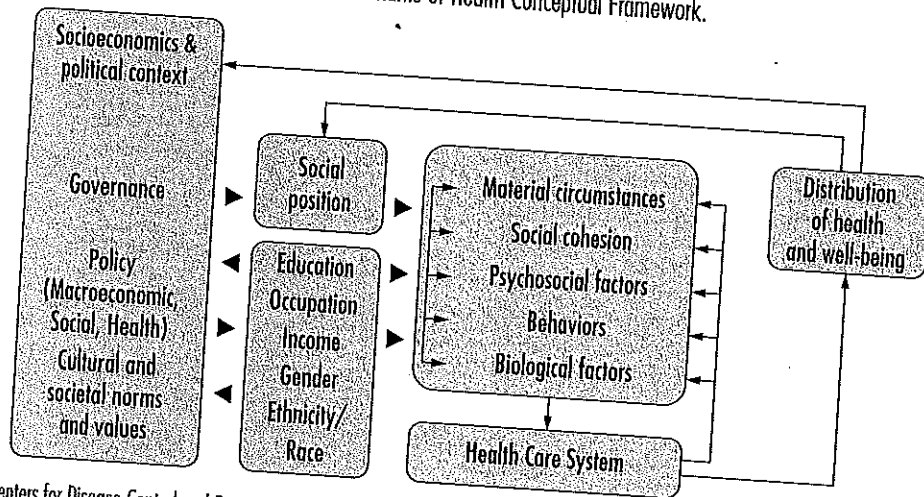


Figure 2-4 WHO Commission on Social Determinants of Health Conceptual Framework.



Source: Centers for Disease Control and Prevention. 2010. *Establishing a Holistic Framework to Reduce Inequities in HIV, Viral Hepatitis, STDs, and Tuberculosis in the United States*.

modified to positively influence population health. Individual lifestyle factors have the potential to promote or damage health, and social interactions can sustain people's health; but living and working conditions; food supplies; access to essential goods and services; and the overall economic, cultural, and environmental conditions have wider influences on individual and population health.

Ansari and colleagues (2003) proposed a public health model of the social determinants of health in which the determinants are categorized into four major groups: social determinants, health care system attributes, disease-inducing behaviors, and health outcomes.

The WHO Commission on Social Determinants of Health (2007) concluded that "the social conditions in which people are born, live, and work are the single most important determinant of one's health status." The WHO model provides a conceptual framework for understanding the

socioeconomic and political contexts, structural determinants, intermediary determinants (including material circumstances, social-environmental circumstances, behavioral and biological factors, social cohesion, and the health care system), and the impact on health equity and well-being measured as health outcomes.

US government agencies, such as the CDC and DHHS, have recognized the need to address health inequities. CDC's National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention adopted the WHO framework on social determinants of health to use as a guide for its activities (see Figure 2-4).

Measures Related to Health

Certain quantitative measures commonly apply to health, health status, and the utilization of health care. The conceptual approaches for defining health and its

distribution help form a vision for the future, and objective measures play a critical role in evaluating the success of various programs, as well as for directing future planning activities. Practical approaches for measuring health are, however, quite limited, and mental health is more difficult to quantify and measure than physical health. An objective evaluation of social and spiritual health is even more obscure.

The concept of population, as it applies to population health, has been borrowed from the disciplines of statistics and epidemiology. The term “population” is not restricted to describing the total population. Although commonly used in that way, the term may also apply to a defined subpopulation, for example, age groups, marital categories, income levels, occupation categories, racial/ethnic groups, people having a common disease, people in a certain risk category, or people in a certain community or geographic region of a country. The main advantage of studying subpopulations is that it helps trace the existence of health problems to a defined group. Doing so avoids concealing serious problems in a minority group within the favorable statistics of the majority. By pinpointing health problems in certain well defined groups, targeted interventions and new policy initiatives can be deployed in the most effective manner.

Measures of Physical Health

Physical health status is often interpreted through *morbidity* (disease and disability) and *mortality* (death) rates. In addition, self-perceived health status is a commonly used indicator of health and well-being. Respondents are asked to rate their health as excellent, very good, good, fair, or poor. Self-perceived health status is highly

correlated with many objective measures of health status. It is also a good predictor of patient-initiated physician visits, including general medical and mental health visits.

