The measurement of health and health outcomes presents a formidable challenge for researchers and clinicians alike. Defining health outcomes, quantifying them, and evaluating them offers an important opportunity for health psychology. The intention of this chapter is to outline the basic concepts in the evaluation of health, discuss challenges in transitioning health psychology into health outcomes measurement, and highlight areas of immediate and future focus.

A single definition of health outcome has eluded both researchers and clinicians. Outcome measurement has typically referred to the endpoint of a health service that accounts for patient experiences, preferences, and values (Clancy & Eisenberg, 1998). Donabedian (1966) referred to outcome as “A change in patients’ current and future health status that can be attributed to antecedent health care.” Although it is conventional to consider an outcome as the endpoint of a particular intervention or service, outcome may also refer to an endpoint of any number of factors, including disease progression, environmental changes, or psychological processes (Klapow et al., 1993). In the end, outcomes measurement within a health
care context functions to provide empirical evidence for decisions made by all those involved in the health care setting (Clancy & Eisenberg, 1998). Because the term outcome is so broad, and generally speaking within the health care setting outcome typically refers to an evaluation of health, the definition and measurement of health must be considered.

This chapter covers a variety of topics important to understanding health psychology's role in outcomes measurement. First, operational definitions of health are examined from epidemiological, historical, medical, and outcomes perspectives. Second, key dimensions of health are identified and targeted for measurement. Third, health psychology's current role in the measurement of health outcomes is examined and recommendations are offered for increasing the presence of health psychology in the field. Fourth, specific areas of measurement research that are immediately applicable for health psychology are identified and reviewed. Fifth, applications of health outcomes research are characterized that should be targeted by health psychology as areas for future research.

DEFINING HEALTH: VARYING PERSPECTIVES

For centuries, scholars have debated about the definition of health. Different definitions emphasize related, but divergent, concepts. Some terms used to describe health are positive concepts, such as wellness or normality. Other terms emphasize negative concepts, such as disability and illness. Much of the debate has centered on whether health is a continuum. Are disability and illness distinct from health, or are they opposite ends of the same continuum (Patrick & Erickson, 1993)?

Because the concept of health lacked conceptual clarity, the World Health Organization (WHO) proposed a comprehensive definition of health in their charter document. Health was defined as "a state of complete physical, mental, and social well-being and not merely the absence of infirmity" (World Health Organization, 1948). In the 50 years since the introduction of this definition, there has been some convergence of thought. It is now widely recognized that health has multiple dimensions. Also, it is now accepted that measures of mortality alone cannot summarize the health status of populations (Field & Gold, 1998). However, there is still considerable debate about what constitutes health and health status.

Historical Perspective

Some of the debate about the definition of health originates from sociologists. From the sociological perspective, illness represents deviation from society's standards for physical and mental well-being. Often, this
deviation is recognized when a person cannot perform activities usual for his or her social role. In addition to observable functioning, illness may cause reports of symptoms or pain, and these deviate from societies norms of wellness. Parsons (1951) defined illness as "a state of disturbance in normal functioning of the total human individual including both the state of the organism as a biological system, and/or his personal and social adjustments" (Parsons, 1951, p. 431). For Parsons, health represented the capacity to perform valued tasks.

Epidemiological Perspective

Epidemiologists have addressed the issue of health status by tabulating the frequency of various outcomes. Their methodologies emphasize rates of morbidity and mortality. Healthy populations, for example, are those where life expectancy is longer and infant mortality rates are lower. The limitations of mortality rates as measures of health are well-recognized. A 1998 Institute of Medicine report summarizing methods for measuring population health concluded that mortality measures are incomplete, insensitive, and cannot be used to summarize population health (Field & Gold, 1998). Just as mortality measures exclude morbidity, morbidity measures often exclude information on mortality. The comprehensive definition of health requires some integration of morbidity and mortality. The major shortcoming of defining health only by mortality is that death is only one dimension of health outcome. Diseases and disabilities affect multiple aspects of wellness. Within the past few decades, attention has turned toward the definition of health-related quality of life.

Traditional Biomedical Perspective

From a biomedical perspective, people are healthy if they are free of disease. A disease is recognized in a human organism through the manifestation of clinical signs and symptoms. These signs and symptoms are associated with underlying lesions or pathology. Diagnostic tests are used to identify pathology, and interventions are designed to repair the lesion or stop the pathological process. Thus underlying pathology is the ultimate target of assessment and treatment. The traditional biomedical model is predicated on finding a specific biological problem and repairing the problem.

Outcomes Perspective

Kaplan (1990) posed the question, "If a disease or condition had an impact upon a tissue or organ system and had no effect on life expectancy, no effect on function, no effect on appearance or symptoms, would it be
of concern?" This question is the foundation of an outcomes model of health. An outcomes model of health is defined from the patient's perspective. Measurement of health outcome is focused on those endpoints that have direct meaning to the patient. Typically these outcomes include two broad categories: length of life and quality of life. Defining health in terms of quality of life will be addressed in detail in the next section. For now, health-related quality of life may be understood as the value assigned to those dimensions of health that are most important to the patient. In an outcomes model of health, biochemical measures do not have meaning as endpoints in and of themselves. Rather, they are important to the extent that they are associated with length and quality of life.

Limitations of a Traditional Biomedical Perspective in Evaluating Health Outcomes

Diagnostic Testing

The biomedical model is appealing and useful in numerous applications of medicine and surgery. However, there is evidence that the biomedical perspective may fall short across indicators of health other than pathophysiology. For example, there is little evidence that life expectancy, infant mortality, or functioning has changed dramatically in the past 20 years. At the same time, however, there have been remarkable increases in the number of people with diagnosed disease. In part, the apparent epidemics in disease are the result of improved diagnostic technologies. New spiral CT scans can now detect hepatic lesions that are less than 2 millimeters. Twenty years ago, only lesions 20 millimeters or greater could be diagnosed. It is apparent there are large reservoirs of undiagnosed disease. As technology has improved, more disease is revealed. For example, about 3% of women eventually die of breast cancer, and about 3% of men die of prostate cancer. However, autopsy studies suggest that nearly 40% of women over 70 have some form of breast cancer (including ductile tumors). Nearly half of men age 70 and above have prostate cancer. The great majority of tumors found at autopsy were not known before and had little consequence for the affected individuals (Black & Welsch, 1993). Because disease is very common, the more we look for disease the more we find. Either greater screening or improved diagnostic technology will reveal more problems (Black & Welsch, 1997).

There are numerous examples of disease reservoirs being unmasked as more diagnostic tests are applied. For example, orthopedic surgeons have used radiographic evidence to confirm that reports of back pain represent disease. However, studies of volunteers without back pain reveal bulging disks in nearly half of all adults. Figure 16.1 shows the percentage of adults without back pain who had bulging disks as revealed by MRI images broken...
Figure 16.1. Percentage of individuals without back pain, broken down by age, with bulges identified by MRI of the lumbar spine (data from Jensen et al., 1994, tab. 2, pg. 70).

down by age. The two lines represent readings of the MRI images by different radiologists. For adults older than age 60, 80% of those without pain or disability had “disease” (Jensen, Kelly, & Brant-Zawadzki, 1994).

