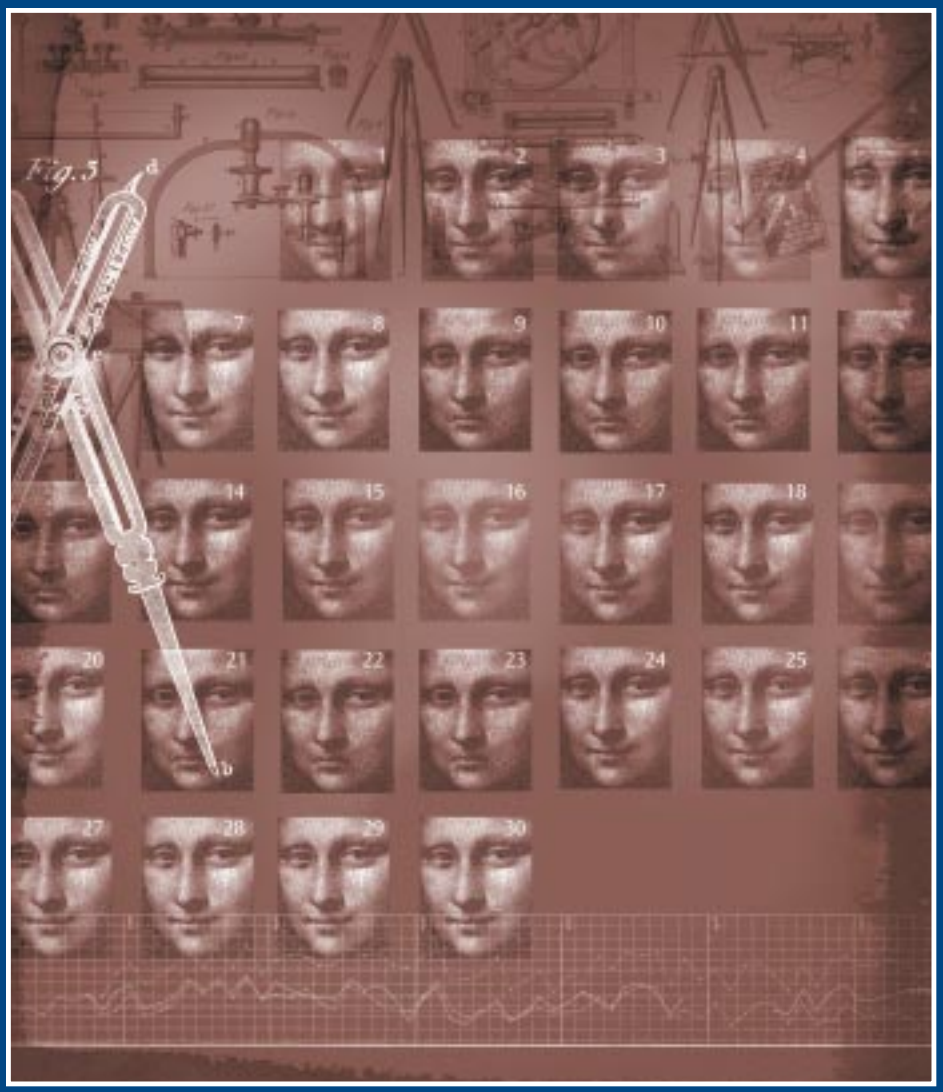
Measuring Healthy Days

Population Assessment of Health-Related Quality of Life



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Center for Chronic Disease Prevention and Health Promotion
Division of Adult and Community Health

November 2000

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For additional information: For general information about the Healthy Days measures, contact: Health Care and Aging Studies Branch, Mailstop K-45, DACH, NCCDPHP, CDC, 4770 Buford Highway NE, Atlanta, Georgia 30341 (Tel: 770-488-5464). For information about public-domain Behavioral Risk Factor Surveillance System (BRFSS) methods or data, see: **http://www.cdc.gov/nccdphp/brfss/** or contact your State BRFSS Coordinator (contact information available on this website).

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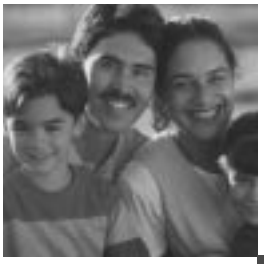
Measuring Healthy Days



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Measuring Healthy Days

EXECUTIVE SUMMARY

This technical report, *Measuring Healthy Days*, describes the origins, validity, and value of a set of survey measures developed by the Centers for Disease Control and Prevention (CDC) and its partners for use in tracking population health status and health-related quality of life (HRQOL) in states and communities. The first four of these measures pertain to general self-rated health and recent days of physical health, mental health, and activity limitation. These measures have been part of the full sample Behavioral Risk Factor Surveillance System (BRFSS) core since 1993 and were added, beginning in 2000, to the examination component of the National Health and Nutrition Examination Survey (NHANES). An additional five measures of activity limitation and five questions on recent days of pain, depression, anxiety, sleeplessness, and vitality constitute an optional quality-of-life module added to the BRFSS in 1995.

> "Health is a state of complete physical, mental, and social well-being—not merely the absence of disease, or infirmity."
>
> —-World Health Organization, 1948

The primary target audiences for this report are public health professionals with a current stake or potential interest in HRQOL measurement. The report identifies the policy origins of the Healthy Days measures, discusses how HRQOL differs from other health and social constructs, and summarizes several studies designed to test the reliability, validity, and responsiveness of the measures. It also describes surveillance findings to date and provides methods and population reference data from 1993–97 to assist states and others in the appropriate use and interpretation of their own Healthy Days data.

In recent years, several organizations have found these Healthy Days measures useful at the national level for: 1) identifying health disparities, 2) tracking population trends, and 3) building broad coalitions around a measure of population health compatible with the World Health Organization's definition of health. The demonstrated value of these measures and the continuous accumulation of public domain data have resulted in support from the CDC Disability, Women's Health, and Arthritis Programs. The HRQOL measures and data have also been used for research or program planning by the CDC Cardiovascular Health, Nutrition and Physical Activity, and HIV/AIDS Programs as well as by the Public Health Foundation, the Foundation for Accountability, the American Cancer Society, and several other government and academic programs.

One of the greatest anticipated uses of the BRFSS Healthy Days measures and data is at the state and local levels in support of the two major goals of Healthy People 2010: *Improving the Quality and Years of Healthy Life* and *Eliminating Health Disparities.* Healthy People 2010 identifies the BRFSS as a key source for tracking several HRQOL measures. As knowledge builds about the value of HRQOL surveillance and how to use it, these validated measures and accumulating data give states and communities a unique resource for tracking adult physical and mental health over time, identifying unmet health needs, and guiding broad community efforts to improve population health.

INTRODUCTION

This report is designed for use by public health professionals who are involved or interested in health- related quality of life (HRQOL) surveillance or measurement. The report identifies the policy and conceptual origins of a set of Healthy Days HRQOL measures that were developed for use as public health outcome measures and summarizes the results of studies designed to test the accuracy and consistency of these measures. It also describes surveillance findings to date and provides analytical methods and population reference data from 1993–1997 to assist states and others in the appropriate use and interpretation of the Healthy Days measures and data.

This report is organized around answers to questions people commonly ask about HRQOL and its measurement.

Why quality of life?

Although the World Health Organization (WHO) defined health very broadly as long as a half century ago, health in the U.S. has traditionally been measured narrowly and in the negative. What is measured is ill health in its severe manifestations, those which are verifiable through physical examination and other objective procedures or tests. These measures have generally been done at the individual level, at clinics and hospitals.

Such traditional measures of morbidity and mortality provide information about the lowest levels of health, but they reveal little about other important aspects of an individual's or a community's level of health, including dysfunction and disability associated with diseases, injuries, and other health problems. Developing a composite index of overall health by combining data about the presence or absence of various diseases and conditions is problematic.

In the 1980s, the search began for additional measures to supplement traditional measures of morbidity and mortality. Health status is now seen by the public health community as a multidimensional construct (*Patrick 1993*). Some of the variables generally considered to be in the domain of health include premature mortality and life expectancy, various symptoms and physiologic states, physical functions, emotional and cognitive functions, and perceptions about present and future health.

This reframed definition of health also considered quality of life. As medical and public health advances led to cures and better treatments of existing diseases and delayed mortality, it seemed logical that those who measure health outcomes would begin to assess the population's health not only on the basis of saving lives, but also in terms of improving them. The public, too, became aware that an important dimension was missing from the traditional health paradigm: the dimension of the quality of a person's life. Although biochemical measures and morbidity data may indicate the need for treatment, they do not always correlate with the way people feel *(Gill 1994, NIH 1993)*.

> "The web of our life is of a mingled yarn—good and ill together."
>
> —-Shakespeare, All's Well That Ends Well

What is quality of life?

Quality of life (QOL) is a popular term that conveys an overall sense of well-being, including aspects of happiness and satisfaction with life as a whole. It is broad and subjective rather than specific and objective. What makes it so challenging to measure is that, although the term "quality of life" has meaning for nearly everyone and every academic discipline, what it actually means is somewhat different for each individual and group. How do you reach accord about a measure for quality of life? Perhaps the strongest area of a consensus is that quality of life is extraordinarily broad and conceptually complex, yet measures are most meaningful when they measure key concepts in a logical way and are as precise as possible.

Although health is an important domain of overall quality of life, there are other domains as well—for instance, jobs, housing, schools, and the neighborhood. Aspects of culture, values, and spirituality are also key aspects of overall quality of life that add to the complexity of its measurement. Nevertheless, researchers in the fields of psychology and sociology have developed useful techniques that have helped to conceptualize and measure these multiple domains and how they relate to each other.

What is health-related quality of life?

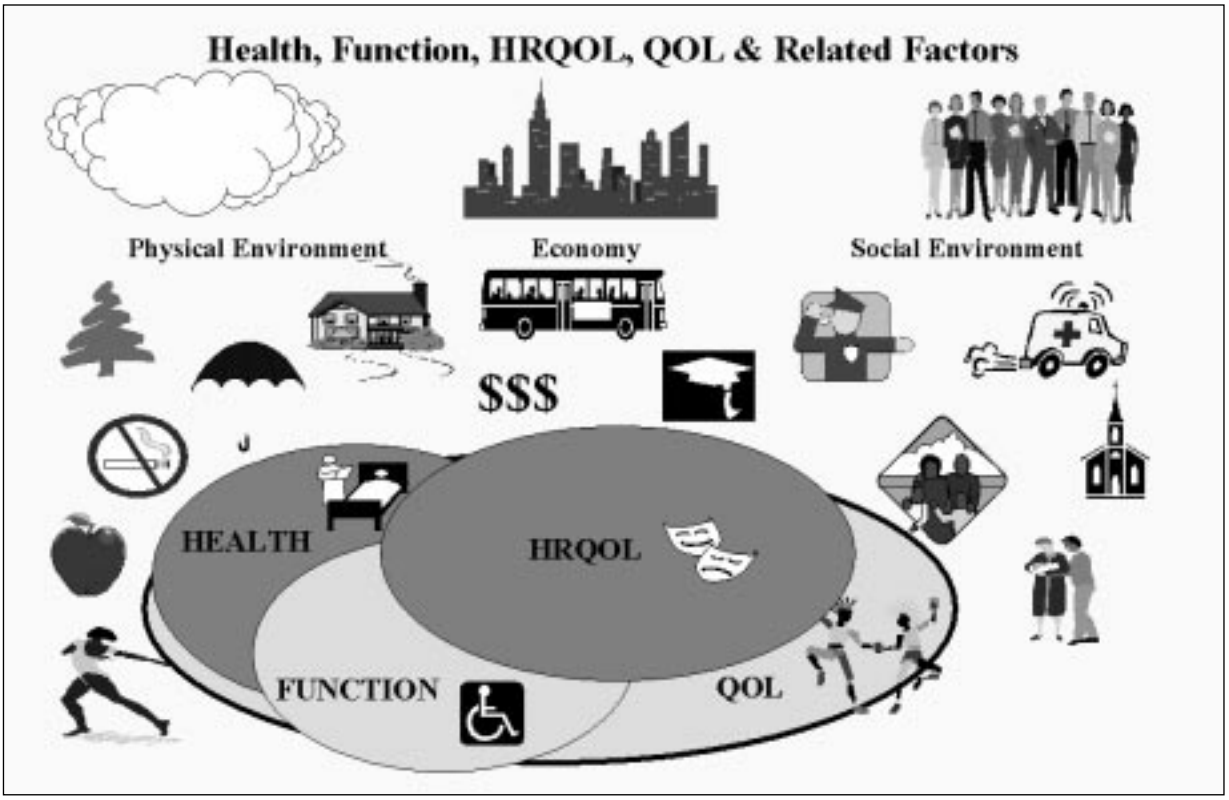
The concept of health-related quality of life (HRQOL) and its determinants have evolved since the 1980s to encompass those aspects of overall quality of life that can be clearly shown to affect health—either physical or mental *(McHorney 1999)*. On the individual level, this includes physical and mental health perceptions and their correlates, including health risks and conditions, functional status, social support, and socioeconomic status. However, some aspects of health do not appear to have a direct bearing on quality of life at the time of assessment. These include an illness, exposure, or genetic predisposition that is unknown to the individual without symptoms.

On the community level, HRQOL includes resources, conditions, policies, and practices that influence a population's health perceptions and functional status. The construct of HRQOL broadens the traditional notion of health to meet the expressed physical and mental health needs of the population. It also enables health agencies to legitimately address broader areas of *healthy* public policy around a common theme in collaboration with a wider circle of health partners, including social service agencies, community planners, and commercial groups *(Stokols 1992)*.

HRQOL is rapidly gaining acceptance as a measurable outcome. HRQOL questions about perceived physical and mental health and function have become an important component of health surveillance and are generally considered valid indicators of service needs and intervention outcomes. Self-assessed health status has proved a more powerful predictor of mortality and morbidity than many objective measures of health *(Idler 1997)*. HRQOL measures make it possible to demonstrate scientifically the impact of quality of life on health, going well beyond the old paradigm that was limited to what can be seen under a microscope.

Why is it important to track HRQOL?

Researchers and practitioners in fields outside public health are actively engaged in quality of life measurement, especially those from sociology, psychology, social work, aging, disability, environmental sustainability, economics, marketing, and urban/rural planning. Moreover, business and community leaders, the media, and the public are interested in community quality of life and appear willing to grant health agencies



CDC Mission

"to promote health and *quality of life* by preventing, and controlling disease, injury and disability"

a major responsibility for measuring and helping to sustain it. Focusing on HRQOL as a national health standard can thereby bridge artificial boundaries between disciplines and between social, mental, and medical services *(Pope 1991)*.