Longevity

Life expectancy—a prediction of how long a person will live—is widely used as a basic measure of health status. The two common measures are life expectancy at birth (Table 2-4)—or how long a newborn can expect to live—and life expectancy at age 65—expected remaining years of life for someone at age 65. These measures are actuarially determined and published by government agencies such as the National Center for Health Statistics (NCHS). The US Census Bureau (1995) projected that life expectancy in the United States will increase

Table 2-4 US Life Expectancy at Birth—1999, 2003, and 2010

Year	Total	Male	Female
1999	76.7	73.9	79.4
White	77.3	74.6	79.9
Black	71.4	67.8	74.7
2003	77.5	74.8	80.1
White	78.0	75.3	80.5
Black	72.7	69.0	76.1
2010	78.8	76.4	81.1
White	81.2	78.5	83.8
Black	74.7	71.4	77.7

Sources: Data from National Center for Health Statistics, *Health, United States, 1996–1997 and Injury Chartbook*. Hyattsville, MD: 1997, p. 108; *Health, United States, 2002*, p. 116; *Health, United States, 2006*, p. 176; and *Health, United States, 2012*, p. 77.

from 76.0 years in 2050.

Morbidity

The measurement such as cancer or heart disease is often expressed as a ratio or proportion of the population at risk in the same community who could acquire the disease (Smith 1979). Incidence is one of two widely used measures of disease, that is, predicting a negative health outcome. It counts the number of new cases in the population during a specified period of time, such as a year (Smith 1979; see also Figure 2-1). Prevalence describes the extent of a disease in a population, people who have the disease during a specified period of time, particularly useful in studying the magnitude of conditions that are chronic. Declining life expectancy is due to success of health prevention efforts and a decline in new cases (Ibrahim 1999). Incidence may suffer from *demographic*, that is, a change in the source. The second measure, *prevalence*, determines the number of cases at a specific point in time in a specific population (see Figure 2-1). It is useful in quantifying the burden of illnesses of a population. Decreased prevalence is a result of treatment programs and a reduction in illness (Ibrahim 1999). Incidence and prevalence are measures of disease, disability

from 76.0 years in 1993 to 82.6 years in 2050.

Morbidity

The measurement of morbidity or disease, such as cancer or heart disease, is expressed as a ratio or proportion of those who have the problem and the *population at risk*. The population at risk includes all the people in the same community or population group who could acquire a disease or condition (Smith 1979). Incidence and prevalence are two widely used indicators for the number of *cases*, that is, people who end up acquiring a negative health condition. **Incidence** counts the number of new cases occurring in the population at risk within a certain period of time, such as a month or a year (Smith 1979; see Formula 2-1). Incidence describes the extent to which, in a given population, people acquire a given disease during a specified time period. Incidence is particularly useful in estimating the magnitude of conditions of relatively short duration. Declining levels of incidence point to success of health promotion and disease prevention efforts, because they prevent new cases (Ibrahim 1985). High levels of incidence may suggest an impending *epidemic*, that is, a large number of people who get a specific disease from a common source. The second measure of morbidity, **prevalence**, determines the total number of cases at a specific point in time, in a defined population (see Formula 2-2). Prevalence is useful in quantifying the magnitude of illnesses of a relatively long duration. Decreased prevalence indicates success of treatment programs by shortening the duration of illness (Ibrahim 1985). Both incidence and prevalence rates can apply to disease, disability, or death.

Formula 2-1

Incidence = Number of new cases during a specified period/Population at risk

Formula 2-2

Prevalence = Total number of cases at a specific point in time/Specified population

The calculation of rates often requires dividing a small number by a large number representing a defined population. The result is a fraction. To make the fractions meaningful and interpretable, they are multiplied by 100 (to get a percentage), 1,000 (to get a rate per 1,000 people), 10,000 (to get a rate per 10,000 people), or a higher multiple of 10.

Disability

Disease and injury can lead to temporary or permanent, as well as partial or total, disability. Although the idea of morbidity includes disabilities, as well as disease, there are specific measures of disability. Some common measures are the number of days of bed confinement, days missed from work or school, and days of restricted activity. All measures are in reference to a specific time period, such as a year.

One of the most widely used measures of physical disability among the elderly, in particular, is the *activities of daily living* (ADL) scale. The ADL scale is appropriate for evaluating disability in both community-dwelling and institutionalized adults. The classic ADL scale, developed by Katz and Akpom (1979), includes six basic activities: eating, bathing, dressing, using the toilet, maintaining continence, and transferring from bed to chair. To evaluate disability in community-dwelling adults, a modified Katz scale is commonly used. It consists of seven items (Ostir et al. 1999).