Similarly, there are substantial discrepancies between studies of X-ray evidence of osteoarthritis and performance of usual activities. Studies on back pain help illustrate some of these issues. Radiographic studies show that an estimated 57% of Americans age 60 years or older have ruptured discs or spinal stenosis. However, these patients often report little or no pain. Surgery to correct spinal stenosis may be of little value on patients who are not impaired. Conversely, pain is often reported by patients who have no abnormalities on X-ray. According to traditional measures, these patients have no problems.

Diagnostic Approaches

Although disease is usually regarded as a binary variable (present or absent) most health problems are on a continuum. By changing the
thresholds for the disease label, many more people are regarded as sick. Overweight, for example, used to be defined as a body weight index greater than 28. This threshold was recently reset at 25 (National Heart, Lung and Blood Institute, 1998), making most of the adult population overweight. Likewise, new methods for assessing subthreshold depression greatly increased the number of people with a mental health "problem" (Judd, Paulus, Wells, & Rapaport, 1996). Just over 5% of patients in general medical practice qualify for a DSM-IV (American Psychiatric Association, 1994) diagnosis of depression. However, more than a quarter of all general medical patients might be labeled as having subsyndromal depression (Wells, 1996).

Reliability and Validity of Biological Measures

Advocates of the biomedical model argue that only biological measures of disease pathology taken with precise instruments have clinical meaning. Unfortunately, not all biological markers are measures of health status or health outcome. As Kaplan (1990) noted, elevated blood pressure is important as a predictor of premature mortality or disability resulting from coronary heart disease and stroke. If blood pressure had no bearing on these outcomes, then it would have little relevance as an endpoint. Elevated blood cholesterol can be predictive of heart disease and early mortality; however, other blood lipids, including low density lipoproteins or chylomicrons, may have very little relationship to health outcomes in the majority of cases. Serological abnormalities in patients with rheumatoid arthritis are poorly correlated with joint inflammation (McCarty, 1986), and erythrocyte sedimentation rate is not consistently associated with pain or dysfunction levels. Thus biological markers may serve as useful predictors of health outcomes but may be less useful as primary outcome measures.

Advocates of the biomedical model also argue that biological markers of health are more reliable than measures of patient perceptions. Measures of patient perspective are often devalued as meaningless and unreliable. Unfortunately, the reliability of many biological markers is often not well studied and the validity of such markers is often justified by their close link with physical or biological theory. Moreover, relatively poor reliability has been demonstrated in several commonly used biological markers. Blood pressure is an important example because it is commonly used as an outcome measure in clinical practice as well as in health psychology research. Conventional sphygomonanometric measurements have demonstrated poor test-retest reliability. This may be accounted for by the variety of sources of error in the process of blood pressure measurement, including environmental conditions (e.g., white coat hypertension), misreading biases, and sampling biases (e.g., changes in blood pressure minute to minute). All of these factors function to reduce the reliability of blood pressure as an outcome variable.
Similar to blood pressure, Fries (1983) noted the questionable reliability and validity of several biological outcome indexes ranging from measures of erythrocyte sedimentation rate (ESR) to latex fixation titer to hemoglobin.

A growing number of studies demonstrate that simple subjective measures of wellness are significant predictors of longevity for patients with chronic illnesses (Coates, Porzott, & Osoba, 1997; Idler & Benyamini, 1997; Kaplan, Ries, Prewitt, & Eakin, 1994). Typically, simple self-report measures perform as well as, or better than, key physiological indicators in predicting mortality (Squier et al., 1995). Many studies show that a simple one-item rating of wellness predicts survival even after adjustment for other risk factors (Idler & Kasl, 1995). Thus, measurement from a patient's perspective may be as precise as physiological markers and have greater relevance to the patient.

The emerging evidence-based medicine paradigm raises questions about the biomedical perspective. Evidence-based medicine advocates argue that a test must have "therapeutic" benefit. This benefit occurs only if the test provides meaningful information that will result in benefit to a patient. In addition, it must be determined whether the test leads to treatment that will result in reduced life expectancy or quality of life (Sackett, 1996). In summary, defining health solely on the criterion of the absence of disease is problematic. In summary, traditional measures of clinical status, including X-rays or clinical tests, do not tell the whole story with regard to health benefit. Measures of health outcome are required to demonstrate the benefits of treatment from the patient's perspective (Kaplan, Anderson, & Ganiats, 1993). There is no "right" answer to the question of how to best conceptualize health. The examination of epidemiological, medical, and outcomes perspectives highlight strengths and weaknesses in each. However, it is important to build an approach to health outcomes assessment on a conceptual foundation. Given the patient-centered focus in the outcomes perspective, it is ideally suited as a conceptual foundation for the field of health psychology.

DIMENSIONS OF HEALTH

To better understand the measurement of health from an outcomes perspective, it is necessary to build a comprehensive theoretical model of health status—that is, a conceptualization of health from the patient's perspective. The major aspects of such a model include mortality (death) and morbidity, where morbidity refers to dimensions of health associated with quality of life (e.g., health-related quality of life). Diseases and disabilities are important for two reasons. First, illness may cause life expectancy to be shortened. Second, illness may make life less desirable at times before death (diminished health-related quality of life; Kaplan & Anderson, 1996; Kaplan
et al., 1997). Environmental exposures or risky health behaviors might reduce life expectancy or quality of life, even if we do not understand their effects on disease process. Treatments might make life better or longer, even though we do not understand the mechanisms through which they influence a biological process. However, to understand health outcomes, it is necessary to quantify health using measures that do not necessarily depend on medical diagnosis.

Nearly all definitions of health recognize that health is multidimensional. Spilker (1996) argued that there are five major domains of life quality: (a) physical status and functional abilities, (b) psychological status and well-being, (c) social interactions, (d) economic or vocational status and factors, and (e) religious or spiritual status. Various approaches to the measurement of health outcome typically attempt to assess different dimensions, although the exact dimensions vary considerably.

An emerging consensus suggests that the concept of health must integrate the concept of mortality with multiple dimensions of life quality. More than 30 years ago, Sullivan (1966) offered a comprehensive review of concepts relevant to health. He noted that three types of evidence supported most definitions of morbidity: clinical, subjective, and behavioral. Sullivan's review concluded that clinical and objective evidence could not be used solely as valid and reliable indicators of health status. Instead, he focused on behavioral evidence including absenteeism, bed–disability days, and institutional confinement. The concept of disability was attractive to Sullivan because it represented deviation from societal standards and was consistent with Parson's (1951) conceptualization of health. Although people may be sick from many different diseases, they all represent deviation from society's ideal of well-being.

