Leading Health Indicators for Healthy People 2020: Letter Report

DETAILS

98 pages | 6 x 9 | HARDBACK
ISBN 978-0-309-38314-1 | DOI 10.17226/13088

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LEADING HEALTH INDICATORS FOR HEALTHY PEOPLE 2020

LETTER REPORT

Committee on Leading Health Indicators for Healthy People 2020

Board on Population Health and Public Health Practice

INSTITUTE OF MEDICINE
OF THE NATIONAL ACADEMIES

THE NATIONAL ACADEMIES PRESS
Washington, D.C.
www.nap.edu

THE NATIONAL ACADEMIES PRESS 500 Fifth Street, N.W. Washington, DC 20001

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This study was supported by Contract No. HHSP23320042509XI between the National Academy of Sciences and the Department of Health and Human Services. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the organizations or agencies that provided support for this project.

International Standard Book Number-13: 978-0-309-18637-7
International Standard Book Number-10: 0-309-18637-4

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Suggested citation: IOM (Institute of Medicine). 2011. *Leading Health Indicators for Healthy People 2020: Letter Report*. Washington, DC: The National Academies Press.

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Willing is not enough; we must do."
—Goethe

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This report has been reviewed in draft form 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 institution in making its 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 review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of this report:

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Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations nor did they see the final draft of the report before its release. The review of this report was overseen by **Georges Benjamin, M.D.,** Executive Director, American Public Health Association and **James S. House, Ph.D.,** Angus Campbell Distinguished University Professor of Survey Research, Institute for Social Research, University of Michigan. Appointed by the National Research Council, they were responsible for making certain that an independent examination of this report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of this report rests entirely with the authoring committee and the institution.

Acknowledgments

Over the course of this study, many individuals and organizations were willing to share their expertise, time, and thoughts with the committee. Their contributions informed committee deliberations and enhanced the quality of this report.

The study sponsor, the United States Department of Health and Human Services (HHS), willingly provided information and responded to questions. The committee is particularly grateful to Dr. Jeanette Guyton-Krishnan of HHS for her feedback during committee deliberations. The committee greatly appreciates the time and input of speakers Dr. Howard Koh, Dr. Carter Blakey, and Rear Admiral Penny Slade-Sawyer, whose presentations informed committee thinking.

The committee was extremely fortunate in its staffing for this study. We wish to thank Lyla M. Hernandez, who did a remarkable job of directing the study. Thanks also go to China Dickerson for her superior administrative support and to Andrew Lemerise for his excellent research support.

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Howard Koh, M.D.
Assistant Secretary for Health
200 Independence Avenue SW
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Dear Dr. Koh:

In response to a request from the Department of Health and Human Services (HHS), the Institute of Medicine (IOM) established the Committee on Leading Health Indicators for Healthy People 2020 to develop and recommend 12 indicators and 24 objectives for consideration by HHS for guiding a national health agenda and for consideration for inclusion in Healthy People 2020. It was anticipated that the work of the committee would build upon the 1999 IOM report, *Leading Health Indicators for Healthy People 2010,* and on the work of the Committee on the State of the USA Health Indicators. The product of the committee was to be a consensus letter report.

In conducting its work, the committee was asked to

1. Review current and past health indicators sets, including Healthy People 2010 Leading Health Indicators, the State of the USA (SUSA) indicators, and the Community Health Status Indicators;
2. Give consideration to provisions of the Patient Protection and Affordable Care Act that mandate the establishment of key national indicators and prevention-related measures, goals, and objectives;
3. Define basic principles or purposes for Healthy People 2020 Leading Health Indicators;
4. Develop criteria for selecting Healthy People 2020 Leading Health Indicators. Such criteria should be actionable and reflect the importance of science, evidence, and public health concerns. Development of such criteria should involve consideration of Healthy People 2010 Leading Health Indicators and reflect the Healthy People 2020 framework that includes new issues and topics (e.g., health communication and health information technology);
5. Choose indicators that, to the extent possible, have annual data sources, with comparable data available at the state and county level; and
6. Identify 24 objectives drawn from Healthy People 2020 and 12 topics under which the selected objectives will be organized.

During the HHS presentation of the charge to the committee on November 8, 2010, the committee was informed that since only 39 of

the 42 Healthy People 2020 topics had written objectives, the committee could propose objectives for the three topics under development. Those topics are: social determinants of health; health-related quality of life and well-being; and lesbian, gay, bisexual, and transgender health. The committee also received clarification from HHS that the 12 topics selected by the committee did not need to be drawn from the list of 42 topics listed in Healthy People 2020.

The following pages make up the letter report and provide the committee's recommendations regarding that task described above. The report is organized as follows. First is a brief discussion of Healthy People 2020, its mission, goals, and foundation health measures, all of which served as background information for the committee in completing its task. Next is the presentation of the committee's recommendations concerning topics, indicators, and objectives. This is followed by a discussion of the committee process, the framework and the process used to select objectives, and a discussion of the selection of topics and indicators. A detailed discussion of each of the selected objectives is then presented as well as suggestions for measures that could be used in the three Healthy People topic areas for which no objectives exist: social determinants of health; health-related quality of life and well being; and lesbian, gay, bisexual, and transgender health.

HEALTHY PEOPLE 2020

Healthy People has evolved during the three decades in which it has existed. In 1990, Healthy People 2000 had two overarching goals, 15 topic areas, and 226 objectives. Today Healthy People 2020 has four overarching goals, 42 topics areas (of which 39 contain objectives), and nearly 600 objectives. The mission of Healthy People 2020 is to

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

The following are the overarching goals of Healthy People 2020:

- Attain high-quality, longer lives free of preventable disease.
- Achieve health equity; eliminate disparities.
- Create social and physical environments that promote good health.
- Promote quality of life, healthy development, and healthy behaviors across life stages.

