Leading Health Indicators for Healthy People 2010: Final Report

Carole A. Chrvala and Roger J. Bulger, Editors; Committee on Leading Health Indicators for Healthy People 2010

ISBN: 0-309-57377-7, 86 pages, 8.5 x 11, (1999)

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Committee on Leading Health Indicators for Healthy People 2010
Division of Health Promotion and Disease Prevention

INSTITUTE OF MEDICINE

NATIONAL ACADEMY OF SCIENCES
Washington, D.C. 1999

Institute of Medicine 2101 Constitution Avenue, N.W. Washington, DC 20418

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Support for this study was provided by the Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services, (contract no. 282-98-0018). The views presented are those of the Institute of Medicine Committee on Leading Health Indicators for Healthy People 2010 and are not necessarily those of the funding organization.
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Printed in the United States of America

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ISBN 0-309-06539-9

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Acknowledgments

Healthy People has been a product of the efforts of many agencies and individuals during the course of the past two decades. The committee expresses its appreciation to the presenters at the June 1998 public session for providing an excellent overview of the leading health indicators as they relate to Healthy People 2010. The presenters addressed many of the issues under consideration by the committee, and the committee appreciates the participants' insights. The presenters were: Edward Sondik, National Center for Health Statistics; Mike Stoto, Department of Epidemiology, George Washington University; Ronald Bialek, Public Health Foundation; Thomas Milne, National Association of City and County Health Officials; Laverne Snow; Association for State and Territorial Health Officers; and Olivia Carter-Pokras, Office of Minority Health. The committee also thanks Michael McGinnis for providing the committee with his summary of leading health indicators for *Healthy People 2010*.

This report has been reviewed by individuals chosen for their diverse perspectives and technical expertise, in accordance with procedures approved by the National Research Council's Report Review Committee. The purpose of this independent review is to provide candid and critical comments that will assist the authors and the Institute of Medicine in making the published report as sound as possible and to ensure that the report meets institutional standards for objectivity, evidence, and responsiveness to the study charge. The content of the review comments and draft manuscripts remain confidential to protect the integrity of the deliberative process. The committee thanks the following individuals for their participation in the review of this report: Ross Brownson, St. Louis University; Ezra Davidson, Charles R. Drew University of Medicine and Science; Paul Frame, Tri-County Family Medicine; Randolph Gordon, Bon Secours Richmond Health Systems; Maureen Henderson, University of Washington; LaDene Larsen, Utah Public Health Association; Anthony Robbins, Tufts University; Susan Scrimshaw, University of Illinois at Chicago; and Hugh Tilson, Glaxo Wellcome Company.

Although the individuals listed above have provided many constructive comments and suggestions, responsibility for the final content of this report rests solely with the authoring committee and the Institute of Medicine.

Contents

Executive Summary

Since its inception in 1979, *Healthy People* has been a significant and innovative health initiative to guide the efforts of this nation to (1) address disparities in health status and health outcomes between diverse population groups and (2) improve the overall health of the nation. *Healthy People* identifies opportunities at the national, state, local, and community levels to remediate the most significant and tractable issues affecting the health of all people residing in the United States. With its goal statements, focus areas, and objectives, *Healthy People* suggests ways to improve the health of the nation's population while using the knowledge and skills of national, state, and local government agencies, individual and group participants in communities, members of health care delivery systems, voluntary groups, and public—and private-sector organizations and agencies.

Healthy People 2010 is the third generation of this health initiative that is intended to address the health problems of this nation as it enters the next millennium. Efforts to develop *Healthy People* for the decade from the years 2000 to 2010 have been under way since September 1996. Although the identification of overarching goals, enabling goals, focus areas, and related objectives for the full *Healthy People 2010* guidance document has dominated these efforts, much attention has also been given to the development of a small set of leading health indicators.

Similar to the five key measures in the first decade of *Healthy People* and the 47 sentinel indicators established for *Healthy People 2000, Healthy People 2010* may benefit from a small set of leading health indicators that will be of interest, importance and relevance to the general public, non-health organizations, and traditional public and private health organizations. Leading health indicators can focus on a small number of key health and social issues that can be brought to the attention of the nation, motivate actions to exert positive influences over these leading health indicators and provide feedback concerning progress toward achieving the targets set for each indicator. Furthermore, a small set of leading health indicators can create a national identity for the full-scale implementation of *Healthy People 2010* and expand the traditional *Healthy People* community to include a wide variety of agencies, organizations, diverse population groups, community organizations, and individuals.

CHARGE TO THE COMMITTEE

The Institute of Medicine convened a committee to consider the issue of leading health indicators for *Healthy People 2010* and to develop and recommend a minimum of two sets of indicators for consideration by the U.S. Department of Health and Human Services. The committee received its charge from the department with several opportunities for review and discussion. The initial charge emphasized that the

committee should recommend a minimum of two candidate indicator sets that would (1) elicit interest and awareness among the general population, (2) motivate diverse population groups to engage in activities that will exert a positive impact on specific indicators and in turn, improve the overall health of the nation, and (3) provide ongoing feedback concerning progress toward improving the status of specific indicators. In subsequent meetings between committee members and staff from the U.S. Department of Health and Human Services, this charge was reviewed and clarification sought where necessary. Specifically, the committee was informed that the charge also included the development of potential dissemination strategies to promote the leading health indicators to the lay public and traditional public and private health care communities. It was also established that clear linkages should be demonstrated between the proposed indicators and the existing full draft of *Healthy People 2010*, including the two overarching goals, four enabling goals and 26 focus areas. Finally, the committee received additional direction that the candidate indicator sets should contain no more than 10 indicators and that any proposed indicator set should be supported by a conceptual framework around which the specific indicators could be organized.

OVERVIEW OF INDICATOR SET DEVELOPMENT

This report provides a detailed discussion of the committee's efforts to develop leading health indicator sets that could focus on health and social issues as well as evoke response and action from the general public and the traditional audiences for *Healthy People*. Briefly, three sets of leading health indicators were developed through the standard Institute of Medicine committee process. The committee followed an iterative approach to guide selection of conceptual frameworks and specific indicators for potential indicator sets. These efforts resulted in consideration of 13 conceptual frameworks and more than 50 categories of indicators. The committee then followed a consensus-based approach to facilitate selection of conceptual frameworks and specific indicators. This resulted in three unique conceptual frameworks and 19 indicators unique to the three proposed sets.

The diverse expertise and experience of the committee members strongly influenced the process of selection of the conceptual frameworks and indicators. However, the appointed committee is confident about the strengths of the three conceptual frameworks underlying each of the proposed sets and similarly, the ability of specific indicators within each set to meet the final set of six essential criteria. The committee is also confident that the three proposed indicator sets are responsive to every aspect of the committee's charge.

The committee also focused on identification of a set of essential criteria to guide the selection of suitable indicators for each of the candidate indicator sets. Initially, the committee accepted the nine criteria that had been recommended by the Working Group on Sentinel Indicators for *Healthy People 2010*. The committee then decided to expand this initial set of nine to include five additional criteria. As the committee progressed in its efforts to select appropriate indicators, they shared a growing awareness of the need to select criteria that would be understandable to the lay public and traditional public and private health care professionals as well as feasible to implement. Ultimately the committee decided that 14 criteria were too numerous and therefore, not feasible to apply in the selection of specific indicators. Following an interactive process that also reflected the committee's best judgments and their consideration of relevant literature and public comment resulted in a smaller set of six essential criteria that were worded in the simplest and most understandable terms. These criteria then became the essential conditions used by the committee to guide selection of the final indicators in each of the three proposed sets. The final set of six criteria are presented in the following Table E.1.

Table E.1 Final Criteria Guiding Selection of Leading Health Indicators

1. Worth measuring—the indicators represent an important and salient aspect of the public's health
2. Can be measured for diverse populations - the indicators are valid and reliable for the general population and diverse population groups
3. Understood by people who need to act - people who need to act on their own behalf or that of others should be able to readily comprehend the indicators and what can be done to improve the status of those indicators
4. Information will galvanize action - the indicators are of such a nature that action can be taken at the national, state, local and community levels by individuals as well as organized groups and public and private agencies
5. Actions that can lead to improvement are known and feasible -there are proven actions (e.g., changes in personal behaviors, implementation of new policies, etc.) that can alter the course of the indicators when widely applied
6. Measurement over time will reflect results of action - if action is taken, tangible results will be seen indicating improvements in various aspects of the nation's health

Committee efforts then turned toward the identification of plausible, science-based conceptual frameworks around which sets of leading health indicators could be organized. In addition, the committee identified 50 categories from which indicators could be selected. These efforts resulted in development of three sets of leading health indicators including (1) a Health Determinants and Health Outcomes Set, (2) a Life Course Determinants Set, and (3) a Prevention-Oriented Set. Three conceptual frameworks provided an underlying logic that facilitated selection and organization of indicators within each of the three proposed sets. In addition, the committee considered issues relevant to dissemination strategies, data collection and analysis, health disparities, potential strategies for action, and strength and limitations associated with the proposed sets. Table E.2 provides an overview of the specific indicators within each of the three proposed sets.

DESCRIPTION OF PROPOSED INDICATOR SETS

Health Determinants and Health Outcomes Set

The Health Determinants and Health Outcomes Set is based on extensive research supporting the field model of determinants of health at the individual and population levels (Evans and Stoddart, 1992). In this conceptual framework, determinants of health are also considered predictors of health behaviors and health outcomes. Knowledge about how well the nation, a state, a community or an individual is doing on specific indicators clarifies factors associated with the current health status of this nation and suggests actions to be taken to further improve the nation's health status. In addition, the proposed set includes a small number of indicators to assess broad population health outcomes. This provides information about disease morbidity and mortality that require interventions to improve disease outcomes of diverse U.S. populations.

The proposed Health Determinants and Health Outcomes Set includes eight indicators representative of health determinants: physical environment, poverty, high school graduation, tobacco use, weight, physical activity, health insurance, and cancer detection. These indicators have been chosen because they represent some of the most powerful determinants of health for which meaningful action can be taken at multiple jurisdictional levels, ranging from the national and state levels to individuals and families in neighborhoods and communities. There are two indicators to address health outcomes. The first focuses on prevention of mortality associated with intentional and unintentional injuries, while the second addresses the extent to which illness, injury or disability prevents people from performing important social roles. The indicator set

therefore recognizes that just as society has an effect on health, so too the health of the population has an effect on the functioning and productivity of society.

Table E.2 Comparative Overview of Three Proposed Leading Health Indicator Sets

Health Determinants and Health Outcomes	Life Course Determinants	Prevention
Physical environment	**Substance abuse**	Poverty
Poverty	Poverty	Tobacco use
High school graduation	*Physical activity*	**Childhood immunization**
Tobacco use	*Health care access*	**Cancer screening**
Weight	**Cognitive development**	**Hypertension screening**
Physical activity	**Violence**	**Diabetic eye exam**
Health insurance	Disability	*Health care access*
Cancer detection	Tobacco use	Disability
Preventable deaths	**Low birth weight**	*Preventable deaths*
Disability		

NOTE: Key: **Bold** = Unique to the set, *Italic* = Common to two sets, Underline = Common to three sets

Life Course Determinants Set

The conceptual framework for the Life Course Determinants Set draws from two models regarding the primary determinants of health. This set integrates the field model, described above, and the life course health development model. The life course health development model reflects a growing body of evidence that health outcomes and health status follow a developmental process in which current health status and outcomes are the product of cumulative inputs across the course of life. This framework suggests that at strategic points throughout the life course, health determinants are susceptible to greatest influence and, in turn, can significantly affect the subsequent life course. For example, lifelong patterns of tobacco use may be most dependent upon smoking behaviors established in adolescence. To be most successful in the prevention of death and disability from diseases associated with tobacco smoking, the public and the health care system should focus efforts most intensely on prevention of smoking initiation and smoking cessation programs targeted to youth. Similarly, the long-term functional level of an adult who has had a stroke may be primarily determined by the physical rehabilitation and psychosocial support received in the first few months following the stroke. The Life Course Determinants Set includes indicators representative of health in a broad social and biological context including substance abuse, poverty, physical activity, health care access, cognitive development, violence, disability, tobacco use and low birth weight.

Prevention-Oriented Set

The third proposed set of leading health indicators is based on the Prevention Model, which relies on four basic constructs: current health status, primary prevention, secondary prevention, and tertiary prevention. The Prevention-Oriented Set uses a simple and conventional structure that encompasses both individual and community-based health activities and the prevention and disease management activities of the health care delivery system. The prevention orientation itself emphasizes that the general population, in collaboration with public and private health professionals, should take action to promote health and

prevent disease in themselves and others. Approaches to the achievement of improvements in health behaviors and disease outcomes can be personal, familial or institutional.

The four categories into which the nine indicators in the Prevention-Oriented Set have been given names that are intended to be comprehensible to the lay public and diverse population groups. Thus, instead of listing the first category as health status, the category is, "How are we feeling?" The category of primary prevention is associated with the question "How do we keep ourselves well?" Secondary prevention is described as "If we are sick, how can we find disease early?" Tertiary prevention is described as "When we are sick, how do we get the best medical care?" Indicators in the proposed set were selected with a particular emphasis on issues pertinent to ease of interpretation by the public, availability of data for national, state, local, and community jurisdictions, and the relation of the indicators to health promotion and disease prevention surveys as well as to morbidity surveys. The specific indicators include: disability, and preventable deaths as measures of current health status; poverty, tobacco use and childhood immunizations as primary prevention strategies; cancer screening and hypertension screening as representative of secondary prevention, and diabetes management and health care access as measures of tertiary prevention.

LINKAGE OF INDICATOR SETS TO HEALTHY PEOPLE 2010

The three proposed leading health indicator sets reflect a shift in emphasis away from simple mortality measures toward a more complex array that includes health-related quality-of- life, protective health behaviors, risk behaviors, social, and environmental factors consistent with one of two overarching goals of *Healthy People 2010:* to increase the quality and years of healthy life. This shift in focus away from measures of mortality reinforces the role of the proposed indicator sets in responding to such an expanded vision of health. Each of the three proposed indicator sets also addresses many of the social, cultural, economic and health care system issues considered by many to be critical factors in efforts to eliminate health disparities, which is the second of the overarching goals established for *Healthy People 2010.* For example, measures of income, education, and access to health care for disease prevention, detection, and treatment are included in one or more of the sets. In addition, the proposed sets include measures relevant to each of the six areas identified by the U.S. Department of Health and Human Services Initiative to Eliminate Disparities in Health. These include cancer screening, diabetes, immunizations, infant mortality, and risk behaviors for cardiovascular and other diseases.

The suggested sets of indicators are also linked to the four enabling goals established for *Healthy People 2010.* These include promotion of health behaviors, promotion of healthy communities, prevention and reduction of diseases and disorders, and improvement of systems for personal and public health. For example, the poverty, health insurance, high school graduation and health care access indicators can be considered to be representative of a healthy community as well as improved systems for personal and public health. Similarly, immunization, tobacco, substance abuse, physical activity, and weight are associated with promotion of healthy behaviors, promotion of healthy communities, and prevention and reduction of disease and disorders.

CROSSCUTTING DATA ISSUES

The committee's selection of three sets of leading health indicators also relied on an analysis of crosscutting data issues. The committee believes it is essential that the DATA2000 Monitoring System be updated for *Healthy People 2010* to ensure that it continues to be the leading source of comprehensive data

for the ongoing monitoring of the proposed leading health indicators and reporting on the indicators on a timely and routine basis. Additional federal databases may also provide alternative sources of data to inform the three proposed sets of leading health indicators.

In the absence of existing data collection efforts, new data collection efforts that will provide data on the indicators as well as permit multilevel analysis and reporting of key results at the national, state, local, and community levels will be required. This has particular relevance to data collection and analysis efforts for specific population groups defined by age, gender, race and ethnicity, disability, socioeconomic levels, geographic locale, sexual orientation, and levels of educational attainment. It will be essential to identify the need for new data collection efforts that will provide information about the three sets of indicators for diverse population groups prior to implementation of the full *Healthy People 2010* plan and the selected set of leading health indicators. Further, analyses for the monitoring of changes in the indicators should include data for the total population as well as data for diverse population groups. Furthermore, to ensure that local or community-based initiatives are the most appropriate and effective to improve the status of the leading health indicators, data will be required for defined jurisdictional units as well as select population groups within those local jurisdictions. This reflects the committee's recognition of the importance of an individual's community in influencing the wide range of health-related behaviors, beliefs, practices, and outcomes considered in each of the three sets of leading health indicators. This is especially true as the focus of the recommended sets has been broadened to encompass a wider range of factors that influence health, such as social, educational, and environmental factors, preventive health behaviors, risk behaviors, to health care systems and other direct biological determinants of health outcomes.

This report also identifies steps the U.S. Department of Health and Human Services can take to ensure the highest quality of data collection and management. This is of particular importance in cases in which new or expanded data sets will be established to measure the indicators and analyze the progress that has been made toward achieving the specific targets for each leading health indicator. The committee encourages particular attention be given to data quality limitations of self-reported data, data validity and reliability, periodicity and timeliness of data availability, representativeness of data and small-area analyses.

DISSEMINATION STRATEGIES

Experience with leading health indicators during the first two decades of *Healthy People* suggests that traditional methods of communication and dissemination are unlikely to be successful in communicating to the general public and motivating public actions to improve the status of specific indicators. This report includes the committee's suggestions for effective strategies for the communication and dissemination of information about the leading health indicators, with an emphasis on the role of the U.S. Department of Health and Human Services as the lead agency to assume responsibility for integration of traditional methods of dissemination of information with new communications channels such as electronic communication. The committee also suggests that research on communications and dissemination strategies should be completed before the department finalizes the language for specific indicators for the selected set of leading health indicators. This research should focus on determination of the most compelling language that will communicate to the diverse groups of the population and encourage those subgroups to take action. Similarly, traditional and innovative communications products and methodologies should be evaluated before their inclusion in the full dissemination protocol for the leading health indicators that will be undertaken by the U.S. Department of Health and Human Services and its collaborating agencies. The department is also strongly encouraged by the committee to establish an ongoing system of process evaluation, including audits of communications products and the use of target group profiles of diverse

population groups. These should be developed prior to initiation of the leading health indicator component of *Healthy People 2010* and continued for the duration *Healthy People 2010*. This will provide the U.S. Department of Health and Human Services with information about the implementation of different communication strategies as well as assessments of their effectiveness in motivating actions among individuals and communities to improve the status of specific indicators. This will provide ongoing feedback about the successes and failures of specific dissemination strategies for diverse population groups and will support modification of these strategies, if necessary, during the full course of *Healthy People 2010*.

CONCLUSIONS AND RECOMMENDATIONS

Chapter 3 of this report recommends three sets of leading health indicators for consideration by the U.S. Department of Health and Human Services along with suggestions for effective dissemination of the selected indicator set to the general public, including diverse population groups, and the public and private health care communities. The chapter also includes information about potential action strategies for each of the proposed indicators, and a discussion of the general strengths and limitations of the three proposed indicator sets. The Committee recognizes the difficulty and complexity of the department's task of selecting a single set of leading health indicators for *Healthy People 2010*. In order to facilitate that process this committee makes a number of recommendations and suggested action steps to be taken by the U.S. Department of Health and Human Services.

Selection of Indicator Set

The committee recommends that the U.S. Department of Health and Human Services select a single set of leading health indicators from among the three proposed sets and commit to support fully the implementation of the selected indicator set for the duration of *Healthy People 2010*. The Committee recognizes that political and/or policy issues may motivate the U.S. Department of Health and Human Services to change indicators within the sets. The committee does not advocate for efforts by the U.S. Department of Health and Human Services to develop alternative sets of indicators comprised of different indicators selected from each of the three proposed sets. The three sets are based on unique conceptual frameworks and integration of indicators between sets would likely compromise the internal validity of each of the sets. If the U.S. Department of Health and Human Services must consider altering the indicators within a set, the committee strongly urges that it is done in such a manner that does not compromise the internal validity of the conceptual frameworks supporting each of the three sets.

Achieving the laudable goals of the leading health indicator effort to promote the nation's health will be difficult unless department efforts to promote, evaluate, and disseminate the selected set of indicators are maintained and strengthened. The Committee offers five suggestions for steps necessary to support the leading health indicator initiative.

Inter-Agency Collaborations

Leading health indicators will be strengthened by continued collaborations of the U.S. Department of Health and Human Services with other federal agencies (e.g., Environmental Protection Agency, U.S. Department of Labor, U.S. Department of Education, U.S. Department of Housing and Urban Development),

private sector agencies, businesses, labor and voluntary groups, state and local health agencies, and community-based groups and organizations with a shared goal of improving the health of their communities and thereby improving the health of the nation.

Dissemination Strategies

A comprehensive plan for communication and dissemination of information related to the leading health indicators should be responsive to the needs of diverse population groups and include both traditional and innovative communication and health behavior change strategies.

Health Disparities

Data must be available on a consistent, timely, and periodic basis to examine health disparities among the following population groups: 1) racial and ethnic minorities; 2) population groups defined by income; 3) population groups defined by age; 4) population groups defined by gender; 5) population groups with disabilities; 6) population groups defined by sexual orientation; 7) population groups defined by levels of educational attainment, and 8) population groups defined by geographic locale.

Poverty/Socioeconomic Status

Analysis of every indicator with socioeconomic status or income level as stratification variables will ensure that health disparities attributable to variations in socioeconomic status are identified, monitored, and corrected.

Data Collection and Analysis

Assuring the availability of appropriate data to monitor the selected leading health indicator sets will include the following actions:

1. Evaluation of data sets for the following characteristics: quality of data, limitations of self-reported data, periodicity and timeliness of data availability, representativeness of data, and ability to provide small-area analyses,
2. Technical assistance to communities to utilize small-area analysis data sets appropriately in the design, implementation, and evaluation of local interventions to improve the status of specific indicators, and
3. Determination of the appropriate intervals for data collection, methods of analysis, and frequency of reporting of results for each of the indicators.

