach in providing a somewhat different perspective as to which problems are most important in terms of their magnitude and impact. The use of YPLL ranks cancer, HIV infections, and various forms of injury-related deaths higher than does the use of crude numbers or rates. Conversely, the use of crude rates ranks heart disease, stroke, pneumonia, diabetes, and chronic lung and liver diseases higher than does the use of YPLL. Four of the top 10 causes of death, as determined by the number of deaths, do not appear in the list of the top 10 causes of YPLL. Each of these various mortality indicators can be examined for various racial and ethnic subpopulations to identify disparities among these groups.

Morbidity, Disability, and Quality Measures

Mortality indicators can also be combined with other health indicators that describe quality considerations to provide a measure of the span of healthy life. These indicators can be an especially meaningful measure of health status in a population because they also consider morbidity and

TABLE 2-1 Age-Adjusted Years of Potential Life Lost (YPLL) before Age 75 by Cause of Death and Ranks for YPLL and Number of Deaths, United States, 2000

Causes of Death	YPLL	Rank by YPLL	Rank by Number of Deaths
Cancer	1,698,500	1	2
Heart disease	1,270,700	2	1
Unintentional injuries	1,052,500	3	5
Suicide	343,300	4	11
Homicide	274,200	5	14
Cerebrovascular diseases	226,500	6	3
Chronic obstructive lung disease	190,700	7	4
Diabetes mellitus	181,200	8	6
HIV infections	178,900	9	18
Chronic liver disease and cirrhosis	141,700	10	12

Note: Years lost before age 75 per 100,000 population younger than 75 years of age.
Reproduced from National Center for Health Statistics. *Health, United States,* 2002. Hyattsville, MD: NCHS; 2002.

disability from conditions that impact on functioning but do not cause death (e.g., cerebral palsy, schizophrenia, arthritis). A commonly used measure of aggregate disease burden is the disability-adjusted life-year or DALY. Other variants on this theme are span-of-healthy-life indicators (called years of healthy life) that combine mortality data with self-reported health status and activity limitation data acquired through the National Health Interview Survey. Depending on the healthy life expectancy measure, Americans average about 10 years of poor health, 15 years of activity limitation, and 30 years of living with a chronic disease. Women have better health status than men, and whites do better than blacks on virtually all of these measures. For healthy life expectancies at age 65, a similar picture appears. The implication is that extending healthy life expectancy can be achieved through several pathways. One would be to extend life expectancy without increasing the measures of poor health, activity limitation, and chronic disease burden. Another would be to reduce the measures of poor health, activity limitation, and chronic disease burden within a constant life expectancy. The optimal approach would accomplish both by extending life expectancy and reducing the burden of poor health, activity limitation, and chronic disease.

Although less frequently encountered, indicators of morbidity and disability are also quite useful in measuring health status. Both prevalence (the number or rate of cases at a specific point or period in time) and incidence (the number or rate of new cases occurring during a specific period) are widely used measures of morbidity.

Increasingly, information on self-reported health status and on days lost from work or school because of acute or chronic conditions is collected through surveys of the general population. The National Center for Health Statistics also conducts ongoing surveys of health providers on complaints and conditions requiring medical care in outpatient settings. These surveys provide direct information on self-reported health status and illuminate some of the factors, such as household income levels, that are associated with health status.

INFLUENCES ON HEALTH

In 1996, public health surveillance in the United States took a historic step. At that time, the Centers for Disease Control and Prevention (CDC) added prevalence of cigarette smoking to the list of diseases and conditions to be reported by states to CDC.[5] This action marked the first time that a health behavior, rather than an illness or disease, was considered nationally reportable—a groundbreaking step for surveillance efforts. How the focus of public health efforts shifted from conventional disease outcomes to reporting on underlying causes amenable to public health intervention is an important story.

Risk Factors

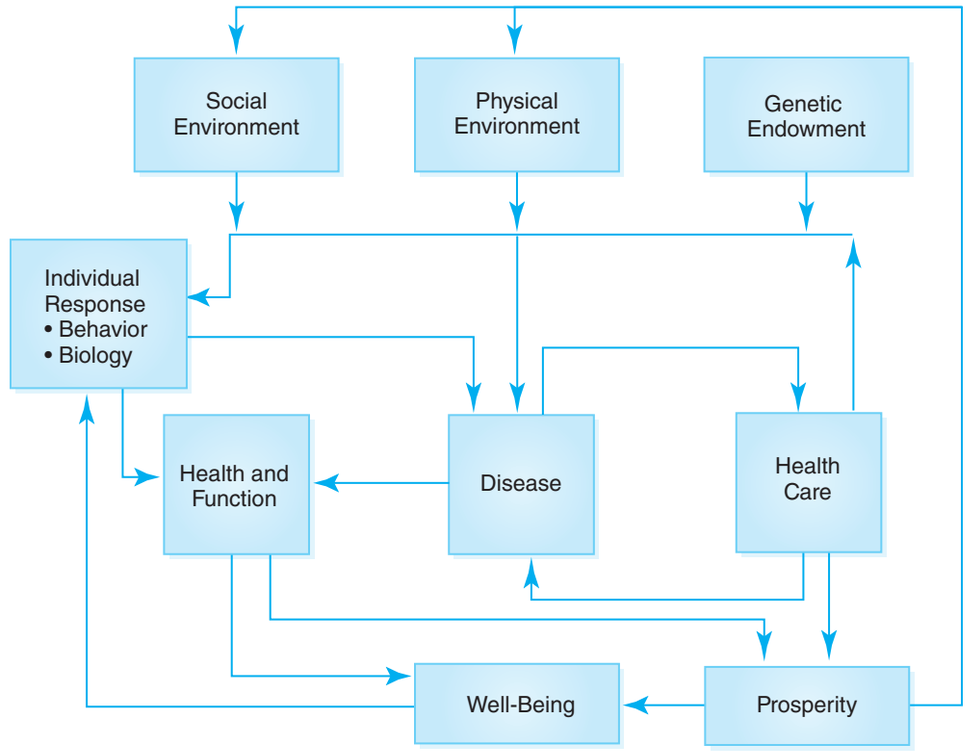
The recognition of tobacco use as a major health hazard was no simple achievement, partly because many factors directly

or indirectly influence the level of a health outcome in a given population. For example, greater per capita tobacco use in a population is associated with higher rates of heart disease and lung cancer, and lower rates of early prenatal care are associated with higher infant mortality rates. Because these factors are part of the chain of causation for health outcomes, tracking their levels provides an early indication as to the direction in which the health outcome is likely to change. These factors increase the likelihood or risk of particular health outcomes occurring and can be characterized broadly as risk factors.