By themselves, measures of both mortality and morbidity are incomplete indicators of health. Combined indexes of morbidity and mortality may more accurately represent the level of wellness. In most attempts to define health, the measurable components include behavioral functioning and both physical and mental symptoms. Symptoms might be pain, cough, anxiety, or depressed mood. Physical functioning is usually measured in terms of limitations in ambulating or disruptions in functioning because of restrictions of mobility, confinement to home, or bed. Social functioning might be represented by limitations in performance of usual social roles; this would include attendance at school, ability to work, or participation in recreational activities. The concept of health-related quality of life usually attaches value to combinations of these attributes (Erickson, Wilson, & Shannon, 1995; Patrick & Erickson, 1993).

The models introduced by Sullivan require combining morbidity and mortality into a single index. Within morbidity, there is also the need to combine or integrate the information. Tabulating the frequencies of different
dimensions of wellness results in an incomplete description of health. For example, consider two people with different health problems. Person 1 has pain from arthritis of the knee and walks with difficulty. However, she is able to work and perform a wide variety of social activities. Person 2 has persistent depressed mood. Although able to ambulate with no difficulty, he is limited in the amount or kind of work he is able to do. Which person is healthier? If we are able to make a judgment, it is only because we are using some system of weighting the circumstances of the two people. If we say person 1 is worse off, more weight is given to mobility. A judgment that person 2 is worse off implies that social functioning is given more weight. Value judgments about the relative importance of dimensions are common. However, weighting is typically done implicitly, arbitrarily, and in an idiosyncratic way. Formal models of health measurement attempt to make the value or preference dimension of health status clear (Kaplan & Anderson, 1996; Torrence & Feeny, 1989).

Time

The concept of health implies a time dimension. In addition to current wellness, future outlook must be considered. A person infected with the HIV virus may appear very well today. However, this person might not be described as healthy because he or she is at increased risk for poor health outcomes in the future. The term prognosis is used to describe transitions in health status over the course of time.

Acute care medicine, like preventive medicine, attempts to prevent or limit future problems. For example, cancer surgery or treatments of myocardial infarction are performed not only to treat current symptoms but also to prevent disease progression and death. Conceptual models of health separate levels of function at one point in time (such as today) from the probability of transition to other levels of function in the future. The failure to separate current health from prognosis is one of the major conceptual obstacles to defining health. Health and severity of illness must be examined in relation to the two independent constructs of current functioning and prognosis.

In sum, measures of health must incorporate several components if they are to be maximally effective in evaluating outcomes. Measures that focus solely on one or more of the dimensions of morbidity (e.g., functional status, psychological and social status, and symptoms) are useful for specific research questions (e.g., documentation of functional abilities after a surgical procedure, improvement in psychological well-being as a function of psychotherapy) but are not as useful for evaluating the overall construct of health. To accomplish this, mortality, morbidity, preferences for health outcomes, and time must all be accounted for in a single metric.
Quality-Adjusted Life Years

Quality-adjusted life years (QALYs) are a metric of health that incorporates mortality, morbidity, preferences, and time. Specifically, QALYs are measures of life expectancy with adjustments for quality of life (Gold et al., 1996; Kaplan, Alcaraz, Anderson, & Weisman, 1996). QALYs integrate mortality and morbidity to express health status in terms of equivalents of well years of life. For example, if a woman dies of breast cancer at age 50 and one would have expected her to live to age 75, the disease was associated with 25 lost life years. If 100 women died at age 50 (and also had life expectancies of 75 years) 2,500 (100 x 25 years) life years would be lost.

Death is not the only outcome of concern in cancer. Many adults continue to suffer from the disease, leaving them somewhat disabled over long periods of time. Although still alive, the quality of their lives has diminished. Quality-adjusted life years take into consideration the quality of life consequences of these illnesses. For example, a disease that reduces quality of life by one half will take away 0.5 QALYs over the course of one year. If it affects two people, it will take away one QALY (equal 2 X 0.5) over a one-year period. A pharmaceutical treatment that improves quality of life by 0.2 for each of five individuals will result in the equivalent of 1 QALY if the benefit is maintained over a one-year period. The basic assumption is that two years scored as 0.5 add up to the equivalent of one year of complete wellness. Similarly, four years scored as 0.25 are equivalent to one completely well-year of life. A treatment that boosts a patient’s health from 0.50 to 0.75 adds the equivalent of 0.25 QALYs. If applied to four individuals, and the duration of the treatment effect is one year, the effect of the treatment would be equivalent to one complete well-year of life. This system has the advantage of considering both benefits and side effects of treatment programs in terms of the common QALY units. Although QALYs are typically used to assess patients, they can also be measured for others, including caregivers that are placed at risk because they experience stressful life events. In their report, Summarizing Population Health, the Institute of Medicine (IOM) recommended that population health metrics be used to evaluate public programs and to assist the decision making process (Field & Gold, 1998). Methods for eliciting these QALY units will be discussed later.

In summary, the concept of the quality-adjusted life year attends to issues historically raised by Parsons (1951), Sullivan (1966), and Patrick and Erickson (1993). QALYs combine measures of morbidity and mortality. Specific medical diagnoses (e.g., hypertension, cancer, and depression) are not incorporated into QALYs but rather are accounted for by the morbidity and mortality outcomes they produce. QALYs also include time or prognosis and incorporate preferences for health outcomes. A consensus conference with the Department of Health and Human Services recommended the use
of QALYs to evaluate health programs (Gold et al., 1996). A recent IOM report on the measurement of population health came to similar conclusions (Field & Gold, 1998).

Can an Outcomes Model of Health Be Applied to Evaluate Traditional Medical Interventions?

Because the medical model has dominated the evaluation of health for so long, the assessment of medical interventions in terms of mortality and biological markers is commonplace. Thus, it is important to consider an outcomes model of health in relationship to traditional medical interventions—specifically, to examine whether or not an outcomes model is relevant in evaluating traditional medical interventions. For example, most surgical interventions are justified on the basis of saving lives. However, the great majority of surgical procedures has no effect on life expectancy but may affect quality of life. This issue was recently reviewed by Fowler, Cleary, Magaziner, Patrick, and Benjamin (1994). Four of the most common indications for surgery in the United States are transurethral resection prostatectomy (TURP) for benign hyperplasia of the prostate (BPH), extractions of cataracts, joint replacement for severe osteoarthritis of the knee or hip, and hysterectomy for diseases of the uterus. Although it is often argued that these procedures prevent deaths, reviews of the evidence suggest that these procedures are rarely performed to extend life expectancy. In each case, however, the surgery may lead to improvements in functioning or the reporting of symptoms. For example, TURP may reduce the symptom of urinary frequency in men. Similarly, cataract extraction may help older patients function better with reading, night driving, and other activities of daily living. Joint arthroplasty may increase mobility for older patients. For most of these cases, traditional physiological markers of outcome provide little information. Patients seek these procedures because they want relief of symptoms or improvement in functioning. As such, it appears that for a variety of surgical interventions, an outcomes model of health is both applicable and relevant.