The development of leading health indicators that provide a clearly understandable and recognizable face for the full *Healthy People 2010* agenda has enormous potential to exert positive influences on the public's

awareness and practice of health-promoting behaviors. This is especially true if the chosen set of indicators is meaningful to and can be acted upon by the lay public, with an emphasis on diverse population groups.

This report contains a number of recommendations and suggestions for the Department of Health and Human Services that address issues relevant to the composition of leading health indicator sets, data collection, data analysis, effective dissemination strategies, health disparities, and application of the indicators across multiple jurisdictional levels. These recommendations and suggestions also reflect the committee's belief that achievement of the overarching and enabling goals of *Healthy People 2010* is possible only when national, state, and local health agencies establish collaborative partnerships with members and organizations representative of a wide array of diverse population groups and communities. These partnerships can yield significant and sustained changes in the health behaviors and health outcomes of the public. In the presence of collaborative, community-based partnerships, leading health indicators for *Healthy People 2010* can be used as tools to mobilize the lay public and health professionals to become engaged in making progress toward the health goals for the nation and to do so in a manner that prompts public understanding of and policy actions related to the important determinants of that progress.

1

Background and Significance

HEALTHY PEOPLE: THE FIRST DECADE

Healthy People has evolved over the past 20 years to become the nation's health agenda. It encompasses health promotion and disease prevention efforts that are intended to achieve and sustain significant improvements in the health of all people in the United States. The conceptual underpinnings of *Healthy People* were first described in a 1979 report from the Surgeon General entitled *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention* (U.S. Public Health Service, 1979). That report outlined a set of 5 national health goals that would guide health promotion and disease prevention activities during the decade 1980 to 1990. The primary purpose of establishing these health goals was to advance a small set of measures that could be tracked on a routine basis to monitor the general status of the health of the public (U.S. Department of Health and Human Services, 1998a). These five goals were established for five distinct age cohorts and included the following:

1. an overall 35 percent reduction in the rate of infant mortality;
2. a 20 percent reduction in the numbers of deaths among children ages 1 to 14 years to fewer than 34 per 100,000;
3. a 20 percent reduction in the numbers of deaths among adolescents and young adults up to age 24 to fewer than 93 per 100,000;
4. a 25 percent reduction in the numbers of deaths among adults ages 25 to 65; and
5. a 20 percent reduction in the average number of days of illness among those over age 65 (U.S. Public Health Service, 1979).

The report described 15 strategies by which these five goals could be achieved by 1990. Each of the 15 strategies, in turn, were supported by objectives that could be grouped into one of following categories: (1) preventive services delivered by the health care system, (2) interventions undertaken by governmental and private sector agencies to prevent harm to the public, and (3) personal and community level activities to promote healthy lifestyles.

The U.S. Department of Health, Education and Welfare (now known as the U.S. Department of Health and Human Services) convened in June, 1979 a conference in which recognized experts addressed each of the 15 strategic areas for intervention. Fifteen panels of experts drafted sets of quantifiable objectives that were then published in the *Federal Register* in fall of 1979 to elicit broad-based review and commentary from the public and private health care system. Interim and final revisions to 226 objectives representing each of the 15 strategic areas were completed by the spring of 1980. A target outcome was identified for the

226 objectives and these were then published in a second document, *Promoting Health/Preventing Disease: Objectives for the Nation* (U.S. Department of Health and Human Services, 1980). The overriding premise for that report was the need for improvement of the health of all people in the U.S. during the decade of 1980 to 1990 through the implementation of intervention plans by governmental bodies and private sector agencies at the national, state, local, and community levels.

Evaluation of progress toward achieving the 226 objectives outlined in *Promoting Health/Preventing Disease: Objectives for the Nation* relied on periodic progress reviews and a midcourse review. Both reviews included discussions of the progress that had been made toward achievement of each of the objectives and the five overarching goals, analysis of shortfalls and problems associated with implementation of the interventions, and suggestions for modifications to the specific language of objectives or the methods of intervention. Five periodic progress reviews and the midcourse review were completed by 1996 (National Center for Health Statistics, 1992, 1994, 1995, 1996, 1997). A final report summarized the progress that had been made in achieving the five overarching goals as well as each of the 226 objectives (Journal of the American Medical Association, 1992). That final review revealed that among the five overarching goals, positive changes had been achieved for infants, children, and adults whereas the goals for adolescents and the elderly had not been met. Of equal importance, this final report set the stage for development and modification of goals and objectives for the next decade of the *Healthy People* including the years from 1990 to 2000.

HEALTHY PEOPLE 2000

The development of priority areas and objectives for the decade from 1990 to 2000 was enhanced by lessons learned during the first decade of *Healthy People*. Several significant changes were incorporated into the *Healthy People 2000* plan as a result of those lessons (U.S. Department of Health and Human Services, 1991). Specifically, the five age-based mortality and morbidity reduction goals were replaced by the following three goals:

1. increase the span of healthy life for Americans,
2. reduce health disparities among Americans, and
3. provide access to preventive health services for all Americans.

In addition, the original 15 strategic areas were expanded, renamed, and reorganized to include 22 priority areas. The entire national public health community was invited to contribute to the process of determining the priority areas, objectives, and targets for *Healthy People 2000*. The total number of objectives increased to 319. Of greater significance was the inclusion of subobjectives to ensure that efforts to reach special population groups in the United States were emphasized, with a particular focus on reduction in disparities of health status and disease outcomes. Special targets were set for population groups at heightened risk of morbidity and mortality from disease including people in certain racial and ethnic minority groups and disabled people.

Another innovation that emerged during planning efforts for *Healthy People 2000* was the identification of a smaller set of 47 "sentinel" indicators selected from among the full set of 319 objectives. These sentinel indicators were thought to provide a succinct measure of the health of the general population and special populations. These 47 indicators were similar in purpose to the five overarching goals established for the first decade of *Healthy People*. These sentinel indicators were conceptually linked to the goals, priority areas, objectives and subobjectives of *Healthy People 2000*. The intent was for sentinel indicators to monitor

the status of the health of the general population on a regular basis and inform those federal, state, local, and community agencies involved in *Healthy People 2000*. Of equal significance, however, was the idea that the sentinel indicators could be presented to the general public and non-health care professionals to increase their awareness of, and involvement in, *Healthy People 2000* activities (Journal of the American Medical Association, 1995, U.S. Department of Health and Human Services, 1998a).

It was also notable that *Healthy People 2000* included a special objective, Objective 22.1, that addressed issues related to health and disease surveillance and data systems (U.S. Department of Health and Human Services, 1991). The Centers for Disease Control and Prevention convened the *Committee for Objective 22.1* to accomplish several tasks. First, the committee developed a set of 18 health status indicators that would allow comparisons of data used by public health officials at the federal, state, and local levels of government. An electronic inventory of data sets that could be used to monitor *Healthy People 2000* at the national level was also established. This inventory described the various data sets used to establish baseline rates for each of the objectives in the 22 priority areas in *Healthy People 2000*. It also suggested alternative data sets that had the potential to be effective monitors of progress toward achievement of all of the *Healthy People 2000* objectives. Particular attention was given to the identification of data sets that were representative of special population groups. Finally, the committee recommended priority data needs and modifications to existing data collection systems to ensure the availability of measures of outcomes, risk factors, and processes that could be used in the planning of prevention programs that would support the *Healthy People 2000* objectives.

Evaluation strategies for *Healthy People 2000* were similar to those described for the first decade of *Healthy People*. Periodic briefing summaries were provided to the assistant secretary for health and human services and were then published in *Public Health Service Progress Review Reports on Healthy People 2000* (National Center for Health Statistics, 1992, 1994, 1997). In addition, a midcourse review was conducted as a 2-year effort initiated in 1993. That midcourse review resulted in publication of the *Healthy People 2000 Midcourse Review and 1995 Revisions* (National Center for Health Statistics, 1995).

A summary analysis of *Healthy People 2000* results indicated that 13 percent of the 319 objectives had reached or superseded the target quantifiable measures and an additional 43 percent of the objectives had achieved positive progress toward these measures. The values for only 2 percent of the objectives remained unchanged from the 1990 baseline values. The proportion of objectives for which only baseline data were available was reduced to 14 percent. Only three percent of the total of objectives lacked baseline rates, which was a significant improvement over the 20 percent reported in the midcourse review (National Center for Health Statistics, 1995, 1996, 1997).

Progress toward achievement of the targets for the 47 sentinel objectives was disappointing. The set did not generate focused interest and attention in the general population or the national public and private health care communities, for that matter. Nor did the establishment of 47 sentinel objectives prompt intensified intervention efforts by agencies to achieve the projected targets. This lack of success was suggested to be due to the fact that 47 measures were too many, that they may not have been of significant interest, especially at the levels of state and local governments, and that they may have lacked political appeal (U.S. Department of Health and Human Services, 1998a).

HEALTHY PEOPLE 2010

Attention was directed toward the third generation of *Healthy People* even before the final review of accomplishments of *Healthy People 2000* were disseminated (National Center for Health Statistics, 1997). Experiences from the previous two decades played a major role in establishing a methodology and time frame for the development of the *Healthy People 2010* plan. The selection of 26 priority or focus areas and

their related objectives and subobjectives, drew heavily upon results from the periodic summaries of *Healthy People 2000* (National Center for Health Statistics, 1992, 1994), the midcourse review of *Healthy People 2000* (National Center for Health Statistics, 1996), and the final *Healthy People 2000* report (National Center for Health Statistics, 1997). It was also recognized that implementation of *Healthy People 2010* would best be considered a dynamic process in which changes to the plan would occur over time on the basis of the occurrence of one or more of the following events indicated in Table 1.1.

Recognition of the anticipated complexity of the *Healthy People 2010* development process prompted the establishment of the Secretary's Council on National Disease Prevention and Health Promotion Objectives for 2010 in September 1996. In addition, the *Healthy People* Consortium began to plan for *Healthy People 2010*. This consortium includes an alliance of diverse organizations committed to the nation's prevention agenda including state and territorial, public health, mental health, substance abuse, and environmental agencies and national organizations representative of the professional, voluntary, and business sectors. A meeting of the *Healthy People* Consortium was convened on November 15, 1996, which resulted in publication of *Building the Prevention Agenda for 2010: Lessons Learned* (U.S. Department of Health and Human Services, 1996). Activities heightened in 1997, with the secretary of health and human services' first briefing on objectives for *Healthy People 2010* followed by a meeting of the Secretary's Council on National Disease Prevention and Health Promotion Objectives for 2010. This meeting provided an opportunity to discuss in greater detail the objectives to be established for 2010. The U.S. Department of Health and Human Services published a focus group report on the utility of *Healthy People 2000* in July 1997 (U.S. Department of Health and Human Services, 1997).

Shortly thereafter, in September 1997, a notice calling for comments on the framework, goals, enabling goals, focus areas, and objectives of the first draft of *Healthy People 2010* appeared in the *Federal Register*. This resulted in more than 700 comments from private consumers of health care services, *Healthy People* Consortium members, members of the U.S. Congress, agencies of state and local governments, health care agencies, and health professional groups, individual health care professionals, and other diverse groups and organizations. The *Healthy People* Consortium reconvened in November 1997 with the specific intent of discussing health disparities and reviewing the degree of progress in reducing these disparities that the nation had made.

Work groups were established for each of the 26 focus areas to discuss objectives, data issues, and disparities in health among diverse population groups. This work continued through 1997 and 1998 and focused primarily on identification of the *Healthy People 2000* objectives to be continued into *Healthy People 2010,* and identification of new objectives to be developed. The first draft of objectives for *Healthy People 2010* were available for internal review by March 1998. This was presented to the Secretary's Council on National Disease Prevention and Health Promotion Objectives for 2010 in April 1998 and the Notice of Call for Public Comment on 2010 draft was appeared in the *Federal Register* in October 1998. The public comment period extended through December 1998 and occurred simultaneously with five regional workshops convened by the U.S. Department of Health and Human Services to elicit comments on the *Healthy People 2010* draft from the health care community, members of special population groups, and interested consumers. A meeting of the *Healthy People 2010* Consortium was held in November 1998 to discuss the implications of results from the public comment period and regional meetings.

A third meeting of the Secretary's Council on National Disease Prevention and Health Promotion Objectives for 2010 will convene in April 1999 and will be followed by a *Healthy People* Consortium meeting in June 1999. Efforts to finalize the *Healthy People 2010* plan, including the overarching goals, enabling goals, focus areas, and objectives, will continue through the remainder of 1999 with the anticipated release of *Healthy People 2010* scheduled for January 2000. At present, *Healthy People 2010* includes two overarching goals (increase quality and years of healthy life and eliminate health disparities), four enabling

goals (promote healthy behaviors, promote healthy and safe communities, improve systems for personal and public health, and prevent and reduce diseases and disorders), 26 focus areas, objectives, and "developmental objectives" that are associated with each focus area but for which current surveillance systems and databases do not yet provide the requisite quantitative measures. The inclusion of developmental objectives in *Healthy People 2010* is intended to identify new focus areas that are important and to encourage the development of national data systems through which they can be monitored. It is anticipated that 30 percent of the objectives for *Healthy People 2010* will be developmental.

Table 1.1 Factors Stimulating Changes to the Healthy People 2010 Plan

1. Analysis and dissemination of significant findings in the data
2. Improvements in data collection methods and systems
3. Enhancements to the science base, especially in the areas of health promotion and disease prevention
4. Growing awareness of health promotion and disease prevention among traditional health care agencies and health professionals
5. Activities of the general population at the community level
6. Ongoing efforts to monitor the quality of health care services
7. Greater specificity and sensitivity of epidemiological knowledge about disease risk factors and methods of effective intervention
8. The changing demographic profile of the U.S. population that will evolve over the decade
9. Changes in availability and access to health care services

During the past two decades *Healthy People* has become entrenched within the national, state, and local public health communities as the driving force behind the nation's health promotion and disease prevention agenda. It has fostered efforts to effect changes in health status, identify emerging health challenges, and facilitate the development, implementation, and evaluation of interventions to respond in a timely manner to key and emerging health issues. The full set of *Healthy People* objectives has been particularly useful to federal, state, and local public health agencies as they do long-range planning and prioritize programs that are appropriate for their target populations. Multilevel comparisons of commonly available data foster understanding of those populations at greatest risk and can suggest priorities for resource allocation. Such multilevel comparisons can also provide cross-sectional and longitudinal analyses of the health of the nation, highlighting these populations at higher risk of disease and poor health outcomes. Analysis at the level of detail of specific population groups is imperative if the nation is going to achieve the desired changes in specific objectives within each of the 26 focus areas for all people in the United States. The 26 focus areas, objectives and developmental objectives, without question, will continue to guide efforts to plan, implement, and evaluate health promotion and disease prevention interventions for the entire population of the United States.

LEADING HEALTH INDICATORS

The breadth of *Healthy People 2010,* however, has the potential to overwhelm and perhaps, discourage individuals, voluntary organizations, community organizations, and businesses from participation. Similar to the five key measures in the first decade of *Healthy People* and the 47 sentinel indicators established for *Healthy People 2000*, *Healthy People 2010* will benefit from a small set of leading health indicators that will be of interest, importance and relevance to the general public, non-health organizations, and traditional

public and private health care communities. Leading health indicators have the potential to significantly increase the impact of *Healthy People 2010* by establishing a small number of key health topics that can (1) be brought to the attention of the nation, (2) motivate actions to promote positive changes in these topics, and (3) provide ongoing feedback about progress toward achieving the desired changes in these topics. Such a set of leading health indicators can focus national attention on a limited number of measures that have relevance to, and can be acted upon by, the general public, public and private policymakers, and health and science professionals. Furthermore, a set of leading health indicators can create a national identity for *Healthy People 2010* and can expand the traditional *Healthy People* community to include a wide variety of agencies, organizations, diverse population groups, community organizations, and individuals from outside as well as within the health care community. To achieve their full potential for success, communications strategies for leading health indicators must be appropriate and effective for the general population and diverse population groups, especially those that may not be reached by traditional health care communications campaigns such as elderly people, members of racial and ethnic minority groups, members of socioeconomically disadvantaged groups and disabled people.

In preparation for the development of a set of leading health indicators, the U.S. Department of Health and Human Services convened a work group in 1997 whose members included 22 individuals from its Office of Public Health and Science, U.S. Public Health Service agencies and other agencies of the U.S. Department of Health and Human Service agencies. This work group was charged with preparing a background paper that would include information on the history of the *Healthy People* initiative, provide the rationale for identifying and using leading health indicators, and describe the potential uses and applications of such indicators (U.S. Department of Health and Human Services, 1998a). In addition, this document provided an overview of existing sets of leading health indicator sets, discussed the theoretical underpinnings for these sets, suggested nine criteria to guide selection of potential indicators, and reviewed issues concerning data availability and analysis. The U.S. Department of Health and Human Services then asked the Institute of Medicine to convene a committee to consider the issue of leading health indicators and to propose a minimum of two sets of indicators from which the department could choose the leading health indicator set for *Healthy People 2010*.

2

Approach to Development of Leading Health Indicator Sets

To undertake the study requested by the U.S. Department of Health and Human Services, the Institute of Medicine appointed a ten-member committee in May 1998. Members were selected for their expertise and experience in multiple disciplines, including public health and health policy, health communications, epidemiology, health care access, health behavior change, and clinical care. The committee met five times between May 1998 and March 1999. The first meeting of the committee included a workshop involving participants from many of the state and local government agencies who had been involved with *Healthy People* since its inception in 1979. In conjunction with its fourth meeting in January 1999, the committee convened a public hearing to elicit comments and recommendations from the public and private health care communities concerning leading health indicators for *Healthy People 2010*. In addition, the committee prepared two interim reports which were published in August 1998 and December 1998, respectively and which provided updates on the committee's progress.

As a result of its work, the committee developed three candidate sets of leading health indicators for consideration by the U.S. Department of Health and Human Services. This process had three major phases:

1. Development of criteria for suitable indicators,
2. Development of potential conceptual organizing frameworks and indicator categories, and
3. Selection of final candidate indicator sets.

The committee completed a number of activities to support the process of reaching consensus on the recommendations for three candidate sets of leading health indicators. Briefly, these activities included:

1. clarification and acceptance of the charge to the committee,
2. review of relevant literature, especially alternative efforts focused on health report cards and indicators considered to be representative of the health and well-being of communities,
3. development of a set(s) of essential criteria against which selection of potential leading health indicators could be assessed,
4. participation in regional meetings convened by the U.S. Department of Health and Human Services to elicit commentary on the selection of leading health indicators for *Healthy People 2010*,
5. consideration of public comments submitted to the Institute of Medicine and the Department of Health and Human Services concerning leading health indicators,
6. evaluation of 11 conceptual frameworks to guide the development of leading health indicator sets,
7. preparation of two interim reports describing the committee's process and efforts,

8. conduct of a public hearing during July 1998 and January 1999, respectively, to elicit further comments on leading health indicator sets, and
9. final selection of conceptual frameworks and candidate indicator sets.

A brief description of each of these activities is provided in the following narrative.

CHARGE TO COMMITTEE

The committee received its charge from the U.S. Department of Health and Human Services and had several opportunities for periodic review and clarification. The initial charge emphasized that candidate leading health indicator sets should (1) elicit interest and awareness among the general population and diverse population groups, (2) motivate these diverse population groups to undertake activities to improve the status of specific indicators and thereby improving the overall health of the nation, (3) provide ongoing feedback to these populations and the members of the public and private health care communities concerning progress toward achieving sustained improvements in the indicators. In subsequent discussions with staff from the U.S. Department of Health and Human Services, the committee came to understand that the charge also included the development of suggestions for communications and dissemination strategies to promote awareness of the leading health indicators and galvanize actions to improve the status of those indicators. It was also established that clear linkages should be demonstrated between the proposed indicator sets and the full draft of *Healthy People 2010,* including the two overarching goals, four enabling goals and 26 focus areas. Finally, additional clarification about the committee charge included the recommendation that the candidate indicator sets should contain no more than 10 indicators and that any proposed indicator set should be supported by a conceptual framework around which the specific indicators could be organized.

REVIEW OF RELEVANT LITERATURE

The committee reviewed and discussed a wide array of previous work related to the concept of leading health indicators and suggested candidate indicators for inclusion in a set of such indicators. Prominent among these was work from the two previous decades of *Healthy People* and the March 1998 report from the Working Group on Sentinel Health Objectives (U.S. Public Health Service, 1979; U.S. Department of Health and Human Services, 1980, 1986, 1998a; National Center for Health Statistics, 1992, 1994, 1995, 1996, 1997) Included in the Working Group report were five organizing frameworks for leading health indicators, suggestions of specific indicators, and a proposal for nine criteria to be used to guide the committee's final selection of indicators. In addition, the committee gave careful consideration to the *Healthy Communities* 2000 project in which communities across the nation developed indicators to monitor the health of their populations and provided feedback concerning progress toward achieving indicator objectives (American Public Health Association, 1991). Another source used by the committee was the work of the Coalition for Healthier Cities, and Communities, and particularly the publication of *Community Indicators: An Inventory* (1997). The committee also familiarized itself with the literature on community health report cards.

DEVELOPMENT OF CRITERIA TO GUIDE SELECTION OF SPECIFIC LEADING HEALTH INDICATORS

The development of criteria that could be used to guide the committee in its selection of leading health indicators was a critical aspect of the process of determining which indicators should be considered for inclusion in the candidate pool of leading health indicators. These criteria would provide a means of "filtering" the many candidate indicators considered by the committee by providing a threshold standard that each indicator must meet as a prerequisite for inclusion in the final set of potential leading health indicators. Such criteria would need to be clearly stated and understandable to the public and the public and private health care communities as well as feasible to implement. The committee's selection of criteria followed an iterative process in which multiple sources of information and recommendations were considered.