Several recent federal policy changes underscore the need for measuring HRQOL to supplement public health's traditional measures of morbidity and mortality. Healthy People 2000 and 2010 both identified quality of life improvement as a central public health goal. In addition, increased awareness of the burden of chronic health conditions and the links between quality of life and prevention led to a revision of the mission of the Centers for Disease Control and Prevention (CDC). Further, the CDC Chronic Disease, Disability, and Women's Health Programs have evolved to target quality of life as an important health outcome.

HRQOL is related to both self-reported chronic diseases (diabetes, breast cancer, arthritis, and hypertension), and their risk factors (body mass index, physical inactivity, and smoking status). Measuring HRQOL can help determine the burden of preventable disease, injuries, and disabilities, and it can provide valuable new insights into the relationships between HRQOL and risk factors.

Measuring HRQOL will help monitor progress in achieving the nation's health objectives. Analysis of HRQOL surveillance data can identify subgroups with relatively poor perceived health and help to guide interventions to improve their situations and avert more serious consequences. Interpretation and publication of these data can garner support for health policies and legislation, help to allocate resources based on unmet needs, guide the development of strategic plans, and monitor the effectiveness of broad community interventions. HRQOL assessment is a particularly important public health tool for the elderly in an era when life expectancy is increasing, with the goal of improving the extra years in spite of the cumulative health effects associated with normal aging and pathological disease processes.

How can HRQOL be measured?

Several measures have been used to assess HRQOL and related concepts of functional status. Among them are the Medical Outcomes Study Short Forms (SF-12 and SF-36), the Sickness Impact Profile, and the Quality of Well-Being Scale. The SF-36 measures are now used by the Health Care Financing Administration (HCFA) and the National Committee for Quality Assurance's Health Plan Employer Data and Information Set (HEDIS 3.0) to help evaluate the quality of care in managed care plans and other health care applications. While these measures have been widely used and extensively validated in clinical settings and special population studies, their length often makes them impractical to use in population surveillance.

Healthy People 2010 Goals

- Increase the quality and years of healthy life
- Eliminate health disparities

HEALTHY DAYS METHODS

To meet the need for a standard set of valid HRQOL measures that could be used in our national health surveillance system, a collaborative program was initiated in 1989 by the Division of Adult and Community Health (DACH) in the CDC's National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). This HRQOL surveillance program received its initial direction and guidance from several planning meetings that included representatives of state and local chronic disease and health promotion programs, relevant academic disciplines, and survey researchers *(CDC 1993-1, CDC 1993-2)*.

During the next several years, the Division worked with CDC's Disability Prevention Program, Women's Health Program, National Center for Health Statistics Questionnaire Development Research Lab, and Epidemiology Program Office to develop and validate a compact set of measures that states and communities could use to measure HRQOL *(Hennessy 1994)*. These are the Healthy Days measures, an integrated set of broad questions about recent perceived health status and activity limitation. On the basis of a synthesis of the scientific literature and advice from its public health partners, the CDC has defined HRQOL as "an individual's or group's perceived physical and mental health over time."

Core Healthy Days Measures

1. Would you say that in **general** your **health** is excellent, very good, good, fair, or poor?
2. Now thinking about your **physical health**, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?
3. Now thinking about your **mental health**, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?
4. During the past 30 days, for about how many days did poor physical or mental health keep you from doing your **usual activities**, such as self-care, work, or recreation?

Definition

Health-related quality of life

"An individual's or group's perceived physical and mental health over time"

The core Healthy Days measures assess a person's perceived sense of well-being through four questions on: 1) self-rated health, 2) number of recent days when physical health was not good, 3) number of recent days when mental health was not good, and 4) number of recent activity limitation days because of poor physical or mental health (see BRFSS "Health Status" questions @ **http://www.cdc.gov/nccdphp/brfss/).** For the Healthy Days measures, *recent* is defined as during the past 30 days.

The first item measures overall self-rated health on a scale from poor through excellent. Question #2 on physical health is a global measure of recent physical symptoms, and question #3 is a global measure of recent mental and emotional distress. Mental and physical health are probed in separate questions in order to link quality of life measurement to the medical, mental health, and behavioral medicine fields. Question #4 about recent activity limitation is a global indicator of perceived disability as well as an indicator of productivity and human capital.

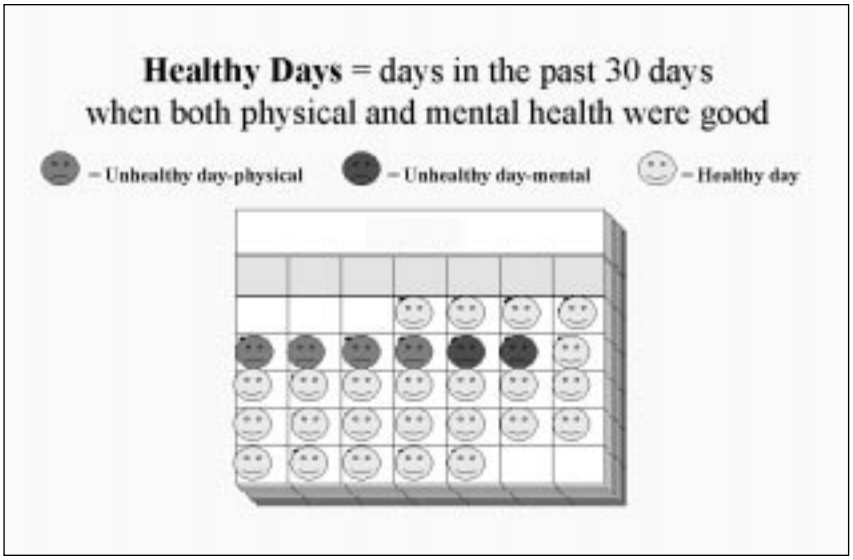
How is the summary index of *unhealthy days* calculated?

Unhealthy days are an estimate of the overall number of days during the previous 30 days when the respondent felt that either his or her physical or mental health was not good. To obtain an estimate of a person's overall *unhealthy days*, responses to questions #2 and #3 are added together, with a logical maximum of 30 *unhealthy days*. For example, a person who reports 4 physically unhealthy days and 2 mentally unhealthy days is assigned a value of 6 *unhealthy days* and someone who reports 30 physically unhealthy days

and 30 mentally unhealthy days is assigned the maximum of 30 *unhealthy days*.

This method for estimating *unhealthy days* is supported by the actual pattern of survey responses to the two individual questions. The large majority of individuals report substantially different numbers of physically unhealthy days versus mentally unhealthy days, e.g., in the 1998 BRFSS, 67.8% of the 68,619 adults who reported any *unhealthy days*, reported *only* physically unhealthy days or *only* mentally unhealthy days, while only 4.5% reported equal numbers for each measure. Additional evidence indicates that other reported days do not overlap, e.g., 10.5% of the 256 persons who reported *both* 15 physically unhealthy days and 15 mentally unhealthy days also reported *more than* 15 days of recent activity limitation due to poor physical or mental health. An alternative calculation method that assumed a maximum amount of overlap in the two responses (e.g., a person who reports 4 physically unhealthy days and 2 mentally unhealthy days is assigned a value of 4 *unhealthy days*) was not as plausible from the overall response pattern. Furthermore, this latter method resulted in only a 0.4 day overall mean difference in *unhealthy days* compared with the recommended method and showed similar demographic patterns and subgroup differences with aggregated population data.

Unhealthy days provides a simple, yet comprehensive, HRQOL summary measure that is a valid and responsive index of perceived physical and mental health over time *(Newschaffer 1998, Moum 1999)* and that is generally acceptable to public health and social science researchers, policy makers, and practitioners. *Healthy days*—a term coined by columnist Jane E. Brody of the New York Times in an article describing the first published comparisons of state HRQOL (NYT, March 29, 1995)—was formerly called *"good health days"* and is a positive complementary form of *unhealthy days*. *Healthy days* estimates the number of recent days when a person's physical and mental health was good (or better) and is calculated by subtracting the number of *unhealthy days* from 30 days *(Hennessy 1994)*. These summary measures are designed to assess people's overall perceptions about their health over time and to identify groups in the general adult population with potentially unmet perceived health needs.



Why collect data about health perceptions?

People's self-perceptions about their health are very important in the present as health outcomes and can serve as proxy measures for the perceived symptom burden of both acute and chronic health conditions. Also, because people generally seek health care only when they feel unhealthy, self-perceptions are also predictive of the future burden on the health care delivery system *(Idler 1997, Pijls 1993)*. The Healthy Days measures, then, work as both outcome measures and predictors. The core set of Healthy Days measures has been used continuously by all states as the first four questions of the Behavioral Risk Factor Surveillance System (BRFSS) since 1993.

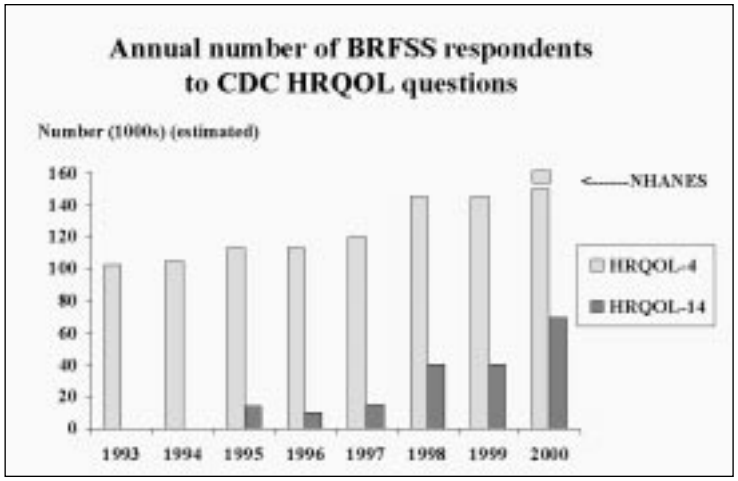
What is the BRFSS?

The BRFSS is a continuous, state-based, random telephone survey of community-dwelling U.S. adults aged 18 and older (see BRFSS website at **http://www.cdc.gov/nccdphp/brfss/).** It is the largest, continuously conducted telephone health survey in the world. It helps agencies monitor modifiable risk factors for chronic diseases and other leading causes of death. All 50 states and the District of Columbia participate in the BRFSS, and many specialized national, state, and local surveys use both its methods and its measures. Therefore, the BRFSS is an important public domain resource for continuous, comparable data about population health.

What is the advantage of having core HRQOL questions on the BRFSS?

The BRFSS is the primary source of state-based information on risk behaviors among adult populations. Data collection is flexible, timely, and ongoing. CDC edits and processes data from each state's monthly interviews, then returns prevalence information and selected reports to all states for their use, allowing for state-to-state and within-state comparisons. The BRFSS gathers information on age, gender, racial and ethnic background, education, marital and employment status, the county of residence, and other demographic factors so that estimates can be made for specific population groups. These data can be used as a benchmark to determine how perceived health and activity limitations vary over time.

More than 900,000 adults have responded to the core HRQOL questions as part of the BRFSS since their introduction in 1993. Adding the core HRQOL question to the BRFSS has also stimulated interest in HRQOL as a public health outcome. Because the BRFSS is the survey that most closely tracks geographical and temporal differences, using the core questions on other special population studies and assessments permits comparability with general population data. For comparability with national surveys, the core Healthy Days questions were added to the examination component of the National Health and Examination Survey (NHANES) beginning in 2000.



The BRFSS was chosen as a vehicle for questions on HRQOL because of its broad coverage that permits state- and locality-based estimates and its high visibility as a surveillance mechanism within the public health community. The new annual survey format for NHANES offers additional opportunities for both surveillance and prevention research. Moreover, including the core questions in existing periodic surveys helps minimize the costs of HRQOL surveillance.

Why ask "How many days . . . " when other questions like rating your overall health are easier to answer?

First, there is a policy value of estimating the burden of disease or disability in days, months, or years because it provides concrete measures that can be understood by legislators and policy makers and can be used in prevention effectiveness studies to assess cost-effectiveness of alternative interventions. As they go about and plan their lives, people tend to think in terms of monthly intervals. High BRFSS response rates for these questions show that most adults are able to estimate the number of days—even if they are making only rough estimates, e.g., in 1998 there was a 98.6% response rate for recent physical health days, 98.5% for recent mental health days, and 99.3% for recent activity limitation days. In addition, quantifying estimates in terms of days in the most recent month avoids the need to use complex weights in aggregating and comparing data that are based on multiple choice questions. Most important, HRQOL is inherently a time-related phenomenon that is best measured over, or with reference to, a specified period of time.

How can you measure HRQOL with only four questions?

Although the four basic questions may tell how population subgroups rate next to the general population, they do not provide enough information to identify specific public health interventions because they only track general health needs.

Therefore, CDC and several state and community health agencies began in January 1995 to collect data on an additional 10-item set of health perception and activity limitation questions. The additional set of 10 questions comprises an optional quality-of-life module that states and communities can choose to include in their surveys (see "Quality of Life Optional Module" questions on the BRFSS questionnaire at **http://www.cdc.gov/nccdphp/brfss/).** With support from CDC's Arthritis Program and Disability and Health Program, about half of all states were using the additional 10-question set in 2000.

These questions include measures for pain, depression, anxiety, sleeplessness, and vitality. Data in response to these measures provide more information on specific potentially remediable causes of poor HRQOL indicated by the first four more global measures. The expanded HRQOL-14 questions measure the burden of both short-term and persistent physical and mental health problems in a manner that disease-specific health planners and legislators can use to allocate resources among competing health programs and to guide health policy by tracking important short- and long-term effects of health programs.

The expanded set of questions will make it possible to compare the perceived burdens of diseases and conditions as well as to differentiate health benefits that alternative interventions yield. Use of the expanded set of questions may be one of the most cost-effective ways of assessing the population need or susceptibility for health services, disease incidence, and death. HRQOL may be a major determinant of many behavioral risks and may be easier to directly modify than the risks themselves. For example, treatment of anxiety and depression among adults who smoke or are overweight may reduce their risk of disease and death and lead them to make and maintain healthy behavioral changes.

Additional Healthy Days Measures

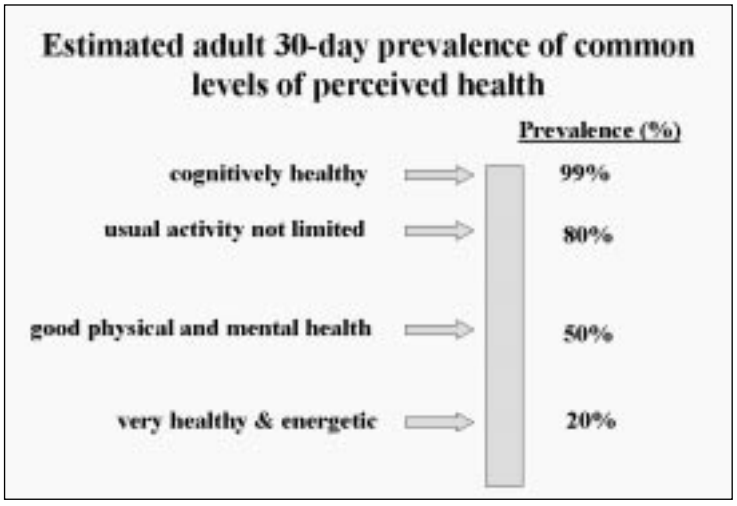
1. any activity limitation

if yes...