In summary, disease and disability reduce health-related quality of life. The outcomes research movement argues that quality of life outcomes (along with mortality), rather than physiological outcomes, are the most important objective of health care. During the last two decades there has been a remarkable growth in the number of studies on health-related quality of life (Figure 16.2). Quality of life measures are now common in clinical trials, epidemiological studies, and other clinical investigations (Spilker, 1996). Many different compendia of quality of life measures are now available (Schumaker & Berzon, 1995; Spilker, 1996). The challenges associated with evaluating such concepts as health status and health-related quality of life...
lend themselves to the skills and training of health psychologists. Unfortunately, health psychology has played a relatively limited role in this area of inquiry. Next, we examine why this has been the case.

HEALTH PSYCHOLOGY'S CURRENT ROLE IN THE MEASUREMENT OF HEALTH OUTCOMES

Measurement is a cornerstone of psychology. The field of health psychology has made significant progress transitioning the principles of psychometric theory into a variety of assessment applications within the medical community. However, measurement within the field of health psychology for the most part has focused on (a) identifying psychological processes associated with health and illness, (b) evaluating psychological and social context variables and their relationship to biological markers of health, and (c) assessing psychological distress as a primary outcome. Although these are important contributions, the focus is somewhat narrow and limits health psychology's role in health outcome measurement.
Measures of Process

The role of psychological factors in the mediation and moderation of biological markers of health has improved the understanding of medical outcomes by accounting for systematic factors that are typically regarded as error variance in predictive models. Moreover, these factors have helped to define behavioral and psychological treatment modalities that complement biomedical interventions. Although these are clearly important contributions, there has been very little work in the field directed specifically toward the measurement of the construct of health as a whole (i.e., symptoms, physical function, and social and psychological function).

From an outcomes model perspective, the dimensions of quality of life (symptoms, physical functioning, and psychosocial functioning) serve as primary endpoints. Thus constructs such as stress, coping, social support, and health beliefs are best conceptualized as process indicators. Their contribution to health outcome evaluation lays predominately in their ability to explain changes in symptoms, function, and well-being. Much of health psychology research has focused on the interrelationships between these variables and has used these variables as primary endpoints. The evaluation of health outcomes has received relatively less attention. The distinction between process variables and outcome variables is always arbitrary and often draws debate among researchers. However, given the general consensus that health outcomes refer to an evaluation of patient symptoms, physical functioning, and psychosocial functioning (Kaplan, 1989; Patrick & Erickson, 1994; Spilker, 1996), we must distinguish between health outcomes and their psychosocial predictors (e.g., stress, coping, and social support).

Health psychology can play a vital role in improving the evaluation of health outcomes. Increased attention to the development and validation of instruments designed to evaluate health status, symptoms, and quality of life as well as increased use of these variables as primary endpoints for the evaluation of psychological and behavioral interventions is greatly needed. Health psychology is in a position to expand its scope of research so that measurement of psychological process variables can be seen as complementary to the measurement of health outcomes rather than as a primary domain.

Biological Markers of Outcome

A great deal of measurement models in health psychology examine the relationship between behavioral and psychological process factors and biological outcomes. This focus has occurred in part as an attempt to justify the importance of behavioral and psychological factors within the medical community. Unfortunately, biological outcomes are often limited in their direct relevance to the patient and fail to encompass a complete
characterization of health status. Therefore, reliance on them as primary endpoints may be quite limiting. Over the past 15 years, however, the emphasis on biological outcomes has continued to grow. In 1985, Grunberg and Baum emphasized new technologies for evaluating physiological outcomes, including portable blood withdrawal pumps, blood pressure monitors, and biochemical assessment tools. Rodin and Salovey in 1989 underscored the importance of disease endpoints and encouraged the field of health psychology to focus within specific disease categories (e.g., cancer and heart disease). There has been significant focus on the study of stress and measurable aspects of immune function (e.g., Pennebaker, Kiecolt-Glaser, & Glaser, 1988). As Kaplan (1990) noted, several reviews of the field of health psychology have emphasized the role of behavior and psychological factors in the development, maintenance, and treatment of disease, emphasizing the role of stress and distress in physiological processes.

With a shift away from the medical model of health and toward an outcome model, the emphasis on biological markers as primary endpoints is not as valuable or useful in health outcome assessment. The major limitation with disease measures is that biological measures of disease process may only be modestly associated with health outcome. The poor correlation between measures of disease process and patient outcome has been documented for many different areas of medicine (Feinstein, 1994). For example, rheumatologists often measure disease activity by sedimentation rates or numbers of swollen joints. However, these measures are poorly correlated with patient disability and capacity to function. Thus, the biological measure serves only a limited role in explaining the patient outcome. From an outcomes perspective, the functional disability and capacity to function (i.e., ability to carry out activities of daily living) are more relevant to the patient than sedimentation rates or numbers of swollen joints. Biological measures such as psychosocial process measures (stress, coping, health behaviors, etc.) serve an important role in contributing to the prediction of health outcomes. Reliance solely on biological measures as correlates of health outcomes may not be the most powerful line of research for health psychologists to pursue.

Psychological Distress: Necessary But Not Sufficient

Although process variables have been an area of concentration in health psychology research, the field has also contributed to the evaluation of distress-related outcomes. The contribution of health psychology in the conceptualization and systematic evaluation of psychological distress has been a cornerstone in the evaluation of health. Measures focused on evaluating psychopathology; symptoms of distress, including depression, anxiety, and hostility; and measures of cognitive status and function are an important component of health outcome assessment. However, the tendency to develop
measurements focused solely on "psychological" symptoms and "mental" health perpetuates a dualistic model and serves once again to narrow health psychology's role in the measurement of health. This issue of separating mental health from physical health in the evaluation of outcome is not just a barrier to health psychology in the evaluation of outcome; it is also a topic of debate in the field of quality of life measurement. Two of the most frequently used quality of life measures, the Medical Outcomes Study Short Form 36 (MOS–SF36; Ware, Phillips, Yody, & Adamszyk, 1996) and the Quality of Well-Being Scale (QWB; Kaplan, Bush, & Berry, 1976) take very different perspectives on this issue. Illustration of these differences in the conceptualization and quantification of quality of life may be useful for appreciating the complexities in health outcome measurement.

The MOS–SF36 consists of 36 items assessing eight dimensions of health (general health perceptions, physical functioning, social functioning, role functioning, emotional well-being, and pain and vitality). Using factor analytic weights, these eight scales are combined into two summary scales representing mental health status and physical health status. The authors of the instrument have conducted validation studies that support the presence of two factors in the structure of health status (Ware et al., 1996) and suggest that health outcomes are best described in two dimensions (physical and mental). Thus, scores on the MOS–SF36 are always presented in physical and mental domains; a single index combining the two domains is not used to characterize quality of life.