The committee first considered the criteria outlined by the Health and Human Services Working Group on Sentinel Health Objectives (U.S. Department of Health and Human Services, 1998a). The efforts of this Working Group resulted in identification of nine criteria. Indicators that failed to meet one or more of these nonweighted criteria would be excluded from a final set of indicators. The nine criteria are displayed in Table 2.1.

After extensive deliberation among the committee, the nine criteria suggested by the Working Group were accepted and five new criteria were added. The five new criteria for inclusion of an indicator were (1) a feasible dissemination plan to ensure that messages would be appropriate and understandable by diverse populations; delivery of these messages would be of sufficient frequency to provoke changes in knowledge and behaviors; and use of messages would rely on multicultural and multidisciplinary strategies for communication, (2) a focus on either primary, secondary, and tertiary prevention issues or environmental and sociocultural determinants of health, (3) a focus on the *Healthy People 2010* visions of eliminating health disparities and improving the number and quality of years of healthy life, (4) an ability to promote positive changes in behaviors by encouraging and supporting the general public and diverse population groups to develop interventions that will result in significant and sustained changes in the status of that indicators and (5) a level of credibility with and support from individuals, groups, organizations, health professionals, and others involved in the delivery of health care education and services to the general population and select population groups.

The revised list of 14 criteria were published in the second Institute of Medicine interim report released by the committee in December 1998 and public comment on these criteria was solicited through electronic and standard mail communications, participation in five regional meetings convened by the U.S. Department of Health and Human Services, and the January 1999 public hearing convened by the Institute of Medicine. The committee completed a thorough review of all public comments and then engaged in further deliberations to finalize the set of criteria. Based on feedback from these various sources and the reasonable judgments of the committee members, there was consensus that nine criteria, much less fourteen, were too cumbersome and would result in undue restrictions on the final selection of indicators for proposed indicator sets. Members then collaborated to refine the set of criteria that would become prerequisites for inclusion of leading health indicators in a candidate set. The committee reduced the number of criteria to six, which were then stated in easy to understand terms for public and professional use. An indicator was required to fulfill all six criteria before the committee would accept it as a potential indicator for inclusion in a set. The six criteria were of equal importance and weight and are presented in Table 2.2.

Table 2.1 Original Set of Criteria for Leading Health Indicators

1. the general public, opinion leaders, and the health and medical communities can easily interpret and understand the indicators
2. they reflect topics that affect the health profile of the nation's populations in important ways
3. they address problems that are sensitive to change and have a substantial impact on prospects for the health of the nation's population
4. they can be linked to one or more of the full set of *Healthy People 2010* objectives;
5. they are generally reliable measures of the state of the nation's health (or that of a select population groups) to ensure that the problem is reflective of a broad scope perspective for a significant proportion of the population;
6. data on the indicators are available from established sources on a regular (at least biennial) basis;
7. they have multilevel trackability to ensure that data can be anticipated at multiple levels (national, state, local, and community) and for diverse select populations;
8. they are reflective of a balance in the selection of targets that does not overemphasize any one group or health condition; and
9. they have utility in directing public policy and operational initiatives.

Table 2.2: Final Criteria Guiding Selection of Leading Health Indicators

1. *Worth measuring*—the indicators represent an important and salient aspect of the public's health
2. *Can be measured for diverse populations* - the indicators are valid and reliable for the general population and diverse population groups
3. *Understood by people who need to act* - people who need to act on their own behalf or that of others should be able to readily comprehend the indicators and what can be done to improve the status of those indicators;
4. *Information will galvanize action* - the indicators are of such a nature that action can be taken at the national, state, local and community levels by individuals as well as organized groups and public and private agencies;
5. *Actions that can lead to improvement are known and feasible* - there are proven actions (e.g., personal behaviors, implementation of new policies, etc.) that can alter the course of the indicators when widely applied; and
6. *Measurement over time will reflect results of action* - if action is taken, tangible results will be seen indicating improvements in various aspects of the nation's health.

REGIONAL MEETINGS

Institute of Medicine staff and some committee members had the opportunity to attend one or more of five regional meetings convened by the U.S. Department of Health and Human Services during the fall of 1998. These meetings provided opportunities for the Department to receive comments from the public and private health care communities on the proposed content of the full *Healthy People 2010* plan as well as the concept of leading health indicators. Many of the comments generated by these meetings focused on clarification of the 26 focus areas, suggestions to add or delete specific objectives within a focus area and suggestions for changes in wording of the objectives and developmental objectives associated with the 26 focus areas. These discussions were also enhanced by comments concerning methods for setting targets for the objectives and ensuring representation of diverse population groups. The comments were of general relevance to the efforts of the Institute of Medicine committee to develop candidate sets of leading health indicators. In addition, a number of comments were directed specifically to the leading health indicator component of *Healthy People 2010*. These included the comments summarized in Table 2.3. As the

committee continued its work, these suggestions provided guidance for its consideration of conceptual frameworks underlying indicator sets and specific indicators to be included within a set.

Table 2.3 Recommendations Concerning Leading Health Indicators

1. Keep the indicators within a set few in number
2. Elicit public awareness and galvanize action among diverse populations
3. Establish link between leading health indicators and objectives in overall *Healthy People 2010* plan
4. Involve major stakeholders from the government and the private sectors
5. Consider broader models of health determinants
6. Emphasize elimination of health disparities
7. Emphasize cultural competency of health care providers
8. Suggested indicators might include: socioeconomic status, breastfeeding, access to health care, injury, violence, disability, risk reduction behaviors, diabetes, end stage renal disease, mental health, obesity, substance abuse, arthritis, osteoporosis, asthma, cardiovascular disease, hypertension, infant mortality, low birth weight, health insurance
9. Ensure trackability at state and local levels
10. Monitor patterns of health care utilization
11. Address quality of health care services
12. Include work place interventions
13. Provide instructions for application
14. Provide incentives for partnerships with business, communities, groups, and individuals
15. Increase the number of minority health care providers

SELECTION OF CONCEPTUAL FRAMEWORKS FOR INDICATOR SETS

The committee began the process of determining candidate leading health indicator sets by reviewing those suggested in the report of the Working Group on Sentinel Health Objectives (U.S. Department of Health and Human Services, 1998a). These included: (1) health status model with 29 indicators; (2) health disparities model with 32 indicators; (3) summary measures/leading contributors approach with 20 indicators; (4) monthly report approach with 12 indicators; and (5) quarterly/semi-annual report approach with 19 indicators. The committee also considered six additional conceptual frameworks including (1) health behavior and access to services model with three primary indicator categories, (2) physical health, mental health, disability, social factors, and ecological factors approach with eight indicators, (3) ecological factors approach with nine indicators, (4) primary, secondary, and tertiary prevention model with four primary indicator categories, (5) personal behavior, occupational issues, indicators of disease, services, and environment approach with five indicator categories, and (6) enabling goals for *Healthy People 2010* model with four main indicator categories. Multiple measures were suggested for each of the indicator categories defined by these eleven conceptual frameworks. The committee suggested indicators and measures for each of these frameworks and invited the private and public health care communities to comment on the frameworks and the suggested indicators and measures following their publication in a second interim report from the Institute of Medicine (Institute of Medicine, 1998).

Following publication of the second interim report, the committee identified two additional conceptual frameworks to support the development of indicator sets. These were the Health Determinants and Health Outcomes model and the Life Course Determinants model. The total number of conceptual frameworks

considered by the committee thus grew to 13 and ranged from as few as four primary categories per indicator set to as many as 32 specific indicators within a set.

INTERIM REPORTS

The committee prepared two interim reports which were published in August 1998 and December 1998, respectively. The two provided a historical overview of *Healthy People*; a discussion of potential criteria that could be used to guide in the selection of indicators; descriptions of possible conceptual frameworks for indicator sets; a discussion of issues related to data collection, analysis and reporting; and consideration of issues relevant to dissemination strategies for the leading health indicator sets. The availability of both reports was announced by the Institute of Medicine and the U.S. Department of Health and Human Services and printed copies of the reports were available from the U.S. Department of Health and Human Services. In addition, both the U.S. Department of Health and Human Services, and the Institute of Medicine published the two reports on their websites, which also encouraged those accessing the reports through the web to submit electronic or paper comments on the reports. These comments were summarized and made available to committee members for their use in all committee deliberations and decision-making.

PUBLIC HEARING

The committee and project staff held a public hearing on January 27, 1999 in Washington, DC to discuss the activities of the committee and the two interim reports. Approximately 35 individuals representative of a number of federal agencies and other national organizations attended the hearing. A number of individuals offered comments at the meeting, and there was also the opportunity for a dialogue between committee members and hearing participants. Many of the comments reflected those expressed at the regional meetings convened by the U.S. Department of Health and Human Services and at an earlier workshop convened by the Institute of Medicine in September, 1998. In addition, participants in an earlier workshop sponsored by the National Center for Health Statistics reported to the committee during the public hearing. That group recommended that infant mortality, health insurance, immunization, smoking, and preventable deaths be key leading health indicators. They also suggested that cancer screening behaviors, environmental issues, teen pregnancy, cardiovascular disease and physical activity be considered for inclusion in a leading health indicator set. Project staff summarized information from the public hearing for use in further committee deliberations to select the final set of criteria guiding the process of selecting specific indicators, conceptual frameworks, and candidate indicator sets and measures to be recommended to the U.S. Department of Health and Human Services.

SELECTION OF CANDIDATE INDICATOR SETS

The committee proposed three sets of leading health indicators for consideration by the U.S. Department of Health and Human Services. These include: (1) Health Determinants and Health Outcomes Set, (2) Life Course Determinants Set, (3) Prevention-Oriented Set. The committee selected conceptual frameworks for each of the three proposed sets and identified issues relevant to the design, implementation, and evaluation

of the three sets. Table 2.4 provides a comparative overview of the 3 proposed sets and their specific indicators.

Table 2.4 Proposed Leading Health Indicator Sets

Health Determinants and Health Outcomes	Life Course Determinants	Prevention
Physical environment	**Substance abuse**	Poverty
Poverty	Poverty	Tobacco use
High school graduation	*Physical activity*	**Childhood immunization**
Tobacco use	*Health care access*	**Cancer screening**
Weight	**Cognitive development**	**Hypertension screening**
Physical activity	**Violence**	**Diabetic eye exam**
Health insurance	Disability	*Health care access*
Cancer detection	Tobacco use	Disability
Preventable deaths	**Low birth weight**	*Preventable deaths*
Disability		

NOTE: Key: **Bold** = Unique to the set, *Italic* = Common to two sets, Underline = Common to three sets

3

Proposed Leading Health Indicator Sets

The public health community has drawn on its collective wisdom and experience to develop a set of objectives and benchmarks intended to improve the overall health of this nation. These are under preparation for publication in the full *Healthy People 2010* plan. Identification of a set of leading health indicators has the potential to significantly enhance the impact of *Healthy People 2010*. Leading health indicators can provide a face for *Healthy People 2010* that will be recognizable to the lay public, especially diverse population groups, and the private and public health care communities in partnership with other interested stakeholders. In addition, a small set of leading health indicators lends itself to identification of a discrete set of actions that will lead to improvement in the status of each indicator and that can be acted upon by the diverse audiences of *Healthy People 2010*.

An effective set of leading health indicators will fulfill a number of functions. First, such indicators will be exemplary measures of key health behaviors and related outcomes that are known and understandable by the general population including socially and demographically diverse population groups. Second, these indicators will be the object of routine data collection and analysis efforts at the national, state, local, and community levels, with the potential for the availability of comparable data across these levels for diverse population groups from 2000 to 2010. Third, a set of leading health indicators can motivate positive changes in knowledge, health behaviors, and health determinants at the level of the individual and will also guide the development of policy and action plans within communities to ensure the maintenance of efforts at making changes in these areas. Fourth, a set of leading health indicators will address primary, secondary, and tertiary prevention issues as well as environmental and social determinants of health. Finally, the *Healthy People 2010* vision of eliminating health disparities and increasing quality and years of healthy life will be integrated into the selection of leading health indicators.

The Institute of Medicine committee followed an iterative process to guide the selection of conceptual frameworks and specific indicators for potential indicator sets. These efforts involved consideration of a total of 13 conceptual frameworks and more than 50 broad categories from which indicators could be chosen. These categories encompassed social, environmental, institutional, and individual factors associated with health status, health determinants, and health outcomes. The committee then adhered to a consensus-based approach in the final selection of conceptual frameworks and specific indicators. This resulted in development of three sets of leading health indicators, each with a unique conceptual framework and each consisting of no more than ten indicators. Given that there is some overlap between sets in the selection of specific indicators, a total of 19 unique indicators were chosen by the committee.

Committee choices about specific indicators and conceptual frameworks were significantly influenced by the scientific literature in the areas of epidemiology, clinical medicine, health policy, and theories of health behavior change. In addition, the diverse expertise and experience of the committee members strongly

influenced the final selection of conceptual frameworks and indicators. However, the appointed committee is confident about the strengths of the three conceptual frameworks underlying each of the proposed sets of leading health indicators and similarly, the ability of each of the specific indicators to meet the six requisite criteria for inclusion in a set. Affirmative responses to each of the six criteria were required before a specific indicator could be included in one or more of the three proposed indicator sets. The committee is also confident that the proposed indicator sets are responsive to every aspect of the committee's charge as defined during the course of the project by the U.S. Department of Health and Human Services

The committee does acknowledge that political and/or policy issues may motivate the department to change indicators within proposed sets or even to make changes to the conceptual frameworks underlying the sets. The committee does not advocate efforts by the department to develop alternative sets of indicators based on revisions to the three proposed conceptual frameworks or development of alternative sets comprised of different indicators selected from each of the proposed sets. The three proposed sets are based on sound conceptual frameworks unique to each set and integration of indicators between sets would likely compromise the internal validity of the proposed sets. If the Department must consider alterations to indicators within a set, the committee urges that it does so in such a manner that will not compromise the integrity of the conceptual frameworks for each of the sets.

The remainder of this chapter focuses on the three sets of leading health indicators that the Institute of Medicine committee has recommended for the consideration of the U.S. Department of Health and Human Services. These three sets are the Health Determinants and Health Outcomes Set, the Life Course Determinants Set, and the Prevention-Oriented Set. The presentation of each of the 3 sets includes a description of the conceptual framework underlying the set and a brief description of the proposed indicators and measures as operationalized by the committee. This is followed by a discussion of suggested actions to change the status of indicators, a discussion of strengths and limitations of the three proposed sets, and a discussion of general strategies for dissemination of the selected indicator set to the lay public and the more traditional audiences for *Healthy People* including public and private health care agencies and professionals; national, state, and local government agencies and staff; businesses; community-based organizations and groups; and other major stakeholders.

HEALTH DETERMINANTS AND HEALTH OUTCOMES INDICATOR SET

Conceptual Framework

The Health Determinants and Health Outcomes Indicator Set has its conceptual basis in the field model of determinants of health at the individual and population levels (Evans and Stoddart, 1994; Institute of Medicine, 1997). This model asserts that disease status and the health and well-being of individuals and populations are a product of individual or population risk factors and the role of medical care. Alternatively, the field model suggests that current health status and disease outcomes associated with disease states in individuals or populations are determined by multiple factors that are both internal and external to the individual or population. These factors include the: (1) physical environment, (2) social environment, (3) genetic endowments, (4) prosperity, (5) individual behaviors, (6) individual biology, (7) health and function, (8) disease, (9) health care systems, and (10) overall well-being.

The schema for the field model also defines directions of influence and interaction among these various factors. The schema acknowledges the complexity of interrelationships and interactions among multiple factors that are determinants of health but not necessarily limited to traditional predictors or determinants of health. Furthermore, the field model seeks to move health policy beyond being simply health care policy

to include health, social, political, and environmental policies as well as characteristics and behaviors inherent in individuals and populations. The relationships among these many determinants of health status and disease outcomes suggest strategic intervention points that an individual or a community can take to effect change in health status or disease outcomes. The field model is represented graphically in Figure 3.1.

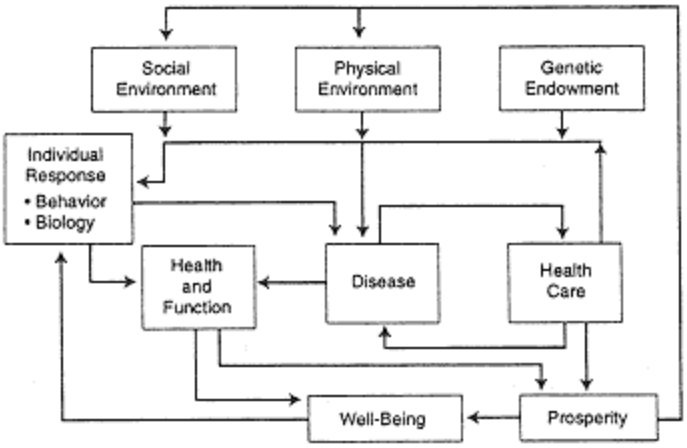

FIGURE 3.1
A model of the determinants of health. Source: Reprinted from R.G. Evans and G.L. Stoddart, 1990, Predicting Health, Consuming Health Care, Social Science Medicine 31:1347–1363, with permission from Elsevier Science Ltd., Kidlington, United Kingdom.

In the proposed Health Determinants and Health Outcomes Indicator Set, all the major categories of determinants with the exception of genetic endowments are considered. In proposing the field model as the underlying conceptual framework for the Health Determinants and Health Outcomes Set of leading health indicators, particular emphasis is placed on the term *leading*. According to the field model, determinants can also be predictors: How well the nation is doing on specific indicators informs not only about where the nations stands today, but where the nation and its diverse population groups are headed. The specific indicators chosen for the Health Determinants and Health Outcomes Set represent some of the most powerful determinants of health on which the nation is capable of taking meaningful action at multiple levels, including the nation as a whole, states, local jurisdictions, and individuals and families living and working in neighborhoods and communities.

In addition, the Health Determinants and Health Outcomes Set includes two measures of broad population health outcomes, reflecting the field model premise that it is important to know about and make improvements in the current status of the health of the nation and its diverse population groups. With respect to outcomes, the committee chose one indicator that focuses on preventable mortality attributed to intentional and unintentional injuries while the second encompasses a broad definition of morbidity associated with disability that includes physical, mental, or developmental illnesses or injuries that might interfere with the performance of important social roles. The proposed indicator set therefore recognizes that just as society has an effect on health, so too the health of its populations will effect the functioning and productivity of society. Table 3.1 describes the specific indicators included in the Health Determinants and Health Outcomes Indicator Set.

Table 3.1 Health Determinants and Health Outcomes Set of Leading Health Indicators

Indicator	Measure
1. Physical environment	Percentage of population living in areas where air quality meets or exceeds all National Ambient Air Quality Standards *and* whose community water systems receive a supply of drinking water that meets the Safe Drinking Water Act Regulations
2. Poverty	Percentage of population with in household incomes less than 100 of the federal poverty limit
3. High school graduation	Percentage of population ages 18 to 24 who have completed high school
4. Tobacco use	Prevalence of any use of tobacco products among youth up to age 17
5. Weight	Percentage of population whose body mass index is no more than 20% lower and no more than 20% higher than that recommended for their age and gender
6. Physical activity	Percentage of population whose participation in physical activity with significant cardiovascular benefits meets or exceeds recommended levels with respect to the number of times per week and the number of minutes per time
7. Health insurance	Percentage of population under age 65 who report that they currently have health insurance coverage
8. Early detection of cancer	Percentage of uterine/cervical, colorectal, and breast cancers detected at an early stage
9. Preventable deaths from injury	Percentage of preventable deaths attributed to intentional and unintentional injury
10. Disability	Average number of days per year lost to school, work, homemaking, and other social roles (e.g., volunteering) for a defined population

Proposed Indicators

The proposed indicators in the Health Determinants and Health Outcomes Set were chosen because there is substantial and credible evidence that they are significantly related to health problems that are important today in the United States, that are likely to persist or worsen in the general population or diverse population groups unless action is taken, and against which it is, in fact, possible to make improvements. In addition, each of the indicators were considered to meet the six criteria considered essential for inclusion of an indicator in a set and the selection of the indicators was guided by the conceptual framework described above. The following sections discuss the 10 indicators in the proposed Health Determinants and Health Outcomes Set.

Physical Environment. Percentage of population living in areas where air quality meets or exceeds all National Ambient Air Quality Standards *and* whose community water systems receive a supply of drinking water that meets the Safe Drinking Water Act Regulations.

Poor air quality is known to exacerbate a wide range of respiratory ailments including asthma, chronic obstructive pulmonary disease, and certain allergic reactions. similarly, water quality has a significant impact on a wide range of waterborne diseases, many of which affect the gastrointestinal tract (e.g., giardiasis, cryptosporidiosis, and *Campylobacter* enteritis). Note that one of the earliest triumphs of public health that led to significant reductions in deaths from illnesses such as cholera and typhoid was a result of making the water supply safe. The Environmental Protection Agency may have data that can be used to track this indicator.

Poverty. Percentage of population with household incomes less than 100 percent of the federal poverty level.

There is an extensive epidemiological literature documenting a positive and almost linear correlation between income and health. Those at the lowest end of the income spectrum, that is those with total family incomes at or below the federal poverty level, have significantly greater burdens of illness and negative disease outcomes. In some cases illness can lead to poverty, but far more frequently, poverty is associated with higher rates of a wide range of social and behavioral risk factors for disease as well as poor health outcomes. The pathways between poverty and ill health have not been fully specified, but they are likely to include poor nutritional status, poor housing, lower levels of educational attainment, residence in neighborhoods with higher rates of crime and violence, and reduced access to and utilization of health care services. Data from the U.S. Department of Labor supplemented by state and local economic indicators and Vital Statistics may provide information about this indicator.

High School Graduation. Percentage of population ages 18 to 24 who have completed high school.