2. major cause
3. how long
4. routine care
5. personal care
6. pain days
7. depression days
8. anxiety days
9. sleepless days
10. vitality days

Why are most of the measures oriented toward the negative side of health?

Unlike disease or death, HRQOL is a health concept that covers the full spectrum of health and is not inherently positive or negative in its orientation. In representative community populations most persons tend be at the healthy end of the spectrum—for example, 85.6% of BRFSS adult respondents reported that their overall health was good to excellent *(Table 1)*. However, to guide public health and social policy, it was important to have HRQOL measures that best identify and distinguish those at the lower end of the health spectrum who have health conditions that could most benefit from healthier environments, early diagnosis, and appropriate treatment. Therefore, more measures were developed that asked about negative HRQOL qualities, such as pain, depression, and activity limitation than about positive qualities such as feeling very healthy and full of energy. Also, it was clear from cognitive studies and field tests of the Healthy Days measures that—because most respondents had fewer recent days affected by these negative qualities—it was easier for them to estimate the number of unhealthy versus healthy days.



How do the Healthy Days measures differ from QALYs, DALYs, and YHLs?

Quality-adjusted life years (QALYs) are estimates of person-years lived at particular levels of health. They are mostly used in cost-effectiveness analysis and clinical trials involving health conditions that consider the quality as well as the length of life. Quality is typically measured on a scale of zero (death) to 1.0 (perfect health) by assigning various weights to potential health states. There is also a group of somewhat related measures, including Disability-Adjusted Life Years (DALYs) and Years of Healthy Life (YHL), that adjust life expectancy estimates with weighted estimates of health and function *(Murray 1998, Erickson 1995)*. On a population level, these latter types of estimates are most useful for guiding health policy and for modeling what we know about death, disease, and their burden, especially at the national and multi-national level.

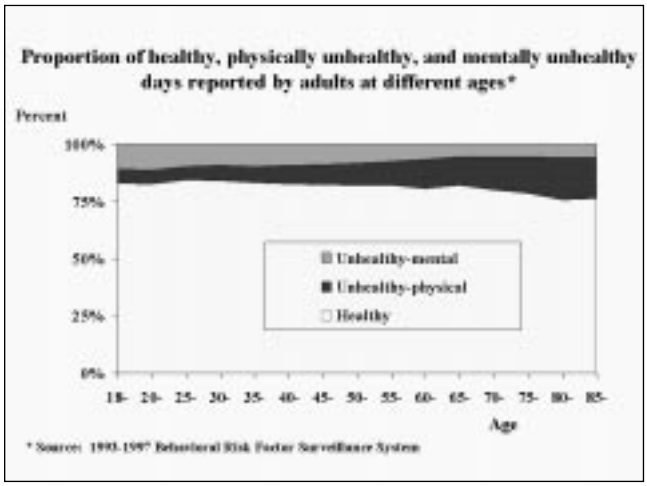
In contrast, the Healthy Days measures are direct estimates of a population's health over time derived from asking a representative sample of people what proportion of their recent days were spent at particular levels of health. Although they could potentially be used for estimating a population's healthy years of life and health-adjusted life expectancy, they were specifically designed as HRQOL surveillance measures capable of identifying disparities and trends and evaluating changes based on broad population interventions. Because they work well at the community and small-group level and also reflect population preferences for quality as well as length of life, the Healthy Days measures complement the other more complex and comprehensive population health measures.

FINDINGS

What have been some of the findings from the Healthy Days core questions?

Nationwide

So far, adult survey respondents have said they have an average of 24.7 *healthy days* (or 5.3 *unhealthy days*) a month, which means that 82.3% of all adult days are reported as healthy *(Table 1)*. Although *healthy days* declined only modestly with increasing age, an interesting finding was that young adults reported consistently worse mental health versus the oldest age groups, whereas older adults reported considerably more physical health problems than younger adults.

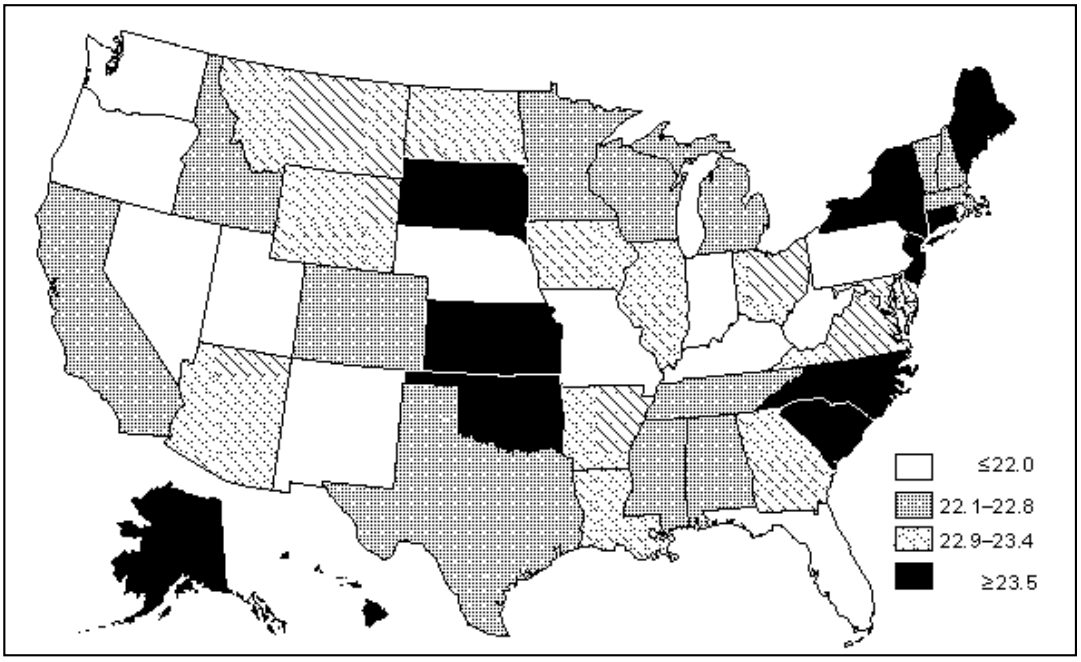


Acquiring representative data about a population can help identify significant health differences among subgroups. For example, the highest average number of *healthy days* was reported by college graduates, Asian Americans (English-speaking), and persons with annual household incomes above $50,000 *(CDC 1994)*. The least mean number of *healthy days* was reported in people who were unemployed, separated, aged 75 years or older, or with less than a high school education. Fewer *healthy days* were also reported by those smoking cigarettes or having a chronic health condition tracked by the BRFSS (i.e., high blood pressure, diabetes, or breast cancer) *(Table 1)*.

Nearly one third of Americans say they suffer from some form of mental or emotional health problem every month—including 11 percent who said their mental health was not good more than seven days a month. Women had more poor mental health days than men *(Borawski 1998)*. Younger Americans, aged 18 to 24 years, suffered the most poor mental health days of all adult age groups. The lowest average was for people over age 65 years, with 1.9 poor mental health days a month. The unemployed also had a high average of poor mental health days, at 5.2 days, but people unable to work because of disabilities fared worse at 8.9 poor mental health days a month. People without health coverage were considerably more likely to suffer poor mental health days a month than people with health coverage (4.2 versus 2.6 days a month).

Several factors seem to predict "frequent mental distress," which is defined as 14 or more days during the previous 30 days when mental health was not good. These factors include being unable to work, being previously married but now separated, having an annual household income of less than $15,000, having less than

Mean number of "healthy days" among adults with less than a high school education,* by state—United States, Behavioral Risk Factor Surveillance System, 1993-1996



*Age-adjusted to the 1990 U.S. population aged ≥18 years.

a high school education, and being an American Indian or Alaska Native. Levels of stress and mental distress are predictive of medical diseases and health services utilization, and data based on the Healthy Days questions allow examination of the reciprocal influences of body and mind.

These data have also shown how reported health differs by place of residence—by state or by proximity to an urban center *(CDC 1995)*. A benefit of tracing perceived health status over time is that it allows study of seasonal patterns and the effects of health-related events over time.

State comparisons

Comparisons of Healthy Days data at the state level and among socioeconomic and demographic subgroups have helped to identify potentially remediable geographic and demographic disparities in health status. After adjusting for age differences, one such comparison found HRQOL differences among states for adults without a high-school degree, but more importantly found notable HRQOL differences *within each state* (e.g., people with less education typically had lower HRQOL than those with more education) *(CDC 1998-2)*.

Percentage of adults reporting frequent mental distress (FMD) by selected sociodemographic group, 1997 BRFSS

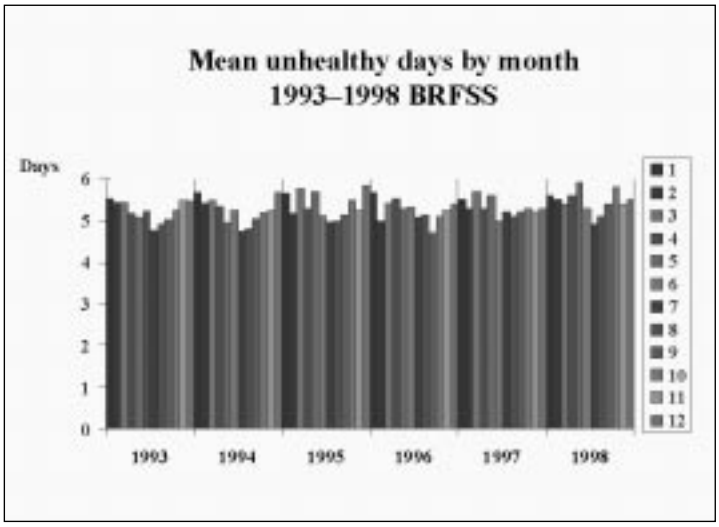
Men	**7.3**
Women	**10.5**
Whites	**8.7**
African Amer.	**10.2**
Asian/Pac. Is.	**6.9**
Amer. Ind/Al. Natives	**15.0**
Hispanic	**11.0**
< H.S. Education	**13.3**
H.S. Graduates	**9.4**
College Graduates	**5.8**
Health Plan = Yes	**8.2**
Health Plan = No	**13.7**
Disabled = No	**6.0**
Disabled = Yes	**20.1**

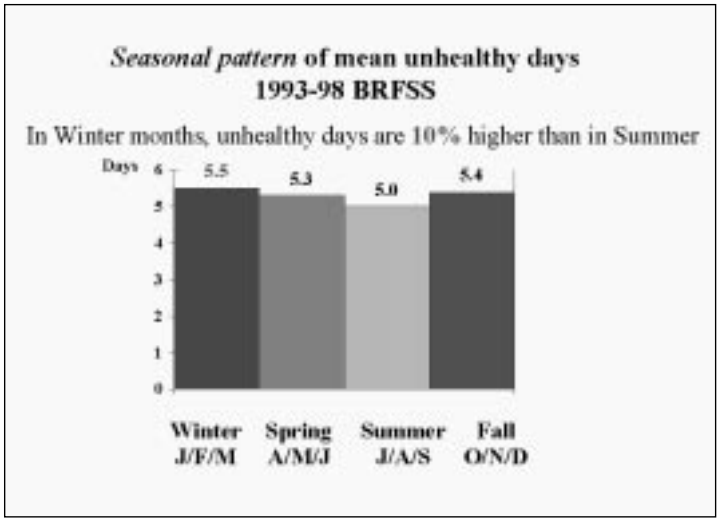
Frequent Mental Distress = mental health was not good for 14 or more days in the past 30 days
See also: Centers for Disease Control and Prevention. Self-Reported Frequent Mental Distress Among Adults—United States, 1993-1996. MMWR, 1998; 47:325-31 @ http://www.cdc.gov/epo/mmwr/mmwr.html

Seasonal patterns

During the first 72 months of data collection with the four core Healthy Days questions, a clear seasonal pattern was observed for each of the three "days in the past 30 days" measures. This was most evident in the *unhealthy days* summary index.

When the 72 months of data were combined and aggregated by calendar quarter, a striking 10% difference was noted between the winter months of January, February, and March, and the summer months of July, August, and September.

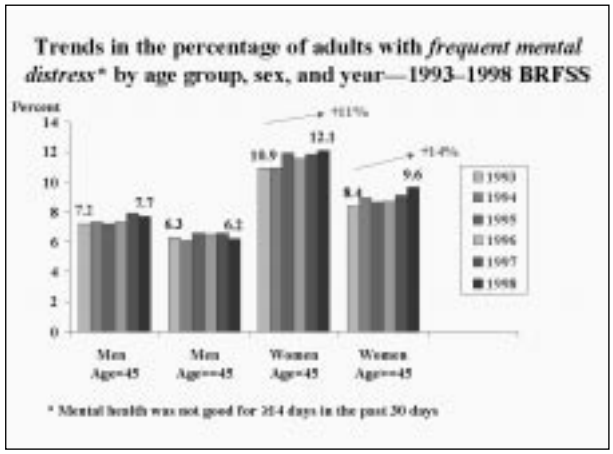




Time trends

During the first six years of data collection, for the period 1993–1998, several trends have been noted at both the national and state levels with the four Healthy Days measures. The most striking nationwide trend has been a significant increase in Frequent Mental Distress (FMD) reported by women —both younger (aged <45 years) and older (aged ≥45 years). A similar trend was not observed for men, although younger men (aged <45 years) showed a non-significant tendency toward higher levels of FMD during the last 2 years of analysis (1997 and 1998).

Several significant upward and downward trends related to the core Healthy Days measures have also been detected at the state level and are now being analyzed.



VALIDATION

Do these questions accurately measure HRQOL?

Specifying HRQOL represents a unique effort on the part of national policy makers to formally recognize quality of life as an important component of health. However, establishing valid and reliable measures of a subjective self-report is challenging. *Validity* is the degree to which a set of questions measures what it is supposed to measure. Validity can be assessed in several ways. *Construct validity* is the ability of the question to correlate with other measures that it should correlate with. *Criterion validity* compares the performance of a measure with some other measure of the condition under study—ideally a "gold standard" accepted in the field. *Concurrent criterion validity* means the measures being evaluated are correlated with an established criterion measure, both of which are available at the same time. *Predictive criterion validity* refers to the usefulness of the measure in predicting future health-related events and states *(Streiner 1995)*.