Five of these items—feeding, bathing, dressing, using the toilet, and transferring from bed to chair—have been retained from the original Katz scale. The additional two items are grooming and walking a distance of 8 feet. Thus, it includes items measuring self-care and mobility. The ADLs identify personal care functions with which a disabled person may need assistance. Depending on the extent of disability, personal care needs can be met through adaptive devices; care rendered by another individual, such as a family member; or care in a nursing facility.

Another commonly used measure of physical function is the *instrumental activities of daily living* (IADL) scale. This scale measures activities that are necessary for living independently in the community, such as using the telephone, driving a car or traveling alone on a bus or by taxi, shopping, preparing meals, doing light housework, taking medicines, handling money, doing heavy housework, walking up and down stairs, and walking a half-mile without help. IADLs typically require higher cognitive functioning than ADLs and, as such, are not purely physical tests of functional disability. The IADL scale measures the level of functioning in activities that are important for self-sufficiency, such as the ability to live independently.

Mortality

Death rates are computed in different forms as indicators of population health. *Crude rates* refer to the total population; they are not specific to any age group or disease category (Formula 2-3).

Formula 2-3

Crude death rate = Total deaths (usually in 1 year) / Total population

Specific rates are useful because death rates vary greatly by race, sex, age, and type of disease or condition. Specific rates allow health care professionals to target programs at the appropriate population subgroups (Dever 1984). Examples of specific rates are age-specific mortality rate (Formula 2-4) and cause-specific mortality rate (Formula 2-5). The age-specific mortality rate provides a measure of the risk (or probability) of dying when a person is in a certain age group. The cause-specific mortality rate provides a measure of the risk (or probability) of dying from a specific cause.

Formula 2-4

Age-specific mortality rate = Number of deaths within a certain age group / Total number of persons in that age group

Formula 2-5

Cause-specific mortality rate = Number of deaths from a specific disease / Total population

Infant mortality rate (actually a ratio; Formula 2-6) is an indicator that reflects the health status of the mother and the child through pregnancy and the birth process. It also reflects the level of prenatal and postnatal care (Timmreck 1994).

Formula 2-6

Infant mortality rate = Number of deaths from birth to 1 year of age (in 1 year) / Number of live births during the same year

Demographic Change

In addition to measures of disease and mortality, changes in the composition of a population over time are important in planning health services. Population change involves

three components: births, migration (Dever 1984). For extension of the elderly to the future requires planning of adult and long-term care services. Longevity is also an important determinant of demographic change. For example, lower death rates, lower fertility rates, together with a growing population. The next sections discuss measures of births and migration and measures of death were previously discussed.

Births

Natality and fertility are terms associated with births. *Natality* is useful in assessing the influence of demographic change and is measured by the crude birth rate (Formula 2-7).

Formula 2-7

Crude birth rate = Number of live births (per 1,000 live births per year) / Total population

Fertility refers to the ability of a population to reproduce (Formulation 2-8). Fertility is a more precise measure of demographic change because fertility relates to the reproductive sector of the population and is measured by the fertility rate (Formula 2-8).

Formula 2-8

Fertility rate = Number of live births (per 1,000 live births per year) / Number of females age 15 and over

Migration

Migration refers to the movement of populations between geographic units and involves change of residence. The next section discusses migration and its impact on demographic change.

three components: births, deaths, and migration (Dever 1984). For example, the migration of the elderly to the southern states requires planning of adequate retirement and long-term care services in those states. Longevity is also an important factor that determines demographic change. For example, lower death rates, lower birth rates, and greater longevity, together, indicate an aging population. The next section presents measures of births and migration, whereas measures of death were previously discussed.

Births

Nativity and fertility are two measures associated with births. *Nativity*, or birth rate, is useful in assessing the influence of births on demographic change and is measured by the crude birth rate (Formula 2-7).

Formula 2-7

Crude birth rate = Number of live births (usually in 1 year)/Total population

Fertility refers to the capacity of a population to reproduce (Formula 2-8). Fertility is a more precise measure than nativity, because fertility relates actual births to the sector of the population capable of giving birth.

Formula 2-8

Fertility rate = Number of live births (usually in 1 year)/Number of females aged 15-44

Migration

Migration refers to the geographic movement of populations between defined geographic units and involves a permanent change of residence. The net migration rate

(Formula 2-9) defines the change in the population as a result of *immigration* (in migration) and *emigration* (out migration) (Dever 1984, p. 249). The rate is calculated for a specified period, such as 1 year, 2 years, 5 years, and so on.