As with poverty, level of educational attainment is highly correlated with a wide range of social and behavioral risk factors and poor health outcomes. This indicator focuses on young people, because society can indeed intervene to improve their high school graduation rates, whereas society does little to increase the educational attainment of older adults. Education level affects people's ability to understand how their own behavior can influence their health, how the health care delivery system works, and how to use the health care delivery system to maximize personal benefit. In addition to the independent effects of education on health, educational level is also related to income and employment opportunities, with lower incomes associated with lower rates of high school completion and more restricted opportunities for jobs. Data on high school graduation rates can be obtained from local Departments or Boards of Education, the U.S. Department of Education, and possibly, the Youth Risk Behavior Survey.

Tobacco Use. Prevalence of any use of tobacco products among youth up to age 17.

Tobacco use has been identified as a leading cause of death in the United States and has effects on many forms of cancers and respiratory ailments and results in poor birth outcomes. Other effects of tobacco use include injuries, deaths and environmental damage caused by fires (McGinnis and Foege, 1993). The proposed indicator encompasses all forms of tobacco use, including cigarette and cigar smoking and use of smokeless tobacco. It also focuses in particular on the school-age population for two reasons. First, school age is the developmental stage at which tobacco products are first tried and when addictions to tobacco products are often established. Risk factors for the initiation of tobacco use at this age include lower socioeconomic status, environmental conditions such as lower cost and ease of access to tobacco products, and perceived social norms that tobacco use is acceptable. Youth with poor self-images, low self-esteem,

and lack of feelings of self-efficacy are significantly more likely to use tobacco products. Reductions in tobacco use would arise both from delays in the age of initiation of tobacco use and from an overall reduced prevalence of use. Second, although there has been steady progress in reducing the rates of tobacco use among adults, the picture is less optimistic when it comes to youth with increased levels of use noted for adolescent females and some racial and ethnic minority groups. At the same time, a wide variety of strategies address not only the prevention of tobacco use among youth and improvements in the rates at which youthful smokers quit. The Youth Risk Behavior Survey may be a significant source of data for this indicator, perhaps supplemented by cost and purchase data provided by the Internal Revenue Service.

Weight. Percentage of population whose body mass index is no more than 20% lower and no more than 20% higher than that recommended for their age and gender.

Obesity typically reflects a diet that is higher in fat and lower in more healthful foods such as whole grains, fruits and vegetables. Certain eating patterns are associated with cardiovascular disease and, to some extent, cancer. In addition, obesity is directly associated with both the prevalence and the sequelae of diabetes On the other hand, an extremely low weight sometimes reflects the presence of dangerous and potentially life-threatening eating disorders such as anorexia and bulimia. Unfortunately, research documenting the precise relationships between dietary habits and disease incidence and outcomes is still in an exploratory phase with an emphasis on bench research with animals.

Exercise is an important aspect of weight control, but the relationship between the two can be reciprocal. It is often the case that people who are significantly over- or under-weight may be more resistant to initiating and sustaining a regular program of physical activity, perhaps because of a poor body image or poor dietary habits that cannot sustain a regular program of physical activity. The National Health and Nutrition Examination Survey, the Behavioral Risk Factor Surveillance Survey, the Youth Risk Behavior Survey and the National Health Interview Survey may serve as potential sources of data concerning body mass index. *Physical Activity*. Percentage of population whose participation in physical activity with significant cardiovascular benefits meets or exceeds the recommended levels with respect to the number of times per week and the number of minutes per time.

Regular and sustained physical activity has documented beneficial effects on cardiovascular functioning (e.g., reducing hypertension and hypercholesterolemia) but also on the prevention of osteoporosis and its sequelae (e.g., hip fractures), the effects of osteoarthritis, and on such mental conditions as depression. Physical activity is also an important element of weight control. This indicator addresses physical activity across the age spectrum. Children who acquire the habit of engaging in regular physical activity tend to maintain the habit throughout their lives. At the same time, a regular program of physical activity has some of its most salubrious effects on conditions faced by older persons. The Youth Risk Behavior Survey, the Behavioral Risk Factor Surveillance Survey, the National Health Interview Survey, and the National Health and Nutrition Examination Survey might all be useful in measuring the status of this indicator during the course of *Healthy People 2010*.

Health Insurance. Percentage of population under age 65 who report that they currently have health insurance coverage.

Almost 20 percent of the United States population does not have health insurance with particular racial and ethnic minority groups being at even greater risk of having no insurance. The unmet need for health insurance coverage creates significant social, structural, system, and personal barriers to the receipt of appropriate health care services in appropriate settings at appropriate times. In particular, it reduces the

ability of the medical care delivery system to provide important clinical preventive services, to encourage healthy behaviors, to intervene early and effectively in the course of acute illnesses, and to effectively and efficiently manage chronic health conditions. Data on health insurance status may be available from the Behavioral Risk Factor Surveillance Survey, the National Survey on Family Growth, and the National Health Interview Survey.

Early Detection of Cancer. Percentage of uterine/cervical, colorectal and breast cancers detected at an early stage.

The cancers included in this composite indicator (uterine/cervical, colorectal, and breast cancers) share an important characteristic: if they are detected early, they are more likely to be cured and less likely to lead to long-term illness or death. In addition, they are among the most prevalent cancers in this country. This indicator uses the actual rate of detection at the early stage rather than the rate of screening. The indicator thus serves as an intermediate health outcome that reflects the ability of the health care system to provide screening examinations, the effectiveness of the health care delivery system at ensuring that individuals are recommended at the proper intervals to obtain these screening examinations, as well as whether individuals avail themselves appropriately of such examinations. Information about the stage of disease at the time of diagnosis will best be provided by population-based cancer registries but may be supplemented by the National Hospital Discharge Survey and Medicare and Medicaid records.

Preventable Deaths Due to Injury. Percentage of preventable deaths attributed to intentional and unintentional injury.

This indicator addresses a significant cause of mortality that affects a wide range of populations defined by age, income, gender, race of ethnicity, geographic locale, job or profession, etc.: intentional and unintentional deaths due to injury. Intentional injury deaths include those from suicide and homicide and thus capture important elements of the emotional, psychological, and social environments of diverse population groups. Deaths attributable to unintentional injuries include motor vehicle accidents (which can, in turn, reflect behaviors such as drinking or substance abuse) and occupational injuries and unintentional deaths from fire, falls and drownings. This indicator focuses on mortality attributed to intentional and unintentional injury but actions taken to reduce mortality from these causes are also likely to reduce morbidity consequent to injury. Vital Statistics will likely be a primary source of information about this indicator.

Disability. Average number of days per year lost to school, work, homemaking, and other social roles (e.g., volunteering) for a defined population.

As noted earlier, disability is included in this set as a signal of the effects that health has on social functioning and economic productivity. Almost 20 percent of the U.S. population has one or more disabilities, including physical, psychological, and developmental disabilities. Furthermore, the inability to perform important social and family roles has profound consequences on individuals and their families, such as diminished self-esteem and self-efficacy, the increased burden on families because of the need to provide care, and decreased potential to contribute financially to the household. The focus of this indicator is not on one particular kind of disability but rather is inclusive of all kinds (physical, mental, emotional, and developmental). Potential sources of data regarding these types of disabilities might include the National Health Interview Survey, and the National Disability Survey.

LIFE COURSE DETERMINANTS SET

Conceptual Framework

The theoretical framework for the Life Course Determinants Set draws from two related models that explain how multiple factors determine health status and outcomes. These include the field model outlined above in the description of the Health Outcomes and Health Determinants Set, and the life course health development model (Halfon et. al., 1999; Halfon, et. al., 1997). Both of these models view health in broad social and biological contexts. Both models also array different determinants and their interactions in a way that suggests how interventions occurring at different points in the life course would yield greater potential health benefits than some of the current standard approaches to disease management or prevention.

As described above, the field model argues that the primary determinants of health include the physical environment, social environment, genetic environment, prosperity, individual behaviors, individual biology, health and function, disease, health care, and well-being. The life course health development model builds upon the field model by using development as an integrating principle to explain how health is established and transformed through a process of sequential and incremental changes over time in the life-course. The process of human development provides a framework that enables one to understand the patterns of relationships between genetic factors and functional biological systems, between neurobiology and behavior, and between individual (phenotypic) characteristics and social and environmental influences (Halfon, et. al., 1999). The life-course health development model has three key components.

First, multiple determinants of health have different magnitudes of effect at different stages of the life course, with certain types of determinants having special relevance at certain stages. In young children, for example, family factors appear to be much more important than individual patterns of behavioral response, whereas such behavioral patterns appear to exert a greater effect as determinants of health in the adult and elderly populations.

Second, health and disease status are considered to be the result of the cumulative effects of risk factors and determinants across the life course, as well as from the particular effects of factors during certain critical periods. Health development can be attributed to the observed cumulative and latent effects that are described in a growing empirical literature on the life course epidemiology of chronic disease and in development of psychopathology.

Third, the depiction of life course health development in terms of a health development trajectory incorporates the differential effects of determinants across the life-course and the effects of determinants on the attainment of health states and long-term health outcomes. Such a trajectory demonstrates how early experience affects later health status and decline and how such experiences have important implications for the way in which the role of health promotion and disease prevention is conceptualized across the life course. This trajectory incorporates and synthesizes the previous two points.

The life course health development model suggests that health-related quality of life is a function of a variety of developmental inputs. The concept of health-related quality of life is often illustrated as a maximum potential level of health and well-being that gradually begins to decline when some stage in the life course is reached. The health development trajectory recognizes that individuals begin life with different endowments that influence the initial rate of rise in their personal trajectory. This suggests that it is important to conceptualize that individual's greatest attainable health-related quality of life as something that can be enhanced through strategic interventions in childhood and that then continues to be maximized through strategic interventions throughout the adult years. This means that both the greatest attainable level

of health-related quality of life and the timing and rate of decline can be influenced by health promotion and risk reduction efforts that occur during childhood and further modified as one grows older.

The life-course health development trajectory also provides a meaningful analysis of population-based health. Entire populations of individuals can demonstrate different health development trajectories. Thus, many of the ethnic, economic, and gender disparities in health status and disease states that are observed can be explained in terms of this construct and the role of differential risk and protective factors across the life course. The initial endowment at birth, presence of risk factors, and presence of health protective factors can have population-level effects as can health promotion and other health care interventions that affect the development and maintenance of the trajectory. Therefore, from a community or population perspective, the potential long-term impact of different health promotion and disease prevention strategies can be considered.

Proposed Indicators

Table 3.2 describes the specific indicators included in the Life-Course Determinants Indicator Set. As noted above for the Health Determinants and Health Outcomes Indicator Set, the selection of the indicators was guided by three factors: (1) development of a sound conceptual framework for the set, (2) ability of the specific indicators to meet the six essential criteria for inclusion in a set, and (3) presence of substantive research demonstrating that each of the indicators are related to important health challenges in the nation and that actions can be undertaken to improve the status of each indicator.

Tobacco Use. Percentage of households in which one or more members use tobacco.

The scientific literature provides extensive documentation that the use of tobacco products and exposure to secondhand smoke are associated with significantly increased risk of disease and other types of adverse health outcomes across the lifespan such as heart disease, many cancers, poor pregnancy outcomes, respiratory illnesses, and oral health problems. Annually, an estimated 3,000 nonsmoking persons in the United States die of lung cancer and up to 300,000 children are affected by lower respiratory tract infections.

This indicator incorporates several aspects of the effects of tobacco use on the user and on others. In addition to serving as a measure of the prevalence of overall tobacco use, the focus of this indicator on households provides a potential measure of the level of exposure of nonsmokers to second hand smoke. It also captures the relationship between family tobacco use patterns and the likelihood that a child or adolescent will initiate use of tobacco. Potential data sources for household tobacco use include the Youth Risk Factor Survey, Behavioral Risk Factor Surveillance Survey, the National Health Interview Survey, and the National Survey on Family Growth.

Health Care Access. percentage of population with a specific source of ongoing primary care.

Unlike many other developed countries, a significant proportion of the U.S. population does not have access to appropriate, readily available health care. Access to primary care is one of the most important factors in ensuring that people at any age receive basic preventive and early intervention services as well as counseling about health protective and risk reduction behaviors. For children in particular, as well as anyone with a chronic disease or disability, improvements in the quality and efficiency of health care can be achieved when services are obtained from a consistent provider (Starfield, 1999). Access to timely and appropriate health care services is a particular problem for different population groups such as the elderly, lower income and racial and ethnic minority groups, and this problem thus contributes significantly to some

of the major health disparities among members of the U.S. population. Even when health care services are available in a community, barriers to the utilization of such services continue to exist. These include financial, cultural, structural, system, and personal barriers. One significant impediment to access to health care services is a lack of insurance which affects almost 20° of the total U.S. population. Racial and ethnic minority groups and groups of lower socioeconomic status are especially likely to lack health insurance and, consequently, fail to receive adequate preventive care and other health care interventions. The committee suggests new or expanded data collection strategies for data on this indicator.

Table 3.2 Life Course Determinants Set of Leading Health Indicators

Indicator	Measure
1. Tobacco use	Percentage of households in which one or more members use any tobacco product
2. Health care access	Percentage of population with an ongoing source of primary care
3. Low birth weight	Incidence of low birth weight (less than 2,500 grams)
4. Physical activity	Percentage of persons ages 12 and older who engage in sustained physical activity for 30 minutes at least 5 days per week
5. Poverty	Percentage of children ages 18 and younger living in households with incomes less than 100° of the federal poverty level
6. Cognitive development	Percentage of eligible children enrolled in Head Start programs
7. Substance abuse	Percentage of youth ages 12 to 17 who have used alcohol or illicit drugs during the previous 12 months
8. Violence	Prevalence of physical assaults among youths and young adults ages 12 to 24
9. Disability	Percentage of population with limitations of activity due to a physical, mental, or developmental conditions

Low Birth Weight. Incidence of low birth weight (less than 2500 grams).

Although there have been dramatic decreases in rates of infant mortality over the past several decades, the percentage of low birth weight births has not declined proportionately. Low birth weight births are associated with disparities in a number of risk and protective factors ranging from poverty, utilization of appropriate prenatal care, and exposures to stressful environments. From a life course health development perspective, low birth weight is associated with a more fragile entry into the world and the need for a range of ongoing medical and social interventions that may require ongoing application through adolescence. For some individuals the sequelae of low birth weight births may include lifelong disabilities and dysfunctions. This is a widely available measure. Vital Statistics may be a potential source of data for this indicator, as may be the National Hospital Discharge Survey.

Physical Activity. Percentage of persons ages 12 and older who engage in sustained physical activity for 30 minutes at least 5 days per week.

The specific recommendations and measures regarding physical activity have changed over time. Nonetheless, studies consistently affirm the overall benefits of frequent periods of moderate physical activity for all age groups. Furthermore, regular performance of aerobic physical activity has been demonstrated to reduce the risk of cardiovascular disease, diabetes, depression, osteoporosis, and even some cancers. A lack of physical activity is also strongly correlated with obesity. Patterns of physical activity for high school students are highly predictive of their patterns of physical activity later in life. Thus, initiation of a program of regular physical activity in the adolescent years may well exert a positive and sustained impact on the overall life course trajectory. Data from the Youth Risk Behavior Survey, Behavioral Risk Factor Surveillance Survey, and the National Health Interview Survey may contribute to the monitoring of this indicator.

Poverty. Percentage of children ages 18 and younger living in households with incomes less than 100 percent of the federal poverty level

Although poverty negatively correlates with health status for all age groups, the effects of poverty in childhood persist throughout life, even when the individual experiences greater affluence at later stages of life. Children who live in households whose incomes are below the federal poverty level are more likely to experience a range of exposures to adverse risk factors such as poor nutrition, poor housing, decreased access to enrichment programs, and have lower levels of access to health care services. As a result, they will experience acute and chronic health conditions at significantly higher rates and of greater severity. For many childhood health outcomes such as low birth weight, infant mortality, meningitis, and child abuse, the rates for children living in poverty can be two- and threefold times greater or more when compared to children living in households with greater affluence. Sources of data for this indicator might include the U.S. Department of Labor and local sources of information about economic development.

Cognitive Development. Percentage of eligible children enrolled in Head Start programs.

The first few years of life are critical for cognitive and emotional development and for the establishment of developmental pathways that are associated with subsequent success in school. Head Start programs have been shown to be an effective intervention for improving and sustaining cognitive and emotional development and academic success. In the process of ensuring that eligible children are identified and enrolled in Head Start, communities may be more likely to develop additional interventions that will benefit other groups within the community who are also at risk of reduced cognitive development, such as homevisiting programs for mothers with newborns who have risk factors for delayed or impaired cognitive and emotional development. Examples of such risk factors might include maternal smoking or substance abuse during pregnancy and low birth weight births. Head Start programs also have the potential to be available in all communities in the United States and consequently can reach diverse population groups. Likely sources of data about Head Start enrollment rates will be local surveys of social service agencies supplemented by data from the U.S. Department of Education.

Substance Abuse. Percentage of youth ages 12 to 17 who have used alcohol or illicit drugs during the previous 12 months.

Substance abuse and related problems are among the most pervasive and intractable among all health and social concerns. For each man, woman, and child in the United States the annual per person costs associated with the care for patients with substance abuse problems are $1000.00. Furthermore, substance

abuse correlates with other serious health and social problems. Use of alcohol and illicit drugs increases the risk of heart disease, stroke, hypertension, hepatitis, human immunodeficiency virus infection and AIDS, and cirrhosis of the liver. The adolescent years appear to be the most critical in establishing lifelong patterns of drug and alcohol use. Those community and family interventions that would address substance abuse among adolescents would also be likely to support the development of more healthful patterns of behaviors among adults in the community. The National Survey on Household Drug Abuse will likely be an important data set to monitor this indicator.

Violence. Prevalence of physical assaults among youths and young adults ages 12 to 24.

There has been an increasing awareness of the adverse effects of violence and social disruption on the health of individuals and communities, including such indirect effects as young mothers or elderly people failing to obtain needed medical care because they are afraid to leave their homes. The likelihood of experiencing violence is exacerbated by poverty, lower levels of educational attainment, lower socioeconomic status, and unemployment. The levels of violence in a community are not easily measured by a single factor, but the indicator proposes for the Life Course Determinants Set might be useful as a sentinel measure. Physical violence is the leading cause of death and injury among youths and young adults and correlates to general community violence in two ways. First, youths may be reflecting the social norm for violence in the communities in which they live, and second, violent behaviors of youth constitute a particularly visible and tragic part of a community's atmosphere of violence. Potential data sources for this indicator might be community statistics provided by local law enforcement agencies as well as national data disseminated by the U.S. Department of Justice.

Disability. Percentage of the population with limitations of activity due to a physical, mental, or developmental condition(s).

The percentage of the population reported to be disabled has increased over the past decade. Estimates suggest that just under 20 percent of the United States population is affected by some type of physical, emotional, developmental and/or mental disability. The greatest increase in the incidence of disabilities has been observed in populations younger than age 44. Individual and societal costs associated with disability include medical care expenditures, lost or reduced productivity, and decreased quality of life. Disabled people are also at increased risk of medical complications and secondary conditions related to physical, social, developmental and mental deficits in well-being. The services provided in a community, such as transportation, nutritional support, social support, job training and increased access to health care, can have a significant impact on the ability of people with disabilities to function at as high a level as possible. Potential sources of data for this indicator might be the National Health Interview Survey, National Health and Nutrition Examination Survey, and the National Hospital Discharge Survey.

THE PREVENTION-ORIENTED SET

Conceptual Framework

The Prevention-Oriented Set has four underlying conceptual components: indicators of current health status and primary prevention, secondary prevention, and tertiary prevention. To enhance its understanding by target lay audiences, the proposed indicator set uses a simple and conventional structure that encompasses both public and community health activities and personal and hygienic behaviors and that also encompasses the preventive and disease management activities of clinical practice (Wallace, 1998). In developing the set, the committee's intent was to select indicators associated with a comprehensive range of opportunities for improvements that would be anchored to an optimistic and prevention orientation. Such an orientation is intended to emphasize that individuals, communities, and groups of individuals can and should work collaboratively with health care and other professional or business organizations to take actions to promote health and prevent disease. Tertiary prevention, which is perhaps less familiar to many professionals, business groups, and the lay public, embodies the principle that even in the face of overt clinical illness, there can be opportunities to apply preventive interventions that may impede the worsening or even improve the function of and prognosis for a patient. Similar to the Health Determinants and health Outcomes and Life-Course Determinants Sets of leading health indicators, the Prevention-Oriented Set includes social indicators, with the most important being level of poverty. Inclusion of poverty reflects the urgency of improving the socioeconomic status of impoverished individuals to better the health of individuals and families.

The categories into which the nine indicators that make up this set have been given names that are intended to be comprehensible to diverse lay audiences. For example, primary prevention is expressed as the question "How do we keep ourselves well?" Secondary prevention is expressed by the question "If we are getting sick, how can we detect these conditions early?" Tertiary prevention corresponds to the question "If we are sick, how do we get the best medical care?' Use of this language to express the conceptual underpinnings for the Prevention-Oriented Set is intended to increase the likelihood that the general public will respond to and be motivated to act upon each of the specific indicators.

Table 3.3 presents the specific indicators proposed for the Prevention Oriented Indicator Set. As with the two other proposed sets, the selection of the indicators was guided by three factors: (1) development of a sound conceptual framework, (2) ability of the specific indicators to meet the six essential criteria for inclusion in a set, and (3) presence of substantive research demonstrating that the indicators are related to important health status and health care challenges for this nation and that actions can be undertaken to improve the status of each indicator.

The following section describes the specific proposed indicators, including the origin of the indicator, data sources, and related issues.

Disability. Percentage of population with limitations of activity due to physical, mental, emotional or developmental conditions

Disability is a widely used health measure that summarizes the net impact of all health conditions, including those of mental and emotional origin, on an individual's physical, emotional, and social functional status. It is one of the oldest functional status measures used in health surveys, and a form of it has been used in the National Health Interview Survey as well as in U.S. labor and economic surveys. It can reflect decrements in function from both acute and chronic illnesses, depending on the time frame queried. In a certain sense it is a composite measure and reflects all aspects of health. It is both a measure of illness-related decrements in function and a personal assessment of desirable functions that may be absent or

diminished because of the dysfunction. Sources of data for this item might include the National Health Interview Survey, the National Disability Survey; and special local and regional surveys.