Validation has been identified as an essential prerequisite for a useful set of measures by leaders in both of the major international quality of life research societies: ISQOLS, the professional society that concentrates on general QOL studies, and ISOQOL, the organization dedicated to HRQOL research. Therefore, the CDC HRQOL measurement program has concentrated its initial efforts on validation.

Construct validity

HRQOL, though fundamentally subjective, can be validated by statistically correlating self-reported survey data with other more objective or established health outcomes and measurements. Some studies have examined how the Healthy Days HRQOL measures compare with other established measures like the Medical Outcomes Study Short Form 36 *(Newschaffer 1998, Andresen 1999-1)*. The SF-36, which is widely used in clinical studies of HRQOL, was developed by the Rand Corporation during the 1980s to measure the functional status and perceived well-being of representative U.S. patient populations. Analyses of the four core questions in representative surveys of adults found that the Healthy Days measures are internally consistent and that they identify known or suspected population groups with unmet health-related needs, including persons with reported chronic health conditions, disabilities, and low socioeconomic status *(Diwan 1995, Nanda 1998, Andresen 1999-3, Moriarty 1999-2)*.

Important HRQOL Validation issues

- Can HRQOL be clearly defined?
- Can HRQOL be accurately measured by survey?
  - Will people answer?
  - Will their responses make sense?
- Are responses merely personality-based?
- Do interviewers influence responses?
- Are responses consistent with other accepted data?
- What do results mean in practical policy terms (i.e., why is HRQOL measurement important)?

Validation of BRFSS HRQOL Measures in a Statewide Sample

St. Louis University School of Public Health
C. Newschaffer, J. Jackson-Thompson, M. Counte

Key HRQOL-14 Findings: N=588

1. Good **construct validity** in a statewide adult population…
   - demography & socioeconomic status
   - reported chronic diseases
   - depression-screen positive
2. Acceptable **correlation** with related SF-36 scales

depression	.55
pain	.56
vitality	.50

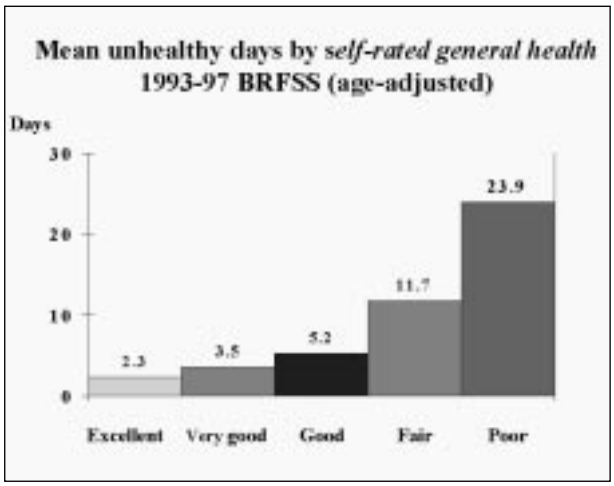
3. BRFSS items **explain** most **variation** in SF-36 summary scores
   - 4 Qs -- >59% of PCS (physical)
   - 3 Qs -- >64% of MCS (mental)

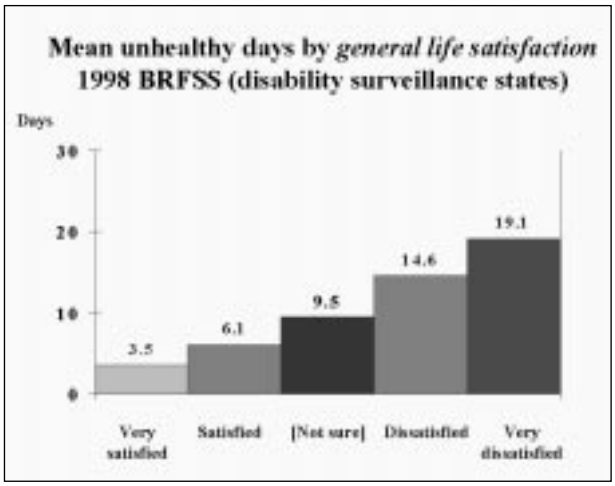
Concurrent validity

Several validation studies are being conducted to assess the set of questions. A validation study performed by the St. Louis University Prevention Research Center and the Missouri Department of Health featured a simultaneous comparison of the 14 HRQOL questions on the BRFSS and the SF-36 in a statewide general population *(Newschaffer 1998)*. Results for both sets of measures varied in similar fashion over sample characteristics. The researchers found that the HRQOL-14 has good construct validity and should be considered for both surveillance and research applications. In addition, they determined that the HRQOL-14 has acceptable criterion and known-groups validity. In this study, the *healthy day's* summary measure was found to be the most valid measure of a quality-of-life deficit in a mixed population with concurrent physical and mental health problems.

The *unhealthy days* measure also shows good concurrent validity when compared with the categorical responses of the self-rated health measure for all adults and for geographic and demographic subgroups. When data are adjusted for age, there is a tenfold difference in *unhealthy days* between adults reporting excellent versus poor general health *(Table 1)*. This comparison also illustrates the value of using a continuous measure such as *unhealthy days* by clearly showing much larger differences in perceived mental and physical health at the "poor" end versus the "excellent" end of the categorical self-rated health measure. Further, it shows that some of those who say their health is excellent still report some *unhealthy days* and those who report poor health also report some *healthy days*.

The *unhealthy days* measure also was found to be directly related to a global life satisfaction question—a frequently assessed construct in studies of overall (not just health-related) quality of life. This relationship—although not as strong as in the previous comparison with general self-rated health—nevertheless shows that HRQOL is a major component of overall QOL.





Predictive validity

Studies are also underway to examine the ability of the Healthy Days measures to predict morbidity and mortality. The Pennsylvania State University Department of Biobehavioral Health is now tracking 82,000 low-income elderly adults in a predictive validity study to link the HRQOL-14 with prescriptions, health care utilization, and mortality *(Ahern 1999)*. This study has been funded by the CDC Office on Women's Health because about 3/4 of the respondents in this study are women and quality of life is an important women's health issue. Early results of this study suggest that a mailed version of the questions has good construct validity and that self-rated health and each of the "days" questions are valid predictors of short-term mortality.

Acceptability

Another study involving persons with known disabilities in the community and in institutional settings, performed by the St. Louis University School of Public Health, concluded that the 14 HRQOL questions have criterion validity with respect to the SF-36 and are acceptable for use with people with disabilities in both surveillance and research *(*Andresen *1999-1)*.

Reliability and responsiveness

Reliability is the consistency or degree of dependability of a measuring instrument. *Responsiveness* is the degree to which a measure is capable of reflecting changes over time. The University of Oslo studied both of these characteristics in a nationwide study of Norwegian adults with a follow-up survey and found that the Healthy Days measures had good *internal consistency* reliability and that response changes on the follow-up survey were indicative of actual changes in respondent health status *(Moum 1999)*. A telephone-based reliability study by St. Louis University School of Public Health in a population of persons with known disabilities (N=52) found substantial re-test reliability after about one week for the eight "days" questions, but not as good reliability for the six categorical response measures *(Nanda 1998)*.

Another longitudinal validation study with older, low-income, African American males conducted by

Quality of Life, Medications, and Health Among the Elderly

Penn State University Department of Biobehavioral Health
College of Health and Human Development
F. Ahern, C. Gold, K. Dominick, L. Markovitz, D. Heller

Key HRQOL-14 Findings: N=82,853

1. Good **construct validity** in a statewide population of older low-income adults...
   - demography & socioeconomic status
   - disease
   - residential status
   - prescription drug use
2. The core Healthy Days measures **predict mortality/hospitalization**

Measuring Health and Disability with the CDC's BRFSS

St. Louis University School of Public Health
E. Andresen, B. Fouts, F. Wolinsky, C. Brownson, J. Romeis

Key HRQOL-14 Findings: N=513

1. Good **construct validity** in a population of persons with disabilities
2. Good respondent **acceptability** ratings

IADL	93%
HRQOL-14	92%
SF-36	90%
QWB	87%

3. Acceptable **correlation** with related SF-36 scales

depression	.71
vitality	.69
anxiety	.67
pain	.61

Columbia University School of Public Health found that changes in respondents' answers to the physical health days question were consistent with reported medical care utilization over a period of several months. In this study, the mental health days and depression days measures showed impressive correlations with the Center for Epidemiologic Studies Depression Scale (CES-D).

What challenges in measurement have been identified?

Some degree of response error is unavoidable when complex concepts are being measured. Response errors can occur if the respondent has difficulty interpreting either what the question is really asking or what a satisfactory response will be. Further confounding this potential difficulty are issues unique to surveying older respondents, differences in how cultural groups view their health *(Larson 1998)*, and issues inherent in administering surveys by telephone, in-person, or by mail *(Moum 1998)*.

Generally, the response format (in this case, number of days) signals respondents about what sort of information is being requested and how to formulate an answer. However, older people often provide narrative answers and are less likely to respond within the format specified by the question. A National Center for Health Statistics (NCHS) cognitive study indicated that older respondents may have trouble translating frequency information recalled from memory into required survey response categories *(Beatty 1996, Schechter 1998)*. The level of their health and activity limitations may not easily be described as occurring or not occurring for a given number of discrete days, and memory problems may further compromise the accuracy of their answers. Many respondents appear to give a response that represents their overall impression of their health over the recent past versus an actual count of days.

Good results on reliability, responsiveness, and validity studies, however, suggest that the response error rate is not too great. For instance, in a recent mixed-mode panel study of the reliability, responsiveness, and other measurement properties of the

Validation of BRFSS QOL Items: Harlem Prostate Screening Project

Columbia University College of Physicians and Surgeons
S. Albert

Key HRQOL-14 Findings: N=239

1. Acceptable **construct validity** in a population of low-income older African American males
2. Good **correlation** with other scales

pain	.60 SF-36 (pain)
days-mental	.59 CESD
depression	.58 CESD

2. Unhealthy physical days were **responsive** to changes in reported doctor appointments and hospitalizations

Healthy Days measures in a nationwide sample of 2400 Norwegian working-aged adults, the measures were found to have normal reliability and test-retest correlations *(Moum 1999)*. Almost all items show responsiveness to change in respondent-defined "health"; the summary measure of *healthy days* was the best predictor.

The Norwegian-language study noted that there were some expected mode effects with persons reporting somewhat more impaired mental health on the self-administered mail version versus the telephone version of the questions *(Moum 1998)*. In the only U.S. study that has examined mode effects, the St. Louis University study of persons with known disabilities found generally better HRQOL reported by respondents for the HRQOL-14 measures in the *in-person* interviews versus the *telephone* interviews, with significantly better HRQOL reported *in-person* for the activity limitation days, any current activity limitation, and needing help with personal care measures *(Andresen 1999-1)*.

What is being done to address problems in accuracy?

Interviewers are trained to help respondents who have difficulty with numbers to provide a numerical response of symptom days. For example, if someone answers "a few days" or "several days," the interviewer would then ask, "Was that for 3 days, 4 days, 5 days, or more than that?" Also, research that correlates non-response and inconsistent responses for persons with diagnosed physical and mental conditions, including dementia, is being planned in longitudinal studies that have incorporated the core Healthy Days measures. Other studies are underway to examine statistical issues of sampling, population weighting, and aggregation of BRFSS estimates *(Schulman 1999)*.

Other Healthy Days Validation Studies

Research Group	Lead Scientist	Key Features
COMPLETED:		
St. Louis U. SPH	C. Newschaffer	SF-36, chron dis/depression
NCHS Cog. Lab	S. Schechter	cognitive interviews (elders)
Georgia State U.	S. Diwan	focus groups (elders)
U. of Michigan	L. Verbrugge	activity limitations
Case Western U.	E. Borawski	severe work disability
IN PROGRESS:		
McMaster U.	S. Ounpuu	disease, demography
U. Oslo	T. Moum	psychometrics, mode, reliability & responsiveness

PRACTICAL APPLICATIONS

HRQOL is more likely than other health outcomes to reflect broad consequences of disease or injury. The Healthy Days questions may also capture health-related factors that are underreported, such as violence against women. In many cultures, a quality-of-life focus could offer a unifying theme for programs as diverse as health services and economic development. Such a focus can also help to ensure that important mental health issues, often ignored or inadequately considered in health status measures and productivity indicators, will be addressed. Asking about recent physical and mental health appears to capture a large proportion of the concerns persons have about the quality of their life related to health. This is a simple but powerful way of broadening the scope of health services to include psychosocial aspects that are now recognized as important to the health and productivity of a population *(Siegel 1994*).

What are some of the cross-cultural uses of the Healthy Days measures?

During the last few years, there has been increasing interest in the use of the Healthy Days measures by other countries, as the population surveillance value of the measures and data is becoming evident *(Lankenau 1995)*. The measures were first used outside the U.S. in a population health survey in Hamilton, Ontario, in December 1995 (N=1,042) *(Ounpuu 2000)*. This study found the four core Healthy Days measures acceptably valid and supported their use in monitoring the health of populations. This study also found that the Healthy Days data provided a useful organizing framework for the measurement of HRQOL in a Canadian city. On the basis of this success, a follow-up survey with the expanded set of Healthy Days measures is under way. In a late-1999 Canadian study designed by a different research group, the four core Healthy Days measures have been used in a province-wide British Columbia survey of adult health and well-being.

The full set of measures has been used in a Spanish-language version of the BRFSS and some of the questions have been translated for use in Sweden and among various Asian immigrant groups in the U.S. The self-rated health and the eight "days" measures have also been studied in depth by the University of Oslo in a nationwide sample of Norwegian adults (N=2,481) in a mixed-mode (telephone versus mail) panel study *(Moum 1999)*. They have been found to have good respondent acceptability (low non- response), normal test-retest reliability, good concurrent validity, and good responsiveness to change over time. The summary measure of *healthy days* was determined to be the best predictor of change.

How are the Healthy Days measures useful at the state and local levels?

CDC, states, and others are now developing the utility of the HRQOL measures for state and local agencies to identify vulnerable subgroups *(Campbell 1999, Perry 1996)*. Further analysis is underway at CDC—in collaboration with the Public Health Foundation—to identify valid community-level HRQOL indicators, such as rates of suicide, alcoholism, divorce, and unemployment, that can be used to supplement direct survey data available to communities *(Kanarek 2000)*. Potential community indicators are being compared with aggregate Healthy Days data to determine those that explain differing local levels of population HRQOL.

Communities that incorporate the HRQOL measures in their local surveys will be better able to partner with the growing number of state and local health groups that use community health assessments. Disseminating data at the local level is a powerful tool to

foster a sense of community ownership and participation *(Dever 1991, IOM 1997)*. CDC and state and local health agencies benefit by learning about community indicators, concepts of sustainability, and the influences of the environment and the economy on population health.