The QWB is a measure of health-related quality of life comprising four subscales (symptoms, mobility, physical activity, and social activity) that are combined into a single score. This score incorporates societal preferences or weightings for each of the states described within the subscales. In contrast to the MOS–SF36, symptoms associated with psychological problems (e.g., depressed mood, anxiety, and loss of control) are combined with a list of "physical" symptoms (i.e., fatigue, dizziness, pain, etc.) in a single symptom subscale.

Kaplan, Ganiats, Sieber, and Anderson (1998) have argued that both mental and physical health problems produce symptoms and that those symptoms are associated with decrements in function. In this argument, the characterization of the symptoms are not as important as the severity when it comes to quantifying health status. Thus, an individual may suffer from a cough. The cough may be mild and have virtually no impact on the individual's ability to function in normal activities. In this situation the individual's health status remains essentially in tact. If, however, the individual has a cough that makes performance of daily activities nearly impossible, the impact on health status is significant. The cough itself is less important than the severity and impact on health status. This same scenario can be envisioned with a substitution of cough with the symptom of depressed...
mood. An individual with a mildly depressed mood may not be limited in normal activities. However, if that individual's mood is severely depressed, normal activities may be next to impossible and health status is likely diminished.

Like the definition of health itself, there is no one "right" way to conceptualize symptoms of psychological distress. However, the QWB provides one illustration of how psychological symptoms can be conceptualized as components of a larger group of general symptoms associated with health status rather than as a distinct entity. Although health psychologists may be particularly adept at evaluating psychological symptoms, they need not be limited to this class of symptoms. Focusing on the evaluation of symptoms in general and their relationship to levels of function enables health psychologists to evaluate the larger constructs of health status and health-related quality of life.

TRANSITIONING HEALTH PSYCHOLOGY INTO THE FIELD OF OUTCOMES MEASUREMENT

Why should health psychology play a major role in the evaluation of health outcomes? As discussed earlier, health is a complex, multidimensional construct. Viewed from the outcomes model it encompasses symptoms, behaviors, and both psychological and social functioning. Operationalizing such a construct and systematically evaluating it is well within the expertise of health psychology. Skills in psychometrics, behavioral assessment, instrument development, and validation are a cornerstone of training for most health psychologists. Because the definitions of health are increasingly shifting from a biomedical process model (i.e., physiological markers of health) to a patient-focused outcomes model (i.e., symptoms and function distress) so too must the measurement of health shift from biomedical process to outcome. This poses an incredible challenge for the medical community, because it requires a new paradigm in evaluation. This paradigm falls within familiar territory for health psychology. The process of defining and operationalizing a construct (e.g., health, anger, pain, and hostility), quantifying it through instrument development, validating the instrument to ensure both reliability and accuracy in measurement, and interpreting data obtained from such an instrument is common practice within health psychology. In fact, existing measures of health beliefs, coping strategies, adjustment to illness, health behaviors, and psychological distress are clear evidence of health psychology's skills in measurement and evaluation. This foundation of behavioral science, which is needed for the evaluation of health-related quality of life, is basic to healthy psychology and is new to medicine.
Health psychology is poised to be a leader in the evaluation of health outcomes. As medicine is increasingly faced with evaluating the impact of interventions on chronic conditions, the rationing of services based on improvement in general health status and quality of life, and the role of the patient as a consumer of health care services, a patient-focused model of outcome will prosper. Health psychology has the opportunity to apply its expertise in measurement across the health care field. Limiting measurement to distress and psychological factors associated with health and illness simply limits the field. Broadening the scope of health psychology to include all patient-based measures of health outcome opens the door to several areas of measurement.

MEASURING HEALTH: TARGET AREAS FOR HEALTH PSYCHOLOGY

Health psychology can contribute to the evaluation of health in numerous ways. In the following section, we highlight several key areas that are particularly well-suited for the field.

Decision Making in Health

As discussed previously, definitions of health are often ambiguous and are laden with implicit or idiosyncratic assumptions about the value of being free from specific impairments, limitations in daily activity, and restrictions from fully participating in society. Patrick and Erickson (1994) have argued that even the notion of disability or illness as distinct from health is a value judgment; what distinguishes health concepts are subjective interpretations of what is and is not desirable. Health services researchers are beginning to realize that to establish coherence within health and health policy research, they must study how best to value health outcomes. Human judgment, decision making, and valuation of health are growing areas of research well suited for health psychology.

Research on valuing health outcomes is of central importance to health policy decision making. Health policy decision makers have a simple objective: Optimize health of the population given budget constraints. This requires decisions about which health programs to fund and which not to fund. Because health programs can both improve health and use resources (i.e., cost money) to varying degrees, a goal in the decision-making process is to rank-order programs according to their cost per unit health effect (i.e., cost-effectiveness). Such a rank-ordered list could be used to fund the most cost-effective programs that fall within a particular health care budget.
Essential to this method is an interval scale measure of unit health effect. Unit health effect can be thought of as a measure of health productivity. The goal of the health policy decision maker is to decrease the cost per unit of health productivity achieved. The question then becomes, "What is health productivity?"

What most people want in exchange for payment for health services is a combination of two things: (a) longer life, and (b) better health status (i.e., reduced symptoms and problems). Therefore, health as a commodity can be thought of as a combination of these two things. In this chapter, we will call any sequence of health states over a given time horizon a health profile.

Just thinking of health in this way does not solve the problem of measurement of a unit health effect. For instance, is greater health productivity achieved when someone lives for five years in perfect health or 10 years in poor health? Such a question requires the measurement of the value people place on health profiles. In the next section, we discuss how the value of different health profiles can be placed on a scale of preference, where a year of life in perfect health serves as the unit of measure. We present different models of preference-based health measurement and health psychology's role in the measurement development. The first set of models we discuss are the health utility models.

HEALTH UTILITY MODELS

Health utility models are mathematical models of considerable technical complexity that describe preference for health profiles for medical choices made under risk or uncertainty that are used in medical decision analysis and cost-effectiveness analysis. The mathematical nature of health utility models should not discourage psychologists from participating in health utility research. In fact, several psychologists have made a number of important contributions to health utility research (Chapman, 1996; Kaplan & Ernst, 1983; Miyamoto & Eraker, 1988, 1989; Treadwell & Lenert, 1999). In this section, we discuss health utility models and the role of psychology in their development and application.

Most medical decisions are made in the context of risk or uncertainty (i.e., death or shortened survival is a possible outcome). Utility measurement is the quantification of preferences under either risk or uncertainty. This type of measurement is necessary to place values on health profiles. Utility for health profiles is often discussed in terms of QALYs, defined earlier in this chapter. In traditional survival analysis, a person receives 1 unit of credit for each year he or she survives. Statistically, those who survive are
coded 1.0 and those who die are coded as 0. Traditional survival analysis does not make the distinction between those who are perfectly well and those who are alive with severe disability. Each is given 1 unit of credit for surviving the year. The QALY concept holds that years of survival should be valued somewhere along the continuum between 0 (death) and 1.0 for (full health). How those numbers are assigned is a matter of major importance and of considerable debate. There are both theoretical and methodological arguments that assignment of these numbers must be based on an individual's willingness to risk death. The other extreme involves simple state valuations using rating scales, or trade-offs between health quality and length of life when no risk of death is involved. All of the different approaches make the assumptions that preferences along the 0 to 1.0 continuum are measured on a linear or interval response scale. Verification of these assumptions is essential to the application of the models.