Table 3.3 Prevention-Oriented Set of Leading Health Indicators

Indicators	Measure
1. Disability	Percentage of population with limitations of activity due to physical, mental, or developmental conditions
2. Preventable deaths from injury	Number of deaths due to intentional and unintentional injuries
3. Poverty	Percentage of families with household incomes less than 100% of the federal poverty limit
4. Tobacco use	Prevalence of regular use of cigarettes and other tobacco products
5. Childhood immunizations	Percentage of children ages 2 or younger who have completed the currently recommended immunization schedule
6. Cancer screening	Proportion of persons receiving age-appropriate cancer screening examinations, including Pap tests, mammograms, fecal occult blood tests, and sigmoidoscopies
7. Hypertension screening	Percentage of adults who have been tested for high blood pressure in the past 2 years
8. Diabetes management	Percentage of diabetics who have had a retinal examination in the past 12 months
9. Health care access	Percentage of population with health insurance and a regular source of medical care

Preventable Deaths From Injury. Number of deaths due to intentional and unintentional injuries.

Preventable deaths from injury includes deaths attributable to both intentional and unintentional injuries. It is proposed that it be based only on numerator data, without a presentation of rates. This presentation format is intended to increase the impact at local levels and to motivate community-based actions in a way that would not be captured from population rates. The underlying causes of death would likely be obtained from a list that encompasses all deaths due to injury and violence and could be provided by conventional Vital Statistics.

Poverty. Percentage of families with household incomes less than 100 percent of the federal poverty level

Poverty is an important predictor and antecedent of poor health status and inadequate access to timely and appropriate health care services. The evidence for the relationship between poverty, health status and disease outcomes is incontrovertible and is understandable by an informed lay audience. The measure is widely available for local areas as well as for the nation because it forms the basis for the monitoring of

economic development. Conventional definitions may change over time, but a stable and credible definition has been tied to the federal poverty levels for several decades. The threshold could be set above 100 percent of the federal poverty level or at some higher level or multiple of that level, such as 150 or 200 percent of the federal poverty level. For national purposes, this indicator would not require adjustment for any particular demographic distributions. Potential data sets have been cited above in the description of indicators for the Health Determinants and Health Outcomes Set and the Life Course Determinants Set.

Tobacco Use. Prevalence of regular use of cigarettes and other tobacco products.

Use of tobacco, which includes cigarettes, smokeless tobacco and cigars, is the greatest cause of most preventable deaths in the United States (McGinnis & Foege, 1993). Because tobacco use rates are sensitive to age and gender, adjustment of the rate for a standard population would seem to be indicated. This indicator focuses on tobacco to the exclusion of other substances that are abused or addictive. Data on tobacco use would be available from the Behavioral Risk Factor Surveillance Survey, the Youth Risk Behavior Survey, and the National Health Interview Survey. In addition, many local jurisdictions may have tobacco use data for at least some segments of their populations, such as children in middle and high school.

Childhood Immunization. Percentage of children ages 2 and younger who have completed the currently recommended immunization schedule.

Childhood immunizations would be a composite measure that would include the level of provision of all vaccines recommended for routine, universal administration to children ages 2 and younger by national expert groups, such as the U.S. Preventive Services Task Force, the U.S. Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices, and the American Academy of Pediatrics. This indicator reflects a variety of important health dimensions, including the level of access to pediatric primary care, the presence of public health immunization programs, and quality assessment programs in health care organizations. Data would be widely available but may not be universally accessible. This composite measure would likely be more interpretable if it were adjusted to a standard demographic population. However, secular trends might result in distortion of the measurement of the indicator when a new vaccine is introduced into general use. Sources of data might include the National Immunization Survey, the Behavioral Risk Factor Surveillance Survey, quality assurance programs from health care systems, and special regional surveys.

Cancer Screening. Proportion of persons receiving age-appropriate cancer screening examinations, including Pap tests, mammograms, fecal occult blood tests, and sigmoidoscopies.

All cancers combined are the second leading cause of death in the United States. More than 1 million new cancers are detected each year and many deaths could be prevented if rigorous early detection programs were conducted for cancers of certain organ sites. The pervasive nature of cancer, which occurs in individuals in all age, gender, income, race and ethnic groups makes it an important candidate as a leading health indicator. The indicator is a composite indicator that comprises four proven cancer screening interventions: Pap tests, screening mammography, fecal occult blood testing, and sigmoidoscopy. The Pap test is indicated for all sexually active women and the other tests find their best application after age 50. The proposed measure would be the percentage of age-eligible men and women who have had the complete screening regimen at recommended intervals. Data for this indicator are not yet universally available. Some existing data sources might include managed care organizations' quality assurance programs and the Behavioral Risk Factor Surveillance Survey.

Hypertension Screening. Percentage of adults who have been tested for high blood pressure in the past two years.

Screening for hypertension is an important screening test and is widely available, and its importance is understood by the general population and diverse population groups. Hypertension is an extremely important risk factor for cardiovascular disease, renal disease, and stroke and substantial deficits in appropriate blood pressure control exist among the U.S. population, particularly among some racial and ethnic and age defined population groups. Hypertension promotes increased morbidity in concert with other chronic conditions, such as diabetes. it is a particularly important problem for African-Americans and other minority groups, as well as elder people among whom hypertension prevalence rates may reach levels of 40 to 50 percent. Sources of data might include the National Health Interview Survey, the Behavioral Risk Factor Surveillance Survey, special local surveys, and the National High Blood Pressure Control Program.

Diabetes Management. Percentage of diabetics who have had a retinal examination in the past 12 months.

Diabetes management is one of two proposed measures of tertiary prevention. Diabetes is one of the leading causes of morbidity and mortality among older populations and is a leading cause of blindness. Screening retinal examinations among diabetics, followed by appropriate management when indicated, can preserve vision. This indicator is proposed as a measure of disease management, in which attention is given to people with overt illness where cure is not possible and preservation of function and quality of life is emphasized. This indicator is also intended to provide a measure of the level access to regular health care with continuity and a prevention orientation. Sources of data on diabetes management and particularly retinal examinations, may not be routinely available and it may be necessary to conduct special population surveys and to acquire data from quality assurance programs of managed care organizations.

Health Care Access. Percentage of population with health insurance and a regular source of medical care.

Health care access is a composite measure that measures the percent of people or families with a basic health insurance package and an identified regular source of medical care. This indicator therefore covers many dimensions of access, including the fiscal, system, geographic, and social dimensions. The social dimension encompasses acceptability of care and the timeliness of the delivery of care. Health care access is a prerequisite for appropriate tertiary prevention services as well as the delivery of care for emergent health problems and primary prevention interventions. As with other types of tertiary prevention, the data for this indicator is not likely to be regularly available and additional survey items to be developed for ongoing national and regional surveys may be required.

Suggested Steps for Action on Proposed Indicators

Each of the three proposed sets of leading health indicators were selected, in part, because their conceptual frameworks acknowledge that the nation's health objectives can only be met if those with professional or personal concerns about health and medicine work collaboratively with those in other sectors of society. The range of potential activities that might result in improvements to one or more of the indicators in the three proposed sets is very broad. Consequently, it will be possible for the traditional users of the *Healthy People* agenda to enlist the interest and mobilize the resources of many new and diverse groups in both the public and private sector. Actions are possible on each of indicators at the national, state and local level, in both the public and the private sectors, and by individuals, families, and communities.

The committee discussed a wide range of potential strategies for action that might result in improved status for the indicators within the three proposed sets. These suggestions are meant to provide general guidance to the U.S. Department of Health and Human Services and are in no way intended to be all inclusive or mandatory. Rather, these action steps are included in this report simply to provide the department and its collaborating agencies with a wide selection of potential intervention strategies. The committee does not expect each suggestion to be acted upon and suggests that actions directed toward a numerous set of diverse interventions may, in fact, be unlikely to have sufficient specificity and sensitivity to achieve sustained changes in any given indicator. The sections below provide specific examples of suggested actions and actors for each of the 19 unique indicators included in at least one of the three proposed indicator sets.

Physical Environment

Actions to improve air and water quality include changes in policies and regulations, educational and enforcement activities related to such policies and regulations, and increased voluntary participation and adherence by those individuals and agencies responsible for implementing and monitoring compliance with those policies and regulations. Actors might include interested citizens, local, state, and national policymakers, professionals in the field of environmental health sciences and in the operation of environmental health protection programs, and representatives from the business and labor communities.

Poverty

Poverty remains a sensitive and controversial issue in public health and public policy. Mitigating the effects of poverty on specific health outcomes can be done in many ways, but every state and region has an apparatus in place, in either the private or public sectors, to promote economic development. This indicator could be used to motivate action at the policy and program level to develop economic potential. Depending on the region, this might involve all economic sectors, as well as public agencies related to housing, commerce, welfare, and related areas.

It is also possible to intervene upon the direct pathways between poverty and poor health so that the effects of poverty are reduced. This might include, for example, the maintenance and strengthening of programs that reduce hunger and improve nutrition; improvements to the enforcement of housing statutes; the maintenance or strengthening of programs that provide fuel assistance or low-income housing, and effective outreach of health care programs to low-income communities, including homeless people.

Alternatively, efforts can be directed toward the reduction of poverty throughout the United States, especially among groups with differentially high poverty rates. A number of "healthy communities" programs have taken this path. The locus of much action to reduce poverty would be outside the health sector as it is traditionally defined and would require extensive collaborations with business, political, labor, financial, and social organizations at the national, state, and local levels. Those concerned about poverty and health often become involved in economic development, workforce development, job and skills training, improvements in education, changes in housing and welfare policy, and related actions. Note, however, that some actions taken within the health sector (e.g., reductions in the rate of teen pregnancy) could also have an positive effect on poverty.

In addition, efforts to address the problem of an increasing number of children living in households whose incomes are below the federal poverty level and ameliorating the adverse consequences of poverty should be important national priorities. A sustained reduction in the number of children living in poverty will require significant changes in national, state, and local policies related to the economy, welfare, Medicaid, housing, and employment. The adverse effects of poverty on children can also be attenuated through state and local partnerships that ensure access to the health, social, educational, cultural and other opportunities and services available to more affluent children.

High School Graduation

Two approaches to action with respect to high school graduation are suggested. The first is to reduce the negative consequences of lower educational attainment levels on people's understanding of health issues and their ability to use the health care system. For example, actions might include the development of health communications campaigns that target populations with low levels of literacy through the use of appropriate materials and channels. They might also include increasing the awareness of health professionals of the importance of clear and comprehensible communication with patients with lower levels of literacy and their skills in such forms of communication.

The second approach is to take action to increase the number of people who graduate from high school. The locus of action would be a combination of interventions in the health care sector (e.g., Reach Out to Read program) while others would occur outside the health care sector and would require involvement in pre-school, in-school and after-school activities. It might also focus on increasing family and community involvement in the educational process, and might involve older people to support the learning of younger people.

Tobacco Use

A wide range of actions at the national, state, local, family, and individual levels can and have been taken to influence the prevalence of tobacco use among diverse population groups in this nation, including young people. State and local governments can establish laws restricting access to tobacco products for children and youth, impose restrictions on where smoking is allowed, and establish taxes on the purchase price of tobacco products as methods that can be used to reduce rates of initiation of tobacco use and limit exposure to secondhand smoke. Schools and business can limit the times and places in which smoking is allowed. Insurance companies and employers can sponsor smoking cessation services and can even provide financial and other incentives for nonsmokers and those who stop smoking. In addition, social norms that support non-use of tobacco and tobacco products can be established and promoted, especially to population groups at greatest risk of initiation of use of tobacco products or continuation of tobacco use. School- and community-based educational interventions, media campaigns, counseling by health care professionals, and effective smoking cessation programs will all have a role to play in efforts to reduce or eliminate use of tobacco and tobacco products.

Alternative behaviors such as physical activity programs should be advocated to youth, to provide them with a more positive self-image and to increase self-esteem. Use of role models and credible spokespeople for specific population groups can also effect change in smoking initiation rates, patterns of tobacco use, and smoking cessation efforts.

Weight

More than one third of the U.S. population is considered overweight with an increased prevalence among individuals in certain racial and ethnic minority groups. In contrast, undernutrition is a particular problem for elderly people and people with eating disorders. Similar to tobacco, a broad array of actions at the national, state, local, family, and individual levels can result in significant improvements in the proportion of the U.S. population that achieves and maintains their recommended body mass index.

Physical Activity

Although vigorous physical activity is associated with a decreased risk of cardiovascular disease, hypertension, and some cancers, a growing body of literature indicates that more moderate levels of activity can be beneficial to a person's health status. Furthermore, the general population and diverse population groups are more likely to participate in moderate levels of physical activity. Community-based actions that may increase the rate of involvement in physical activity by all age groups could include: reduction of barriers to engaging in exercise behaviors, public education interventions to promote understanding of the health benefits of regular physical activity, improved communication between patients and health care providers about physical activity, and a reduction or elimination of structural or system barriers to engaging in physical activity. Examples of the last action might include provision of appropriate footwear, safe walking routes, and increased access to organized exercise programs.

Children develop physical activity habits in part through school required physical education programs, but especially through recreational opportunities that are actively promoted by their families and community. These programs should be actively promoted to children and their parents. Employers can encourage physical activity by their employees through measures such as flexible working hours to allow use of exercise facilities, inclusion of exercise facilities in the workplace, and providing memberships to gyms as a benefit. Health insurance plans can offer incentives to employers to support and promote work-site exercise programs. Finally, media campaigns with credible role models and spokespeople can also be effective means of encouraging greater participation in regular physical activity, especially among children, adolescents, and young adults.

Health Insurance

Actions can be taken to improve access to health care for people who are not insured through such mechanisms as providing greater resources for health care organizations (public and private) that care for a disproportionate share of the uninsured population. National and state policies are clear arenas for action in this area and would include not only increasing the rate of coverage through public mechanisms but encouraging coverage through private mechanisms such as through the workplace. Actions can also be taken locally to encourage increases in the number of people insured through their place of employment (e.g., through the use of purchasing coalitions for small and medium sized businesses) and the development of "high-risk pools" for people who would normally be excluded because of their health history.

Early Detection of Cancer

A wide range of health professionals and organizations can be enlisted in the efforts to increase the rate of early detection of uterine/cervical, breast, and colorectal cancers. They can take actions to both increase and publicize the availability of screening services, target their efforts at populations with lower than average screening rates, and address directly the wide range of barriers (including knowledge, beliefs and attitudes) to the use of screening services through media campaigns, local outreach efforts such as bringing a mammography van to a neighborhood, or providing transportation to screening sites. Of equal importance, those in the health care sector can obtain support for achieving improvements in cancer screening rates from actors as diverse as employers (who ask health plans to document how well they do at providing cancer screening exams to their age-eligible employees who need them), the faith community (as ministers encourage their congregations to take care of themselves and their families by sponsoring outreach efforts to populations with low screening rates), and a wide range of social, professional, political, and other community-based groups for both men and women.

Preventable Mortality Due to Injury

The emphasis on unintentional and intentional injuries captures public attention in a important way, whether it is traffic safety, child abuse, elder abuse or neglect, firearms accidents, product safety, or occupational health. Many public-and private-sector interests are deeply involved here, including medicine, transportation, drug and alcohol law enforcement, general law enforcement and the judicial system, social work, engineering, public safety, and public health.

Deaths from suicide among young adults, for example, might require a variety of institutional and community-based interventions to identify those at risk, provide crisis support to those contemplating taking their lives, and identify and address underlying sources of extreme stress (both in daily life and as a result of major life events). Deaths from motor vehicle accidents might involve actions as diverse as efforts to increase the safety of motor vehicles and of roads and highways, improved enforcement of drunk driving laws, improvements in driver education programs, improvements in the number of effective alcohol treatment programs, and educational programs at the community level to reduce social acceptance of excessive use of alcohol and to encourage the use of designated drivers or alternative transportation.

Disability

National and state level policy actions can be taken in order to ensure availability of supports and incentives to help those with short- or longer-term disabling conditions to either recover or maintain their functional status and the ability to live independently. Alternative actions might also be preventive in nature. For example, local communities might organize efforts to encourage appropriate physical activity programs and diets for older women to prevent or reduce the effects of conditions such as osteoporosis and osteoarthritis. Local businesses might participate in efforts to reduce the rate of occurrence of disabilities resulting from lower back injury or repetitive strain either by the use of preventive ergonomic steps, through the provision of employee training in healthy work habits, or by the provision of access to state-of-the-art physical therapy services. Federal and state funds and programs should be used effectively to support training, access to rehabilitative and medical services, and other programs that help people function at their

highest level. Local communities are likely to actually provide the services to people with disabilities or potentially disabling conditions and their families, particularly through social services, mental health and educational programs, and efforts to coordinate the services in a particular community.

Health Care Access

This is an ongoing national issue that will be highlighted by inclusion as a leading health indicator in two of the three proposed sets. Federal and state actions will be necessary to address access to health care comprehensively, especially to fully respond to issues associated with the costs of access to care for those without any form of health insurance. However, some measures can be taken at the regional and local levels to improve access to health care overall, especially for children, and also to influence health care networks and insurance providers to promote appropriate primary care models of service delivery. Federal and state standards that are incorporated into funding contracts or that are a part of licensing procedures for health care agencies may also help improve the focus on the provision of appropriate primary and preventive care.

Low Birth Weight

Action on the low birth weight indicator require additional funding and efforts to ensure access to prevention-oriented prenatal care at each of the levels of federal, state, and local government. Local communities, however, will identify their populations at risk and will be the source for the development of the necessary and appropriate interconnected network of services. Effective, community-based service networks will include health care providers, nutrition programs, educational programs about pregnancy and parenting, social services, substance abuse programs, and other local agencies and groups. These will all contribute to the delivery of effective prenatal care and education and continuous risk assessment to identify problems or the potential for problems as early in the pregnancy as possible. Special attention must also be focused on the prevention of pregnancy among adolescents since this age group is significantly correlated with higher rates of low birth weight births and subsequent complications

Cognitive Development

Local communities can assemble a task force of people committed to the future of their communities to support the initiation or expansion of early childhood programs that focus on social, emotional, and cognitive development. Head Start is an extremely successful model that could be broadly implemented in all communities and in many communities is being expanded to Early Head Start programs for children from birth to age three. Additional federal and state funding as well as technical assistance could facilitate community efforts to fully implement Head Start and Early Head Start and ensure their availability to all eligible children. Head Start and Early Head Start are just two of many programs that have been targeted to children from birth to five years to optimize their development, improve health, and increase their chances for educational success.

Substance Abuse

Use of drugs and alcohol by adolescents is problem that requires a multifaceted and long-term approach involving all aspects of a local community, including schools, recreation programs, parent groups, and the faith community, as well as the judicial system, and health care providers. State and national involvement can provide funding to support research to develop effective substance abuse prevention programs and help influence the media messages and role models presented to adolescents. In many communities, the use of drugs and alcohol by adolescents may also be associated with educational attainment, current economic conditions, and future economic opportunities. Thus, partnerships with the business and economic sectors of a community will be important. Drug and alcohol use prevention efforts should also be connected to other risk reduction interventions for adolescents and should encompass pregnancy prevention, sexual responsibility, reduction of the levels of violence, and the elimination of drunk driving.

Violence

It has too often been left to law enforcement and the courts to solve the problems of violence in communities. Adolescents and young adults adopt violent behaviors for a wide range of reasons, for example, because of peer pressure, because their role models exhibit violent behaviors, and because of emotional or mental illness. Violence cannot be addressed as an isolated behavior problem, and requires interventions beginning in early childhood, continuing throughout adolescence, and reinforced throughout all aspects of the life of the community. Successful efforts at reducing community violence could involve the educational, recreational, mental health, and social service systems at the state and local levels.

Childhood Immunization

Many professional organizations are responsive to the childhood immunization indicator. Specific public programs devoted to immunization will use data on this leading health indicator to promote interest in and compliance with childhood immunization recommendations. Because vaccines are administered largely in the clinical setting, in either private or public clinics, this indicator can become a touchstone for the delivery of effective primary care with a prevention orientation. In addition, community-based efforts can be undertaken to inform and motivate populations at risk of non-compliance with the recommended vaccination protocols for young children. Examples of such efforts might include integration of immunization information into childbirth preparation classes, worksites, schools, religious communities, and descriptions of covered benefits in health insurance plans. Effective use of local media to promote awareness of the importance of immunizations and highlight the availability of free or low-cost services might also be considered. National or state mass media campaigns involving credible and motivating spokespeople could also serve as effective interventions for this indicator.

Cancer Screening

There are several important points of action to improve cancer screening rates. This indicator will motivate community organizations devoted to cancer control and care to take action. It will also motivate actions among those involved in the delivery of primary care and the medical subspecialty groups in which the more technological aspects of cancer screening are practiced. In addition, the health education sector could support cancer screening efforts that enhance self-care, such as breast self examination, and the development of communications skills of health care providers to make effective referrals for screening examinations. Availability of free or low-cost screening programs can reduce or eliminate financial barriers to screening. Additional promotional efforts might involve media campaigns, enhanced access to screening services at the community or neighborhood level, and effective education and outreach programs to reduce attitudinal barriers to screening such as fear, embarrassment, and inaccurate perceptions of risk and personal susceptibility.

Hypertension Screening

Many constituencies for hypertension screening could be motivated to take action. Specifically, many federal and state governmental programs could receive an impetus to increase the level of effort in this area as could community organizations dedicated to the control of hypertension and its consequences. Other constituencies might include providers of primary care and several medical subspecialties are already involved in the screening and management of hypertension. Individuals can take action on their own behalf by asking their health care providers to routinely measure their blood pressure and inform them of their results. Individuals can also take steps to monitor their own blood pressures at pharmacy-based screening stations and becoming informed about the symptoms of elevated blood pressure levels. Those concerned with the health of African Americans and other racial or ethnic minority groups and the health of the elderly population could also be motivated to take actions to educate the public and provide no or low-cost screenings.