Adopting a quality of life approach to community health assessment can offer health agencies a popular and positive way to integrate diverse activities and contribute to the vitality of their communities *(Moriarty 1996, 1999-1)*. Impaired health days may reflect poor health days on the job and increased health care use as well as diminished quality of life. These measures translate well to partners in public health such as the business and education communities. Because data based on the Healthy Days measures reflect the combined effects of many groups' actions in a community, successful interventions and healthy public policies require active partnerships with the community's major players.

COST-EFFECTIVENESS ANALYSIS

An economic evaluation in which alternative programs, services, or interventions are compared in terms of the cost per unit of clinical effect (for example, cost per life saved, cost per millimeter of mercury of blood pressure lowered, or cost per quality-adjusted life-year gained). The last form of measuring outcomes (and equivalents such as **"healthy days of life gained"**) gives rise to what is also referred to as COST-UTILITY ANALYSIS.

From: Glossary of Methodologic Terms (American Medical Association, Archives of Internal Medicine). **http://archinte.ama-assn.org/info/auinst_term.html**

How are the HRQOL measures being used to identify and address the needs of special populations?

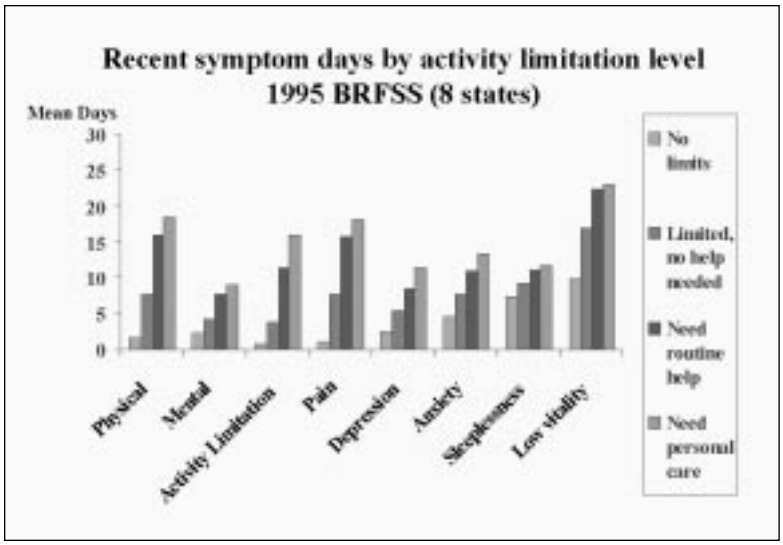
Uses in clinical medicine

Although the HRQOL-14 measures were designed for public health surveillance, they may also prove useful in helping to measure the medium- and long-term effects of medical care. Recently, the Foundation for Accountability (FACCT) in Portland, Oregon, has been developing chronic disease outcome measures for diabetes, asthma, and coronary artery disease (See FACCT|ONE at **http://www.facct.org/).** The initial version of these measures includes both the SF-12 (an abbreviated form of the SF-36) and the core Healthy Days questions. Inclusion of the core Healthy Days questions in clinical assessments provides useful data on how patient populations differ from those in the broader geographic community.

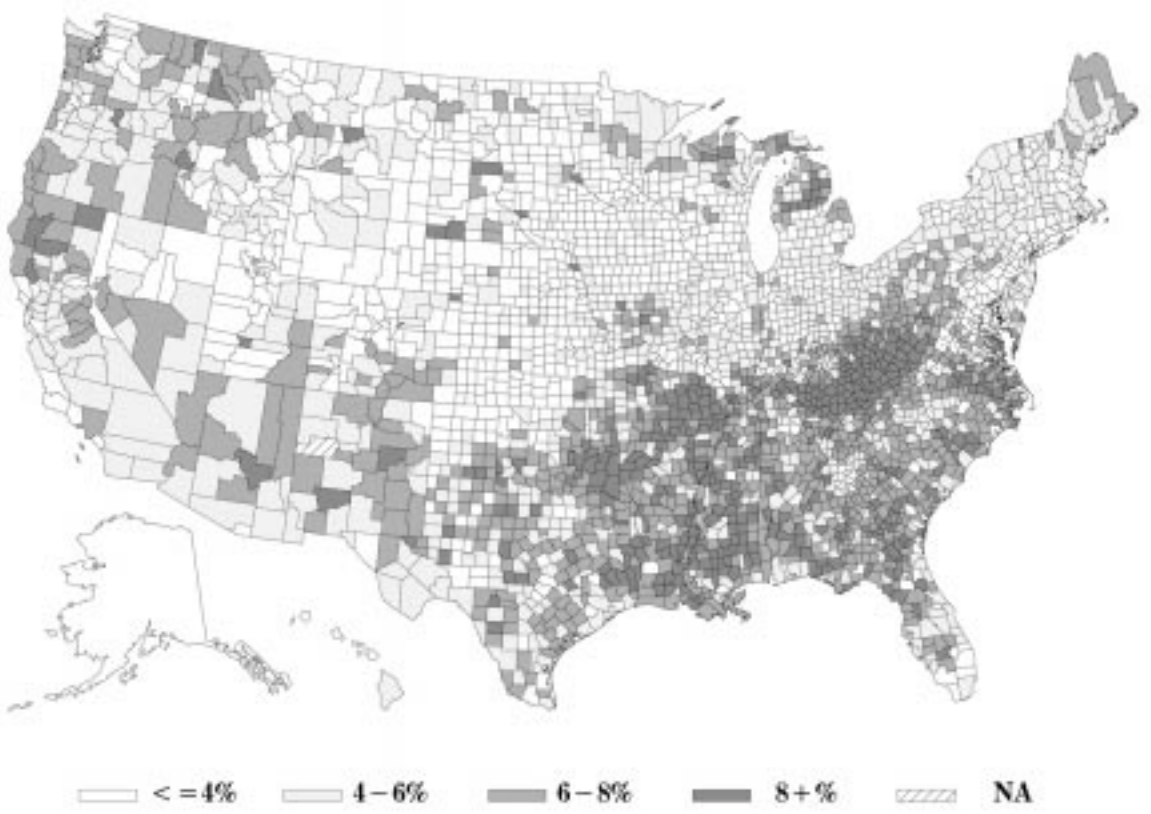
Disability

A study conducted by the St. Louis University School of Public Health concluded that the HRQOL-14 questions are acceptable to use with people with disabilities *(Nanda 1998)*. A study at Case Western Reserve University studied the county-level prevalence of severe work disability and found that the estimates of HRQOL from the BRFSS were highly correlated with U.S. Census and Social Security figures *(Borawski 1999, Jia 1999)*.

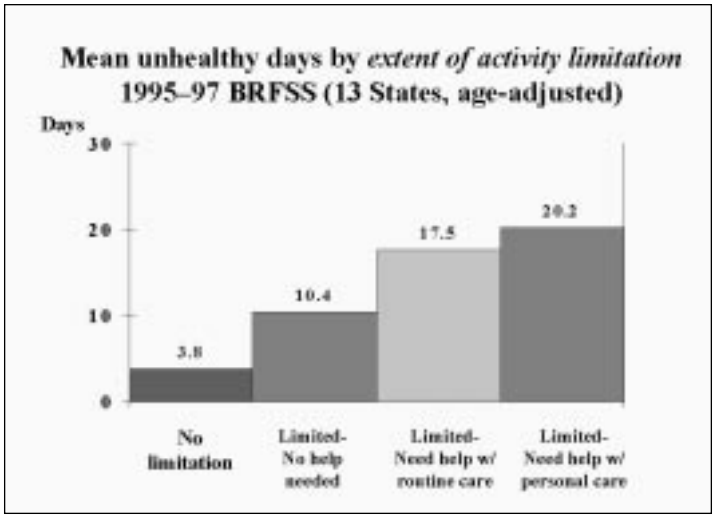
Healthy Days measures are now used by all Disability Prevention States as part of a standard set of questions



The Severe Work Disability Rate by County, 1995–1996 BRFSS



that includes the HRQOL-14 questions and nine questions that pertain specifically to disability and related concepts. Because it includes the HRQOL module, the Disability set of questions makes it possible to compare persons with disability to the general population, and this comparison clearly shows the large overall differences in HRQOL burden *(CDC 1998-2)*. Information can be culled from the BRFSS about preventive health behaviors practiced by an important population at elevated risk for many adverse health outcomes. The Disability measures are part of a 14-state program to increase surveillance of disability.



CDC and others are now studying potential uses of the HRQOL data in tracking disability in the adult population and in estimating state-level economic implications of reported activity limitation *(Andresen 1999-2, Andresen 2000, Verbrugge 1999)*. Public health disability research has broadened to concentrate on outcomes of disability, especially on secondary conditions that are common and preventable. This surveillance will also be helpful in targeting programs to prevent secondary conditions associated with disability and to identify environmental determinants of disability.

Mean symptom days for selected activity-limiting conditions
1995-1997 BRFSS (13 states)

		MAIN CAUSE OF LIMITATION		
MEASURE	NO LIMIT	ARTHRITIS	CANCER	DEPR/ANX
Unhealthy days	4	12	19	21*
Low vitality	10	18	22	24*
Pain	1	13*	12	7
Depression	2	5	10	19*
Anxiety	5	8	11	19*
Sleeplessness	7	9	11	13*
Limitation of usual activities	1	5	13*	13*

* ***highest mean for symptom***

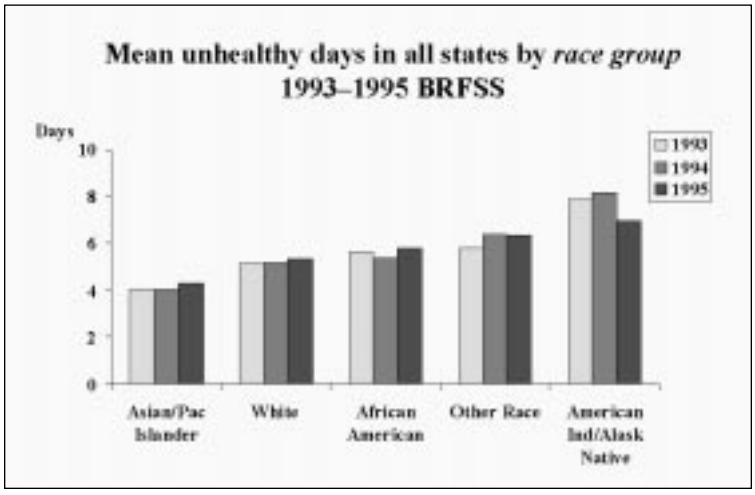
Racial and ethnic groups

According to results from the core HRQOL questions, Native Americans and Alaskan Natives reported the highest mean number of impairment days of any subpopulation *(Table 1)*. Survey results may even be underreported because Native Americans have the highest percentage of phoneless households of any racial or ethnic group (an estimated 23% in 1990)*(Gilliland 1998)*. This HRQOL disparity alerts program planners to the need to focus efforts on Native Americans and Alaskan Natives. Such findings of health deficits can be considered in planning future Indian Health Service services *(John 1999)*.

Puerto Ricans responding to a Spanish language version of the BRFSS also report high levels of HRQOL impairment. These responses suggest the need for further study of this population and the potential value of translating the Healthy Days questions into other languages.

Chronic disease epidemiology

HRQOL surveillance is particularly relevant to the field of chronic disease epidemiology. It provides direct evidence of the considerable population burden of long-term health conditions. The Healthy Days measures and population data clearly show that persons who report a current activity limitation because of a chronic health condition also report much more symptom burden than those with no limitation *(CDC 1998-2)(Table 2)*. The extent to which particular symptoms are reported tends to reflect the expectations for each disease—for example, high levels of pain for cancer and arthritis. In chronic disease programs, HRQOL is useful both as a health outcome and a risk factor.

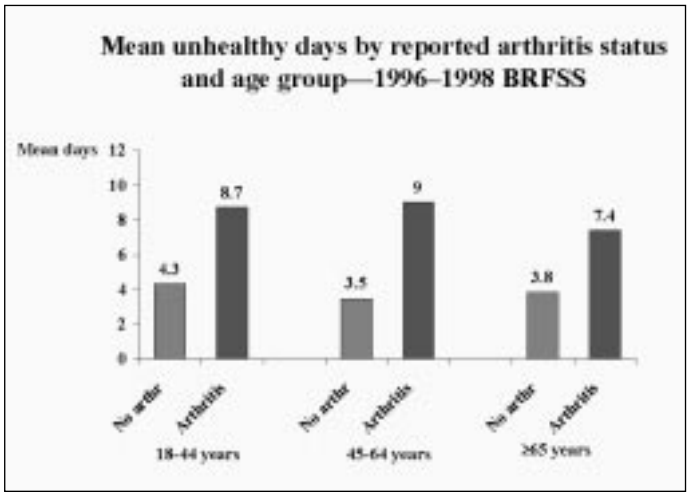


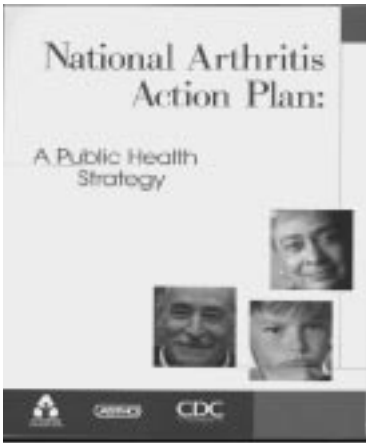
Arthritis

The Arthritis Program at CDC is interested in assessing quality of life in a nationally representative sample of persons with reported or diagnosed arthritis and related conditions—including the extent to which HRQOL varies by level of physical fitness and lower body strength. The National Arthritis Action Plan targets HRQOL data as a key surveillance need *(Arthritis Foundation 1999)*.

National Arthritis Action Plan Recommendations on Quality of Life Surveillance, 1999

- Encourage states to use the BRFSS modules on arthritis and **quality of life**
- Encourage the development and use of modules on arthritis and **quality of life** in national data sets (e.g., NHIS, NHANES)
- Analyze data on arthritis and **quality of life** (e.g., from the BRFSS, NHIS, & NHANES) to quantify the impact of arthritis on **quality of life**
- Monitor changes in the occurrence of arthritis and its impact (e.g., on disability and **quality of life**)





Surveillance for arthritis is critical for understanding the epidemiology of this disease, targeting interventions, developing policy, and setting priorities for prevention research. Specific activities to improve arthritis surveillance include encouraging states to use the full set of HRQOL-14 measures. Analyzing these data should help quantify the impact of arthritis on quality of life.

Preliminary results from an analysis of 1996– 1998 BRFSS data showed that, compared with respondents without arthritis, persons with arthritis (defined as having chronic joint symptoms or doctor-diagnosed arthritis) reported worse age-adjusted HRQOL for both females and males on all four core BRFSS measures *(CDC 2000)*. HRQOL measures will be useful to states for tracking arthritis- related Healthy People 2010 objectives and for measuring progress toward the plan's goal of increasing quality and years of healthy life.