Additionally, Healthy People 2020 has developed four "foundation health measures." According to the Healthy People 2020 website[1]:

> Over the course of the decade, the four foundation health measures will be used to monitor progress toward promoting health, preventing disease and disability, eliminating disparities, and improving quality of life.

The four classes of foundation health measures are general health status, health-related quality of life and well-being, determinants of health, and disparities. The foundation health measures were published by HHS after the charge to the committee was developed and the work of the committee begun. The committee was not required in the charge to take this set of measures into account in developing its recommendations.

RECOMMENDATIONS

As instructed in the statement of task, the committee has developed and recommends 12 indicators and 12 topics, and selected 24 objectives from the Healthy People 2020 objectives that relate to the identified indicators and topics. A list of the objectives with accompanying subobjectives, quantitative goals, and data sources can be found in Appendix B.

Recommendation 1:

The committee recommends that the following indicators be used by HHS as the Healthy People 2020 Leading Health Indicators. These indicators are:

1. **Proportion of the population with access to health care services**
2. **Proportion of the population engaged in healthy behaviors**
3. **Prevalence and mortality of chronic disease**
4. **Proportion of the population experiencing a healthy physical environment**
5. **Proportion of the population experiencing a healthy social environment**

[1] See http://www.healthypeople.gov/2020/about/tracking.aspx (accessed November 18, 2010).

6. **Proportion of the population that experiences injury**
7. **Proportion of the population experiencing positive mental health**
8. **Proportion of healthy births**
9. **Proportion of the population engaged in responsible sexual behavior**
10. **Proportion of the population engaged in substance abuse**
11. **Proportion of the population using tobacco**
12. **Proportion of the population receiving quality health care services**

Recommendation 2:

The committee recommends the following 24 objectives,[2] selected from the Healthy People 2020 objectives, as important objectives related to these indicators.

1. **AH 5: Increase educational achievement of adolescents and young adults.**
2. **AHS 1: Increase the proportion of persons with health insurance.**
3. **AHS 3: Increase proportion of persons with a usual primary care provider.**
4. **AHS 7: (Developmental) Increase the proportion of persons who receive appropriate evidence-based clinical preventive services.**
5. **C 1: Reduce the overall cancer death rate.**
6. **EH 1: Reduce the number of days the Air Quality Index (AQI) exceeds 100.**
7. **EMC 1: (Developmental) Increase the proportion of children who are ready for school in all five domains of healthy development: physical development, social-emotional development, approaches to learning, language, and cognitive development.**
8. **FP 8: Reduce pregnancy rates among adolescent females.**
9. **HA 1: Reduce central line-associated bloodstream infections (CLABSI).**
10. **HC/HIT 1: (Developmental) Improve the health literacy of the population.**
11. **HDS 2: Reduce coronary heart disease deaths.**
12. **HDS 5: Reduce the proportion of persons in the population with hypertension.**

[2] The numbers are those used in Healthy People 2020 to identify the objectives.

13. **HIV 17: Increase the proportion of sexually active persons who use condoms.**
14. **IVP 1: Reduce fatal and nonfatal injuries.**
15. **MHMD 4: Reduce the proportion of persons who experience major depressive episodes (MDE).**
16. **MICH 8: Reduce low birth weight (LBW) and very low birth weight (VLBW).**
17. **NWS 10: Reduce the proportion of children and adolescents who are considered obese.**
18. **NWS 17: Reduce consumption of calories from solid fats and added sugars in the population aged 2 years and older.**
19. **PA 2: Increase the proportion of adults who meet current federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity.**
20. **SA 13: Reduce past-month use of illicit substances.**
21. **SA 14: Reduce the proportion of persons engaging in binge drinking of alcoholic beverages.**
22. **SH 4: Increase the proportion of adults who get sufficient sleep.**
23. **TU 1: Reduce tobacco use by adults.**
24. **TU 3: Reduce the initiation of tobacco use among children, adolescents, and young a**dults.

Table 1 displays the relationship among the recommended objectives, indicators, and topics.

The following section of the report describes the process the committee used to complete its work.

COMMITTEE PROCESS

The committee met three times over the course of this 6-month study. The first meeting was held in conjunction with an information gathering session during which HHS staff delivered the charge to the committee and provided background information on the evolution of Healthy People since 1990. The remaining two meetings were held in closed session during which the committee reviewed, analyzed, and synthesized different approaches to indicator development, among which were *Leading Health Indicators for Healthy People 2010* (IOM, 1999), the *State of the USA Health Indicators* (IOM, 2009b), the Community Health Status Indicators program of HHS, and the *County Health Rankings* (Mobilizing Action Toward Community Health, 2010). The committee also reviewed provisions of the Patient Protection and Affordable Care Act (ACA) related to the key national indicator system, and various quality provisions including the

TABLE 1 Topics, Indicators, and Objectives

Topic	Indicator	Objective[a]
Access to Care	Proportion of the population with access to health care services	1. AHS 1: Increase the proportion of persons with health insurance. 2. AHS 3: Increase proportion of persons with a usual primary care provider. 3. AHS 7: (Developmental) Increase the proportion of persons who receive appropriate evidence-based clinical preventive services.
Healthy Behaviors	Proportion of the population engaged in healthy behaviors	4. PA 2: Increase the proportion of adults who meet current federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity. 5. NWS 10: Reduce the proportion of children and adolescents who are considered obese. 6. NWS 17: Reduce consumption of calories from solid fats and added sugars in the population aged 2 years and older. 7. SH 4: Increase the proportion of adults who get sufficient sleep.
Chronic Disease	Prevalence and mortality of chronic disease	8. HDS 2: Reduce coronary heart disease deaths. 9. HDS 5: Reduce the proportion of persons in the population with hypertension. 10. C 1: Reduce the overall cancer death rate.
Environmental Determinants	Proportion of the population experiencing a healthy physical environment	11. EH 1: Reduce the number of days the Air Quality Index (AQI) exceeds 100.
Social Determinants	Proportion of the population experiencing a healthy social environment	12. HC/HIT 1: (Developmental) Improve the health literacy of the population. 13. EMC 1: (Developmental) Increase the proportion of children who are ready for school in all five domains of healthy development: physical development, social-emotional development, approaches to learning, language, and cognitive development. 14. AH 5: Increase educational achievement of adolescents and young adults.