Mathematical models begin with premises, or axioms. From a set of axioms, other conclusions can be deduced from the theory. These conclusions are often called theorems. If a mathematical model represents a phenomenon well, the axioms and theorems will provide a researcher with information about how individuals will behave in various situations. If not, then the theory is likely false, and axioms need to be revised to better account for behavior. The mathematical model as a whole should also tell us something about how numbers can be used to represent the objects of empirical study.

Clearly, mathematical models of preference are of great import to health policy research. Consider the health policy analyst: She is interested in health productivity (i.e., a unit health effect) and has empirical knowledge about the changes in health status and survival duration different medical treatments produce. Each person in the population she represents will have their own health profiles (i.e., each person in the populations will experience a sequence of health states over varying survival duration). Moreover, members of the populations will have preferences for these health profiles (e.g., they may prefer full health for 7 years to back pain for 10 years, and back pain for 10 years to coma for 12 years). If numbers can represent these preferences, then the analyst can recommend funding for health services that maximize preference, and thus health productivity is maximized. Knowing how individuals make choices with respect to their health under a multitude of circumstances is paramount for maximizing health productivity in a population. Thus, the inherent usefulness of mathematical models in health policy is clear.

Another key point is that health utility models are measurement models. Most psychologists are trained in a psychometric tradition. This tradition emphasizes the use of scaling procedures that assume the validity of a mathematical measurement model and produce a numerical representation
that best fits the data (Krantz, Luce, Suppes, & Tversky, 1971). Examples of these approaches include Thurstonian scaling (Torgerson, 1958), factor analysis (Harman, 1976), and test theory (Lord & Novick, 1968). In sharp contrast, health utility models are concerned with the validity of the underlying axioms of a mathematical model that explain a person's decision-making behavior in the health context. A psychometric approach to measurement of health would, in a sense, assume it knows what the people in a given population want. This is an approach to be aware of if actual preference for health profiles in a given population are to be maximized. Let us now discuss specific health utility models.

Health utility models originate from a theory of decision under risk, developed by von Neumann and Morgenstern (1944), and called von Neumann and Morgenstern (vNM) utility theory. The theory is notable for being the first to prove that preferences for choices made under risk could be quantified under specific assumptions about decision-making behavior. The theory is about individual decision making under risk but has been extended to health policy situations by adopting specific assumptions about aggregation of individual utilities (see Bleichrodt, 1997).

In the case of vNM theory, a set of axioms (which amount to rules for rational decision making behavior under risk) are outlined. From this set of axioms, it can be deduced that there must exist a utility function unique up to positive linear transformations (i.e., an interval scale of preference). Interval and ratio scales of preference are the only two scale types that are appropriate for measuring health productivity. The theory was further extended to cover decisions with multiple objectives (i.e., a multiattribute theory of vNM utility by Keeney & Raiffa, 1976).

Health utility, or preferences for health states, was first conceived by Fanshel and Bush (1970). Later, the theory was summarized in the context of vNM utility theory by Pliskin, Shepard, and Weinstein (1980). Pliskin et al. (1980) realized the multiple objectives one faces over any health decision: improving health quality and increasing longevity (i.e., the health profile). This group developed a multiattribute theory of health utility that consisted of two attributes: survival duration and health quality. The crux of the theory is that vNM utility, within the health domain, is a function of these two attributes. The theory has some reasonable implications. For instance, the theory implies that the longer one lives in a constant health state, better than death, the greater one's utility. Similarly, at constant survival duration, utility increases as health quality improves.

QALYs represent utility for various levels of health quality over survival duration. Pliskin et al. (1980) developed the theory under a somewhat complex set of axioms. Only recently has it been shown that by introducing a self-evident assumption, that for duration of zero life years (i.e., immediate death), all quality of life levels are equivalent, (called "the zero condition"),
the theory of health utility can be greatly simplified, resulting in simple tests with direct empirical meaning (Bliechsrot, Wakker, & Johannesson, 1997).

Health utility theory has largely been developed by economists. They have approached the problem of health preference measurement axiomatically, or deductively, by postulating a small parsimonious set of organizing principles. Economists place great importance on formal mathematical models. Such methods provide a concise language for communicating scientific ideas and offer specific predictions about the behavior of individuals. Often these predictions go untested because economists place a greater importance on theory development than on empirical tests of theory. In contrast, most psychologists emphasize inductive tests of theory (Anderson, 1981). Inductively driven theories within health psychology are often nonmathematical. These theories are not conceived from a few fundamental postulates and, hence, lack a clear axiomatic basis. Yet, health psychologists are trained within a strong empiricist tradition. This tradition values research design and statistical hypothesis testing as important tools in theory testing.

Psychology’s contribution to the study of health utility theory has been the conduct of systematic experiments that test the axioms of health utility models. For instance, Miyamoto and Eraker (1988) tested the independence axiom, a necessary axiom in QALY theory. This axiom asserts that utility (i.e., preference) for survival duration and health quality do not depend on each other. The parsimony of any health utility model is threatened if preference for particular health states depends idiosyncratically on the order in which the states are experienced or the particular time they are experienced. A policy analyst would have difficulty making policy recommendations if he or she had to evaluate a multitude of unique health profiles in determining the value placed on any point in time health state. The independence axiom in effect says that the independence axiom can be conceived of visually. Visually, independence implies that utility curves for various health states over survival duration do not intersect, except at zero duration. Figure 16.3 provides hypothetical illustrations of the satisfaction (see Figure 16.3a) and violation (see Figure 16.3b) of the independence axiom for three health states: full health, back pain, and below-knee amputation. In Figure 16.3a, we see that preference for survival duration increases in a manner that is independent of health state. In contrast, Figure 16.3b illustrates a situation where utility for survival duration is dependent on which health quality state is achieved. For below-knee amputation and full health, utility increases constantly over survival duration, whereas for back pain it increases, reaches a peak, and then decreases, crossing below the utility curve for below-knee amputation. Miyamoto and Eraker (1988) found that a majority of individuals satisfied the independence axiom when asked to make risky choices for various health states over different survival durations. This is an important finding because all current QALY health policy
models assume independence. For instance, with the general health policy model (GHPM) proposed by Kaplan and Anderson (1988), health preferences for various health states are determined by peer judges. Specific states are assigned weights, then patients are observed over time to empirically determine their transitions to other states of wellness. With this model, QALYs are accrued over an observation period, where point in time wellness is based on the weights assigned to specific health states. Point in time wellness is treated as independent of time. Hence, the GHPM imposes the independence axiom on outcomes data.