Diabetes Management

Diabetes management will resonate most closely with the professional and patient communities interested in diabetes and its sequelae. However, preemptive screening and management of diabetic retinopathy for the prevention of blindness have many other constituencies, including those involved in medical subspecialties, technology development, disease management, health care quality evaluation, and self-care for chronic conditions. Employers might also support diabetic eye exams to help maintain the health and functional status of their diabetic employees. Inclusion of this indicator is intended to serve as a model indicator for several complex and overt conditions for which clinical interventions can significantly improve the quality of life and prevent disability and death.

GENERAL DISCUSSION OF ISSUES RELEVANT TO THE PROPOSED INDICATOR SETS

The committee would like to bring a number of issues to the attention of the U.S. Department of Health and Human Services to ensure that the proposed sets of leading health indicators remain responsive to their three primary functions to generate awareness, motivate action, and provide ongoing feedback. Issues of particular relevance to the committee include: (1) modifications to the proposed indicator sets, (2) operationalization of measures for the specific indicators; (3) clarification of the role and functions to be filled by the leading health indicators; (4) rationale for inclusion or exclusion of specific indicators within the three sets; (5) suggestions of indicators for future development; and (6) general points of clarification. Each of these issues is addressed below

Modifications to Indicator Sets

The committee is confident that each of the three sets of indicators are based upon conceptually sound and unique frameworks. The Health Determinants and Health Outcomes Set is based on the tenets of the field model in which health is based on a variety of determinants (Evans and Stoddart, 1992). The final set of indicators selected for the Health Determinants and Health Outcomes Set reflects these various determinants. The Life Course Determinants Set relies on both the field model and the life course health development model in which the role of the life course trajectory is considered to be an additional factor in determining when and how interventions should be applied to different age cohorts in an effort to maximize the effectiveness of such interventions. For example, cognitive development is an indicator for which interventions should occur during the first five years of life in order to exert a positive and sustained effect on a child's developmental trajectory. The Prevention-Oriented Set bases selection of leading health indicators primarily on the three processes of prevention: primary, secondary, and tertiary. Two or three indicators in the Prevention-Oriented Set have been selected as representative of each of these three domains.

The committee feels strongly that integration or 'mixing and matching' of indicators between sets could violate the basic tenets of these three conceptual frameworks. Consequently, the committee recommends **that an intact set be selected as the leading health indicator set for *Healthy People 2010***. It is recognized, however, that the actual operationalization of measures for specific indicators within a set might be modified by the U.S. Department of Health and Human Services. The committee also recognizes that political and policy factors may influence the department's final selection of a single set in its entirety, regardless of the committee's recommendation. The committee suggests that changes to specific indicator categories (e.g., replacing cognitive development in the Life Course Determinants Set with an indicator of dietary habits) in the selected set or switching indicators between sets might result in compromises to the three conceptual frameworks and their associated indicator sets.

Operationalization of Indicator Measures

The committee acknowledges that the operationalization of measures for the indicators in the three proposed sets may change during the course of the decade in response to changes and advances in medical knowledge and technology. For example, identification of new screening examinations for the detection of cancers other than breast, colorectal, and uterine/cervical in their earliest, most treatable stages might require

modification of the cancer detection indicator in the Health Determinants and Health Outcomes Set and the cancer screening indicator in the Prevention-Oriented Set. Similarly, if new evidence supports the expansion or reduction of the age range for a target screening activity, the indicator could be similarly adjusted. As new vaccines or vaccine schedules are recommended for universal or large population use, the childhood immunization indicator could be appropriately modified. Health care reform efforts during the decade may also precipitate a substantive change in the measures related to health care access and health insurance. As these reforms are put into place, the measure for the health care access and health insurance indicators may require revisions or the indicators themselves may even be dropped from inclusion in the selected set of leading health indicators.

The committee also recognizes that there are differences in the operationalization of measures for some instances in which sets share a common indicator. For example, physical activity is included in two of the three sets but the suggested measures for this indicator are slightly different between the two sets. Similarly, the measures for tobacco use are operationalized in a slightly different format between each of the three proposed sets. The committee chose to include different operational definitions for the measures of indicator for two reasons.

First, the focus of the three conceptual frameworks underlying the proposed indicator Sets strongly influenced the committee's selection of specific measures for shared indicators. For example, the Life-Course Determinants Set emphasizes measures that are targeted to younger populations for whom interventions will yield some of their most beneficial effects by modifying behaviors early in the life course and thus, preventing or delaying the onset of disease morbidity and mortality. Thus, the measure of tobacco use for the Life Course Determinants Set focuses on assessment of *household* tobacco use to serve both as a predictor for initiation of use of tobacco products among youth and as a proxy measure for exposure of children and youth to secondhand smoke. Alternatively, a measure for the tobacco use indicator chosen for the Prevention-Oriented Set encourages assessment of changes in the prevalence of the use of tobacco products for the general population and throughout the life course.

Similarly, the measure for the Poverty indicator in the Life-Course Determinants Set focuses on the percentage of *children* living in households with incomes below the federal poverty level. In comparison, the Health Determinants and Health Outcomes and Prevention Oriented Sets include a measure of Poverty that encompasses the *general population* which is consistent with the orientation of these two sets to include all U.S. populations and diverse population groups.

Second, the committee included variations in operational definitions for indicators shared between sets in order to present the department with *different measurement choices*. While the committee is opposed to changing indicators within or between the three proposed sets, there is consensus that the department will select the operational definitions of the measures for each indicator that will be most effective in reaching the general population and diverse population groups. Thus, disability is presented as a rate in the Health Determinants and Health Outcomes Set whereas it is a number or count in the Prevention-Oriented Set. The committee recognizes the possibility that these two ways of measuring the impact of disabilities will evoke different reactions among the various target population groups for the leading health indicators for *Healthy People 2010*. The committee expects that final decisions about the actual measures for all indicators in the chosen set of leading health indicators should be based on results from the quantitative and qualitative research suggested in Chapter Four of this report. This will ensure that the language selected for the measure for each indicator is most effective in communicating with diverse populations and motivating the public to take actions to improve the status of those indicators.

Role and Functions of Leading Health Indicators

The committee also emphasizes that the proposed sets of leading health indicators are not to be interpreted as mechanisms by which the health care delivery system in the United States can be monitored or evaluated. Reporting on the leading health indicators will not inform the public about the quality of health care in the United States. Rather, the selected indicator set will serve as a means for monitoring the health of the U.S. population and its diverse population groups and will be used to motivate interventions at the national, state, local, community, and individual levels. Changes in the status indicator measures during the course of the decade will be used to assess the impact of such interventions.

It is also important to acknowledge that the three proposed sets are not inclusive of all health behaviors, risk factors, and health conditions. In fact, such an all-inclusive set would fall beyond the scope and intended functions of a set of leading health indicators as described in the Executive Summary and Chapter One of this report. It was not possible to include every health threat or condition that will be recognized in the full *Healthy People 2010* plan for several reasons. To do so would require that the size of the sets be significantly increased beyond the recommendation of no more than 10 indicators per set. Furthermore, inclusion of more health issues within each set would complicate the process of dissemination of the sets to the general public and the public and private health care communities and undermine the likelihood that the sets would generate interest and galvanize action in these populations. Obviously, the indicators in each of the proposed sets will not satisfy all of the many health and disease-specific advocacy groups. However, the proposed sets are the result of thoughtful consideration of relevant literature combined with the multidisciplinary expertise and considered judgment of the Institute of Medicine committee.

Rationale for Inclusion or Exclusion of Specific Indicators

Poverty

There was consensus among committee members that availability of timely, comprehensive quality medical care is an absolute requisite for the coordination and implementation of a national public health initiative that addresses health care delivery, protection from environmental exposures, coordination of social services, and effective health promotion at the community and individual levels. This point of view is clearly expressed in each of the three proposed indicators sets by the inclusion of the poverty indicator. This indicator underscores the absolute necessity of efforts directed toward elimination of disparities in health status and health outcomes associated with socioeconomic status. Furthermore, the health care access indicator, included in the Life Course Determinants and Prevention-Oriented Sets and the health insurance indicator in the Health Determinants and Health Outcomes Set are intended to focus attention on social and health care system factors associated with the delivery of care for preventive health as well as urgent and chronic conditions. Increased public awareness and commitment toward change such as increasing access to care, elimination of barriers associated with socioeconomic status, and increasing general availability of insurance coverage are considered by the committee to be requisite for the achievement of sustained improvements in the health status of the general population and diverse population groups.

Tobacco Use

As noted above, inclusion of indicators to address each and every risk factor, prevention strategy, and/or disease state is not feasible, logical, or consistent with the intended scope and function of a set of leading health indicators. The committee feels strongly, however, that inclusion of an indicator of tobacco use in each of the three proposed sets is essential to reflect the tremendous impact of tobacco use on the health of the nation's many diverse populations. In fact, the committee believes that improvements in the status of the tobacco indicator has the greatest potential for achieving significant and sustained improvements in the health of all people of the United States.

Tobacco is a leading risk factor for many cancers, cardiovascular disease, stroke, asthma, and other severe respiratory conditions. The committee argues that efforts to modify tobacco use patterns as well as effect change in laws, regulations, and policies relevant to tobacco use will yield the most significant and positive effects on current and long-term health status of diverse populations in the United States. Furthermore, efforts to prevent smoking initiation among children and youth have the potential to reduce incidence of some cancers, cardiovascular disease, and respiratory illnesses in their lifetimes. The committee asserts that an indicator of tobacco use should be included in the final set of leading health indicators for *Healthy People 2010*.

Diet and Nutrition

The exclusion of diet and nutrition from the three proposed sets of indicators is based on the committee's consideration of measurement issues associated with this indicator. Dietary behaviors present considerable measurement challenges, particularly efforts to establish baseline dietary profiles and monitor changes in these profiles over time. These measurement difficulties can be particularly troublesome to efforts to assess the dietary patterns in diverse population groups such as racial or ethnic minorities, income-defined groups, and the elderly. Recall bias, social desirability response bias, and the reliance on self-report data are only a few examples of such measurement challenges. The committee feels that the state-of-the-art of dietary measurement has not yet achieved a level that would provide regular, timely, valid and reliable measurement for each indicator, for diverse population groups, and at multiple jurisdictional levels. Consequently, dietary patterns are not included as a leading health indicator in the three proposed indicator sets

It should be noted, however, that the Health Determinants and Health Outcomes Set includes weight and appropriate body mass index as a proxy measure for dietary habits. The suggested indicator addresses both underweight and overweight and is considered by the committee to be an indirect reflection of dietary choices and eating patterns. The committee also assumes that weight measured as body mass index will lend itself to regular, timely, and valid measurement by individuals and their health care providers.

Suggested Indicators for Future Leading Health Indicator Sets

Inevitably, a list of no more than ten indicators can only address some of the nation's most important health problems. The committee's suggestions concerning modifications to proposed indicators and suggestions for new indicators for future development as leading health indicators are discussed in the following narrative.

High School Graduation

High school graduation rates are relatively crude estimates of educational attainment. It would be valuable to develop a more sophisticated approach to assess not only how many individuals graduate from high school but how many graduate with competencies in key areas that permit them both to play important social roles and to take action to maintain and improve their own health and the health of their families.

Violence

It would also be valuable to invest resources in the development of an additional broad measure of the social environment, specifically, a measure of the fear of violence. An example of such an indicator might be the percentage of the population who report that concerns about violence interfere with their ability to pursue activities of daily living or life goals or to perform important activities. It is possible to develop such a measure, but it appears that new data collection efforts would be required to support this measure at multiple jurisdictional levels and for diverse population groups.

Social Support and Isolation

Social and emotional aspects of health are increasingly recognized as fundamental to the health status of individuals and communities. The committee suggests that an indicator of social support and social isolation might merit consideration for inclusion in a future set of leading health indicators. These could be measured with a validated social support scale. There is increasingly strong evidence for the impact of social support and social isolation on health status and health behaviors across the life-course (Berkman, 1980). Social support and isolation are suggested as indicators for consideration in future sets of leading health indicators in part because of the complexity of collection of information about these issues across multiple jurisdictional levels and diverse population groups. Furthermore, at this time there is a lack of well-defined, feasible, and effective intervention strategies that would sustain an increase in the levels of social support and a decrease in the levels of social isolation.

Mental Health

Another indicator that would address the social and emotional aspects of health is the proportion of the population with a diagnosed mental health problem(s) or (for children up to age five) developmental problems who are receiving care. Although many aspects of the mental health status of a community are not encompassed in this indicator, the committee suggests that it would be an important first step toward ensuring appropriate care systems for those already diagnosed with mental health or developmental problems. If such a step were taken, communities might be more able and more likely to address issues related to ensuring the early detection of mental health or developmental problems and establishing programs for prevention and early intervention.

Foster Care

The committee also suggests that the proportion of children in foster care might serve as a meaningful indicator in the future. The number of children reported and confirmed to be abused and neglected has dramatically increased over the past decade. Children generally arrive in the foster care system because of family violence or family neglect or both and both of these conditions can be caused by and can aggravate social disruption. A measure of involvement in foster care could serve as a sentinel for community levels of violence, substance abuse, and social disruption and might call attention to a group of children at particularly high risk for a variety of serious short-term and long-term developmental problems. The number of children enrolled in foster care programs could also provide a measure of the availability of community intervention services for endangered children.

Substance Abuse

The committee suggests development of a more comprehensive measure of substance abuse than that included in the Life-Course Determinants Set. A possible measure for this indicator might be the percentage of households in which someone uses drugs or uses alcohol inappropriately. Data on this proposed indicator are not currently collected and are likely to be more difficult to collect in detail at the local level but it would be an important measure for communities. There are a number of useful reasons to focus on households, especially to identify potential impacts on children and others in the family, such as increased risks of domestic violence, child abuse, and exposure to role models who may increase the likelihood that children in the household will adopt the same alcohol or drug use patterns. This indicator would also provide some measure of the service needs for the adults in the community.

Physical Environment

The Health Determinants and Health Outcomes Set includes a limited measure of the physical environment that focuses on air and water quality. However, many other components of the physical environment have a significant effect on health. It would be desirable to assess the general or overall quality of the physical environment in which an individual lives or in which a community is located. Many specific measures are available for single aspects of the environment, such as air or water quality, but the committee is not aware of any composite measures of environmental quality. This would be a fruitful area for further study and for recommendations from experts.

Genetic Screening

Genetic screening is a subject with many medical, political, social, and legal complexities and one for which some guidelines and measures of quality would be valuable for use in future indicator sets. The availability and use of genetic screening for a wide variety of health conditions are rapidly increasing and could be expected to increase exponentially in the next few years. Some data indicate that there are considerable disparities in the availability and access to current genetic screening services and these

disparities have implications for future access trends. The potential use of genetic screening to improve immediate and long-term health through early identification of diseases or of susceptibilities is tremendous. There is, however, the potential for significant misuse. For example, health insurance plans might move to deny coverage for people known to be at increased genetic risk for some health condition(s). This may be the area in which society can anticipate the greatest changes between current practices and knowledge and those of the year 2010. Consequently, consideration of this as a future leading health indicator is warranted.

Suggested Dissemination Strategies for the Leading Health Indicator Set

A well-designed, well-implemented, and well-evaluated dissemination and communication plan is essential to achieving the goal that leading health indicators will capture the interest of the public and will encourage actions that will lead to advances in health. Effective communication of health information depends on a scientific approach informed by the fields of behavioral science, communication theory, consumer research, social marketing, advertising, and public relations. Strategic communications about the selected set of leading health indicators can build on the momentum of the *Healthy People 2010* program and can place the leading health indicators on the media and public agenda. Leading health indicators can also stand apart from *Healthy People 2010* activities and become an integral part of the U.S. Department of Health and Human Services' programming, field work, and press activities. From the moment the department begins discussions that lead to the selection from this committee's report of a set of leading health indicators, planning must begin for a strategic, time-phased, multistep process for promotion of the understanding, use, and evaluation of the leading health indicators. This committee offers suggestions for how the department can optimize traditional and innovative communication strategies to achieve the goals that they set forth for the leading health indicators. If expertise in the development and implementation such a comprehensive plan is not resident in the U.S. Department of Health and Human Services, it should be accessed through other means.

The communication plan should use research tools to inform the development and execution of the project as well as explore the use of new partnerships and networks. The formative research and message design for leading health indicators described in Chapter Four should consider models of behavioral change (e.g., Prochaska and Di Clemente, 1992, Bandura, 1986), communications theory, and diffusion of innovations theories (Rogers, 1996) in order to develop a realistic strategy to encourage the nation's diverse populations to adopt the leading health indicators. A science-based plan of communication for the leading health indicators will also involve regular assessment of the results of the communications activities to make adjustments and provide feedback to further heighten awareness of, interest in, and appropriate actions on the leading health indicators.

Historically, federal health initiatives have relied on traditional channels of communication, such as radio, television, and print media (Chamberlain, 1996, Rogers and Storey, 1987). However, the effectiveness of these channels is sometimes offset by the cost of using them. Television, radio, and newspapers often are attractive tools to public health programs because they reach the largest audience. However, they do not necessarily reach the most important audiences with messages that are relevant to and salient for those populations. The development of specialized media, marketing, and public relations efforts targeted to diverse population groups would be consistent with the overarching goal of *Healthy People 2010* to eliminate health disparities. Even if the public health campaign designer has identified a number of audiences and knows that these audiences should be approached differently, it is often difficult to derive such an approach. It is also sometimes too expensive to develop different strategies and tactics to produce many different

versions for a variety for population groups by using traditional communications channels. These traditional channels need not be abandoned, but should be complemented by specialized or innovative communications strategies.

Given that the leading health indicator set will carry efforts to improve the health of the U.S. population through the new century, it is only appropriate that dissemination and communications plans should maximize the use of new technologies such as the next generation of the Internet and interactive health communication technologies. Use of innovative approaches along with more traditional tactics should be integrated into the communications and dissemination plans at the outset to maximize the potential impacts of the leading health indicators on the public.

The entire spectrum of dissemination materials for the leading health indicator set that are going to be released should fit among a strategic and tactical plan that is implemented by the U.S. Department of Health and Human Services and that outlines the short and long-term objectives, press strategies, public affairs plans, approach (activities, channels, formats), time lines, responsibilities, costs, expected outcomes, and assessment activities. Although it is anticipated that the general public will be a primary target population for information about the leading health indicators, it is likely that the principal audiences for *early adoption* of the indicator set will be the leadership in the general public health, health service delivery, and health care policy communities.

The initial development of communications and dissemination plans for the selected indicator set should include communication audits and target group profiles to describe the preferred dissemination mechanisms for a group and their subsequent expected use for the dissemination of the leading health indicators. For example, a "VIP" health leadership profile might be useful to tailor the message for diffusion in the policy community. This likely will differ from that for an audience of health care practitioners. "Push-and-pull" electronic technology applications, in which a recipient can obtain automatically customized information that includes the latest statistics and support documents in his or her area of interest or need, could also prove useful. Other examples for consideration include print and electronic publications, for example, a *Leading Health Indicators at-a-glance* or a how-to guide describing how to develop activities to improve the status of the leading health indicators. These should be short, concise, and tailored for different audiences. Each one should be tested for message, format, channel, and source. For example, there may be one for community health planners, members of the Association of State and Territorial Health Officials, American Public Health Association, National Association of City and County Health Officials, media sources, health professional students, lay health care workers, specific demographic and social groups, and so forth. Each of these could be mass produced with the potential for joint sponsorship and distribution of such information for their memberships and audiences.

A variety of traditional and innovative communications products should be tested with diverse audiences. Some traditional examples of such products include conferences and workshops for health care and public health professionals, public service announcements, newsletters, articles in professional medical and health journals, speakers' bureaus, and op-ed pieces prepared by nationally recognized health experts. Some more innovative communications strategies for consideration and evaluation might include interactive computer programs, video programming, electronic messaging, hyperlinks to and from other reputable health care-related sites on the World Wide Web, and aggressive collaborations with community organizations. Depending on the goals of the campaign and the materials and events to be promoted, an appropriate mix of such tools can be designed to help release and promote the leading health indicators. This mix can be designed and modified from the results of the ongoing communications audits.

4

Linkage with Healthy People 2010

OVERARCHING GOALS

Increased Quality and Terms of Healthy Life

The first overarching goal of *Healthy People 2010* is to increase the quality and the years of healthy life. The focus on health status and quality of life deviates somewhat from earlier generations of *Healthy People,* which placed greater emphasis on reducing mortality and increasing longevity. For example, the five sentinel indicators for the first decade of *Healthy People* were targeted to reduce mortality among five different age cohorts. Commonly used measures of mortality are death rates, life expectancy, and years of potential life lost before age 75. Data are available for every death that occurs in the United States and can be analyzed for the total population, special population groups, and specific causes of mortality. Consequently, mortality measures have long been used in population health surveillance activities at the state, local, and community levels. However, since 1979 the life expectancy of the general U.S. population has increased significantly. This has shifted the emphasis on mortality to a broader view of health that includes mortality as well as attention to health outcomes and determinants such as prevention of disabilities, improvement of overall physical, social, and mental status, relief of pain, earlier detection and treatment of health conditions, and improved functional capacity at each stage of life.

The three proposed leading health indicator sets reflect this shift in emphasis away from simple mortality measures to the more complex topic of health-related quality of life. Two of the three sets the (Health Determinants and Health Outcomes Set and the Prevention-Oriented Set) incorporate only a single measure of preventable mortality, whereas the Life Course Determinants Set relies on no direct measure of mortality. Rather, the three proposed indicator sets incorporate factors that emphasize improvements in the quality of life as well as increases in the years of healthy life. These include measures of the physical environment, socioeconomic and educational factors, primary prevention of disease, societal factors, and health care system variables that ensure early detection and treatment of disease. This shift in focus away from measures of mortality reinforces the view that a wide variety of social, environmental, and behavioral factors play a major role in increasing the quality and years of healthy life.