TABLE 1 Continued

Topic	Indicator	Objective[a]
Injury	Proportion of the population that experiences injury	15. IVP 1: Reduce fatal and nonfatal injuries.
Mental Health	Proportion of the population experiencing positive mental health	16. MHMD 4: Reduce the proportion of persons who experience major depressive episodes (MDE).
Maternal and Infant Health	Proportion of healthy births	17. MICH 8: Reduce low birth weight (LBW) and very low birth weight (VLBW).
Responsible Sexual Behavior	Proportion of the population engaged in responsible sexual behavior	18. FP 8: Reduce pregnancy rates among adolescent females. 19. HIV 17: Increase the proportion of sexually active persons who use condoms.
Substance Abuse	Proportion of the population engaged in substance abuse	20. SA 13: Reduce past-month use of illicit substances. 21. SA 14: Reduce the proportion of persons engaging in binge drinking of alcoholic beverages.
Tobacco	Proportion of the population using tobacco	22. TU 1: Reduce tobacco use by adults. 23. TU 3: Reduce the initiation of tobacco use among children, adolescents, and young adults.
Quality of Care	Proportion of the population receiving quality health care services	24. HA 1: Reduce central line-associated bloodstream infections (CLABSI).

[a] The numbering of the objectives is directly from Healthy People 2020.

National Strategy to Improve Health Care Quality, Quality Measure Development, and quality in wellness programs. (Appendix A provides a table that summarizes provisions of the ACA as they relate to the 12 indicators and 24 identified objectives.)

In the document *Leading Health Indicators for Healthy People 2010: Final Report* (IOM, 1999), the committee found the use of the terms *topic, indicator,* and *objective* confusing. The committee determined that it was necessary to define these three terms because it was directed to identify

12 indicators, 24 objectives and 12 topics (number six above in the list of issues to consider).

For purposes of this report, therefore, a *topic* is defined as a general category relevant to health, for example, chronic illness. An *indicator* is defined as a measurement, for example, prevalence of cardiovascular disease. An indicator could relate to multiple topics, for example, the indicator *percentage of adults with a body mass index (BMI) equal to or greater than 30* could relate to the topics of chronic disease and health behaviors. *Leading health indicators* are quantitative expressions of health-related concepts that reflect major public health concerns. By major public health concern, the committee means a major component of overall morbidity, mortality, or limited functional health status or health-related quality of life, or a major determinant of morbidity, mortality, or functional health status or health-related quality of life. An *objective* is a statement of movement in an indicator toward a quantitative target, for example, reduce the prevalence of cardiovascular disease by 10 percent.

PRINCIPLES AND PURPOSES

The committee was asked to define basic principles or purposes for Healthy People 2020 Leading Health Indicators. The committee confined its discussion to the scope of the charge that it was given and tried to address each of the bullet points as well as the overall statement of task. In identifying topics, indicators, and objectives, the committee sought to use the available base of scientific knowledge to identify important domains of health in terms of statistics on mortality, morbidity, functional health status, and the extent to which a current health state also represented a risk for future health concerns. Within these broad principles, the committee chose specific objectives using the criteria listed in Table 2, which were similar to those used to select the Healthy People 2010 Leading Health Indicators.

Since a larger set of topics and objectives already exists in the full-length Healthy People 2020 document, and HHS has also identified a set of foundation health measures for special focus, the committee worked with the idea that the topics, indicators, and objectives it put forward could be used to create an even sharper focus on health domains of special significance. *Leading Health Indicators for Healthy People 2010* (IOM, 1999) recommended that indicators be used as follows:

1. To elicit interest and awareness among the general population;
2. To 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. To provide ongoing feedback concerning progress toward improving the status of specific indicators.

The committee believes that the indicators for Healthy People 2020 also should serve these purposes. The specific number 12 for indicators suggests that an indicator and related objectives could be selected for special attention each month during a calendar year, although the recommended indicators and objectives are clearly important enough to be worthy of attention at all times. HHS may wish to use the recommended indicators and objectives in a variety of other ways, including highlighting them in communications to state and local health departments, using them as a guide to funding priorities in a variety of HHS programs, and using them as priority guides for ongoing departmental public health data collection and reporting activities.

HHS may also wish to invest analytic resources into the development of aggregate indices for any of the 12 recommended topics for which such indices do not already exist. The committee's discussion of health-related quality of life and the Economic Hardship Index offers an example of aggregate indices in topics other than the 12 recommended here for special attention. While each of the 24 recommended objectives has at least one clearly defined measure and data source, many of the broader topics and indicators are not easily reflected or monitored by a single number. Development and validation of aggregate indices in these areas would be a valuable part of the Healthy People 2020 effort that could then carry into future 10-year Healthy People cycles.