The types and number of risk factors are as varied as the influences themselves. Depending on how these factors are lumped or split, traditional categories include biologic factors (from genetic endowment to aging), environmental factors (from food, air, and water to communicable diseases), lifestyle factors (from diet to injury avoidance and sexual behaviors), psychosocial factors (from poverty to stress, personality, and cultural factors), and use of and access to health-related services. Refinements of this framework are reflected in **Figure 2-5**, which differentiates several outcomes of interest, including disease, functional capacity, prosperity, and well-being that can be influenced by various risk factors. These various components are often interrelated (e.g., stress, a social environmental factor, may stimulate individual responses, such as tobacco or illicit drug use, which, in turn, influence the likelihood of disease, functional capacity, and well-being). In addition, variations in one outcome, such as disease, may influence changes in others, such as well-being, depending on the mix of other factors present. This complex set of interactions, consistent with the social-ecological model, draws attention to fundamental factors or causes that can result in many diseases, rather than focusing on specific factors that contribute little to population-wide health status.

Although many factors are causally related to health outcomes, some are more direct and proximal causes than others. Specific risk factors have been clearly linked to specific adverse health states through epidemiologic studies. For example, numerous studies have linked unintentional

FIGURE 2-5 Determinants of Health



Reproduced from Evans RG, Stoddard GL. Producing health, consuming health. *Soc Sci Med*. 1990;31:1359, with permission from Elsevier.

TABLE 2-2 Selected Behavioral Risk Factors Related to Leading Causes of Deaths in the United States, 2000

Cause of Death and Percent of all Deaths	Smoking	High Fat/ Low Fiber	Sedentary Lifestyle	High Blood Pressure	Elevated Cholesterol	Obesity	Alcohol Use
Heart disease (30%)	X	X	X	X	X	X	X
Cancer (23%)	X	X	X			X	X
Stroke (7%)	X	X		X	X	X	
Chronic lung disease (5%)	X						
Unintentional injuries (4%)	X						X
Pneumonia & influenza (3%)	X						
Diabetes (3%)		X	X			X	
HIV infection (1%)							
Suicide (1%)							X
Chronic liver disease (1%)							X
Atherosclerosis (1%)	X	X	X		X		

Data for causes and percent deaths from National Center for Health Statistics. *Health United States 2002*. Hyattsville, MD: NCHS; 2002. Risk factors related to causes from Brownson RC, Remington PL, Davis JR, et al. *Chronic Disease Epidemiology and Control*. 2nd ed. Washington, DC; American Public Health Association; 1998 and U.S. Public Health Service. *The Surgeon General's Report on Nutrition and Health*. Washington, DC: PHS; 1988.

injuries with a variety of risk factors, including the accessibility to firearms and the use of alcohol, tobacco, and seat belts. Tobacco, hypertension, over-nutrition, and diabetes are well-known risk factors for heart disease. As documented in **Table 2-2**, epidemiologic research and studies over the past 50 years have linked numerous behavioral risk factors to many common diseases and conditions.[6] Ongoing behavioral risk factor surveys (often through telephone interviews) are conducted by governmental public health agencies to track trends in the prevalence of many important risk behaviors within the population. These surveys document that the health-related behaviors of tens of millions of Americans place them at risk for developing chronic disease and injuries.

Despite the recent emphasis on behavioral factors, risk factors in the physical environment remain important influences on health. Air pollution, for example, is directly related to a wide range of diseases, including lung cancer, pulmonary emphysema, chronic bronchitis, and bronchial asthma. National standards exist for many of the most important air pollutants and are tracked to determine the extent of these risks in the general population. The proportion of the U.S. population residing in counties that have exceeded national standards for these pollutants suggests that air pollution risks, like behavioral risks, affect tens of millions of Americans.[7] The physical environment influences health through several pathways, including facilitating risk-taking behaviors, influencing social relationships, and even exposing residents to visual cues that can arouse fear, anxiety, and depression.

Behavioral and environmental risk factors are clearly germane to public health interest and efforts. Focusing on these factors provides a different perspective of the enemies of personal and public health than that conveyed by disease-specific incidence or mortality data. Such a focus also promotes more rational policy development and interventions. Unfortunately, determining which underlying factors are most important is more difficult than it appears because of differences in the outcomes under study and measures used. For example, a study using 1980 data found tobacco, hypertension, and over-nutrition responsible for about three-fourths of deaths before age 65 and injury risks, alcohol, tobacco, and gaps in primary prevention accounting for about three-fourths of all YPLL before age 65.[8] Further complicating these analyses is the finding that individual risk factors may result in several different health outcomes. For example, alcohol use is linked with motor vehicle injuries, other injuries, cancer, and cirrhosis; tobacco use can result in heart disease, stroke, ulcers, fire and burn injuries, and low birth weight, as well as cancer.[6,8]

Despite problems with their measurement, the identification of antecedent causes is important for public health policy and interventions. **Table 2-3** compares deaths in the year 2000 by their listed causes of death and their actual causes (major risk factors).[9] The two lists provide contrasting views as to the major health problems and needs of the U.S. population.

Coroners and medical examiners report immediate and underlying causes of death through death certificates which have two parts, one for entering the immediate and

TABLE 2-3 Listed and Actual Causes of Death, United States, 2000

10 Leading Causes of Death	Number	Actual Causes of Death	Number
Heart disease	710,760	Tobacco	435,000
Malignant neoplasm	553,091	Poor diet and physical inactivity	400,000
Cerebrovascular disease	167,661	Alcohol consumption	85,000
Chronic lower respiratory tract diseases	122,009	Microbial agents	75,000
Unintentional injuries	97,900	Toxic agents	55,000
Diabetes mellitus	69,301	Motor vehicle	43,000
Influenza and pneumonia	65,313	Firearms	29,000
Alzheimer's disease	49,558	Sexual behavior	20,000
Nephritis, nephrotic syndrome, and nephrosis	37,251	Illicit drug use	17,000
Septicemia	31,224	**Total**	**1,159,000**
Other	499,283		
Total	**2,403,351**		

Data from Mokdad AM, Marks JS, Stoup DF, Gerberding JL. Actual causes of death in the United States, 2000. *JAMA*. 2004; 291: 1238–1245.

underlying conditions that caused the death and a second for identifying conditions or injuries that contributed to death but did not cause death. For example, a death attributed to cardiovascular disease might list cardiac tamponade as the immediate cause, due to or as a consequence of a ruptured myocardial infarction, which itself was due to or a consequence of coronary arteriosclerosis. For this death, hypertensive cardiovascular disease might be listed as a significant condition contributing to, but not causing, the immediate and underlying causes. So where do smoking, obesity, diet, and physical inactivity get identified as the real causes of such deaths? Perhaps the Chadwick-Farr debate of the mid-19th century continues today in terms of whether deaths in the year 2000 should be attributed to tobacco use, just as many of those in England in 1839 might have been attributed to starvation.