Elimination of Health Disparities

There can be no argument that equity of health status, health outcomes, and health quality of life does not exist among all of the diverse populations in the United States. The burden of illness and death is disproportionately greater in some racial and ethnic groups, among those with lower incomes, disabled populations, gender groups, and across the age spectrum. Higher disease incidence rates and poorer rates of survival for many illnesses, higher levels of exposure to adverse social and environmental risk factors, and decreased access to medical and preventive interventions all contribute to the disproportionate rate of negative health outcomes in diverse population groups. *Healthy People 2000* attempted to address this issue by establishing an overarching goal of reducing disparities in health among the members of the U.S. population. Differential targets for specific objectives within the 22 priority areas of *Healthy People* 2000 were established for high-risk groups. These differential targets for different population groups had the effect of promoting attention to between-group differences but generally failed to move the health of high-risk groups to equity with the health of those populations who have benefitted from the best rates of morbidity and mortality from disease. In fact, data from the *Healthy People 2010 Review, 1997* (National Center for Health Statistics, 1997) identified 95 objectives for which health disparities were equal to or greater than 25 percent or more between the general population and at least one target population group defined by racial or ethnic origin, socioeconomic status, disability, age, gender, and geographic location.

The second overarching goal of *Healthy People 2010* moves beyond the reduction of disparities in health to the elimination of such disparities for racial and ethnic minority groups, gender groups, socioeconomically disadvantaged people, disabled people, and people in specific age groups. One underlying motivation for this important conceptual change was the hope that it would focus even greater attention on health disparities and promote development and implementation of an increased number of effective interventions that would address health disparities and ensure equity in health outcomes. This emphasis on the elimination of health disparities is also consistent with the national commitment to the elimination of health disparities between racial and ethnic minority groups by 2010 in six areas: (1) infant mortality, (2) cancer screening and management, (3) cardiovascular disease, (4) diabetes, (5) human immunodeficiency virus infection and AIDS, and (6) childhood and adult immunizations.

To meet the goal of the elimination of health disparities by 2010, a variety of changes to the manner in which research on health determinants and health interventions is conducted must be made. First, there must be an emphasis on epidemiological studies to determine disease factors that contribute to higher risk for specific diseases such as prostate cancer in African-American men, cervical cancer in Vietnamese women, breast cancer in white women of higher socioeconomic status, and diabetes in Hispanic subgroups. An expanded knowledge base about effective, culturally sensitive interventions for the prevention, detection, and treatment of disease must also be developed. The interventions must be responsive to the unique educational and motivational needs of different population groups. Correct identification of at-risk groups and evaluation of interventions targeted toward these groups will require improvements in the collection and monitoring of standardized data. Finally, all people must have equal levels of access to the health care system. Such enhanced access has the potential to increase the likelihood of disease prevention through patient counseling and education, early detection of disease through screening, and provision of state-of-the-art disease treatment and management.

Each of the three proposed indicator sets addresses many of the above cited social, cultural, and economic issues that are critical determinants of the elimination of health disparities. For example, measures of income, educational attainment, and access to health care for disease prevention, detection, and treatment are included in one or more of the sets. An indicator that monitors the number of preventable deaths from unintentional and intentional injury is also included in two of the three sets. It is a particular strength that

the three proposed indicator sets focus on some of the most significant determinants of health disparities as well as the six priority areas of the President's Initiative on Race (1997), and the U.S. Department of Health and Human Services' initiative, *Eliminating Racial and Ethnic Disparities in Heath* (U.S. Department of Health and Human Services, 1998a).

The actual content and wording selected to express the indicators to many different groups will be of equal or greater importance to the elimination of health disparities. If the leading health indicators are to accomplish their three primary goals (promote awareness and understanding, motivate actions, and provide ongoing feedback about progress toward improving the status of the indicators), it will be of critical importance to express them in language that speaks directly to the general population and its many diverse population groups. Currently, the three sets of recommended indicators rely on phrasing that is more familiar to the professionals in the public and private health care systems as well as proponents of the general concept of *Healthy People*. Preliminary qualitative research that assesses consumers response to the proposed leading health indicator sets will be funded and conducted by a private health care foundation during spring and summer, 1999. The results of that work will specifically address the three primary functions of leading health indicators (noted above) and elicit consumer impressions of their ability to fulfill these functions. Participants in this research will at least include members of diverse age, gender, racial and ethnic, socioeconomic and geographic locales.

Results from the initial data collection efforts on public reactions to the three proposed indicator sets will be provided to the U.S. Department of Health and Human Services by fall 1999 and would guide efforts to further refine for consumer evaluation and acceptance of the indicators within the selected set. This committee suggests that such work be conducted by the U.S. Department of Health and Human Services or its designee. This second level of evaluation should focus on the actual language and strategies that will be used to convey information about the leading health indicators to the target population groups established for *Healthy People 2010*. For example, results of this research might suggest the following action statements as the most effective language to communicate to the general population and diverse population groups about the indicators contained for the Life Course Determinants Set.

1. Don't smoke; if you do smoke, quit.
2. Get regular exercise.
3. Explore employment and training opportunities in your community.
4. Don't use alcohol or illegal drugs, especially when driving.
5. Enroll your child in Head Start.
6. Make sure your children get the immunizations they need to keep from getting sick.
7. Make sure our young people don't die at a young age from accidents, violence, or suicide.
8. Get health insurance, if you can, and find a doctor who knows you and can take care of you on a regular basis.
9. Get help early from agencies in your community to help you handle any physical, mental, or developmental problems your or your family members might have.

Alternative wording and presentation styles should also be explored and tested for the Health Determinants and Health Outcomes and Prevention Oriented Sets. This will help to ensure that the messages about each indicator in the selected leading health indicator set for *Healthy People 2010* are conveyed in ways that elicit the public's attention and motivate them to act on their behalf and that of others.

Integration of the proposed leading health indicators with the overarching goal of the elimination of health disparities will also be achieved by the process of data collection, analysis, and reporting. Specifically, data sets that provide information about indicators in the chosen set of leading health indicators

for each of the five primary population groups that are targeted (groups stratified by race and ethnicity, gender, disability, socioeconomic status, and age) will be identified or their development will be recommended. Furthermore, all data analysis for the monitoring of changes in the indicators will include the total population and at least each of the five groups. It may also be necessary to recommend that the availability and quality of data be determined for a second tier of population groups currently under consideration by the U.S. Department of Health and Human Services including, educational attainment, geographic location, and sexual orientation. When data are available for these additional groups, they should be included in all subgroup analyses of the indicators within the chosen set.

Methods for the reporting of results of these analyses should extend beyond traditional public health publications and public media to include communications strategies that are known or determined to be effective in disseminating messages to the general population as well as diverse population groups. Communications can be expanded through the following: (1) the popular print and electronic press; (2) national, state, local, and community publications; (3) various channels through which the important messages can be delivered (for example, interpersonal versus personal and print versus electronic media); (4) the publications of selected groups; and (5) identification of appropriate sources through which key findings can be disseminated, such as community leaders, ministers, businesses, schools, and institutions of higher education. Dissemination strategies for reporting on the leading health indicators are discussed in greater detail in Chapter 3.

Enabling Goals

Four enabling goals have been established for *Healthy People 2010*: (1) improve systems for personal and public health, (2) promote healthy behaviors, (3) prevent and reduce diseases and disorders, and (4) promote healthy communities.

Integration of the proposed leading health indicator sets with each of these four enabling goals is readily apparent upon review of the indicators within each of the three proposed sets. For example, the Health Determinants and Health Outcomes Set includes three indicators directed to the improvement of systems for personal and public health (poverty, health insurance, and high school graduation). Promotion of healthy behaviors is exemplified by the tobacco use and weight indicators. Prevention and reduction of diseases and disorders includes the indicators preventable deaths, cancer screening and cancer detection. Finally, healthy communities are addressed by the physical environment indicator. Table 4.1 provides an overview of the relationship between indicators in the proposed Health Determinates, and Health Outcomes set and the four enabling goals of *Healthy People 2010*.

Congruence with the enabling goals and the suggested indicators also exists for the Life Course Determinants Set. The health care access and poverty indicators are representative of systems for personal and public health, whereas substance abuse, exercise, and tobacco can be linked to the promotion of healthy behaviors. Prevention and reduction of diseases and disorders is represented by the low birth weight and disability indicators. The cognitive development indicator addresses the enabling goal of the promotion of healthy communities. Table 4.2 describes the specific indicators in the LCD set that match with each of the four enabling goals.

Table 4.1 Congruence of Health Determinants and Health Outcomes Set With Four Enabling Goals

Indicator	Promote Healthy Behaviors	Promote Healthy Communities	Prevent and Reduce Disease and Disorders	Improve Systems for Personal and Public Health
Physical environment		X	X	X
Poverty		X		X
High School graduation		X		X
Tobacco use	X	X	X	
Weight	X		X	
Physical activity	X		X	
Insurance	X	X	X	X
Cancer detection			X	X
Preventable deaths due to injury	X	X	X	X
Disability	X	X	X	X

Table 4.2 Congruence of Life Course Determinants Set with Four Enabling Goal

Indicator	Promote Healthy Behaviors	Promote Healthy Communities	Prevent and Reduce Disease and Disorders	Improve Systems for Personal and Public Health
Substance abuse	X	X		
Poverty		X		X
Physical activity	X		X	
Health care access	X	X	X	X
Cognitive development	X	X	X	
Violence		X	X	
Disability		X	X	X
Tobacco use	X	X	X	
Low birth weight			X	X

Relationships between the four enabling goals and the indicators for the Prevention-Oriented Set can also be identified. Specifically, the health care access and poverty indicators link with systems for personal and public health. Tobacco use is representative of the second enabling goal of the promotion of healthy behaviors. Prevention and reduction of diseases and disorders will include the childhood immunization, hypertension screening, cancer screening, diabetes management, disability, and preventable death indicators. Finally, the indicator healthy communities is represented by the poverty indicator. Table 4.3 summarizes the relationships between the indicators of the Prevention Oriented set and each of the four enabling goals established in for *Healthy People 2010*.

Table 4.3 Congruence of Prevention Oriented Set with Four Enabling Goals

Indicator	Promote Healthy Behaviors	Promote Healthy Communities	Prevent and Reduce Disease and Disorders	Improve Systems for Personal and Public Health
Poverty	X	X		
Tobacco use	X	X	X	
Childhood immunization	X	X	X	X
Cancer screening		X	X	X
Hypertension screening		X	X	X
Diabetes Management			X	X
Health care access		X	X	X
Disability		X	X	X
Preventable deaths due to injury			X	X

Healthy People 2010 Focus Areas, Measurable Objectives, and Developmental Objectives

The three proposed indicator sets are intended to provide an ongoing assessment of the health of the U.S. population and its diverse population groups. However, it will also be important to ensure that the leading indicators are reflective of and coordinated with the overall *Healthy People 2010* plan. In order to meet this challenge, indicators within each of the three proposed sets represent 1 or more of the 26 focus areas selected for *Healthy People 2010*. Whenever possible, selection of indicators has been coordinated with the quantifiable and developmental objectives established for each of the 26 focus areas. Routine analysis and reporting on the selected leading health indicator set will be supplemented by less frequent but more detailed levels of analysis and reporting for each of the 26 focus areas. In addition, the dynamic nature of the *Healthy People 2010* plan must be recognized. As the decade is marked by advances in science, changes in the demographics of the U.S. population, social change, improvements in the health care delivery system, improvements in communications strategies, especially those for diverse population groups, and progress toward attainment of the quantitative and developmental objectives within the 26 focus areas, the U.S. Department of Health and Human Services must ensure that appropriate changes are incorporated into the relevant dimensions of the selected leading health indicator set.

5

Crosscutting Data Issues for Leading Health Indicator Sets

DATA SOURCES FOR PROPOSED LEADING HEALTH INDICATOR SETS

As noted previously, data are the foundation of *Healthy People* (U.S. Department of Health and Human Services, 1998a). The availability of data is requisite for implementation and evaluation of the entire *Healthy People 2010* initiative and, in particular, for the leading health indicator component to ensure ongoing assessment of each indicator. Regular monitoring of and reporting on the relevant data sets will ensure that information about the selected set and its indicators is available to inform the public about and maintain the awareness of the indicators in the mind of the public.

Currently, more than 200 data sets contribute to an electronic database, the DATA2000 Monitoring System, that was established for *Healthy People 2000* and that is maintained by the Centers for Disease Control and Prevention. The DATA2000 Monitoring System is a component of the Centers' WONDER system and contains the national baseline and monitoring data for all measurable objectives established for *Healthy People 2000*. It is expected that the DATA2000 Monitoring System will be updated to include all of the measurable objectives contained in *Healthy People 2010*. It will also be imperative to ensure that data for each of the indicators in the selected set are incorporated into the updated version of the DATA2000 Monitoring System.

The general public currently has access to the DATA2000 Monitoring System through the Internet (http://www.cdc.gov/nchswww/datawh/cdcwond/d2000ms/d2000ms.htm), and detailed statistical summary reports are published in the National Center for Health Statistics' *Healthy People 2000 Statistical Notes* (http://www.cdc.gov/nchswww/default.htm). These, however, are not considered viable strategies for effective, broad-based communication of important results pertaining to progress toward the specific leading health indicators in the selected leading health indicator set. The content and format of the *Statistical Notes* publications are best suited for professionals involved in the public and private health care delivery systems. As such, they are very unlikely to inform the public about leading health indicators. Furthermore, although access to the Internet is quickly expanding, many populations such as elderly people, racial or ethnic minority groups, and groups of lower socioeconomic status may be less likely to know about the Internet, may have no or limited access to the Internet, and may not consider results from the DATA2000 Monitoring System to be of personal relevance or pertinence. Consequently, alternative strategies for the reporting of results from the DATA2000 Monitoring System will have to be developed.

The U.S. Department of Health and Human Services maintains the primary data sets that contribute to the DATA2000 Monitoring System. These include the following:

1. vital statistics,
2. National Health and Nutrition Examination Survey,
3. National Health Interview Survey,
4. Youth Risk Behavior Survey,
5. Primary Care Provider Survey,
6. National Survey of Worksite Health Promotion Activities,
7. National Survey of Family Growth,
8. Behavioral Risk Factor Surveillance Survey,
9. National Household Survey on Drug Abuse,
10. National Hospital Discharge Survey,
11. National Notifiable Disease Surveillance System, and
12. National Immunization Survey.

A brief description of the 12 data sets is provided in the publication *Leading Indicators for Healthy People 2010* (U.S. Department of Health and Human Services, 1998aa). These descriptions provide information about the purpose of the survey, the general content and format of the survey method of data collection, and the periodicity of data collection efforts. More detailed information is available from the U.S. Department of Health and Human Services and the particular agencies responsible for each data collection effort. It is expected that these 12 data sets will play a lead role in providing ongoing monitoring of the proposed leading health indicators for the U.S. Department of Health and Human Services. Each of the 12 data sets have been or will be modified to comply with current federal policies about the collection and reporting of race and ethnicity data. This is of critical importance to ensure that the appropriate subgroup analyses can be completed for the leading health indicators.

Additional federal databases may contain data that inform the proposed leading health indicator within the chosen set, such as motor vehicle accident rates, injuries, and deaths as a subset of preventable morbidity and mortality (National Traffic Safety Board), occupational injuries and deaths as a subset of preventable morbidity and mortality (U.S. Department of Labor), environmental data (Environmental Protection Agency), tobacco consumption patterns (Internal Revenue Service), the level of dissemination of information to patients about primary prevention behaviors such as exercise and immunizations (National Ambulatory Medical Care Survey), and levels of education (U.S. Department of Education). Succinct summaries of these and many other potential data sources that can be used to inform the proposed leading health indicators can be found in a number of recent publications including *A Compendium of Selected Public Health Data Sources* (U.S. Department of Health and Human Services, 1996), *Key Monitoring Indicators of the Nation's Health and Health Care and Their Support by NCHS Data Systems* (Lewin-VHI, 1995), and *Data Sources for Monitoring Progress Toward the Year 2000 Objectives for the Nation* (Research Triangle Institute, 1990a, b).

Identification of the specific data sets that will be used to quantify the baselines and targets for the leading health indicators in the selected set is beyond the scope of this report for several reasons: (1) data will be available from multiple sources and it will be necessary to select the best data set(s) to inform each of the indicators; (2) the final format, structure, and language for each of the indicators and the selection of effective communications strategies will be determined only after one of the three proposed indicator sets is chosen; (3) the availability of data at the national, state, local, and community levels may be subject to change; and (4) reliability and validity of data for each of the indicators must be determined. Each of these issues is discussed in greater detail below.

First, among the eligible data sets, more than a single data set can capture information about specific indicators by different methodologies and sampling techniques. For example, information about cancer

screening behaviors can be provided by the Behavioral Risk Factor Surveillance Survey, National Health and Nutrition Examination Survey, Primary Care Provider Survey, and the Medicare Current Beneficiary Survey (U.S. Department of Health and Human Services, 1998aa). Similarly, the practice of healthy behaviors such as rates of exercise, non use of tobacco, and non use of illicit substances by the general population or specific age cohorts can be quantified by results from the National Health and Nutrition Examination Survey, Youth Risk Behavior Survey, Behavioral Risk Factor Surveillance Survey, National Survey of Worksite Health Promotion Activities, National Survey of Family Growth, and National Household Survey on Drug Abuse. Actual selection of the appropriate data sets for each leading health indicator within a set will best be accomplished in cooperation with federal personnel associated with the design and administration of these diverse surveys and the National Center for Health Statistics because these individuals will have the greatest familiarity with the strengths and limitations of each data set.

In addition, results from the research recommended by this committee will be used to finalize the actual format, structure, and language for the each of the leading health indicators and develop effective strategies to support their dissemination to the public. Results from this research will not be available for several months. In the absence of information about issues such as placement of the indicators within a set (which might imply prioritization to the public) or the final language chosen to ensure broad communication of the indicators and their measures to the general public and diverse population groups, it is premature to select a specific survey or surveys to provide the requisite data on measurable indicators. Similarly, it would be premature to recommend new data collection initiatives.

The ability of existing surveys to include data availability at the national, state, local, and even census tract levels may also be subject to change. Such changes might be predicated on the mandate to ensure adequate representation of target populations in meaningful subanalyses according to racial and ethnic minority group, gender group, age group, income group and disability status. Survey content and sampling frame are two dimensions that could be significantly altered to respond to this mandate. Similarly, the age adjustment modification from 1940 to 2000 has the potential to affect the distribution of populations within the sampling frames for each survey. These two factors pose significant challenges to the selection of specific surveys for use in the measurement of individual leading health indicators.

Finally, reliable and valid data on indicators that might reflect social norms or a bias to give the best or most socially acceptable answers on topics such as income, level of educational attainment, disabilities associated with mental health, and substance abuse are not readily available from the 12 major sources of data. This suggests that these surveys will require evaluation and modification to ensure the validity of the data for these indicators or that new data collection efforts will be required to begin to collect this information. It is likely that survey modification will best be undertaken for some indicators, whereas new data collection efforts will be appropriate for others. It is premature to select data sources for the proposed leading indicators until decisions are made about the best way to resolve these issues and until the appropriate modifications to data sets are complete.

GENERAL DATA ISSUES FOR PROPOSED LEADING HEALTH INDICATOR SETS

Data Quality

As new and existing data sources are considered for the leading health indicators for *Healthy People 2010* a number of overriding issues will warrant careful consideration. First, the quality of the data will merit intense scrutiny, particularly for those efforts that are based on new or expanded data collection initiatives. Compromises to data quality can occur at multiple levels including the operationalization of

measures, uniformity in structure and content of specific questions, adherence to standardized methods of data collection and recording, and adherence to standardized methods for data management and analysis.

Limitations of Self-Reported Data

It will also be important to recognize that the majority of existing potential data sets that might be used to measure the leading health indicators rely on either telephone, in-person, or mail surveys. Although, these are scientifically sound, credible, and well-established methods of data collection, they may be vulnerable to biases inherent in self-reporting. Consequently, specific indicators of health promotion and health protective behaviors as well as some social determinants of health such as income and education that may be susceptible to self-reporting biases may benefit from new data collection efforts that do not rely on self-reporting or third-party confirmation of self-reported findings.

Data Validity and Reliability

In addition, attention must be given to factors that might affect the validity and reliability of the data collected for specific indicators. It will be essential to establish the construct validity of data for each of the leading health indicators, especially those that will rely on new data collection efforts. Further consideration must also be given to the reliability of the data collected on the leading health indicators. The issue of the validity of responses over time will be of particular significance to the success of efforts intended to establish ongoing monitoring and feedback to the public regarding each indicator. It is likely that many of the proposed indicators will rely on data from sources that are well established and that have been evaluated for their scope of representation as well as validity and reliability. However, if specific questions in existing data collection efforts require modification or if new data collection efforts must be established to inform the selected leading health indicator set accurately, the representativeness of sampling frames along with the validity and reliability of new questions will have to be determined before application of the data to that indicator set.

Periodicity of Data Availability

The periodicity or frequency with which data for certain indicators will be available will also be of concern. Data collection efforts may not be performed at sufficiently frequent intervals, and thus, information will not be available to measure specific indicators on a routine basis. Inconsistencies in the frequency of data collection affects both federal and nonfederal sources. For example, the National Health and Nutrition Examination Survey was most recently conducted during the interval from 1988 to 1994; the next National Health and Nutrition Examination Survey will begin in 1999. Consequently, this survey will be of limited value in providing ongoing information for some of the proposed leading health indicators as will the National Health Interview Survey, which has a lag time for data reporting and which contains supplementary questions that are not asked on an annual basis. Variable reporting frequencies have the potential to undermine dissemination efforts to ensure that the leading health indicators will achieve and maintain a constant level of public awareness and provide ongoing feedback about progress toward achieving the indicator targets.