FRAMEWORK FOR SELECTING INDICATORS AND OBJECTIVES

Once the committee agreed on the definitions of terms to be used in its task, it turned to defining the framework for health within which the topics, indicators, and objectives would be developed or selected. The committee agreed that developing the framework would have been facilitated if Healthy People 2020 had included a definition of *health*. However, absent that definition, the committee proceeded by reviewing several existing frameworks. The framework used in the report *Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention* highlighted preventive health services, health protection, and health promotion as important determinants of disease and disability (HEW, 1979). Evans and Stoddart (1990) proposed a framework of health determinants that included disease, health functioning, well-being, and behavioral and biological responses to social and physical environments. A population health framework for setting national and state health goals proposed by Kindig and colleagues (2008) included health outcomes, health determi-

nants (health care, health behaviors, socioeconomic factors, and physical environment), and health policies and interventions. A similar framework is used in the *County Health Rankings* (Mobilizing Action Toward Community Health, 2010) and includes health outcomes (morbidity and mortality), health factors (health behaviors, clinical care, social and economic factors, and physical environment), and programs and policies.

The conceptual framework the committee developed for organizing and displaying the 24 objectives selected for Healthy People 2020 (Figure 1) consists of the intersection of two conceptual models: the life course model or perspective and the health determinants and health outcomes model. These two models represent two of the three conceptual frameworks recommended by the IOM Leading Health Indicator Committee for Healthy People 2010, which the committee was asked to consider in its work (IOM, 1999). The life course perspective also forms the implicit basis for one of the four overarching goals of Healthy People 2020: "Promote quality of life, healthy development, and healthy behaviors across all life stages." Health determinants are one of the four foundational health measures of Healthy People 2020.

The life course approach is based on two concepts: first, the impact of specific risk factors and determinants of health varies during the life

	Health Determinants and Health Outcomes					
Life Stage	Policy	Physical Environment	Social and Economic	Health Behavior	Health and Health Care Services	Outcomes
Pregnancy and infancy: birth, growth, and maternal bond						
Childhood: growth, learning and development of familial and social bonds						
Adolescence: transition to independence						
Young adult: independence and work						
Adult: work, family, societal contribution						
Elderly: meaning, legacy, decline						

FIGURE 1 Framework for objectives for leading health indicators.

course; and second, health and disease result from the accumulation of the effects of risk factors and determinants over the life course. The combination of these two components produces a life course health "trajectory" that represents the cumulative effect of risk factors and determinants at each point in the life course. Typically, the health trajectory "rises" during childhood, adolescence, and early adulthood, plateaus during middle age, and then declines with advancing age. This trajectory can be improved through the reduction of risk factors and the promotion of health through individual and population level (i.e., societal) actions, applied at specific points or during specific stages of the life course, especially during the early years of life (Ben-Shlomo and Kuh, 2002; Halfon, 2009; Halfon and Horchstein, 2002; IOM, 1999; Wise, 2009). There is also evidence to suggest that the impact of factors during early life and at other points in the life course is not immutable but can be influenced by other factors later in the life course (Ben-Shlomo and Kuh, 2002; Wise, 2009). The committee believes that the life course approach provides a useful framework for viewing health determinants and their relative importance at different stages of life, and for guiding the development of targeted health policies, programs, and actions to improve health (Guyer et al., 2009).

OBJECTIVES

In addition to the framework, the committee also developed criteria for selecting objectives from among the almost 600 objectives in Healthy People 2020. In the 1999 IOM report *Leading Health Indicators for Healthy People 2010*, the criteria listed were identified as criteria for selecting leading health indicators. To reflect its definitions of topics, indicators, and objectives, the committee modified the criteria used in Healthy People 2010, for its use in selecting objectives. These criteria are displayed in Table 2.

Despite a conceptual framework and explicit criteria for selection contained in Table 2, the task of choosing 24 objectives from the hundreds of objectives proposed for Healthy People 2020 was very challenging. Each of the objectives included in Healthy People 2020 has relevance and is important to a particular population. Yet, the committee was charged with selecting only 24. Some objectives were eliminated from consideration because they represented health determinants with relatively small effects on overall health in a population or because they were not clearly "actionable" (i.e., responsive to policies or initiatives by public or private health agencies) or because great progress has already been made in the specific area addressed by the objective. The committee also sought to have a balance in the selected objectives so they were not all focused, for example, on individual health behaviors or on measures of health for children. A

TABLE 2 Criteria for Selecting Objectives

1.	Objective is well-defined.
2.	Objective is worth measuring, that is, it represents an important and salient aspect of the public's health.
3.	Objective is valid and reliable and can be measured for the general population and diverse population groups.
4.	Objectives can be understood by people who need to act, that is, the people who need to act on their own behalf or that of others should be able to readily comprehend the objectives and what can be done to improve the status of those objectives.
5.	Objective will galvanize action, that is, the objectives 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.
6.	Action can improve the objective.
7.	Measurement over time will reflect results of action, that is, if action is taken, tangible results will be seen indicating improvements in various aspects of the nation's health.
8.	Data for the objective are available for various geographic levels (local, national) and population subgroups (e.g., race/ethnic, socioeconomic status, rural/urban).
9.	Changes in societal domains other than health (e.g., socioeconomic or environmental conditions or public policies) can have a detectable effect on the objective.

good objective in a particular domain may not have been selected because an even stronger objective in that domain was chosen.

To conduct a thorough review of each of the Healthy People 2020 objectives the committee divided into three groups, each of which took a different approach to identifying 24 objectives. Criteria used by all three groups for selecting objectives included those in Table 2 and the conceptual framework (Figure 1). The first group started with the framework (Figure 1) that combines life course and health determinants and health outcomes. Using data from the National Vital Statistics System and several national health surveys, the group compiled information for each life stage on the leading causes of death, the most common hospital discharge diagnoses, common chronic diseases seen in the ambulatory setting, and frequently self-reported health conditions. Next, the group identified objectives related to the evidence-based determinants within each health determinant category in Figure 1 for the previously compiled diseases and health outcomes for each of the life course stages. Using the selection criteria in Table 2, the group reviewed the Healthy People 2020 objectives and placed each objective in the appropriate life course stage and health determinant and health outcome categories.