OUTSIDE-THE-BOOK THINKING 2-2

Visit the Internet web site of several national print media and use the search features to identify articles on public health for a recent month. Catalog the health problems (both conditions and risks) from that search and compare this with the listing of health problems and issues on Table 2-3. Are the types of conditions and risks you encountered in the print media similar? Were some conditions and risks either overrepresented or underrepresented in the media, in comparison with their relative importance as suggested by Table 2-3? What are the implications for the role of the media in informing and educating the public regarding public health issues?

Social and Cultural Influences

Understanding the health effects of biologic, behavioral, and environmental risk factors is straightforward in comparison with understanding the effects of social, economic, and cultural factors on the health of populations. This is due in part to a lack of agreement as to what is being measured. Socioeconomic status and poverty are two factors that generally reflect position in society. There is considerable evidence that social position is an overarching fundamental determinant of health status, even though the indicators used to measure social standing are imprecise, at best.

Social standing affects lifestyle, environment, and the utilization of services; it remains an important predictor of good and poor health in our society. Social class differences in mortality have long been recognized around the world. In 1842, Chadwick reported that the average ages at death for occupationally stratified groups in England were as follows: "gentlemen and persons engaged in the professions, 45 years; tradesmen and their families, 26 years; mechanics, servants and laborers, and their families, 16 years."[10] Life expectancies and other health indicators have improved considerably in

England and elsewhere since 1842, but differences in mortality rates among the various social classes persist to the present day.

OUTSIDE-THE-BOOK THINKING 2-3

Great Debate: There are three propositions to be considered. Proposition A: Disease entities should be listed as official causes of death. Proposition B: Underlying factors that result in these diseases should be listed as official causes of death. Proposition C: No causes of death should be listed on death certificates. Select one of these positions and develop a position statement with your rationale.

Several countries, including Great Britain and the United States, have identifiable social strata that permit comparisons of health status by social class. Britain conducts ongoing analyses of socioeconomic differences according to official categorizations based on general social standing within the community. For the United States, educational status, race, and family income are often used as indirect or proxy measures of social class. Despite the differences in approaches and indicators, there is little evidence of any real difference between Britain and the United States in terms of what is being measured. In both countries, explanations for the differences in mortality appear to relate primarily to inequalities in social position and material resources.[11,12] This effect operates all up and down the hierarchy of social standing; at each step improvements in social status are linked with improvements in measures of health status. For example, a study based on 1971 British census follow-up data found that a relatively affluent, home-owning group with two cars had a lower mortality risk than did a similar relatively privileged group with only one car.[11]

In the United States, epidemiologists have studied socioeconomic differences in mortality risk since the early 1900s. Infant mortality has been the subject of many studies that have consistently documented the effects of poverty. Findings from the National Maternal and Infant Health Survey, for example, demonstrated that the effects of poverty were greater for infants born to mothers with no other risk factors than for infants born to high-risk mothers.[13] Poverty status was associated with a 60% higher rate of neonatal mortality and a 200% higher rate for postneonatal mortality than for those infants of higher-income mothers.

Poverty affects many health outcomes. Low-income families in the United States have an increased likelihood (or relative risk) of a variety of adverse health outcomes, often two to five times greater than that of higher-income families. The percentage of persons reporting fair or poor health is about four times as high for persons living below the poverty level as for those with family income at least twice the poverty level.[1]

The implications of the consistent relationship between measures of social standing and health outcomes suggest that studies need to consider how and how well social class is categorized and measured. Imprecise measures may understate the actual differences that are the result of socioeconomic position in society. Importantly, if racial or ethnic differences are simply attributed to social class differences, factors that operate through race and ethnicity, such as racism or ethnic discrimination, will be overlooked. These additional factors also affect the difference between the social position one has and the position one would have attained, were it not for one's race or ethnicity. Race in the United States, independent of socioeconomic status, is linked to mortality, although these effects vary across age and disease categories.[14] Nevertheless, anthropologists concluded long ago that race is not an appropriate generic category for comparing health outcomes. Its usefulness does not derive from any biologic or genetic differences, but rather, it derives from its social, cultural, political, and historical meanings.

Studies of the effect of social factors on health status across nations add some interesting insights. In general, health appears to be closely associated with income differentials within countries, but there is only a weak link between national mortality rates and average income among the developed countries.[15] This pattern suggests that health is affected less by changes in absolute material standards across affluent populations than by relative income differences and the resulting disadvantage in each country. It is not the richest countries that have the greatest life expectancy. Rather, it is those developed nations with the narrowest income differentials between rich and poor. This finding argues that health in the developed world is less a matter of a population's absolute material wealth than of how the population's circumstances compare with those of other members of their society. A similar perspective views income to be related to health through two pathways: a direct effect on the material conditions necessary for survival, and an effect on social participation and the

opportunity to control one's own life circumstances.[16] In settings or societies that provide little in the way of material conditions (e.g., clean water, sanitation services, ample food, adequate housing), income is more important for health. Where material conditions are conducive to good health, income acts through social participation.

The effects of culture on health and illness are also becoming better understood. To medical anthropologists, diseases are not purely independent phenomena. Rather, they are to be viewed and understood in relation to ecology and culture. Certainly, the type and severity of disease varies by age, sex, social class, and ethnic group. For example, Puerto Rican children overall have a higher prevalence of asthma than Mexican American, non-Hispanic white, and African American children.[17] Differences in poverty status do not explain the disparities for Puerto Rican and African American children, two populations that have higher asthma rates than non-Hispanic white and Mexican American children regardless of poverty status. The reason for the higher rate among Puerto Rican children overall is unknown, but the different distributions and social patterns suggest differences in culture-mediated behaviors. Such insights are essential to developing successful prevention and control programs. Culture serves to shape health-related behaviors, as well as human responses to diseases including changes in the environment, which, in turn, affect health. As a mechanism of adapting to the environment, culture has great potential for both positively and negatively affecting health.