Independence greatly limits the general form a utility function can take, but it is still satisfied by several different parametric families of functions. Until one has a unique parametric utility function, it is impossible to compute a person’s utility for health states. In a separate study, Miyamoto and Eraker (1989) examined the empirical plausibility of different parametric models for health utility. They tested the validity of different parametric equations for representing health utility functions. Specifically, they tested the class of the so-called log/power models against another class of models known as linear/exponential. The distinction between these models is beyond the scope of this chapter, but it is important to note that these different models have different implications for the allocation of health resources. In their work, Miyamoto and Eraker (1989) found that fewer individuals violated the qualitative tests of a linear/exponential QALY model than a log/power QALY model. This work has implications for which parametric form should be used for computing health state utilities in cost-effectiveness analysis. Currently, most health policy applications with QALYs assume a linear QALY model. This is a special case of the linear/exponential family of utility functions. Allowing QALYs to be computed using either linear
or exponential utility functions may move health policy decision making closer to actual individual preferences under risk (Gold et al., 1996).

**Health Utility Models and Time Preference**

Most people would prefer to receive $1,000 today than in one year. This is one reason banks pay clients interest on their accounts. In addition, most people would prefer to pay $1,000 in one year than today. This is why credit card companies charge interest to customers carrying a balance. Time preference for money and other goods is an important factor in understanding utility. Health utility is no exception.

Health utility models all make assumptions about people’s preferences for outcomes as a function of time. The simplest model, the linear QALY model, assumes that persons are indifferent to when they receive health benefits or decrements. For instance, the GHPM is a linear QALY model. Because utility is linear with respect to time, under the GHPM, a person confined to a wheelchair would accrue the same number of QALYs between the ages of 20 and 21 years as they would if they were confined to a wheelchair between the ages of 60 and 61 years. Other models relax this assumption and suggest that utility for health (much like utility for money) tends to decrease as consumption is delayed (Torrance & Feeny, 1989).

Of course, there are a number of psychological factors that may influence time preference. For instance, the bank account versus credit card example suggests an impatience–procrastination effect (Fishburn, 1982). People prefer to receive a good outcome sooner rather than later (impatience) but prefer to delay the receipt of a bad outcome (procrastination). Preliminary evidence suggests this principle tends to hold empirically in the domain of health as well (Chapman, 1996). However, other psychological theories of time preference and health are plausible. For instance, the notions of savoring and dread may, for some individuals, influence time preference for health (Fishburn, 1982). A person may actually experience anticipatory anxiety associated with a delayed health outcome that is negative (e.g., a surgery or painful procedure), causing dread. Or he or she may savor a delay in a positive health outcome (i.e., derive pleasure from knowing that they will achieve better health in the future). A savoring–dread effect is in opposition to the notion of impatience–procrastination. More empirical research is needed to determine people’s time preference for positive and negative outcomes so that axiomatic theories of utilities can be developed to explain these effects.

In sum, health psychology’s role in contributing health utility theory is one of applying improved research design and statistics to tests of health-utility theory predictions. In this way, health psychologists compliment...
the elegant mathematical formulations of economists in modeling health decision making. Many advances in health utility theory have occurred through the multidisciplinary work between psychologists and economists.

**Behavioral Economics**

Despite advances in vNM utility formulations in the health domain, there has amassed considerable evidence that vNM utility theory is not valid as a descriptive theory of choice under risk. People tend to violate theory predictions in systematic ways (Kahneman & Tversky, 1979, 1984; Slovic, Lichtenstein, & Fischhoff, 1988). Most of this research has been conducted by psychologists, and only recently has this research received significant notice from the economic profession (Laibson & Zeckhauser, 1998). This research has spawned the development of a field known as behavioral economics, which places its focus on behavioral tests of economic models.

Behavioral economics has led to advances in mathematical formalizations of descriptive theories of choice under risk (Kahneman & Tversky, 1979; Quiggin, 1982; Tversky & Kahneman, 1992; Wakker & Tversky, 1993). Descriptive theories of choice represent concise revisions of the vNM utility theory. These theories are designed to account for violations of vNM utility theory that are caused by psychological factors that influence attitudes toward making decisions under risk. These new descriptive theories of choice are important for health policy decision making because they have implications for the unit health effects, or utilities, associated with particular health states (Bleichrodt & Quiggin, 1997; Miyamoto, 2000). This in turn influences the results of cost-effectiveness analyses.

Several anomalies of risky choice are emerging as important within descriptive theories of risky choice behavior. For instance, framing effects play a role in risk attitude (Kahneman & Tversky, 1979). For making decisions under risk, when outcomes are framed as gains, individuals tend to be risk-averse and when framed as losses they tend to be risk-seeking. In addition, persons appear to distort probabilities in specific ways. For instance, moving from an uncertain outcome (e.g., $p = 0.99$) to a certain outcome (i.e., $p = 1.0$) has a disproportionate impact on choice compared with moving between two uncertain outcomes over the same increment of probability (e.g., moving from $p = 0.98$ to $p = 0.99$). Finally, related to the framing example is the finding that losses appear to loom much larger than gains. This finding is called loss aversion, where the value curve for outcomes that are perceived as losses is steeper than it is for gains. An intuitive way to think about loss aversion is in the context of preference for money. As stated by Kahneman and Tversky (1979), "the aggravation that one experiences in losing a sum of money appears to be greater than the pleasure
associated with gaining the same amount" (p. 279). For health utility, loss
aversion may be tied to one's aspiration level for survival. People may have
an aspiration level, or break-even point, with respect to longevity. If people
do not make it to their break-even point, they may feel that they have
been shortchanged. However, if they live beyond their break-even point
for longevity, they may view those extra years as a gift. For instance, imagine
a person who aspires to live 80 years. For this person, living any number
of years beyond 80 is considered a gain, and living any number of years
below 80 years is considered a loss. It is possible that decisions relating to
risky prospects above and below such a reference level may prove to be
different. This is an area of health outcomes measurement where psychologi-
cal theory plays an important role and where validation of psychological
theories has important health policy implications. A greater volume of
quality research on judgment and decision making within health psychology
will help address these important research questions.

Alternative Ways to Value Outcomes

Rating scales offer a highly efficient way of assigning numbers to health
states such that the numbers represent preferences for those health states.
However, the use of rating scales as a response mode has been the subject
of controversy both within and outside the field of psychology (Luce &
Galanter, 1963; Nord, 1992; Richardson, 1991; Stevens, 1966). Within the
health state preference literature, economists have criticized rating scales
for not having the axiomatic basis associated with vNM expected utility
theory. Also, the rating response has been perceived as not being able to
provide an interval scale of measurement for cost-effectiveness analysis
(Nord, 1992; Richardson, 1991). However, the programmatic research of
Norman H. Anderson on functional measurement (see Anderson, 1990, for
review) has shown that, although rating scales are susceptible to biases,
these biases can be controlled. Of equal importance, Anderson (1981, 1990)
has shown that there are specific tests of the rating scale property that can
be conducted to ensure that the numeric values associated with rating
responses represent an interval scale of measurement. In addition, Luce
(1981) has developed an axiomatic formalization of Anderson's methods.
Considerable research in the area of health outcomes measurement for
health policy decision making has employed rating scales using Anderson's
bias minimizing methods (Kaplan et al., 1979; Kaplan & Ernst, 1983; Patrick,
Bush, & Chen, 1973). Other research has examined the relationship between
physical and mental health constructs via Anderson's psychological measure-
ment model (Cadman & Goldsmith, 1986; Viet, Rose, & Ware, 1982).