In the second group, members conducted an initial independent rating of each objective. The ratings were based upon the criteria in Table 2 as well as how well each objective fit within the framework developed by the committee (Figure 1). Members were asked to assign an "A" to "D" rating for those objectives with *A* for "must include," *B* for "consider including," *C* for "consider dropping," and *D* for "drop." The lists were then compiled and objectives that received all *A* ratings were included on a list to be presented to the full committee. Objectives that received all "D" ratings were dropped. The remaining objectives were circulated among the subcommittee and members were asked to describe their reasoning for inclusion or elimination. All objectives on which there was clear agreement and those with varied ratings were forwarded to the full committee for consideration and discussion.

The third group's approach was to begin by identifying indicators, rather than reviewing the 600 objectives. The rationale for this approach was that the indicators could then be used to guide the selection of objectives. Members reviewed the 2010 leading health indicators[3] and objectives (and whether their targets were met, improved, or worsened), the SUSA indicators, and the Community Health Status Indicators. The goal was to use as many indicators and objectives from Healthy People 2010 as reasonable in order to build on the knowledge of past Healthy People efforts regarding indicator selection. Additionally, the group thought that, to the extent indicators and objectives previously used were included, this would assist states and local communities to assess whether improvement had occurred over time. Once the areas of overlap were identified, group members omitted indicators that could be folded into broader categories, reviewed the new topics list from Healthy People 2020, and selected new indicators and objectives consistent with emerging areas of importance.

The resulting combined list of objectives from all three groups included more than 100 objectives, including potential objectives identified for the three Healthy People 2020 topic areas that are not yet populated (social determinants of health; health-related quality of life and well-being; and lesbian, gay, bisexual, and transgender health).

Informed by the work of these three groups, the next step involved a detailed review of the nearly 600 objectives, including discussions of what each objective conveyed about either health or determinants of health and how it fit or did not fit into the overall framework developed by the committee. During this review of the Healthy People 2020 objectives, the committee found it frustrating that some objectives, such as those concerned with reducing obesity, were stated as applying to a nar-

[3] The Healthy People 2010 Leading Health Indicators can be found at http://www.healthypeople.gov/2010/LHI/lhiwhat.htm (accessed February 3, 2011).

row developmental stage, such as children and adolescents. Since the committee was restricted to selecting objectives from the Healthy People 2020 list, it was not possible to include an overall objective that addressed, for example, reducing obesity across the life course. Rather, the committee was forced to choose an objective that applies only to one stage of development. The committee hopes, however, that when objectives are applicable across the life course (e.g., reducing obesity), action will not be restricted to the single developmental stage that the Healthy People 2020 objective specifies.

The committee aimed to select objectives that would populate all the rows and columns of the framework. The committee also strove to have a balance of objectives that addressed determinants and those that addressed health outcomes. The rationale for such a balance is that a focus on determinants makes it easier for various entities to know what to do. On the other hand, a focus on health outcomes allows for creativity in developing interventions, adjustment for local circumstances, and opportunities in terms of budget and time priorities. The 24 objectives selected by the committee are listed at the beginning of this report and in Table 1. They are also listed below, in abbreviated form, in Figure 2 to indicate where in the framework the objectives belong.

Given the importance to health of the three unpopulated Healthy People 2020 topic areas (social determinants of health; health-related quality of life and well being; and lesbian, gay, bisexual, and transgender health), the committee was disappointed that it could not select any objectives in these areas as part of the 24 to be recommended because no objectives had been listed by Healthy People 2020. However, these areas are important. For that reason and because the committee was informed by HHS staff at its first meeting that it had the opportunity to suggest ideas for these areas, the committee has developed suggestions for each of the three areas. Suggested measures for two of the topic areas are discussed beginning on page 43 of this report. These measures are:

1. Social Determinants of Health
   a. Economic Hardship Index
2. Health-Related Quality of Life and Well-Being
   a. Health-Adjusted Life Expectancy
   b. Health-Related Quality of Life
   c. Well-Being

For the topic area lesbian, gay, bisexual, and transgender health, the committee suggests objectives from the selected 24 that could be modified to address the LGBT area. A detailed discussion of the importance of each

	Health Determinants and Health Outcomes					
Life Stage	Policy	Physical Environment	Social and Economic	Health Behavior	Health and Health Care Services	Outcomes
Pregnancy and infancy: birth, growth, and maternal bond	AHS 1: Health Insurance AHS 3: Primary Care Provider AHS 7: Preventive Services	EH 1: Air Quality	AHS 1: Health Insurance HC/HIT 1: Health Literacy		AHS 3:Primary Care Provider AHS 7: Preventive Services HA 1: Bloodstream Infections HDS 5: Hypertension FP 8: Pregnancy Rate MHMD 4: Reduce MDEs	C 1: Cancer Mortality HDS 2: CHD Mortality IVP 1: Injuries MICH 8: Birth Weight
Childhood: growth, learning, and development of familial and social bonds	AHS 1: Health Insurance AHS 3: Primary Care Provider AHS 7: Preventive Services NWS 17: Fats and Sugars TU 3: Tobacco Initiation	EH 1: Air Quality	AH5: Educational Achievement AHS 1: Health Insurance EMC 1: School Readiness HC/HIT 1: Health Literacy	NWS 17: Fats and Sugars TU 3: Tobacco Initiation	AHS 3:Primary Care Provider AHS 7: Preventive Services HA 1: Bloodstream Infections HDS 5: Hypertension MHMD 4: Reduce MDEs NWS 10: Obesity	C 1: Cancer Mortality HDS 2: CHD Mortality IVP 1: Injuries
Adolescence: transition to independence	AHS 1: Health Insurance AHS 3: Primary Care Provider AHS 7: Preventive Services NWS 17: Fats and Sugars TU 3: Tobacco Initiation	EH 1: Air Quality	AH 5: Educational Achievement AHS 1: Health Insurance HC/HIT 1: Health Literacy	HIV 17: Condom Use NWS 17: Fats and Sugars SA14: Binge Drinking SA 13: Illicit Substances SH 4: Sleep TU 3: Tobacco Initiation	AHS 3:Primary Care Provider AHS 7: Preventive Services FP 8: Pregnancy Rate HA 1: Bloodstream Infections HDS 5: Hypertension MHMD 4: Reduce MDEs NWS 10: Obesity	C 1: Cancer Mortality HDS 2: CHD Mortality IVP 1: Injuries

continued

FIGURE 2 Populated framework for objectives for leading health indicators.