Cardiovascular health

The Cardiovascular Health Branch of the CDC/NCCDPHP Division of Adult and Community Health has recently begun to study the use of the Healthy Days measures in its research. In recent presentations of data derived from the BRFSS, the measures were shown to be useful in characterizing the excess symptom burden of self-reported heart disease and stroke. The apparent association of HRQOL with cardiovascular disease risk and protective factors is a promising area of research that offers hope for new disease prevention and control strategies *(Greenlund 2000)*.

Aging

The Healthy Days measures and population data are particularly useful for identifying disparities among vulnerable groups of older adults, because many of them have chronic health conditions that are not easily assessed by other available means. In a December 1999 MMWR Surveillance Summary analysis, the CDC Health Care and Aging Studies Branch reported notable state differences in mean *unhealthy days* reported by adults aged 75

years and older in the 1993–1997 BRFSS *(Campbell 1999)*. Of even greater policy significance, substantially more mean *unhealthy days* were reported by older men and women with low annual household income than by those with the highest levels of income—particularly for those aged 55–64 years who were generally not yet eligible for Social Security and Medicare benefits.

Women's health

The Healthy Days measures and data are important for women's health, because they reflect the differential burdens associated with many pertinent health issues–-including child-bearing, parenting, violence, caregiver burden, arthritis, osteoporosis, medication use, and level of health related to socioeconomic status. In August 2000, state means for BRFSS mental health days and activity limitation days were included as key indicators of women's mental health and overall health in the new *Making the Grade on Women's Health: A National and State-by-State Report Card* developed by the National Women's Law Center (see: **http://www.nwlc.org/display.cfm?section=health**).

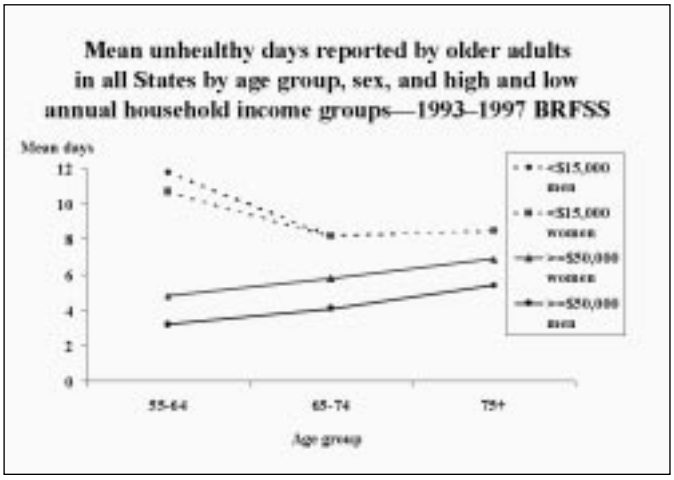
Significantly increasing trends of Frequent Mental Distress can be observed from 1993–1998 for both young and old women. A higher overall level of *unhealthy days* and activity limitation days were also reported by women than by men *(Table 1)*. These results reveal how the measures highlight gender disparities.

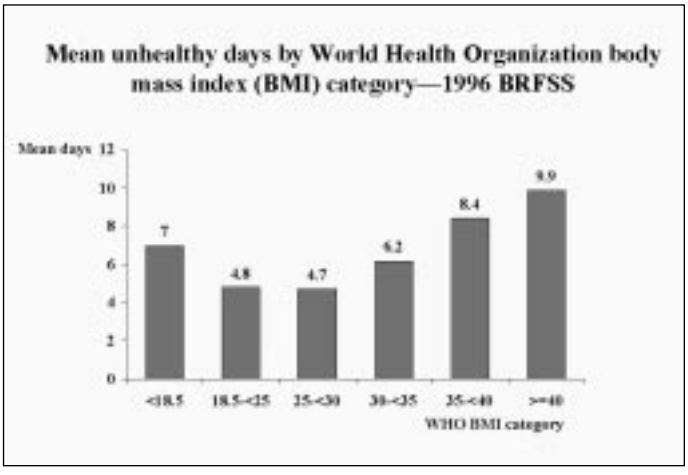
Other chronic and acute health conditions

The value of the Healthy Days measures for assessing the burden of other chronic and acute health conditions is now being explored. As brief, validated measures with a large amount of continuously collected population data, they offer an attractive complement to surveys seeking to assess HRQOL burden against a robust population standard. For example, the HIV/AIDS Survivors Survey is planning to include the 14 Healthy Days measures in its 2000 survey, and the American Cancer Society plans to include Healthy Days measures in a survey of persons who have been diagnosed with cancer.

Obesity, physical activity, nutrition, smoking and other behavioral risk factors

In addition to their value in reflecting the burden of current health conditions, the Healthy Days measures offer considerable promise for improving understanding of how poor HRQOL may be a determinant of behavioral risks and protective behaviors *(Ford 2000)*. Researchers have suggested the potential value of studying how potentially modifiable HRQOL-14 measures for recent physical health, mental distress, activity limitation, pain, depression, anxiety, sleeplessness, and lack of vitality correlate with health risks (including hypertension, hypercholesterolemia, smoking, physical activity, and obesity) and protective factors (including use of preventive services and safety gear) *(CDC 1998-1)*. Those people with poor HRQOL may also be those who need screening and other preventive services and who are affected by other risk factors for chronic disease.





POLICY IMPLICATIONS

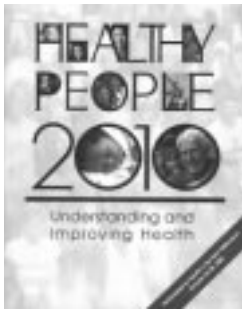
What are the policy implications of HRQOL surveillance?

The Healthy Days measures are beginning to show their value for population surveillance and program planning and evaluation. Because the Healthy Days measures consistently reflect population differences in educational attainment, income, employment status, marital status, chronic diseases, and disability, and because they correlate with broader community health status indicators such as the proportion of births to adolescents, they offer health agencies a useful tool for guiding healthy public policy and collaborating with partners outside the health community *(Institute of Medicine 1997)*. These measures assess the burden of both short-term and persistent physical and mental health problems in a manner that is not disease-specific. Therefore, health planners and legislators can use the measures and resulting data to help allocate resources among competing health programs and to guide health policy by tracking important short- and long-term effects of health programs. Because of their sensitivity to broad influences such as seasonal patterns and time trends, the Healthy Days measures are also likely to be useful in detecting the impact of major population-based policy or interventions.

Why is HRQOL surveillance important in Healthy People 2010?

Healthy People 2010, developed with leadership of the Department of Health and Human Services, is the nation's prevention agenda with a scorecard to assess progress toward meeting goals *(DHHS 2000)*. It is a road map that can be used by states, communities, professional organizations, and others who are concerned about increasing life expectancy and enhancing population health. Healthy People 2010 has two major overall goals: 1) to increase the quality and years of healthy life and 2) to eliminate health disparities. By continuously tracking population HRQOL in national and state surveillance systems, the Healthy Days measures and

"To affect the quality of the day—that is the highest of arts." —-Thoreau



data will help to directly monitor the nation's and states' progress toward meeting the first goal of improved HRQOL. This will help to assure that the net progress in achieving targets set by the Healthy People 2010 objectives in specific focus areas is not offset by unanticipated new diseases, barriers, or health problems.

The second major goal of Healthy People 2010 is to eliminate health disparities among segments of the population. BRFSS and NHANES data obtained from socioeconomic and demographic questions and the Healthy Days measures will help to quantify perceived physical and mental health disparities among population subgroups on the basis of characteristics such as gender, race or ethnicity, education, income, place of residence, and sexual orientation. The Healthy Days population surveillance data also offer great promise as a tool to help identify more precisely which individual behaviors and community-level factors—such as physical activity and safe neighborhoods—contribute to good health. Identifying these factors in turn helps program planners to focus their resources on the health improvement interventions most likely to be effective in eliminating disparities.

How do Healthy Days relate to the Healthy People 2010 Leading Health Indicators?

The leading health indicators are a set of 10 measures intended to make Healthy People 2010 more useful as a focus of national attention and as a tool for monitoring the health of Americans. Although the full set of objectives for Healthy People 2010 will be used by health professionals, the leading health indicators are

intended to engage the public and other health partners. There is great potential for using the Healthy Days measures and population data as a unifying theme that links the Healthy People 2010 goals, leading health indicators, and objectives. For example, Healthy Days data can provide valuable insights on the individual and community determinants of the leading health indicators and can demonstrate the overall population effects of improvements in the indicators:

Physical Activity

Cross-sectional analyses show that Healthy Days measures are correlated in expected ways with leisure-time physical activity and inactivity *(Table 1)*. Healthy Days could be useful outcome measures that change positively in response to exercise programs and might also help to predict whether persons will begin and maintain an exercise program.

Overweight and obesity

Studies comparing *unhealthy days* with Body Mass Index (BMI) show that adults who are either underweight or obese report higher levels of impaired HRQOL *(Ford 2000)(Table 1)*. BMI is similarly associated with depression days and anxiety days *(Table 2)*. This information provides valuable insights into the causes and effects of obesity, a major U.S. public health problem.

Tobacco use

Compared with adults who have never smoked, those who are former smokers and current smokers report higher levels of *unhealthy days (Table 1)*. Most of these *unhealthy days* are attributable to impaired mental rather than physical health, which should help focus exploration on potentially fruitful areas of prevention or health promotion.

Substance abuse

Population data provide some support that HRQOL is lower among those who report high levels of alcohol use in the past month. Although the accuracy of self-reported data may be especially problematic among this group, the collection of data about health perceptions of persons who use and abuse substances may yield new insights into prevention and treatment approaches.

Responsible sexual behavior

Although no such data are currently available for analysis, the core Healthy Days and sexual behavior measures now being asked in the NHANES examination component will provide data for a study of potential connections between HRQOL and responsible sexual behavior. This is an important prevention research area that needs exploration.

Mental health

Population surveillance of perceived mental distress—in general as well as symptoms of depression, anxiety, sleeplessness, and lack of vitality—is an integral aspect of the Healthy Days measures *(Borawski 1998)*. Of all adults who report a current activity limitation, those who say that the major cause is depression, anxiety, or some other emotional problem report the highest levels of recent sleeplessness, the lowest levels of vitality, and the highest levels of recent activity limitation *(Table 2)*.

Injury and violence

The Healthy Days measures are potentially useful in measuring the perceived burden of injuries and disabilities—including the effects of partner violence. For example, in one study involving 13 states, the 1.7% of adults who reported a current activity limitation due mainly to a fracture, bone, or joint injury had these limitations for an average of 5.9 years and reported an average of 11.8 recent pain days—10 times as much as adults with no current activity limitation, who averaged only 1.1 pain days *(CDC 1998-1)(Table 2)*.

Environmental quality

Although no analyses have yet been made of the relationships between *unhealthy days* and environmental quality, community residents who have asthma or similar respiratory conditions would likely report more *unhealthy days* in periods of poor air quality than during periods of clean air. Poor water and other environmental contaminants are also likely to be associated with reports of low HRQOL.

Immunization

Some BRFSS data are available for analysis of relationships between HRQOL and influenza and pneumonia immunization status. This is a prevention research area that needs exploration.

Access to care

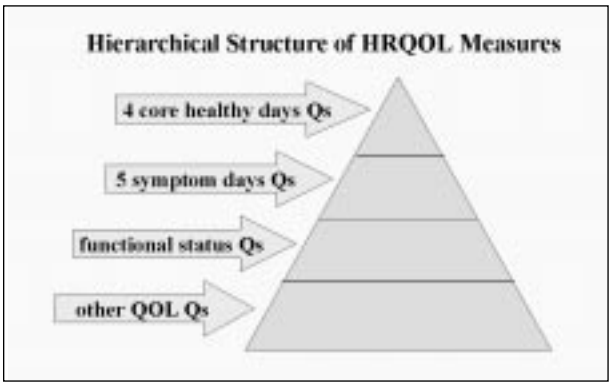
Adults who report having no health care coverage or insurance also report higher levels of *unhealthy days* compared with those with coverage *(Tables 1, 2)*, mostly because of the higher levels of perceived mental distress among those with no coverage.

How can the Healthy Days measures support epidemiologic and prevention research?

The validity, brevity, and comparability of the Healthy Days measures make them ideal additions to existing and new survey instruments to enhance opportunities for epidemiologic and prevention research.

The addition of the core Healthy Days measures to the NHANES, beginning in 2000, supports public health prevention goals. NHANES measures the national burden of preventable disease, injuries, and disabilities. It will provide valuable new insights into the relationship between HRQOL and clinically-measured health characteristics and conditions such as blood pressure, physical strength and endurance, oral health, and mental health (**http://www.cdc.gov/nchs/nhanes.htm**).

Moreover, the addition of the HRQOL questions to the NHANES survey is important because it is a nationally representative survey that is linked with other national surveys and health outcomes. NHANES Healthy Days data will help validate people's self-reports in comparison with the NHANES objective measures of physical health and blood work for interviewed subjects. NHANES studies of the levels of reported *unhealthy days* and activity limitation days in relation to measured body mass index and physical endurance, as well as to reported nutritional and physical activity patterns, can provide research-based messages to support related health communication objectives. Adding the Healthy Days questions to NHANES extends the HRQOL surveillance to adolescents as well as adults and will yield important information on the nature and extent of health disparities among geographic and socio-demographic groups.



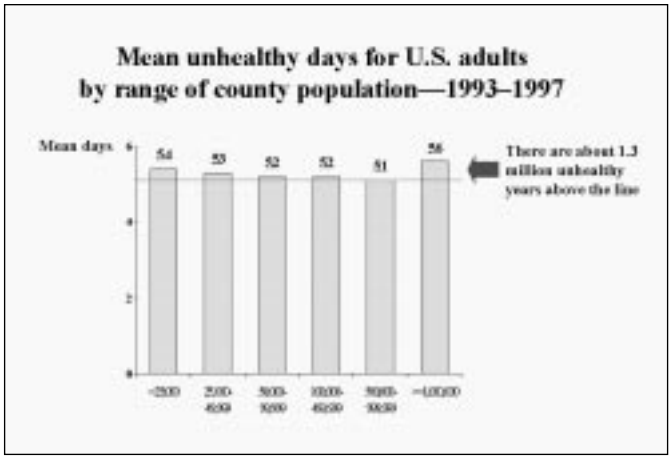
How can an HRQOL focus support community mobilization?