Timeliness of Data Availability

The timeliness of data availability will be essential to ensure that the indicators are updated and presented at a regular frequency to the public to maintain a constant level of awareness that will, in turn, motivate changes in communities, health systems, and individual behaviors. Such regular data updates will also establish the necessary feedback that will underscore the need for the intensification or redirection of efforts to achieve specific targets for the various indicators. Current schedules for the collection, analysis and reporting of data for existing data sets may present a challenge to the achievement of regular updates on the status of the leading health indicators. For example, the provision of final vital records data may take up to 3 or 4 years following the year in which the data were actually collected. In fact, final vital statistics data for 1995 became available only in 1998. If this remains the case, vital statistics will be of limited utility in providing the necessary updates on leading health indicators associated with mortality, natality, and social variables. Consequently, those involved in analysis of and reporting on data for the leading health indicators will have to rely on alternate sources of data that can be readily available within the shortest amount of time possible without compromises to validity or reliability.

Representativeness of Data

It will also be essential to consider the representativeness of survey data obtained from statistical samples that will be used to monitor each of the leading health indicators. This is a particular threat to analyses that will be required to characterize the status of specific population groups for the selected indicators. Most national sample surveys have complex sampling frames, and this complexity must be addressed during the data analysis phase to ensure valid estimates on the performance of specific leading health indicators for the general population as well as diverse population groups. Personnel involved with the actual analysis of data for multiple demographic and health status groups as well as multiple jurisdictions (the national, state, local, and community levels) will have to be well versed in the specific strengths and weaknesses of the specific sampling frames for all existing and new surveys that will contribute data to be used in the monitoring of the leading health indicators.

Small-Area Analysis

Leading health indicators based on population-based survey data, health care expenditure data, or vital records will be of great value with respect to characterization of the overall health status of the nation. However, the indicators are also expected to be informative at the state, local, and community levels for diverse populations including racial and ethnic minorities, and groups categorized by gender, age, socioeconomic status, and disability status. Some of the data sets that contribute data to the DATA2000 Monitoring System may be pertinent to smaller geographic areas, such as measures of common occurrences (e.g., all causes of mortality or live births) and those that are collected at frequent intervals (national and state estimates provided by the monthly Behavioral Risk Factor Surveillance Survey). However, statistical justification will be extremely weak if efforts are made to infer to smaller localities findings representative of specific leading health indicators from national sample survey data. Assurances about the statistical stability of specific indicators also will not be possible when the number of events in a given time period and jurisdiction is small. It will be important to inform the public about the limitations of such data sets to prevent the inappropriate generalization of national findings to state, local, or even community levels. It will

be equally important to identify alternate sources of similar information that will accurately support local level analyses and to develop new data collection efforts that will be conducted as local or community-based surveys with effective linkages to data management systems for the leading health indicators. Some mechanisms that can address these limitations and that can handle requests for data about specific leading health indicators from local jurisdictions and interest groups include the following:

1. federal support and technical assistance for efforts to conduct national surveys that are relevant to the leading health indicator sets at the state, local, and community levels and for diverse population groups;
2. federal support and technical assistance for identification of and statistical improvements to existing state, local, and community risk factor, vital records, or survey data that might be relevant to one or more indicators;
3. provision of indicator information from geographically, socially, or demographically similar population surveys;
4. development and dissemination of statistical "tool kits" that would assist state, local, and community health authorities and interested groups to extrapolate national statistical information to the demography of the local population; and
5. education in analytic techniques that would support summarization of existing state, local, and community information over longer but more statistically secure intervals, such as "rolling averages."

To summarize, significant work needs to be undertaken by the U.S. Department of Health and Human Services following selection of a set of leading health indicators for *Healthy People 2010*. First, data sets that will be appropriate for the measurement of each of the indicators within the chosen set must be selected and evaluated on the basis of a number of dimensions including the quality of the data, limitations of self-reported data, data validity and reliability, periodicity and timeliness of data availability, the representativeness of the data, and the ability of the data to be used for small-area analyses. Of equal importance will be the determination of appropriate intervals for collection, methods of analysis, and frequency of reporting on results for each of the indicators. It would be best if the collection of data on each of the indicators were to occur on an ongoing basis rather than to be tied to surveys that obtain data at only a simple point in time. Furthermore, methods of data analysis should be defined at the outset and should be adhered to during the course of implementation of the selected leading health indicator set. Consistency of analysis will help to ensure that the same information about each indicator is available to be reported to the public. Finally, careful consideration of the appropriate time intervals of reporting on the indicators to the public will be required. Reporting at intervals that are too frequent may make it difficult for the public to perceive any significant or meaningful change in the indicators. In contrast, delayed reporting on the indicators to every 1 or 2 years may increase the likelihood that the public will lose awareness of the indicators and motivation to act on them.

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Conclusions and Recommendations

The committee has drawn upon the diverse experiences and expertise of its members to provide the U.S. Department of Health and Human Services with three leading health indicator sets including the Health Determinants and Health Outcomes Set, the Life Course Determinants Set, and the Prevention-Oriented Set. The committee has made every effort to ensure that these proposed indicator sets were responsive to the original charge from the Department as well as the comments and suggestions received through the mail, electronic mail, regional meetings, and public hearing. The committee strongly endorses the need for a single, small set of leading health indicators that could reflect progress toward the health goals of the nation.

Such a small set of leading health indicators has the potential to significantly increase the impact of *Healthy People 2010* by establishing a focus for national attention, generating cues to action, and providing feedback concerning progress toward achievement of improvements in the status of each leading health indicator. Leading health indicators can be considered focal points that direct efforts to improve the health of all of the many populations of the United States and that also serve as barometers of change in the major areas of health behaviors, health outcomes, and health disparities. Selection of a leading health indicator set will allow the public and members of the public and private health care communities to focus on a limited number of issues that have meaning and relevance to the general public, public and private policymakers, and health and science professionals. Furthermore, a small set of leading health indicators can create a national identity for the full-scale implementation of *Healthy People 2010* and expand the traditional *Healthy People* community to include a broad membership of population groups and community organizations.

The committee recommends that the U.S. Department of Health and Human Services select a set of leading health indicators from among the three proposed sets and fully support the implementation of the selected indicator set for the duration of the decade.

The committee recognizes the difficulty of the task to select a single set of leading health indicators for *Healthy People 2010*. Political and/or policy issues may motivate the U.S. Department of Health and Human Services to change indicators within the three proposed sets to form a different set of leading health indicators. The committee does not advocate for efforts by the U.S. Department of Health and Human Services to develop alternative sets of indicators especially those that might be comprised of different indicators from each of the three proposed sets. The three sets are based on unique conceptual frameworks and integration of indicators between sets would likely compromise the internal validity of each of the sets. If the U.S. Department of Health and Human Services must consider altering the indicators within a set, the committee strongly urges that it is done in such a manner that does not compromise the internal validity of the conceptual frameworks supporting each of the three sets.

Achieving the laudable goals of the leading health indicator effort to promote the health of the U.S. population will be difficult unless department efforts to promote, evaluate, and disseminate the leading health

indicator set are maintained and strengthened. The committee offers five suggestions for steps to be taken by the department that will support the implementation of the leading health indicator effort. These include

1. development and maintenance of collaborations with partner agencies and organizations,
2. commitment of adequate resources and effort to disseminate and monitor the selected set of indicators for the entire course of *Healthy People 2010*,
3. health disparities,
4. inclusion of poverty as an indicator or stratification variable, and
5. general data issues, including data analysis at multiple jurisdictional levels.

Interagency Collaborations

Leading health indicators will be strengthened by continued and expanded collaborations between the U.S. Department of Health and Human Services with other federal agencies (e.g., the Environmental Protection Agency, U.S. Department of Labor, U.S. Department of Education, U.S. Department of Housing and Urban Development), the business and labor communities, private-sector agencies, voluntary organizations (e.g., the American Diabetes Association, the American Heart Association, and the American Lung Association), state and local health departments, and community-based groups with a shared goal of improving the health of their communities and thereby improving the health of this nation's population. In the absence of such a commitment by the department, it is highly likely that the leading health indicator effort will be unsuccessful as it has been in the two previous decades of *Healthy People*.

COMMITMENT OF ADEQUATE RESOURCES AND EFFORT FOR DISSEMINATION OF INDICATOR SET

The committee strongly urges the U.S. Department of Health and Human Services to carry forward this concept of leading health indicators for the duration of *Healthy People 2010*. Achievement of the full potential for the selected set of indicators will rest squarely on the shoulders of the department and will require allocation of sufficient resources to (1) disseminate knowledge about the leading health indicator set to the general population and its diverse population groups; (2) support efforts at the national, state, local, community, and individual levels to intervene upon the suggested indicators; and (3) ensure ongoing data collection efforts at the national, state, local, and community levels that will permit the monitoring of changes in the indicators through the course of the decade. The committee urges the department to develop a comprehensive plan for the communication and dissemination of information related to the leading health indicators. Such a plan should be responsive to the needs of diverse population groups and should include both traditional and innovative communications strategies to bring about changes in health behaviors. The committee reiterates the imperative for the Department to select an indicator set and fully commit to design and implementation of communications and dissemination plans, implementation of interventions, and monitoring progress toward each indicator target within the chosen set.

HEALTH DISPARITIES

Enormous disparities in health status and disease outcomes continue to exist between various population groups in the United States. For example, there is overwhelming evidence that racial and ethnic minority groups are more likely to suffer from certain diseases (e.g., some cancers), and when they are diagnosed with these conditions, they are more likely to die prematurely or suffer untoward consequences at a greater rate than the population as a whole. The critical problem and the opportunity for the United States in this regard are to fully understand the dimensions of the disparities that exist and then to make the appropriate commitments to act to reduce those disparities. Furthermore, in reducing and eliminating health disparities, the essential thrust of the nation's efforts must be to raise everyone to the highest standard of health rather than to seek some lower common denominator.

The concept of leading health indicators is one that can capture the imagination of the nation as a whole and lead to actions at the federal, state, local, and community levels to improve the overall health status of the nation's populations. The committee believes, however, that it can be equally effective in bringing attention to and action to bear upon the disparate experiences of certain population groups. This is consistent with the commitment by the Clinton Administration as a whole and the U.S. Department of Health and Human Services to address the issues of disparities in the health of the population as a major policy focus in the coming decade. To be useful to this larger initiative of the administration, the committee strongly urges that the selected set of leading health indicators be tracked and measured in such a way as to ensure that sufficient information is collected to yield valid and reliable results that describe disparities in the health of the population and monitor changes in these disparities over the course of the decade.

Plans are currently underway to track all objectives established for *Healthy People 2010* and the leading health indicators in such a way as to obtain data for the nation as a whole and for certain subgroups of the U.S. population. The committee applauds this effort and urges the U.S. Department of Health and Human Services to ensure the availability of meaningful data on a consistent, timely, and periodic basis to examine disparities among the following population groups: (1) racial and ethnic minorities, (2) population groups defined by income, (3) population groups defined by age, (4) population groups defined by gender, (5) population groups with disabilities, (6) population groups defined by sexual orientation, (7) population groups defined by educational attainment, and (8) population groups defined by geographic locale.

Racial and Ethnic Minorities

As a minimum standard, data on census-defined racial and ethnic groups should be collected with particular attention given to African Americans, Hispanic Americans, Caucasians, Native Americans, Pacific Islanders, and Asian Americans. Strong consideration should be given to further breaking down the data for some of these groups to detect evidence of clear health status differences among subgroups of these racial and ethnic populations. For example, differences in rates of practice of high-risk behaviors such as tobacco use or substance abuse could be examined for Hispanic Americans as a whole as well as for groups of Hispanic origin from Cuba, Central America, Mexico, South America, and Puerto Rico. Similarly, differential rates of cervical cancer incidence could be determined for women from various regions of Asia.

Populations Defined by Income

As a minimum, data should be collected to distinguish between those with total family incomes that fall below 100 percent of the federal poverty level. It might also be informative to examine income differentials at 150 and 200 percent of the federal poverty level since these cut off points are often used as criteria for determination of eligibility for social services and subsidized health care. In addition, the committee believes that strong consideration should be given to distinguishing between those with and those without health insurance coverage for analyses of all indicators.

Populations Defined by Age

Data should be collected to assess disparities and trends across standard, census-defined age categories. In particular, indicators that apply to children, youth, and elderly people should capture any disparities that exist between these age cohorts and the general population. This particular focus on these three age groups reflects the importance of examining disparities in specific indicators for population groups that are often dependent on others for their daily well-being and care.

Populations Defined by Gender

When appropriate, gender-specific disparities should be analyzed, with particular attention given to disparate rates of disease incidence, management, and survival as well as gender-based variations in the practice of specific health behaviors that could increase or decrease the risk of certain health conditions.

Populations with Disabilities

Data should be collected to assess disparities and trends across populations with disabilities. In particular, indicators that apply to health care access, health insurance, health promotion and risk reduction behaviors, and health outcomes should be examined for population groups with different levels and kinds of disabilities. Comparisons of the status of specific indicators should also be made to the general population. Inclusion of people with disabilities is important to provide analyses of disparities in specific indicators for population groups that are often dependent on others for their daily well-being and care.

Populations Defined by Sexual Orientation

Some indicators address issues that may be closely linked to sexual orientation. For example, among teenagers who commit suicide, a high proportion occurs among homosexual teenagers. When such disparities exist, the committee strongly urges that data be collected to ensure a full understanding of the factors that contribute to the differences between heterosexuals and homosexuals.

Populations Defined by Educational Attainment

As a minimum, data should be collected to distinguish between those who have and those who have not graduated from high school. Analysis of the indicators according to census-defined educational categories is suggested. In addition, the committee believes that analyses should examine the degree of correlation between educational attainment, socioeconomic status and indicators reflective of risk behaviors.

Populations Defined by Geographic Locale

Data should also be collected to identify disparities in health determinants, behaviors, and outcomes that occur on a regional basis throughout the United States. This level of analysis will have particular relevance to indicators associated with health care access, socioeconomic status, and certain risk behaviors such as tobacco use and substance abuse. As a minimum, analyses of geographic disparities should permit comparisons of urban and rural areas.

Exclusion of Specific Indicators of Health Disparities

In making its selection of candidate indicators for each of the three proposed sets, the committee debated the wisdom of including separate indicators that would focus on health disparities in the general population. It chose not to do so and, instead, urges that every indicator that it has proposed be tracked, as appropriate, for each of the population groups noted above. The committee members agree that the latter approach will more effectively address efforts to eliminate health disparities.

POVERTY AS A LEADING HEALTH INDICATOR

Committee members agreed unanimously that socioeconomic status and that poverty in particular are critical determinants of health and disparities in health behaviors and outcomes. Committee members had differing opinions, however, about whether a measure of poverty or socioeconomic status should be included in the proposed sets of leading health indicators. This represented an awareness that social issues such as poverty are outside the purview of the public and private health communities.

The committee recognizes that inclusion of a direct measure of poverty in each of the three proposed sets of leading health indicators may fall beyond the scope of the efforts of the U.S. Department of Health and Human Services. In the absence of a leading health indicator reflective of socioeconomic status, the committee strongly urges analysis of every indicator with socioeconomic status or income level as stratification variables. This will ensure that health disparities attributable to variations in socioeconomic status are identified, monitored, and corrected, if possible.

GENERAL DATA ISSUES AND ANALYSIS AT MULTIPLE JURISDICTIONAL LEVELS

General Data Issues

Significant work needs to be undertaken by the U.S. Department of Health and Human Services following its selection of a set of leading health indicators for *Healthy People 2010*. First, data sets that will be appropriate for the measurement of each of the indicators within the chosen set must be selected and evaluated on the basis of a number of dimensions including the quality of the data, limitations of self-reported data, data validity and reliability, periodicity and timeliness of data availability, representativeness of the data, and the ability of the data to be used for small-area analyses. Of equal importance will be the determination of appropriate intervals for data collection, methods of data analysis, and frequency of reporting on results for each of the indicators. It would be best if the collection of data on each of the indicators were to occur on an regular basis rather than to be tied to surveys that obtain data at only single points in time. Furthermore, methods of data analysis should be defined at the outset and should be adhered to during the course of implementation of the selected leading health indicator set. Consistency of analysis will help to ensure that the same information about each indicator is available to be reported to the public. Careful consideration of the appropriate time intervals of reporting on the indicators to the public will also be required. Reporting at intervals that are too frequent may make it difficult for the public to perceive any significant or meaningful change in the indicators. In contrast, delayed reporting on the indicators to every 1 or 2 years may increase the likelihood that the public will lose awareness of the indicators and motivation to act on them.

Analysis at Multiple Jurisdictional Levels

One of the four enabling goals used to organize the objectives in *Healthy People 2010* is the promotion of healthy and safe communities. This is an important goal and one that is increasingly recognized in activities and publications such as the *Healthy Communities 2000: Model Standards*, and in the Community Health Improvement Process (CHIP) recommendations in the Institute of Medicine's recent report *Improving Health in the Community* (American Public Health Association, 1991; Institute of Medicine, 1997). The work of these groups suggests that communities respond to data that reflect their own particular situation. Most communities, however, have local data on only a few health issues, such as mortality, hospitalizations, childhood immunization rates, and cases of reportable diseases. Unless the local community has organized and funded special surveys or research, it will typically have no information about local rates of health protective or risk-taking behaviors, the prevalence of mental illness or disabilities, or even the number of people in the community without health insurance or a regular source of primary care.

This lack of local information can cause two serious problems. First, in the absence of such information about their own community, citizens and policymakers are far less likely to see something as important enough to merit the use of their resources or tax dollars. For example, local school officials or parents generally do not find national data on drug use among adolescents to be sufficiently convincing to prompt them to develop a substance abuse intervention program for their own high school. The second problem is that even if a community is concerned about a particular issue such as substance abuse, it often lacks the specific information necessary to develop a program targeted to the specific needs of the community. This is further complicated by the absence of baseline and impact evaluation data for assessment of the community-wide effectiveness of any programs that might be implemented.

There is increasing recognition of the importance of an individual's "community" in influencing a wide range of health-related behaviors, beliefs, and practices. This is especially true as the focus shifts from health care to the wider range of factors that influence health, such as those considered in the three proposed indicator sets. In fact, there is increasing evidence and understanding among the general public that health is an outcome of many psychosocial, educational, and environmental factors, in addition to health care and other direct biological determinants. For most people, their health behaviors and knowledge are affected most directly by the people immediately around them, including their family, friends, coworkers, and others whom they identify as peers. In some instances, the "community" may in fact be the city, town or county in which they live. In other cases, the community that is important for consideration may be a neighborhood or an extended network of persons of the same ethnic or racial group. For local programs to be most appropriate and effective for these diverse communities, data on each of the indicators in the selected set will be needed not only for defined jurisdictional units but also for the major racial, ethnic, educational, and economic subgroups within these jurisdictions.

Given the absence of good local data, communities have shown a variety of responses. Perhaps the most common response is a lack of interest or failure to implement programs that will address the most serious of the community's concerns about health. A few communities, such as those with greater resources or greater levels of initial interest, have sponsored local research or surveys to assess issues of concern. However, a community's ability to interpret its data is hindered by not having similar data from other similar localities for comparative purposes. In addition, communities frequently cannot sustain the commitment of resources to collect at regular intervals the data that would allow monitoring of the effects of intervention programs. Communities in which there is interest but not the resources to collect local data must often resort to the use of state or national results and must use those results as if they were valid for their particular small communities. For example, they may calculate the number of local cases of a condition or disease by applying the national rates of the condition or disease. This can lead to erroneous assumptions about local needs and provides no way to monitor outcomes, but these communities believe they are doing the best they can in the absence of valid data about their local jurisdictions.

During the course of development of the three proposed indicator sets and the review of relevant data issues, the committee came to recognize the imperative for resources to ensure that data are available for small jurisdictional regions throughout the United States. In addition, technical assistance will be essential at the local community level to ensure that these data are appropriately analyzed and interpreted.

Summary of Issues Relevant to Data Collection and Analysis

In light of these issues relevant to data collection, analysis, and reporting, the committee makes several suggestions.

1. Data sets should be evaluated for the following characteristics: quality of data, limitations of self-reported data, periodicity and timeliness of data availability, representativeness of data, and ability to provide small-area analyses and analyses for multiple jurisdictional levels.
2. Technical assistance should be provided to ensure appropriate use of small-area analysis data sets representative of multiple jurisdictional levels in the design, implementation, and evaluation of local interventions to improve the status of specific indicators.
3. Appropriate intervals for data collection, methods of data analysis, and frequency of reporting on results for each of the indicators will also need to be determined.

Development of leading health indicators that provide a clearly understandable and recognizable face for the full *Healthy People 2010* agenda has enormous potential to exert positive influences on the public's awareness and practice of health promoting behaviors. This is especially true if the chosen set of indicators are meaningful to and can be acted upon by the lay public, with an emphasis on the inclusion of diverse population groups. This report contains a number of recommendations to the U.S. Department of Health and Human Services that address issues relevant to the composition of leading health indicator sets, data collection, data analysis, effective dissemination strategies, health disparities, and effective use of interagency collaborations to support the full implementation of the leading health indicator set. These recommendations reflect the committee's belief that achievement of the *Healthy People 2010* overarching and enabling goals is possible, but *only* when national, state, and local health agencies establish collaborative partnerships with members and organizations representative of a wide array of diverse population groups and communities. These partnerships can yield significant and sustained changes in the health behaviors and health outcomes of the public. In the presence of collaborative, community-based partnerships, leading health indicators for *Healthy People 2010* can be used as tools to mobilize efforts by the lay public and health professionals to become engaged in progress toward the health goals for the nation and to do so in a manner which prompts public understanding and policy actions related to the important determinants of that progress.

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