Young Adult: independence and work	AHS 1: Health Insurance AHS 3: Primary Care Provider AHS 7: Preventive Services NWS 17: Fats and Sugars SH 4: Sleep TU 1: Tobacco Use TU 3: Tobacco Initiation	EH 1: Air Quality	AH5: Educational Achievement AHS 1: Health Insurance HC/HIT 1: Health Literacy	HIV 17: Condom Use NWS 17: Fats and Sugars PA 2: Physical Activity SA14: Binge Drinking SA 13: Illicit Substances SH 4: Sleep TU 1: Tobacco Use TU 3: Tobacco Initiation	AHS 3:Primary Care Provider AHS 7: Preventive Services HA 1: Bloodstream Infections HDS 5: Hypertension MHMD 4: Reduce MDEs	C 1: Cancer Mortality HDS 2: CHD Mortality IVP 1: Injuries
Adult: work, family, societal contribution	AHS 1: Health Insurance AHS 3: Primary Care Provider AHS 7: Preventive Services NWS 17: Fats and Sugars SH 4: Sleep TU 1: Tobacco Use	EH 1: Air Quality	AHS 1: Health Insurance HC/HIT 1: Health Literacy	HIV 17: Condom Use NWS 17: Fats and Sugars PA 2: Physical Activity SA14: Binge Drinking SA 13: Illicit Substances SH 4: Sleep TU 1: Tobacco Use	AHS 3:Primary Care Provider AHS 7: Preventive Services HA 1: Bloodstream Infections HDS 5: Hypertension MHMD 4: Reduce MDEs	C 1: Cancer Mortality HDS 2: CHD Mortality IVP 1: Injuries
Elderly: meaning, legacy, decline	AHS 3: Primary Care Provider AHS 7: Preventive Services NWS 17: Fats and Sugars SH 4: Sleep TU 1: Tobacco Use	EH 1: Air Quality	HC/HIT 1: Health Literacy	HIV 17: Condom Use NWS 17: Fats and Sugars PA 2: Physical Activity SA14: Binge Drinking SA 13: Illicit Substances SH 4: Sleep TU 1: Tobacco Use	AHS 3:Primary Care Provider AHS 7: Preventive Services HA 1: Bloodstream Infections HDS 5: Hypertension MHMD 4: Reduce MDEs	C 1: Cancer Mortality HDS 2: CHD Mortality IVP 1: Injuries

FIGURE 2 Continued

of the selected objectives and of the suggestions for the unpopulated topic areas begins on page 53.

TOPICS AND INDICATORS

Following the committee's selection of the 24 objectives, members organized the objectives into 12 topics with associated indicators. The indicators are designed to capture the essence of the objectives. Since the indicators are built directly on the 24 objectives, they are, therefore, indirectly affected by the Table 2 criteria, but only indirectly through the objectives. Two approaches were considered, each having substantial support from the committee: a "thematic" approach (Table 1, presented on page 6) and a "framework" approach (Table 3, presented on page 18). The committee had a difficult time deciding which set of indicators to recommend and the margin for choosing one over the other was narrow. Given this, the committee believes it is important to present both sets of indicators for consideration by HHS. The first set uses the thematic approach. It is discussed immediately below and is the set of indicators recommended by the committee, as discussed on page 6 of this report.

To develop indicators in the thematic approach, the committee reviewed each of the 24 objectives and categorized them into 12 health-related topics or themes. These topics are not a comprehensive view of all determinants and outcomes of health and health care but represent a subset of important topics for emphasis over the next 10 years. The topics characterize and are highlighted by the selected 24 objectives but with a broader perspective. One indicator was developed for each topic, using the topic's objectives as the measurement guide.

The merit of the thematic approach is its simplicity for many constituencies to understand the nature of the topic and to have a short number of objectives associated with each topic. For example, if an organization chose to emphasize a different topic each month in the promotion of Healthy People 2020, then each month would have one to four objectives upon which to focus. Committee proponents of this approach concluded that a shorter number of objectives to focus on at one time would facilitate a more effective communication strategy when broadly applied and thus would be more likely to have the intended health impact. The organization of topics and objectives in this manner provided for a logical approach to develop the 12 leading health indicators. A disadvantage of the thematic approach is that the presentation does not highlight the framework that guided its development.

As stated earlier, the committee recommends that HHS use the indicators displayed in Table 1 on page 6. However, the committee suggests that HHS consider a second set of indicators that uses the life course,

determinants, and outcomes framework to generate a set of topics and associated health indicators that consists of 12 topics, 6 of which are the life course stages in combination with the five health determinant categories in the framework, and the health outcome category. Indicators are associated with each of these 12 topics. Table 3 lists the topics, indicators, and objectives in this approach. It should be noted that 15 of the objectives are applicable to each stage of the life course. Rather than reproduce these in the table below, those 15 objectives are listed following the table and the statement "Objectives for all life stages*" has been placed in the appropriate cells.

Advantages of this approach for promoting the goals and objectives of Healthy People 2020 include ability to convey messages by age or life stage, cross-sector collaboration, flexibility in selecting objectives to emphasize, and recognition of the importance of the physical environment and social and economic factors. Disadvantages to the framework approach are that it is more difficult to identify lead agencies for specific indicators, and several of the selected objectives fall under more than one indicator thereby making it more difficult to focus on a small set of specific objectives and to communicate the objectives and indicators to the field.