Formula 2-9

Net migration rate = (Number of immigrants - Number of emigrants)/Total population (during a specific period of time)

Measures of Mental Health

Measurement of mental health is less objective than measurement of mortality and morbidity, because mental health often encompasses feelings that cannot be observed. Physical functioning, by contrast, reflected in behaviors and performances, can be more readily observed. Hence, measurement of mental health more appropriately refers to assessment rather than measurement. Mental health can be assessed by the presence of certain symptoms, including both psychophysiologic and psychological symptoms. Examples of psychophysiologic symptoms are low energy, headache, and upset stomach. Examples of psychological symptoms are nervousness, depression, and anxiety.

Self-assessment of one's own psychological state may also be used for mental health assessment. Self-assessment can be obtained through self-reports of frequency and intensity of psychological distress, anxiety, depression, and psychological well-being.

Measures of Social Health

Measures of social health extend beyond the individual to encompass the extent of social contacts across various facets of life, such as

family life, work life, and community life. Breslow (1972) attempted to measure social health along four dimensions: (1) employability, based on educational achievement, occupational status, and job experience; (2) marital satisfaction; (3) sociability, determined by the number of close friends and relatives; and (4) community involvement, which encompassed attendance at religious services, political activity, and organizational membership.

Social health status is sometimes evaluated in terms of social contacts and social resources. *Social contacts* are evaluated in terms of the number of social contacts or social activities a person engages in within a specified period. Examples are visits with friends and relatives, as well as attendance at social events, such as conferences, picnics, or other outings. *Social resources* refer to social contacts that can be relied on for support, such as relatives, friends, neighbors, and members of a religious congregation. Social contacts can be observed, and they represent the more objective of the two categories; however, one criticism of social contact measures is their focus on events and activities themselves, with little consideration of how the events are personally experienced. Unlike social contacts, social resources cannot be directly observed and are best measured by asking the individuals direct questions. Evaluative questions include whether these individuals can rely on their social contacts to provide tangible support and needed companionship and whether they feel cared for, loved, and wanted.

Measures of Spiritual Health

Within a person's individual, social, and cultural context, spiritual well-being can have a large variety of connotations. Such

variations make it extremely difficult to propose standardized approaches for measuring the spiritual dimension. Attempts to measure this dimension are illustrated in the General Social Survey, which includes people's self-perceptions about happiness; religious experiences; and their degree of involvement in activities, such as prayer and attending religious services. A wide range of tools for spiritual assessment are now available. Generic methods of spiritual assessment are not associated with any particular religion or practice, and hence do not require a detailed understanding of any particular religious tradition (Draper 2012). An example of a generic scale is one developed by Vella-Brodrick and Allen (1995) which evaluates items such as reaching out for spiritual intervention; engaging in meditation, yoga, or prayer; duration of meditation or prayer for inner peace; frequency of meditation or prayer; reading about one's religious beliefs; and discussions or readings about ethical and moral issues. Several quantitative measurement scales are also available to assess dimensions such as general spirituality, spiritual well-being, spiritual needs, and spiritual coping (Monod et al. 2011), but their use has been confined mainly to clinical research.

Measures of Health Services Utilization

Utilization refers to the consumption of health care services and the extent to which health care services are used. Measures of utilization can be used to determine which individuals in a population group receive certain types of medical services, which do not receive services, and why. A health care provider, such as a hospital, can find out the extent to which its services are used. Measures of utilization can help managers decide whether certain services should be

added or eliminated, and they can determine whether a service is effective in reaching the target populations. Measures of utilization play a critical role in the planning of health care delivery capacity. For example, many hospital beds are reserved for acute care needs of a given population (Levy et al. 1995). Measures of utilization are too numerous to be covered here; selected common measures are presented in Formulas 2-10 to 2-16.

Crude Measures of Utilization

Formula 2-10

Access to primary care services in a given population who visit a provider in a given year/Size of the population

(This measure is generally expressed as a fraction is multiplied by 100.)

Formula 2-11

Utilization of primary care services in a given year/Size of the population

(This measure is generally expressed as a fraction is multiplied by 100.)

Specific Measures of Utilization

Formula 2-12

Utilization of targeted services in a specific targeted population (or visits)/Size of the target population

(The fraction obtained is multiplied by 10 to facilitate interpretation.)

Formula 2-13

Utilization of specific inpatient days/Size of the population

added or eliminated, and health planners can determine whether programs have been effective in reaching their targeted populations. Measures of utilization, therefore, play a critical role in the planning of health care delivery capacity, for example, how many hospital beds are required to meet the acute care needs of a given population (Pasley et al. 1995). Measures of utilization are too numerous to be covered here, but some selected common measures are provided (Formulas 2-10 to 2-16).