There is evidence that different societies shape the ways in which diseases are experienced and that social patterns of disease persist, even after risk factors are identified and effective interventions become available.[18,19] For example, the link between poverty and various outcomes has been well established; yet even after advances in medicine and public health and significant improvement in general living and working conditions, the association persists. One explanation is that as some risks were addressed, others developed, such as health-related behaviors, including violent behavior and alcohol, tobacco, and drug use. In this way, societies create and shape the diseases that they experience. This makes sense, especially if we view the social context in which health and disease reside—the setting and social networks. For problems such as HIV infections, sexually transmitted diseases, and illicit drug use, spread is heavily influenced by the links between those at risk.[20] This also helps to explain why people in disorganized social structures are more likely to report their own health as poor than are similar persons with more social capital.[21,22]

Societal responses to diseases are also socially constructed. Efforts to prevent the spread of typhoid fever by limiting the rights of carriers (such as Typhoid Mary) differed greatly from those to reduce transmission risks from diphtheria carriers. Because many otherwise normal citizens would have been subjected to extreme measures in order to avoid the risk of transmission, it was not socially acceptable to invoke similar measures for these similar risks.

If these themes of social and cultural influences are on target, they place the study of health disparities and inequities at the top of the public health agenda. They also argue that health should be viewed as a social phenomenon. Rather than attempting to identify each and every risk factor that contributes only marginally to disparate health outcomes of the lower social classes, a more effective approach would be to directly address the broader social policies (distribution of wealth, education, employment, discrimination, and the like) that foster the social disparities that cause the observed differences in health outcomes.[19] This social-ecological view of health and its determinants is critical to understanding and improving health status in the United States and other nations.

Global Health Influences

Considerable variation exists among the world's nations on virtually every measure of health and illness currently in use. The principal factors responsible for observed trends and obvious inequities across the globe fall into the general categories of the social and physical environment, personal behavior, and health services. Given the considerable variation in social, economic, and health status among the developed, developing, and underdeveloped nations, it is naive to make broad generalizations. Countries with favorable health status indicators, however, generally have a well-developed health infrastructure, ample opportunities for education and training, relatively high status for women, and economic development that counterbalances population growth. Nonetheless, countries at all levels of development share some problems, including the escalating costs involved in providing a broad range of health, social, and economic development services to disadvantaged subgroups within the population. Social and cultural upheaval associated with urbanization is another problem common to countries at all levels of development. Over the course of the 20th century, the proportion of the world's population living in urban areas tripled—to about 40%; this trend is expected to continue throughout the new century.

The principal environmental hazards in the world today appear to be those associated with poverty. This is true for

developed as well as developing and underdeveloped countries. Some international epidemiologists predict that, in the 21st century, the effects of overpopulation and production of greenhouse gases will join poverty as major threats to global health. These factors represent human effects on the world's climate and resources and are easily remembered as the "3 Ps" of global health (pollution, population, and poverty):

- Pollution of the atmosphere by greenhouse gases, which will result in significant global warming, affecting both climate and the occurrence of disease
- Worldwide population growth, which will result in a population of 10–12 billion people within the next century
- Poverty, which is always associated with ill health and disease [23,24]

It surprises many Americans that population is a major global health concern. Birth rates vary inversely with the level of economic development and the status of women among the nations of the world. Continuing high birth rates and declining death rates will mean even more rapid growth in population in developing countries. It has taken all of history to reach the world's current population level, but it will take less than half a century to double that. Many factors have influenced this growth, including public health, which has increased the chances of conception by improving the health status of adults, increasing infant and child survival, preventing premature deaths of adults in the most fertile age groups, and reducing the number of marriages dissolved by one partner's premature death.

Global warming represents yet another phenomenon with considerable potential for health effects. Climate change has direct temperature effects on humans and increases the likelihood of extreme weather events. A number of infectious diseases are also climate sensitive, some because of effects on mosquitoes, ticks, and other vectors in terms of their population size and density and changes in population movement, forest clearance and land use practices, surface water configurations, and human population density.[25] Global warming will also contribute to air quality-related health conditions and concerns.

In general, public health approaches to dealing with world health problems must overcome formidable obstacles, including the unequal and inefficient distribution of health services, lack of appropriate technology, poor management, poverty, and inadequate or inappropriate government programs to finance needed services. Much of the preventable disease in the world is concentrated in the developing and underdeveloped countries, where the most profound differences exist in terms of social and economic influences.

Although many of these factors appear to stem from low levels of national wealth, the link between national health status and national wealth is not firm, and comparisons across nations are seldom straightforward. Improved health status correlates more closely with changes in standards of living, advances in the politics of human relations, and a nation's literacy, education, and welfare policies than with specific preventive interventions. The complexities involved in identifying and understanding these forces and their interrelationships often confound comparisons of health status between the United States and other nations.

ANALYZING HEALTH PROBLEMS FOR CAUSATIVE FACTORS

The ability to identify risk factors and pathways for causation is essential for rational public health decisions and actions to address important health problems in a population. First, however, it is necessary to define what is meant by health problem. Here, health problem means a condition of humans that can be represented in terms of measurable health status or quality-of-life indicators. It is important to note that this basic definition must be modified for the purposes of community problem solving and the development of interventions. This characterization of a health problem as something measured only in terms of outcomes is difficult for some to accept. They point to important factors, such as access to care or poverty itself, and feel that these should rightfully be considered as health problems. Important problems they may be, but if they are truly important in the causation of some unacceptable health outcome, they can be dealt with as related factors rather than health problems.

The factors linked with specific health problems are often generically termed risk factors and can exist at one of three levels. Those risk factors most closely associated with the health outcome in question are often termed determinants. Risk factors that play a role further back in the chain of causation are called direct and indirect contributing factors. Risk factors can be described at either an individual or a population level. For example, tobacco use for an individual increases the chances of developing heart disease or lung cancer, and an increased prevalence of tobacco use in a population increases that population's incidence of (and mortality rates from) these conditions.