TABLE 3 The Framework Approach to Identifying Topics, Indicators, and Objectives

Topic	Indicator	Objectives
Pregnancy and infancy	Proportion of healthy births and infants	• FP 8: Reduce pregnancy rates among adolescent females. • MICH 8: Reduce low birth weight (LBW) and very low birth weight (VLBW). • Objectives for all life stages*
Childhood	Proportion of healthy children	• EMC 1: (Developmental) Increase the proportion of children who are ready for school in all five domains of healthy development: physical development, social-emotional development, approaches to learning, language, and cognitive development. • NWS 10: Reduce the proportion of children and adolescents who are considered obese. • TU 3: Reduce the initiation of tobacco use among children, adolescents, and young adults. • Objectives for all life stages*

TABLE 3 Continued

Topic	Indicator	Objectives
Adolescence	Proportion of healthy adolescents	• AH 5: Increase educational achievement of adolescents and young adults. • FP 8: Reduce pregnancy rates among adolescent females. • NWS 10: Reduce the proportion of children and adolescents who are considered obese. • TU 3: Reduce the initiation of tobacco use among children, adolescents, and young adults. • Objectives for all life stages*
Young adult	Proportion of healthy young adults	• AH 5: Increase educational achievement of adolescents and young adults. • PA 2: Increase the proportion of adults who meet current Federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity. • SH 4: Increase the proportion of adults who get sufficient sleep. • TU 1: Reduce tobacco use by adults. • TU 3: Reduce the initiation of tobacco use among children, adolescents, and young adults. • Objectives for all life stages*
Adult	Proportion of healthy adults	• PA 2: Increase the proportion of adults who meet current Federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity. • SH 4: Increase the proportion of adults who get sufficient sleep. • TU 1: Reduce tobacco use by adults. • Objectives for all life stages*
Elderly	Proportion of healthy older adults	• PA 2: Increase the proportion of adults who meet current Federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity. • SH 4: Increase the proportion of adults who get sufficient sleep. • TU 1: Reduce tobacco use by adults. • Objectives for all life stages*

continued

TABLE 3 Continued

Topic	Indicator	Objectives
Policy	Proportion of population covered by comprehensive policies to promote health	• AHS 1: Increase the proportion of persons with health insurance. • AHS 3 Increase proportion of persons with a usual primary care provider. • AHS 7 (Developmental) Increase the proportion of persons who receive appropriate evidence-based clinical preventive services. • EMC 1: (Developmental) Increase the proportion of children who are ready for school in all five domains of healthy development: physical development, social-emotional development, approaches to learning, language, and cognitive development. • NWS-17: Reduce consumption of calories from solid fats and added sugars in the population aged 2 years and older. • TU 1: Reduce tobacco use by adults. • TU 3: Reduce the initiation of tobacco use among children, adolescents, and young adults.
Physical environment	Proportion of population experiencing healthy natural and built environments	• EH 1: Reduce the number of days the Air Quality Index (AQI) exceeds 100. • IVP 1: Reduce fatal and nonfatal injuries. • PA 2: Increase the proportion of adults who meet current Federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity.
Social and economic factors	Proportion of population experiencing healthy social and economic environments	• AH 5: Increase educational achievement of adolescents and young adults. • EMC 1: (Developmental) Increase the proportion of children who are ready for school in all five domains of healthy development: physical development, social-emotional development, approaches to learning, language, and cognitive development. • HC/HIT 1: (Developmental) Improve the health literacy of the population. • FP 8: Reduce pregnancy rates among adolescent females.

TABLE 3 Continued

Topic	Indicator	Objectives
Social and economic factors (continued)		• MHMD 4: Reduce the proportion of persons who experience major depressive episodes (MDE). • NWS 10: Reduce the proportion of children and adolescents who are considered obese. • SA 13: Reduce past-month use of illicit substances. • SA 14: Reduce the proportion of persons engaging in binge drinking of alcoholic beverages. • TU 1: Reduce tobacco use by adults. • TU 3: Reduce the initiation of tobacco use among children, adolescents, and young adults.
Health behavior	Proportion of population experiencing healthy behaviors	• FP 8: Reduce pregnancy rates among adolescent females. • HIV 17: Increase the proportion of sexually active persons who use condoms. • NWS 10: Reduce the proportion of children and adolescents who are considered obese. • NWS 17: Reduce consumption of calories from solid fats and added sugars in the population aged 2 years and older. • PA 2: Increase the proportion of adults who meet current Federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity. • SA 13: Reduce past-month use of illicit substances. • SA 14: Reduce the proportion of persons engaging in binge drinking of alcoholic beverages. • SH 4: Increase the proportion of adults who get sufficient sleep. • TU 1: Reduce tobacco use by adults. • TU 3: Reduce the initiation of tobacco use among children, adolescents, and young adults.

continued

TABLE 3 Continued

Topic	Indicator	Objectives
Health and health care services	Proportion of the population receiving quality population health services and individual health care services	• AHS 1: Increase the proportion of persons with health insurance. • AHS 3: Increase proportion of persons with a usual primary care provider. • AHS 7: (Developmental) Increase the proportion of persons who receive appropriate evidence-based clinical preventive services. • HA 1: Reduce central line-associated bloodstream infections (CLABSI). • HDS 5: Reduce the proportion of persons in the population with hypertension. • MHMD 4: Reduce the proportion of persons who experience major depressive episodes (MDE). • NWS 10: Reduce the proportion of children and adolescents who are considered obese.
Outcomes	Proportion of the population experiencing positive health and long life	• C 1: Reduce the overall cancer death rate. • IVP 1: Reduce fatal and nonfatal injuries. • HDS 2: Reduce coronary heart disease deaths. • MICH 8: Reduce low birth weight (LBW) and very low birth weight (VLBW).