Crude Measures of Utilization

Formula 2-10

Access to primary care services = Number of persons in a given population who visited a primary care provider in a given year/Size of the population

(This measure is generally expressed as a percentage, i.e., the fraction is multiplied by 100.)

Formula 2-11

Utilization of primary care services = Number of primary care visits by people in a given population in a given year/Size of the population

(This measure is generally expressed as number of visits per person per year.)

Specific Measures of Utilization

Formula 2-12

Utilization of targeted services = Number of people in a specific targeted population using special services (or visits)/Size of the targeted population group

(The fraction obtained is multiplied by 100, 1000, or a higher multiple of 10 to facilitate interpretation of the result.)

Formula 2-13

Utilization of specific inpatient services = Number of inpatient days/Size of the population

(The fraction obtained is multiplied by 100, 1000, or a higher multiple of 10 to facilitate interpretation of the result.)

Measures of Institution-Specific Utilization

Formula 2-14

Average daily census = Total number of inpatient days in a given time period/Number of days in the same time period

Formula 2-15

Occupancy rate = Total number of inpatient days in a given time period/Total number of available beds during the same time period

or

Average daily census/Total number of beds in the facility

(This measure is expressed as a percentage, i.e., the fraction is multiplied by 100.)

Formula 2-16

Average length of stay = Total number of inpatient days during a given time period/Total number of patients served during the same time period

Measures of Global Health

Global monitoring of changes in the health of various populations requires the use of "tried and true" global health indicators. Global health indicators can be divided into those that directly measure health phenomena (e.g., diseases, deaths, use of services) and indirect measures (e.g., social development, education and poverty indicators); these are also referred to as proximal and distal indicators, respectively. On the basis of population statistics describing levels of education attained and access to safe water and sanitation, it is possible to categorize a

country fairly accurately as having a population with high, medium, or low burden of disease (Larson and Mercer 2004).

Anthro-Cultural Beliefs and Values

A value system orients the members of a society toward defining what is desirable for that society. It has been observed that even a society as complex and highly differentiated as in the United States can be said to have a relatively well integrated system of institutionalized common values at the societal level (Parsons 1972). Although such a view may still prevail, American society now has several different subcultures that have grown in size due to a steady influx of immigrants from different parts of the world.

The current system of health services delivery traces its roots to the traditional beliefs and values espoused by the American people. The value and belief system governs the training and general orientation of health care providers, type of health delivery settings, financing and allocation of resources, and access to health care.

Some of the main beliefs and values prevalent in the American culture are outlined as follows:

1. A strong belief in the advancement of science and the application of scientific methods to medicine were instrumental in creating the medical model that primarily governs health care delivery in the United States. In turn, the medical model has fueled the tremendous growth in medical science and technological innovation. As a result, the United States has been leading the world in medical

breakthroughs. These developments have had numerous implications for health services delivery:

- a. They increase the demand for the latest treatments and raise patients' expectations for finding cures.
- b. Medical professionals have been preoccupied with clinical interventions, whereas the holistic aspects of health and use of alternative therapies have not received adequate emphasis.
- c. Health care professionals have been trained to focus on physical symptoms rather than the underlying causes of disease.
- d. Integration of diagnosis and treatment with disease prevention has been lagging behind.
- e. Most research efforts have focused on the development of medical technology. Commitment of resources to the preservation and enhancement of health and well-being has lagged behind.
- f. Medical specialists, using the latest technology, are held in higher esteem and earn higher incomes than general practitioners.
- g. The desirability of health care delivery institutions, such as hospitals, is often evaluated by their acquisition of advanced technology.
- h. Whereas biomedicine has taken central stage, diagnosis and treatment of mental health have been relegated to a lesser status.
- i. The biomedical model has neglected the social and spiritual elements of health.

2. America has been capitalism. Due to capitalism, health has been viewed as an (or service), not as a
3. A culture of capital entrepreneurial spirit. Hence, abilities to obtain health largely determined and consumption of which services will have access to where and in what quantity. Some key implications:
 - a. Upper-tier access to services is available private health insurance public insurance for The uninsured mal
 - b. A clear distinction the types of service and affluent communities between those in city locations.
 - c. The culture of individual sizes individual health population health, therefore, has been ing the individual than keeping the healthy.
 - d. A concern for the leged classes in society the elderly, the children—led to the public programs health care, and the Medicare Insurance Program
4. Principles of free general distrust of have kept the delivery