Determinants are scientifically established factors that relate directly to the level of a health problem. As the level of the determinant changes, the level of the health outcome changes. Determinants are the most proximal risk factors through which other levels of risk factors act. The link between the determinant and the health

outcome should be well established through scientific or epidemiologic studies. For example, for neonatal mortality rates, two well-established determinants are the low birth weight rate (the number of infants born weighing less than 2,500 g, or about 5.5 pounds, per 100 live births) and weight-specific mortality rates. Improvement in the neonatal mortality rate cannot occur unless one of these determinants improves. Health outcomes can have one or many determinants.

Direct contributing factors are scientifically established factors that directly affect the level of a determinant. Again, there should be solid evidence that the level of the direct contributing factor affects the level of the determinant. For the neonatal mortality rate example, the prevalence of tobacco use among pregnant women has been associated with the risk of low birth weight. A determinant can have many direct contributing factors. For low birth weight, other direct contributing factors include low maternal weight gain and inadequate prenatal care.

Indirect contributing factors affect the level of the direct contributing factors. Although several steps distant from the health outcome in question, these factors are often proximal enough to be modified. The indirect contributing factor affects the level of the direct contributing factor, which, in turn, affects the level of the determinant. The level of the determinant then affects the level of the health outcome. Many indirect contributing factors can exist for each direct contributing factor. For prevalence of tobacco use among pregnant women, indirect contributing factors might include easy access to tobacco products for young women, lack of health education, and lack of smoking cessation programs.

TABLE 2-4 Risk Factors

Determinant	Scientifically established factor that relates directly to the level of the health problem. A health problem may have any number of determinants identified for it.	Example: Low birth weight is a prime determinant for the health problem of neonatal mortality.
Direct contributing factor	Scientifically established factor that directly affects the level of the determinant.	Example: Use of prenatal care is one factor that affects the low-birth-weight rate.
Indirect contributing factor	Community-specific factor that affects the level of a direct contributing factor. Such factors can vary considerably from one community to another.	Example: Availability of day care or transportation services within the community may affect the use of prenatal care services.

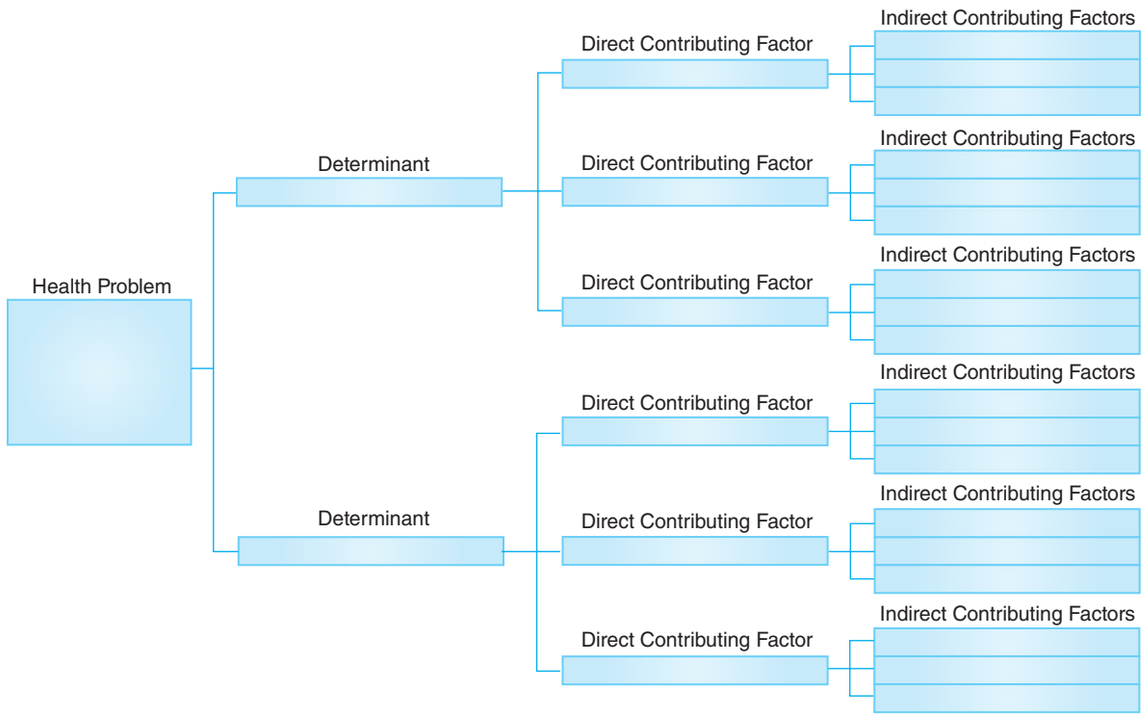
Data from Centers for Disease Control and Prevention, Public Health Practice Program Office, 1991.

OUTSIDE-THE-BOOK THINKING 2-4

Select a health outcome and analyze that outcome for its determinants and contributing factors, using the method described in the text. Identify at least two major determinants for the problem that you select. For each determinant, identify at least two direct contributing factors, and for each direct contributing factor, identify at least two indirect contributing factors.

The health problem analysis framework begins with the identification of a health problem (defined in terms of health status indicators) and proceeds to establish one or more determinants; for each determinant, one or more direct contributing factors; and for each direct contributing factor, one or more indirect contributing factors. Intervention strategies at the community level generally involve addressing these indirect contributing factors. When completed, an analysis identifies as many of the causal pathways as possible to determine which contributing factors exist in the setting in which an intervention strategy is planned. The framework for this approach is presented in **Table 2-4** and **Figure 2-6**. This framework forms the basis for developing meaningful interventions; it is used in several of the processes and instruments to assess community health needs that are currently in wide use at the local level. Community health improvement processes and tools are topics for another chapter.

FIGURE 2-6 Health Problem Analysis Worksheet



Reproduced from Centers for Disease Control and Prevention. Public Health Practice Program Office, 1991.