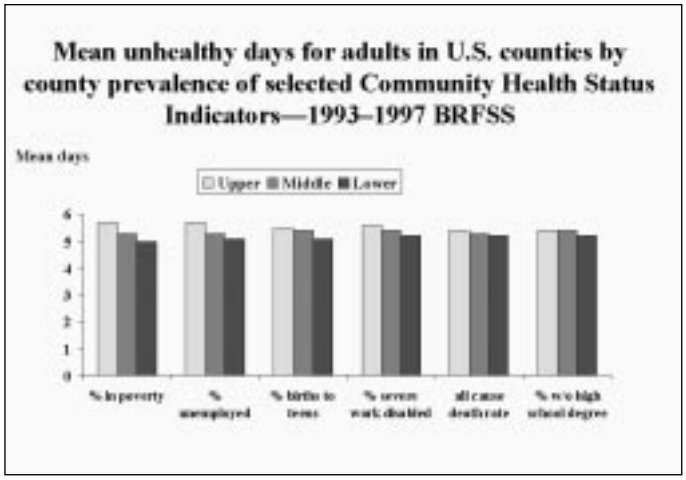
The Healthy Days measures have been used effectively in Boone County, Missouri since 1993 to help identify health problems of vulnerable groups and to justify additional funding for addressing these disparities. The measures are also proving to be valuable for population health assessment in Hamilton, Ontario *(Ounpuu 2000)*, and as community health indicators in King County, Washington (see *Communities Count 2000: Social and Health Indicators Across King County* at **http://www.communitiescount.org**). In addition, the utility of the core measures to identify health needs and changes in communities is currently being tested by both the CDC Division of Adult and Community Health and the Urban Research Center Program of the CDC Epidemiology Program Office.

The Healthy Days measures and data have attracted the interest of the National Association of County and City Health Officials (NACCHO), and their applicability to local health agencies has been described in articles in the NACCHO monthly newsletter *(Moriarty 1996, Centra 1998)*. More recently, with support from the Health Resources and Services Administration, the Public Health Foundation and its partners, NACCHO and ASTHO, have included county-level BRFSS data from the four core Healthy Days measures in their July 2000 Community Health Status Indicator (CHSI) reports (see: **http://www.communityhealth.hrsa.gov/**).

The PHF is also now collaborating with the CDC to identify county-level indicators of HRQOL—using mean *unhealthy days* as a summary measure of perceived population physical and mental health *(Kanarek 2000)*. Initial findings from this study show that adults residing in counties with the largest (i.e., ≥1 million) and smallest (i.e., <25,000) populations report the highest levels of *unhealthy days* while those in moderately large counties (i.e., between 500,000 and 999,999 residents) report the lowest level of mean *unhealthy days*. This study also found that counties with the highest rates of poverty, unemployment, births to teens, severe work disability, age-adjusted mortality, and lack of a high school diploma also had the highest reported levels of *unhealthy days* in comparison with counties with lower prevalences of these indicators.

The Institute of Medicine (IOM) recognized the value of tracking both self-rated health and the *unhealthy days* measure in its recent book, *Improving Health in the Community: A Role for Performance Monitoring,* available in its entirety on the National Academy of Sciences Press website (IOM 1997). The IOM identified these BRFSS-based measures as two of its recommended 25 Community Health Profile indicators that all communities should track. The book also contains a practical set of appendices with specific examples of how the BRFSS HRQOL measures can be used in combination with other measures that individual communities identify as important. For example, one appendix suggests the use of the Healthy Days depressive symptoms measure for estimating the prevalence of adult depression in the community, in conjunction with information on the prevalence of treatment for diagnosed depression and other community correlates of depression.





CONCLUSIONS AND FUTURE DIRECTIONS

The Healthy Days measures and accumulating population data offer considerable promise as part of a new public health paradigm that looks at health as a broad multidimensional construct, comprising both physical and mental well-being.

What are the main advantages of the Healthy Days measures and population data?

1. Relate directly to the **Healthy People 2010** goals
2. Reflect known demographic and socioeconomic **disparities and health patterns**
3. Reflect the **burden** of physical and mental illness and disability
4. Are **validated** against other established measures (e.g., MOS Short Form 36)
5. **Predict** short-term mortality and hospitalization
6. Provide new insights into **health behaviors**
7. Indicate important new **policy-relevant** disparities and trends
8. Provide a focus for comprehensive **community health** programs
9. Provide **comparable** population data from 1993 onward (nearly one million adults)
10. Are **simple** to measure, calculate, interpret, and add to other assessments

What areas need future study and analysis?

Areas in which future effort will extend the value of the Healthy Days measures include:

1. Use of alternative weighting methods for aggregating multiple years of data and for estimating the sub-state prevalence of HRQOL; use of other analytic methods, such as multilevel analyses, to describe relationships between aggregated BRFSS data and potential community indicators of population HRQOL.
2. Validation studies that simultaneously compare the Healthy Days measures with "gold standard" measures of mental illness, such as the Diagnostic Interview Schedule (DIS) for depression and anxiety; additional validation studies for persons with known major chronic health conditions, such as diabetes, cardiovascular disease, asthma, and cancer.
3. Measurement research, such as sensitivity/specificity analyses, to identify appropriate cutoff points for analysis and population prevalence threshold levels that indicate policy-relevant HRQOL changes for each Healthy Days variable.
4. Studies to demonstrate that the Healthy Days measures are suitable for measuring the HRQOL effects of public health interventions and are therefore suitable for use on cost-effectiveness studies.
5. Studies of mode effects (self-administered versus telephone versus in-person versus proxy) and feasibility in a variety of settings—including prisons, homeless shelters, clinics, and assisted-living and skilled nursing facilities.

Lessons learned from HRQOL surveillance in the U.S.

1. Consensus versus vision	no one ideal set of measures
2. Clarity is critical	e.g., perceived good mental and physical health over time
3. Brevity is best	four questions are easy to add
4. Validity is essential	comparisons with validated measures; prediction studies
5. Continuously collected HRQOL data are useful	show group differences, trends, & socio-environmental effects

6. Direct measure-to-measure (crosswalk) and risk-adjustment studies that examine potential uses of the continuous population data from the core Healthy Days measures to predict expected HRQOL results in other surveys that use both the Healthy Days and other HRQOL measures.
7. Predictors of HRQOL in persons.
8. Studies of HRQOL among the working-age population, including its effects on productivity and the costs of unhealthy days to employers and society.
9. Multi-variate analyses to quantify the associations of specific individual, group, and environmental characteristics with population HRQOL.

Conclusion

As knowledge builds about HRQOL surveillance and its potential uses, the Healthy Days measures and accumulating population data give states and communities a unique nationwide standard for identifying and tracking perceived unmet health needs and disparities. Focusing on HRQOL will help health agencies bridge artificial distinctions between physical and mental health and spur collaboration with a wider circle of health partners toward shared goals.

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RESOURCES

A. CDC Behavioral Risk Factor Surveillance System Home Page (with links to BRFSS questionnaires, public domain data, State Coordinators): **http://www.cdc.gov/nccdphp/brfss/.**

B. CDC National Center for Environmental Health, Division of Child Development, Disability, and Health. Secondary Conditions Prevention Branch: **http://www.cdc.gov/nceh/cddh/dh/scstates.htm**

C. CDC Arthritis Program Website: **http://www.cdc.gov/nccdphp/arthritis.htm**

D. Healthy People 2010: **http://web.health.gov/healthypeople**

E. CDC's MMWR articles: **http://www.cdc.gov/epo/mmwr/mmwr.html**

F. International Society for Quality of Life Studies (ISQOLS): **http://www.cob.vt.edu/market/isqols/**

G. International Society for Quality of Life Research (ISOQOL): **http://www.isoqol.org/**

H. Community Health Status Indicators Project: **http://www.communityhealth.hrsa.gov/** and **http://www.phf.org**

TABLES

Table 1: Percentage of good-to-excellent self-rated health, mean unhealthy days, and mean activity limitation days among adults by demographic and health characteristics (age-adjusted*)—Behavioral Risk Factor Surveillance System, 1993–1997

CHARACTERISTIC	COUNT	%GOOD-TO-EXCELLENT HEALTH	MEAN UNHEALTHY DAYS	MEAN ACTIVITY LIMITATION DAYS
Overall	**576,367**	**86.1**	**5.3**	**1.7**
Sex				
Male	239,094	86.7	4.3	1.6
Female	337,273	85.7	6.0	1.8
Age group				
18-24 yr	53,074	93.5	5.2	1.1
25-34 yr	116,845	93.7	4.7	1.1
35-44 yr	131,184	91.6	5.1	1.4
45-54 yr	93,871	87.1	5.3	1.7
55-64 yr	64,920	79.7	5.6	2.1
65-74 yr	67,469	74.5	5.6	2.2
>= 75 yr	46,458	66.9	6.7	3.0
Self-reported race				
White	492,134	87.2	5.2	1.6
Black	50,877	78.8	5.8	2.2
Asian/Pacific Islander	13,478	87.9	4.2	1.3
American Indian/Alaska Native	7,048	77.6	7.3	2.6
Other	10,985	76.9	6.1	2.1
Ethnicity				
Hispanic	30,610	76.6	5.9	2.0
Non-Hispanic	543,600	86.7	5.2	1.7
Highest grade/year of school completed				
Less than high school	79,505	69.7	7.5	3.0
High school grad	189,372	85.1	5.4	1.7
Some college	157,118	88.8	5.3	1.6
College grad	148,984	93.5	4.0	1.1
Annual household income				
< $15,000	94,279	72.6	8.2	3.3
$15,000-$24,999	108,695	82.8	6.0	2.0
$25,000-$34,999	88,475	88.6	4.9	1.4
$35,000-$49,999	93,478	91.8	4.3	1.1
≥ $50,000	115,122	92.2	4.0	1.1
Refused	26,583	89.4	4.1	1.2

TABLE 1 *(continued)*

CHARACTERISTIC		COUNT	%GOOD-TO-EXCELLENT HEALTH	MEAN UNHEALTHY DAYS	MEAN ACTIVITY LIMITATION DAYS
Employment status					
Employed for wages		306,804	90.5	4.2	0.9
Self-employed		49,523	91.4	4.2	0.9
Out of work one year or more		9,066	72.4	9.1	4.2
Out of work less than one year		12,401	82.1	7.2	2.7
Homemaker		46,317	83.8	5.7	1.5
Student		19,331	90.3	5.1	1.3
Retired		110,956	81.9	5.9	2.2
Unable to work		18,021	34.5	19.9	13.4
Marital status					
Married		316,030	88.3	4.6	1.4
Divorced		71,805	83.1	6.8	2.3
Widowed		63,283	82.5	6.3	2.1
Separated		14,941	76.5	8.6	2.8
Never married		97,549	85.7	5.3	1.8
Unmarried couple		11,415	83.1	6.3	1.9
Reported diabetes mellitus					
Yes		27,721	57.5	9.9	4.4
No		547,721	87.6	5.1	1.6
Told has high blood pressure					
Never told		295,384	89.1	4.7	1.4
Told once		21,027	86.2	5.6	1.6
Told twice		71,518	73.6	7.9	3.0
Reported breast cancer†					
Yes		3,634	73.7	8.5	3.0
No		333,639	85.2	6.1	1.8
Sex	**Body mass index category (WHO§)**				
Male	Underweight	2,213	73.7	7.6	3.5
	Normal	92,910	87.9	4.2	1.5
	Pre-Obese	105,590	88.6	4.0	1.3
	Obese, Class 1	27,670	82.0	5.0	1.9
	Obese, Class 2	5,947	74.5	6.3	2.8
	Obese, Class 3	2,049	64.4	8.2	3.6
Female	Underweight	12,882	83.8	6.8	2.1
	Normal	173,209	89.6	5.3	1.5
	Pre-Obese	85,455	85.6	6.0	1.8
	Obese, Class 1	32,857	78.1	7.4	2.4
	Obese, Class 2	10,334	69.2	9.2	3.3
	Obese, Class 3	5,508	60.7	11.3	4.7

TABLE 1 *(continued)*

CHARACTERISTIC	COUNT	%GOOD-TO-EXCELLENT HEALTH	MEAN UNHEALTHY DAYS	MEAN ACTIVITY LIMITATION DAYS
Cigarette smoking status				
Never smoked	299,931	88.2	4.5	1.4
Former smoker	143,657	86.0	5.4	1.7
Smokes <1 pack/day	62,793	83.3	6.4	2.1
Smokes ≥1 pack/day	65,679	80.2	7.3	2.5
Drank 5 or more alcoholic beverages once or more in the past month				
Yes	51,571	87.4	5.5	1.6
No	355,560	86.0	5.3	1.7
Any leisure-time physical activity in past month				
Yes	205,005	89.7	4.5	1.2
No	89,827	78.1	6.8	2.8
Uses seatbelt in car				
Always	255,465	87.3	5.1	1.6
Nearly always	58,437	86.8	5.1	1.6
Sometimes	31,359	83.3	5.7	1.9
Seldom	15,878	82.3	6.0	1.9
Never	17,643	78.1	7.1	2.4
Never drive/ride in car	1,455	66.1	8.8	4.4
Has health insurance				
Yes	505,188	87.2	5.1	1.6
No	69,742	78.6	6.6	2.3
Self-rated health				
Excellent	139,565	100.0	2.3	0.4
Very good	194,685	100.0	3.5	0.7
Good	159,276	100.0	5.2	1.4
Fair	59,442	0.0	11.7	4.2
Poor	23,399	0.0	23.9	13.9

*** Responses in all groups except the age groups were age-adjusted to the overall BRFSS sample for 1993–1997 for all characteristics except age group.**

† Questions regarding breast cancer were posed to women only.

§ Categories are underweight (< 18.5 kg/m2); normal (18.5 kg/m2-24.9 kg/m2); overweight (25.0 kg/m2-29.9 kg/m2); obese class I (30.0 kg/m2-34.9 kg/m2); obese class II (35.0 kg/m2-39.9 kg/m2); and obese class III (≥40 kg/m2).