How best to use rating scales within the health outcomes measurement
domain is an important area of research for health psychologists to address.
For instance, some health-related quality of life measures use a decomposed rating strategy, where each item on the measure receives a weight and these weights are summed and subtracted from full health to produce a health-related quality of life score. Other health-related quality of life measures, such as the European Quality of Life Scale (EQ-5D; EuroQol Group, 1990), use a holistic strategy. With a holistic strategy, a person’s health problems are summarized and then the person is asked to give a rating response that represents how they value their current health (as described by the summary of endorsed items) in relation to full health and to death. Future research needs to determine the biases associated with these different approaches to health outcomes measurement. Finally, there is considerable evidence that psychological factors influence rating responses (Anderson, 1981, 1990; Birnbaum & Veit, 1974; Parducci, 1968). For instance, work by Bliechrodt and Johanneson (1998) has shown that for health preference elicitation, rating scale responses depend on the number of preferred alternatives in the rating task. However, a reanalysis of this data by Schwartz (1998) revealed that a psychological theory of judgment, known as range-frequency theory (Parducci, 1968), could be used to account for this effect. Findings such as these suggest that there is the need for the development and application of quantitative psychological theories of judgment within the area of rating-based health state preference elicitation.

In summary, health policy and decision-making research requires health outcomes measurement. Researchers largely agree that value or preference-based outcomes are necessary to accomplish health policy decision-making goals (e.g., funding health programs contingent on satisfactory cost-effectiveness ratios). However, psychological factors play a significant role in influencing judgments, choices, and trade-offs associated with health state valuation (Bliechrodt & Johanneson, 1998; Kahneman & Tversky, 1979; Miyamoto, 2000). Additional research is needed to identify biases and to establish valid methodologies for valuing health states. Such work will ensure that ratings accurately reflect preferences for health states.

**Incorporating Costs Into Health**

As mentioned, cost of care is an important factor in health outcomes research, particularly for cost-effectiveness analysis. Methodologies for estimating costs have now become standardized (Gold et al., 1996). From an administrative perspective, cost estimates include all costs of treatment and costs associated with caring for any side effects of treatment. Typically, economic discounting is applied to adjust for using current assets to achieve future benefits. From a societal perspective, costs are broader and may include the cost of family members staying off work to provide care.
When comparing programs for a given population with a given medical condition, cost-effectiveness is measured as the change in costs of care for the new program compared to the existing therapy or program, relative to the change in health measured in a standardized unit such as the QALY. The difference in costs over the difference in effectiveness is the incremental cost-effectiveness and is usually expressed as the cost per QALY. Because the objective of all programs is to produce QALYs, the cost–QALY ratio can be used to show the relative efficiency of different programs (Gold et al., 1996; Kaplan & Anderson, 1996).

More and more, health policy researchers, as well as health administrators, are interested in how much new interventions cost. Health psychologists need to be mindful of both costs and outcomes in their research. This is because, increasingly, the value of health research is being considered with respect to how the research affects costs. There are a few basic research questions that speak to this cost and outcomes issue: (a) “Does this research have an effect on cost of medical care, or other outside costs? And, if so, does it increase these costs or decrease them?” (b) “Are there ways to implement this health psychology intervention that are less costly, but equally effective?” (c) “If this intervention helps to reduce costs, does it do so at the expense of poorer health outcome?” Because health and medical researchers are becoming more vigilant about containing costs, these questions are important to consider in any health psychology research program or project.

FUTURE AREAS OF FOCUS: APPLYING AN OUTCOMES MODEL IN HEALTH POLICY

To refer to health policy as a “future” area of focus is a bit of a misnomer. The application of an outcomes model in the development and evaluation of health policy is a highly relevant endeavor that should be a primary target for health psychology researchers. The aforementioned areas of study will serve to facilitate health psychology’s transition into broader applications such as health policy evaluation.

Using an outcomes model to evaluate health policy means reconceptualizing what health care systems and their providers’ offer. There are important contrasts between the outcomes model and the existing traditional biomedical model when it comes to characterizing the provision of health care. The traditional model assumes that the role of a health care provider is to diagnose problems and to treat them. In other words, health care systems and their providers treat diseases. In contrast, the outcomes model argues that the role of health care is to treat patients, not just their diseases.
Sometimes treating the diseases of patients will make them live longer and feel better. However, there are other occasions in which treating diseases has no effect on life expectancy or quality of life and there are other occasions in which medical treatment causes harm (Kaplan, 1997). The outcomes model recognizes that health care is really about making decisions. Under most circumstances, a provider has alternative pathways, and the patient and provider together need to select the pathway that maximizes patient benefit. By using the tools of psychometrics and cognitive science, an outcomes model may improve the conceptualization and measurement of benefit and the decision process itself. The development of rigorous and empirical models of measurement and decision making will ultimately improve the process of health policy evaluation. Health psychologists can, and should, play a role in this process.

CONCLUSION

The field of health psychology was founded with a broad definition. As proposed by Mattarazzo (1980),

Health psychology is the aggregate of the specific educational, scientific, and professional contributions of the discipline of psychology to the promotion and maintenance of health, the prevention and treatment of illness, and the identification of etiologic and diagnostic correlates of health, illness and related dysfunctions. (p. 8)

Although health psychology has made significant contributions to the health care field, most research in health psychology has focused on the study of illness correlates and psychological processes among those with chronic illnesses. Many health psychologists have focused attention on measures of biological process, believing these are more acceptable to mainstream biomedical researchers. Thus, research in health psychology has not been as broad-based as the definition that characterizes the field.

Within the past decade there has been a major paradigm shift in health care. New medical and surgical interventions are typically measured using evaluations of health-related quality of life. In addition, regulatory agencies, the National Institutes of Health, and pharmaceutical companies have accepted health outcome measurement as a central feature in clinical medical research. Although methods for health outcome assessment borrow from psychometric traditions, psychologists have been relatively uninvolved in this field.

The challenges ahead for health outcomes assessment and in medical decision making are enormous. There are significant opportunities for the study and application of health outcome measurement strategies and models
for medical decision making. The field of health psychology is well suited
to take on these challenges by applying its unique combination of expertise
in psychometric theory and behavioral science to improve the evaluation
of health outcomes and facilitate the process of medical decision making.

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