Although this framework is useful, it does not fully account for the relationships among the various levels of risk factors. Some direct contributing factors may affect more than one determinant, and some indirect contributing factors may influence more than one direct contributing factor. For example, illicit drug use during pregnancy influences both the likelihood of low birth weight and birth weight-specific survival rates. To account fully for these interactions, some direct and indirect contributing factors may need to be included in several different locations on the worksheet. Despite the advancement of epidemiologic methods, many studies ignore the contributing factors that affect the level of these major risk factors, leading to simplistic formulations of multiple risk factors for health problems that exist at the community level.[26]

ECONOMIC DIMENSIONS OF HEALTH OUTCOMES

The ability to measure and quantify outcomes and risks is essential for rational decisions and actions. Specific indicators, as well as methods of economic analysis, are available to provide both objective and subjective valuations. Several health indicators attempt to value differentially health status; outcomes, including age-adjusted rates; span of healthy life; and YPLL. For example, YPLL represents a method of weighting or valuing health outcomes by placing a higher value on deaths that occur at earlier ages. Years of life lost thus become a common denominator or, in one sense, a common currency. Health outcomes can be translated into this currency or into an actual currency, such as dollars. This translation allows for comparisons to be made among outcomes in terms of which costs more per person, per episode, or per another reference point. Cost comparisons of health outcomes and health events have become common in public health. Approaches include cost-benefit, cost-effectiveness, and cost-utility studies.

Cost-benefit analyses provide comprehensive information on both the costs and the benefits of an intervention. All health outcomes and other relevant impacts are included in the determination of benefits. The results are expressed in terms of net costs, net benefits, and time required to recoup an initial investment. If the benefits are expressed in health outcome terms, years of life gained or quality-adjusted

life-years (QALYs) may be calculated. This provides a framework for comparing disparate interventions. QALYs are calculated from a particular perspective that determines which costs and consequences are included in the analysis. For public health analyses, societal perspectives are necessary. When comprehensively performed, cost-benefit analyses are considered the gold standard of economic evaluations.

Cost-effectiveness analyses focus on one outcome to determine the most cost-effective intervention when several options are possible. Cost-effectiveness examines a specific option's costs to achieve a particular outcome. Results are often specified as the cost per case prevented or cost per life saved. For example, screening an entire town for a specific disease might identify cases at a cost of $150 per new case, whereas a screening program directed only at high-risk groups within that town might identify cases at a cost of $50 per new case. Although useful for evaluating different strategies for achieving the same result, cost-effectiveness approaches are not very helpful in evaluating interventions intended for different health conditions.

Cost-utility analyses are similar to cost-effectiveness studies, except that the results are characterized as cost per QALY. These are most useful when the intervention affects both morbidity and mortality, and there are a variety of possible outcomes that include quality of life.

These approaches are especially important for interventions based on preventive strategies. The argument is frequently made that "an ounce of prevention is worth a pound of cure." If this wisdom is true, preventive interventions should result in savings equal to 16 times their actual cost. Not many preventive interventions measure up to this standard, but even crude information on the costs of many health outcomes suggests that prevention has economic as well as human savings. The U.S. Public Health Service has estimated that as much as 11% of health expenditures for the year 2000 could have been averted through investments in public health for six conditions: motor vehicle injuries, occupationally related injuries, stroke, coronary heart disease, firearms-related injuries, and low-birthweight infants.[27] Beyond the direct medical effects, there are often nonmedical costs related to lost wages, taxes, and productivity.

Economists assert that the future costs for care and services that result from prevention of mortality must be considered a negative benefit of prevention. For example, the costs of preventing a death from motor vehicle injuries should include all subsequent medical care costs for that individual over his or her lifetime, because these costs would not have occurred otherwise. They also argue that it is unfair to compare future savings to the costs of current prevention programs and that those savings must be discounted to their current value. If a preventive program will save $10 million 20 years from now, that $10 million must be translated into its current value in computing cost benefits, cost-effectiveness, or cost utility. It may be that the value of $10 million 20 years from now is only $4 million now. If the program costs $1 million, its benefit/cost ratio would be 4:1 instead of 10:1 before we even added any additional costs associated with medical care for the lives that were saved. These economic considerations contribute to the difficulty of marketing preventive interventions.

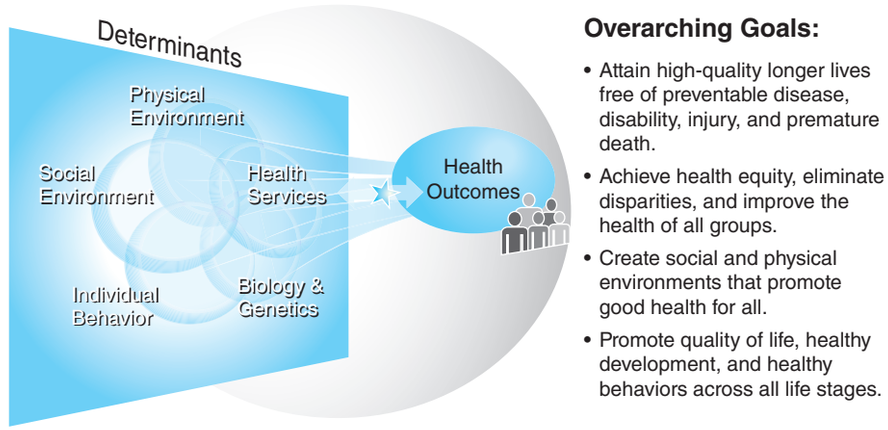
Two additional economic considerations are important for public health policy and practice. The first of these is what is known as opportunity costs, which represents the costs involved in choosing one course of action over another. Resources spent for one purpose are not available to be spent for another. As a result, there is a need to consider the costs of not realizing the benefits or gains from paths not chosen. A second economic consideration important for public health is related to the heavy emphasis of public health on preventive strategies. The savings or gains from successful prevention efforts are generally not reinvested in public health or even other health purposes. These savings or gains from investments in prevention are lost. Maybe this is proper, because the overall benefits accrue more broadly to society, and public health remains, above all else, a social enterprise. However, imagine the situation for American industry and businesses if they could not reinvest their gains to grow their businesses. This is often the situation faced by public health, further exacerbating the difficulty of arguing for and securing needed resources.

HEALTHY PEOPLE 2020

The data and discussion in this chapter only broadly describe health status measures in the United States in the early decades of the new century. Several common themes emerge, however, that form the basis for national health objectives focusing on the year 2020.[28] **Figure 2-7** (consistent with the social-ecological model described earlier) presents a *Healthy People* process grounded in a broad view of the many factors influencing health. The year 2020 objectives build on the nation's experience with three previous panels of health objectives established for the years 1990, 2000, and 2010.