TABLE 2: Health-related quality of life among adults by demographic and health characteristics for 13 states using the full set of Healthy Days measures—Behavioral Risk Factor Surveillance System, 1995–1997

			MEAN NUMBER OF DAYS IN PAST 30 DAYS								
Characteristic		Count	Healthy Days	Not Good Physical Health	Not Good Mental Health	Activity Limitation	Pain	Sad, Blue, Depressed	Anxious	Sleepless	Full of Energy
Overall		**42,632**	**24.7**	**3.1**	**2.8**	**1.7**	**2.6**	**3.0**	**5.2**	**7.6**	**19.0**
State	**Year**										
California	1996	4,003	24.5	3.1	3.0	1.3	2.4	2.9	4.9	6.9	18.9
Delaware	1995	2,112	24.9	3.0	2.9	1.8	3.0	2.8	5.0	7.4	19.9
Indiana	1995	2,412	23.7	3.5	3.6	1.7	3.4	3.4	6.1	9.0	18.4
Kansas	1995	2,009	24.7	3.1	3.0	1.7	2.8	2.9	5.7	7.8	18.8
Kansas	1997	2,004	26.6	2.1	1.7	0.8	1.9	1.8	3.6	6.3	19.7
Mississippi	1995	1,592	24.8	3.3	2.6	2.2	3.2	3.5	4.7	6.7	20.2
Missouri	1995	1,572	24.6	2.9	3.1	1.7	2.6	2.9	5.3	7.9	18.5
Missouri	1996	1,550	24.2	3.5	3.0	1.8	3.4	3.3	5.4	8.4	18.9
Missouri	1997	1,849	24.1	3.5	3.2	1.9	3.0	3.2	5.6	7.9	18.4
New Mexico	1995	1,298	24.1	3.7	2.8	2.1	2.3	3.0	5.4	7.2	20.3
New York	1996	4,312	24.6	3.1	2.9	1.7	2.6	3.3	5.7	8.2	19.0
New York	1997	3,403	24.6	3.1	3.0	1.8	3.0	3.7	6.2	8.3	19.9
North Carolina	1995	1,326	26.1	2.8	1.8	1.4	2.2	2.9	4.2	6.9	17.5
North Carolina	1996	2,794	25.9	2.7	2.0	1.8	2.5	2.6	4.4	7.2	19.7
Ohio	1997	3,166	25.8	2.6	2.2	1.4	2.4	2.2	3.7	7.5	19.2
Pennsylvania	1997	3,603	24.7	3.2	2.9	1.6	2.4	2.9	5.0	7.5	18.5
Rhode Island	1997	1,842	24.8	3.0	2.7	1.9	2.6	2.9	5.1	7.4	19.1
Tennessee	1995	1,785	24.8	3.6	2.5	1.8	2.5	3.5	5.6	7.6	17.7
Sex											
Male		17,234	25.6	2.7	2.3	1.5	2.4	2.5	4.5	7.0	20.0
Female		25,398	24.0	3.5	3.3	1.8	2.8	3.6	5.8	8.2	18.1
Age group											
18-24 yr		3,739	24.9	1.9	3.4	1.2	1.4	3.6	6.2	10.0	18.1
25-34 yr		8,648	25.2	2.1	3.0	1.2	1.7	3.0	5.9	9.6	18.5
35-44 yr		9,379	24.9	2.5	3.3	1.5	2.4	3.2	5.7	8.5	19.2
45-54 yr		7,056	24.7	3.2	2.9	1.7	3.0	3.2	5.2	7.4	19.1
55-64 yr		4,860	24.5	4.0	2.4	2.0	3.6	2.9	4.6	5.3	20.1
65-74 yr		5,122	24.4	4.8	1.7	2.0	3.7	2.4	3.3	4.1	19.9
≥ 75 yr		3,623	23.3	5.9	1.9	3.0	4.6	2.8	3.0	3.9	18.6
Race/ethnicity											
White, non-Hispanic		33,910	24.8	3.1	2.7	1.6	2.7	2.8	5.2	7.7	19.0
Black, non-Hispanic		4,654	24.1	3.4	3.3	2.1	2.9	4.1	5.3	8.1	18.6
White, Hispanic		1,932	24.6	3.1	2.0	1.3	2.1	3.4	5.3	6.5	19.7
Black, Hispanic		208	23.5	3.5	4.2	2.7	3.1	4.7	7.9	7.9	19.9
Other, Hispanic		481	23.8	3.4	3.6	2.4	3.2	4.1	5.8	8.4	19.2
Asian/Pacific Isl.		696	26.0	1.7	2.5	0.6	1.4	2.3	4.1	6.3	18.4
Native Amer/Alaska Natv		273	23.4	4.0	3.8	1.9	3.5	4.3	6.7	7.7	18.5
Other		214	23.5	2.5	4.3	2.2	2.0	3.0	5.3	8.0	20.1

TABLE 2 *(continued)*

MEAN NUMBER OF DAYS IN PAST 30 DAYS

Characteristic	Count	Healthy Days	Not Good Physical Health	Not Good Mental Health	Activity Limitation	Pain	Sad, Blue, Depressed	Anxious	Sleepless	Full of Energy
Educational level										
< High school grad	5,944	22.5	5.4	3.6	3.0	4.4	4.6	6.0	6.9	17.5
High school grad	14,243	24.7	3.1	2.9	1.6	2.8	3.2	5.1	7.6	19.2
Some college	11,233	24.8	2.8	3.0	1.6	2.5	3.0	5.4	8.3	18.9
College grad	11,073	25.9	2.1	2.3	1.0	1.7	2.1	4.6	7.4	19.8
Annual household income										
< $15,000	5,666	21.6	5.5	4.4	3.4	4.6	5.1	6.9	8.0	17.0
$15,000-$24,999	8,216	23.7	4.0	3.3	2.3	3.4	3.8	5.5	7.5	18.2
$25,000-$34,999	6,533	25.0	2.7	2.8	1.4	2.4	2.9	5.4	7.8	19.3
$35,000-$49,999	6,864	25.8	2.0	2.4	1.0	1.9	2.4	4.8	7.6	19.4
≥$50,000	8,618	26.1	2.0	2.1	0.9	1.6	1.9	4.5	7.9	19.7
Missing/Unknown income	6,735	25.0	3.2	2.5	1.5	2.8	2.9	4.7	6.9	19.8
Employment status										
Employed, wages	23,190	25.9	1.8	2.5	0.9	1.6	2.5	5.1	8.4	19.5
Self-employed	3,023	25.9	2.1	2.4	1.0	1.9	2.5	5.3	7.2	20.6
Unemployed ≥1 yr	696	20.8	5.4	5.3	3.9	5.4	5.8	7.8	9.2	16.5
Unemployed <1 yr	875	21.9	3.9	5.4	2.8	3.0	6.1	8.7	7.5	17.8
Homemaker	3,301	24.1	3.3	3.2	1.6	2.5	3.5	5.3	7.3	18.5
Student	1,324	25.0	1.7	3.4	0.9	1.4	3.3	6.2	9.6	18.3
Retired	8,705	24.2	5.0	1.8	2.2	4.0	2.5	3.1	4.0	19.7
Unable to work	1,473	10.7	16.1	9.6	12.9	14.5	10.6	12.2	11.7	9.1
Marital status										
Currently married	22,589	25.3	2.9	2.4	1.5	2.5	2.5	4.6	7.3	19.6
Divorced	5,336	23.4	3.8	3.9	2.3	3.7	4.2	6.7	8.6	18.0
Widowed	4,876	22.7	5.7	2.8	2.8	4.7	3.9	4.3	4.9	18.4
Separated	1,346	21.9	4.4	5.0	2.6	4.0	5.8	8.2	9.3	17.1
Never married	7,511	24.7	2.3	3.3	1.4	1.8	3.5	6.0	8.8	18.4
Unmarried couple	861	24.1	2.4	3.9	1.4	2.1	3.5	5.9	8.9	18.3
Told has diabetes										
Yes	2,115	19.7	8.5	3.8	4.7	6.6	5.0	6.2	7.3	15.3
No	40,462	25.0	2.8	2.8	1.5	2.4	2.9	5.1	7.6	19.2
Told has high blood pressure										
Never told	28,920	25.3	2.5	2.7	1.3	2.1	2.9	5.1	7.7	19.4
Told once	1,953	24.0	3.5	3.3	1.6	2.8	3.3	5.6	7.9	18.7
Told twice	7,180	22.4	5.5	3.4	3.0	4.9	3.9	5.8	7.1	17.0
Reported breast cancer*										
Yes	333	21.7	5.7	4.1	3.7	5.3	4.3	6.7	6.6	16.6
No	25,065	24.0	3.4	3.3	1.8	2.8	3.5	5.8	8.2	18.2

TABLE 2 *(continued)*

MEAN NUMBER OF DAYS IN PAST 30 DAYS

Characteristic		Count	Healthy Days	Not Good Physical Health	Not Good Mental Health	Activity Limitation	Pain	Sad, Blue, Depressed	Anxious	Sleepless	Full of Energy
Body mass index by sex†											
Underweight	Male	140	22.0	6.1	3.1	4.1	3.8	5.3	7.7	7.4	16.9
Normal BMI	Male	6,279	25.6	2.5	2.4	1.4	2.2	2.6	4.6	7.1	20.1
Overweight	Male	7,723	26.2	2.3	1.9	1.3	2.2	2.2	4.1	6.6	20.4
Obese (class I)	Male	2,172	24.7	3.2	2.7	1.8	2.9	2.7	5.0	7.7	19.1
Obese (class II)	Male	504	23.3	4.7	3.8	3.1	5.1	4.0	5.8	9.0	16.8
Obese (class III)	Male	156	20.3	7.4	3.4	4.3	6.2	4.0	5.1	7.2	17.2
Underweight	Female	491	22.7	2.5	5.4	1.5	1.5	4.8	8.8	11.3	16.7
Normal BMI	Female	6,260	24.8	2.1	3.5	1.2	1.5	3.2	6.0	9.7	18.5
Overweight	Female	2,440	24.2	2.5	3.8	1.3	2.1	4.2	6.7	10.6	17.1
Obese (class I)	Female	944	23.6	3.3	4.0	1.9	2.7	4.1	7.3	10.5	16.2
Obese (class II)	Female	329	22.0	3.8	5.1	2.4	3.2	5.1	8.2	11.7	14.1
Obese (class III)	Female	189	18.9	6.0	6.8	3.5	4.2	7.6	9.9	12.6	14.7
Cigarette smoking status											
Never smoked		22,201	25.5	2.6	2.4	1.3	2.1	2.6	4.5	7.3	19.5
Former smoker		9,260	24.3	3.8	2.7	2.1	3.3	2.9	5.1	6.7	19.1
Smokes <1 pack/day		3,717	23.4	3.2	4.0	1.8	2.7	4.2	6.7	9.3	18.1
Smokes ≥1 pack/day		4,897	22.9	3.8	4.5	2.5	3.8	4.8	7.8	9.9	17.0
Drank ≥ 5 alcoholic beverages at least once in past month											
Yes		4,086	24.6	2.2	3.5	1.3	2.0	3.4	6.3	8.5	18.2
No		13,876	25.4	2.3	2.7	1.2	2.0	2.7	5.1	7.7	19.7
Leisure-time physical activity during past month											
Yes		14,026	25.5	2.3	2.6	1.1	1.9	2.7	4.8	7.4	20.2
No		6,984	23.2	4.7	3.4	2.7	4.2	3.9	6.0	8.1	17.1
Uses seatbelt in car											
Always		20,004	25.1	3.0	2.5	1.6	2.6	2.8	4.9	7.5	19.5
Nearly always		4,284	25.1	2.8	2.7	1.5	2.5	2.8	4.9	7.5	18.4
Sometimes		2,624	24.3	2.9	3.5	1.8	2.7	3.7	6.0	8.7	18.4
Seldom		1,262	24.6	2.8	3.4	1.5	2.8	4.0	7.3	9.2	17.8
Never		1,580	22.3	4.8	4.4	3.0	4.6	4.9	7.4	10.2	16.5
Has health insurance											
Yes		37,582	24.9	3.1	2.7	1.6	2.6	2.8	4.9	7.5	19.1
No		4,959	23.9	3.0	3.9	1.7	2.6	4.3	6.6	8.1	18.5
Self-rated health status											
Excellent		9,772	27.6	0.9	1.6	0.4	0.9	1.8	3.9	6.9	22.7
Very good		14,357	26.5	1.5	2.1	0.7	1.4	2.2	4.3	7.3	20.3
Good		12,025	24.7	3.0	2.7	1.3	2.6	3.3	5.5	7.7	18.1
Fair		4,600	18.8	7.9	5.1	4.3	6.3	5.6	7.7	8.6	13.2
Poor		1,774	5.9	22.3	9.3	14.4	15.4	10.4	11.7	12.0	6.7

TABLE 2 *(continued)*

Characteristic	Count	MEAN NUMBER OF DAYS IN PAST 30 DAYS: Healthy Days	Not Good Physical Health	Not Good Mental Health	Activity Limitation	Pain	Sad, Blue, Depressed	Anxious	Sleepless	Full of Energy	Years Limited
Extent of activity limitation											
None	34,390	26.2	1.7	2.3	0.7	1.1	2.4	4.5	7.2	20.3	
Limited, but no help needed	5,037	19.6	7.4	4.6	4.1	7.8	5.4	7.7	9.1	14.0	
Need help with routine care needs	1,585	12.5	14.9	7.3	10.3	15.2	8.4	10.9	11.4	9.1	
Need help with personal care needs	837	9.8	17.9	8.6	15.1	17.9	10.5	12.4	11.7	7.7	
Cause of activity limitation											
Depression/Anxiety/ Emotional problem	170	9.0	9.8	15.7	13.1	7.2	18.6	19.0	13.4	6.1	7.8
Cancer	111	10.8	16.4	9.3	12.9	12.1	10.0	11.1	11.0	8.3	3.9
Diabetes	179	14.5	13.1	7.0	9.8	8.7	9.4	9.4	9.2	11.5	7.2
High blood pressure	75	14.8	9.9	6.3	7.5	7.4	8.8	7.7	7.9	11.7	10.0
Back or neck problem	1,372	16.9	10.2	6.1	7.1	13.5	7.0	10.0	12.0	11.8	7.3
Lung/Breathing problem	557	16.9	10.1	5.2	6.4	6.2	6.0	9.0	10.3	11.9	11.4
Stroke problem	153	17.0	12.6	4.1	8.0	7.1	6.7	8.1	6.7	10.2	4.7
Other impairment/ problem	1,373	17.1	9.2	6.7	6.8	8.7	6.6	9.5	10.3	12.3	9.2
Heart problem	633	17.1	11.2	4.5	6.7	7.4	5.5	7.2	8.3	12.2	8.5
Walking problem	526	17.8	10.8	3.7	6.3	11.8	5.1	6.5	7.3	12.7	7.4
Arthritis/Rheumatism	1,244	18.1	10.2	4.0	4.7	13.4	5.4	7.9	8.8	12.0	8.2
Fracture/Joint injury	710	18.9	8.9	3.9	5.8	11.8	4.8	7.4	9.4	15.0	5.9
Eye/Vision problem	252	21.8	5.8	4.2	2.9	4.1	5.1	5.4	7.7	18.0	14.4
Hearing problem	64	23.9	4.2	2.0	2.6	4.4	3.1	5.5	6.5	20.2	17.4
No limitation	34,390	26.2	1.7	2.3	0.7	1.1	2.4	4.5	7.2	20.3	_

*** Questions regarding breast cancer were posed to women only.**

† Categories are underweight (< 18.5 kg/m2); normal (18.5 kg/m2-24.9 kg/m2); overweight (25.0 kg/m2-29.9 kg/m2); obese class I (30.0 kg/m2-34.9 kg/m2); obese class II (35.0 kg/m2-39.9 kg/m2); and obese class III (≥40 kg/m2).