Assessments of the *Healthy People 2000* and *Healthy People 2010* efforts yielded similar findings. In general, progress was apparent for many of the broader goals, especially the age-adjusted mortality targets for age groups under

FIGURE 2-7 The *Healthy People 2020* Model



Reproduced from U.S. Department of Health and Human Services, *Healthy People 2020* Framework, available at www.healthypeople.gov website. Accessed March 15, 2014.

age 70. Nonetheless, a substantial proportion of the objectives targeting special populations, especially African Americans and Native Americans, were found to be moving in the wrong direction. These findings fueled concerns that health inequities and disparities were persisting, if not increasing, in the United States. In addition, with nearly 500 objectives established in both the 2000 and 2010 efforts, tracking became a complex undertaking. Many objectives could not be tracked because of the unavailability of or lack of consensus for the tracking measures.

Healthy People 2020 (HP2020), summarized in **Table 2-5**, provides a comprehensive set of 10-year, national goals and objectives for improving the health of all Americans. HP2020 contains 42 topic areas with over 1,200 objectives. A smaller set of objectives, called Leading Health Indicators, is identified in **Table 2-6**; these were selected to communicate high-priority health issues and actions that can be taken to address them.

The graphic framework for HP2020 offered in Figure 2-5 illustrates the fundamental interrelationships among the social determinants of health and emphasizes their collective impact and influence on health outcomes and conditions. The HP2020 framework also underscores a continued focus on population disparities, including those categorized by race/ethnicity, socioeconomic status, gender, age, disability status, sexual orientation, and geographic location. Four foundational health measures serve as indicators of progress towards achieving these goals: general health status, health-related quality of life, determinants of health, and disparities. **Table 2-7** provides additional details on these measures.

Central to the *Healthy People 2020* effort are four overarching goals, two of which focus on:

1. Attaining high-quality, longer lives free of preventable disease, disability, injury, and premature death; and
2. Achieving health equity, eliminating disparities, and improving the health of all groups.

Although these two overarching goals appear appropriate, they are only arguably linked. From one perspective, they represent two very different approaches to improving outcomes for the population as a whole. If we view the health status of the entire population as a Gaussian curve, one approach would be to shift the entire curve further toward better outcomes, and a second approach would be to change the shape of the curve, reducing the difference between the extremes. These represent quite different strategies that would be associated with quite

TABLE 2-5 *Healthy People 2020* Vision, Mission, Goals, and Focus Areas

Vision

A society in which all people live long, healthy lives.

Mission

Healthy People 2020 strives to:

- Identify nationwide health improvement priorities.
- Increase public awareness and understanding of the determinants of health, disease, and disability and the opportunities for progress.
- Provide measurable objectives and goals that are applicable at the national, state, and local levels.
- Engage multiple sectors to take actions to strengthen policies and improve practices that are driven by the best available evidence and knowledge.
- Identify critical research, evaluation, and data collection needs.

Overarching Goals

- Attain high-quality, longer lives free of preventable disease, disability, injury, and premature death.
- Achieve health equity, eliminate disparities, and improve the health of all groups.
- Create social and physical environments that promote good health for all.
- Promote quality of life, healthy development, and healthy behaviors across all life stages.

Focus Areas

1. Access to health services
2. Adolescent health
3. Arthritis, osteoporosis, and chronic back conditions
4. Blood disorders and blood safety
5. Cancer
6. Chronic kidney diseases
7. Dementia, including Alzheimer's disease
8. Diabetes
9. Disability and secondary conditions
10. Early and middle childhood
11. Educational and community-based programs
12. Environmental health
13. Family planning
14. Food safety
15. Genomics
16. Global health
17. Health communication and health information technology
18. Healthcare-associated infections
19. Hearing and other sensory or communication disorders (ear, nose, throat—voice, speech, and language)
20. Heart disease and stroke
21. HIV
22. Immunization and infectious diseases
23. Injury and violence prevention
24. Lesbian, gay, bisexual, and transgender health
25. Maternal, infant, and child health
26. Medical product safety
27. Mental health and mental disorders
28. Nutrition and weight status
29. Occupational safety and health
30. Older adults

(*continues*)

TABLE 2-5 *Healthy People 2020* Vision, Mission, Goals, and Focus Areas (*continued*)

31. Oral health
32. Physical activity
33. Preparedness
34. Public health infrastructure
35. Quality of life and well-being
36. Respiratory diseases
37. Sexually transmitted diseases
38. Sleep health
39. Social determinants of health
40. Substance abuse
41. Tobacco use
42. Vision

Reproduced from U.S. Department of Health and Human Services. *Healthy People 2020* Web site. www.healthypeople.gov. Accessed June 3, 2014.

different policies and interventions. Focusing on the tail end of the distribution of health requires investment in questionably effective attempts that benefit relatively few and fail to promote the health of the majority. On the other hand, even small improvements in overall society-wide health measures have provided greater gains for society than very perceptible improvements in the health of a few.[29] The choice is one that can be viewed as focusing on "epiphenomena," such as risk factors or on the larger context and social environment. *Healthy People 2020* ambitiously seeks to do both.

Monitoring all national health objectives is not considered feasible at the state and local level. Instead, only priorities linked to the national health objectives will likely be tracked. An Institute of Medicine committee in 1997 identified a basic set of indicators for use in community health improvement processes (**Table 2-8**). Together with the catalog of leading health indicators from the current Healthy People process, these measures provide a useful starting point for population-based community health assessment and improvement initiatives.

OUTSIDE-THE-BOOK THINKING 2-5

Projections call for a continuing increase in life expectancy through the first half of the 21st century. What effect will increased life expectancy have on the major goals of *Healthy People 2020*—increasing the quality and years of healthy life and eliminating health disparities?

OUTSIDE-THE-BOOK THINKING 2-6

Your community is about to undertake a community health assessment and you have been tasked to review and improve the list of community health profile indicators proposed for this process. These include the *Healthy People 2020* Leading Health Indicators (Table 2-6) and the basic community health indictors proposed by the IOM (Table 2-8). Identify and justify three indicators you would add to this list, based on what you know about the health status and needs of your community.

TABLE 2-6 *Healthy People 2020* Leading Health Indicators

Access to Health Services • Persons with medical insurance • Persons with a usual primary care provider
Clinical Preventive Services • Adults who receive a colorectal cancer screening based on the most recent guidelines • Adults with hypertension whose blood pressure is under control • Adult diabetic population with an A1c value greater than 9 percent • Children aged 19 to 35 months who receive the recommended doses of DTaP, polio, MMR, Hib, hepatitis B, varicella, and PCV vaccines
Environmental Quality • Air Quality Index (AQI) exceeding 100 • Children aged 3 to 11 years exposed to secondhand smoke
Injury and Violence • Fatal injuries • Homicides
Maternal, Infant, and Child Health • Infant deaths • Preterm births
Mental Health • Suicides • Adolescents who experience major depressive episodes
Nutrition, Physical Activity, and Obesity • Adults who meet current Federal physical activity guidelines for aerobic physical activity and muscle-strengthening activity • Adults who are obese • Children and adolescents who are considered obese • Total vegetable intake for persons aged 2 years and older
Oral Health • Persons aged 2 years and older who used the oral health care system in past 12 months
Reproductive and Sexual Health • Sexually active females aged 15 to 44 years who received reproductive health services in the past 12 months • Persons living with HIV who know their serostatus
Social Determinants • Students who graduate with a regular diploma 4 years after starting 9th grade
Substance Abuse • Adolescents using alcohol or any illicit drugs during the past 30 days • Adults engaging in binge drinking during the past 30 days
Tobacco • Adults who are current cigarette smokers • Adolescents who smoked cigarettes in the past 30 days

Reproduced from U.S. Department of Health and Human Services. *Healthy People 2020* Web site. www.healthypeople.gov. Accessed June 3, 2014.

TABLE 2-7 Measures of Progress toward *Healthy People 2020* Goals

General Health Status • Life expectancy (with international comparison) • Healthy life expectancy • Years of potential life lost (YPLL) (with international comparison) • Physically and mentally unhealthy days • Self-assessed health status • Limitation of activity • Chronic disease prevalence
Health-Related Quality of Life (HRQoL) and Well-Being • Patient Reported Outcomes Measurement Information System (PROMIS) Global Health Measure – assesses global physical, mental and social HRQoL through questions on self-rated health, physical HRQoL, mental HRQoL, fatigue, pain, emotional distress, social activities, and roles. • Well-Being Measures – assess the positive evaluations of people's daily lives – when they feel very healthy and satisfied or content with life, the quality of their relationships, their positive emotions, resilience, and realization of their potential. • Participation Measures – reflect individuals' assessments of the impact of their health on their social participation within their current environment. Participation includes education, employment, civic, social and leisure activities. The principle behind participation measures is that a person with a functional limitation – for example, vision loss, mobility difficulty, or intellectual disability – can live a long and productive life and enjoy a good quality of life.
Determinants of Health • Policymaking • Social factors • Health services • Individual behavior • Biology and genetics
Disparities • Race and ethnicity • Gender • Sexual identity and orientation • Disability status or special health care needs • Geographic location (rural and urban)

Reproduced from U.S. Department of Health and Human Services. *Healthy People 2020* Web site. www.healthypeople.gov. Accessed June 3, 2014.

TABLE 2-8 Proposed Indicators for a Community Health Profile

Sociodemographic Characteristics
1. Distribution of the population by age and race/ethnicity
2. Number and proportion of persons in groups such as migrants, homeless, or the non-English speaking for whom access to community services and resources may be a concern
3. Number and proportion of persons aged 25 and older with less than a high school education
4. Ratio of the number of students graduating from high school to the number of students who entered ninth grade 3 years previously
5. Median household income
6. Proportion of children less than 15 years of age living in families at or below the poverty level
7. Unemployment rate
8. Number and proportion of single-parent families
9. Number and proportion of persons without health insurance
Health Status
10. Infant mortality rate by race/ethnicity
11. Numbers of deaths or age-adjusted death rates for motor vehicle crashes, work-related injuries, suicide, homicide, lung cancer, breast cancer, cardiovascular diseases, and all causes, by age, race, and gender, as appropriate
12. Reported incidence of AIDS, measles, tuberculosis, and primary and secondary syphilis, by age, race, and gender, as appropriate
13. Births to adolescents (ages 10–17) as proportion of total live births
14. Number and rate of confirmed abuse and neglect cases among children
Health Risk Factors
15. Proportion of 2-year-old children who have received all age-appropriate vaccines, as recommended by the Advisory Committee on Immunization Practices
16. Proportion of adults aged 65 and older who have ever been immunized for pneumococcal pneumonia; proportion who have been immunized in the past 12 months for influenza
17. Proportion of the population who smoke, by age, race, and gender, as appropriate
18. Proportion of the population aged 18 or older who are obese
19. Number and type of U.S. Environmental Protection Agency air quality standards not met
20. Proportion of assessed rivers, lakes, and estuaries that support beneficial uses (e.g., fishing- and swimming-approved)
Health Care Resource Consumption
21. Per-capita health care spending for Medicare beneficiaries (the Medicaid adjusted average per-capita cost)
Functional Status
22. Proportion of adults reporting that their general health is good to excellent
23. During the past 30 days, average number of days for which adults report that their physical or mental health was not good
Quality of Life
24. Proportion of adults satisfied with the healthcare system in the community
25. Proportion of persons satisfied with the quality of life in the community

Data from the Institute of Medicine. *Using Performance Monitoring to Improve Community Health: A Role for Performance Monitoring*. Washington, DC: National Academy Press; 1997.

CONCLUSION

From a social-ecological perspective, the health status of a population is influenced by many factors drawn from biology, behavior, the physical and social environment, and the use of health services. Social and cultural factors also play an important role in the disease patterns experienced by different populations, as well as in the responses of these populations to disease and illness. Globally, risks associated with population growth, pollution, and poverty result in mortality and morbidity that are still associated with infectious disease processes. In the United States, behaviorally mediated risks, including tobacco, diet, alcohol, and injury risks, rather than infectious disease processes, are the major contributors to

health status, and the considerable gap between low-income minority populations and other Americans continues to widen. Public health activities strive to improve population health status (effectiveness) through cost-beneficial strategies and interventions (efficacy) and with equal benefits for all segments of the population (equity). Elimination and reduction of the disparities in health status among population groups have emerged as the most critical national health goal for the year 2020. With the increasing availability of data on health status, as well as on determinants and contributing factors, the potential for more rational policies and interventions has increased. Over the long term, public policies that narrow income disparities and increase access to education, jobs, and housing do far more to improve the health status of populations than do efforts to provide more healthcare services. Health improvement efforts require more than data on health problems and contributing factors, which view health from a negative perspective. Also needed is information from a positive perspective, in terms of community capacities, assets, and willingness. More important still, there must be recognition and acceptance that the right to health is a basic human right and one inextricably linked to all other human rights, lest quality of life be seriously compromised.[30] It is this right to health that energizes and challenges public health workers to measure health and quality of life in ways that promote its improvement.

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