* The following objectives—which do *not* specify a particular life stage—apply to all life stages listed above, although some may be better applied to one or more specific life stages:

- AHS 1: Increase the proportion of persons with health insurance.
- AHS 3 Increase proportion of persons with a usual primary care provider.
- AHS 9 (Developmental) Increase the proportion of persons who receive appropriate evidence-based clinical preventive services.
- C 1: Reduce the overall cancer death rate.
- EH I: Reduce the number of days the Air Quality Index (AQI) exceeds 100.
- HA 1: Reduce central line-associated bloodstream infections (CLABSI).
- HC/HIT 1: (Developmental) Improve the health literacy of the population.
- HDS 2: Reduce coronary heart disease deaths.
- HDS 5: Reduce the proportion of persons in the population with hypertension.
- HIV 17: Increase the proportion of sexually active persons who use condoms.
- IVP 1: Reduce fatal and nonfatal injuries.
- MHMD 4: Reduce the proportion of persons who experience major depressive episodes (MDE).
- NWS 17: Reduce consumption of calories from solid fats and added sugars in the population aged 2 years and older.
- SA 13: Reduce past-month use of illicit substances.
- SA 14: Reduce the proportion of persons engaging in binge drinking of alcoholic beverages.

The following section of the report provides, for each objective, details on the importance of that objective to health.

IMPORTANCE OF OBJECTIVES

AH 5: Increase Educational Achievement of Adolescents and Young Adults

Education is associated with longer life; improved health status; lower infant mortality; more favorable social and economic determinants of health, including better occupations, higher income, increased wealth, and higher social standing; and positive health behaviors. It is inversely related to the incidence and prevalence of many—though not all—diseases and injuries (Cutler and Lleras-Muney, 2006; Egerter et al., 2009; HHS, 2006b; Kawachi et al., 2010). Behaviors that education affects in a positive, dose-response manner include reduced tobacco, alcohol, and other substance use; and increased physical activity (Egerter et al., 2009; HHS, 2006b). Health conditions affected by education include diabetes, cardiovascular disease, hypertension, HIV-related disease, and most injuries (HHS, 2006b). Many of the leading health indicators selected for Healthy People 2010 also show a clear relationship with education (HHS, 2006b).

Despite the clear relationship between education and good health, the mechanisms through which education affects health are less clear, and the ability to demonstrate clear causal relationships between education and health outcomes has proven difficult (Cutler and Lleras-Muney, 2006; Fujiwara and Kawachi, 2009; Kawachi et al., 2010). Figure 3 illustrates three proposed models for how education might affect health. These models show the potential complexity of the relationship between education and health, and they suggest substantial methodological problems inherent in proving a causal relationship between education and health. As with efforts to establish a causal relationship between income and health, conducting experiments in which one group's educational attainment is restricted is generally neither practical nor ethical. Thus, most research has relied on either quasi-experiments or observational studies that rely on "natural" societal differences in level or quality of education (Kawachi et al., 2010). These studies often have limited ability to control for other variables with the potential to affect health. Nevertheless, recent reviews have concluded that "there is evidence to suggest that schooling is causally related to improvements in health outcomes" (Kawachi et al., 2010) and "policies that impact educational attainment could have a large effect on population health" (Cutler and Lleras-Muney, 2006).

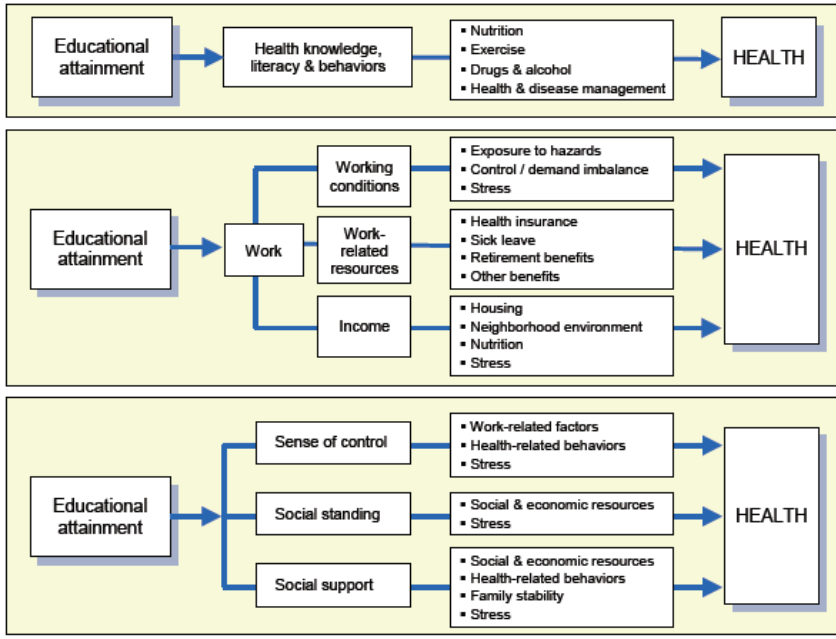

FIGURE 3 Interrelated pathways through which education affects health.
SOURCE: Egerter et al., 2009.

AHS 1: Increase the Proportion of Persons with Health Insurance

Provisions of the Patient Protection and Affordable Care Act seek to improve access to health insurance through a variety of mechanisms, including the individual mandate that requires all citizens to have health insurance coverage; the employer requirement that requires businesses with more than 50 employees to offer coverage to its employees or pay an assessment; the regional or state exchanges that will provide coverage plans of varying benefits and costs for purchase by individuals or businesses; and the expansion of Medicaid eligibility to individuals who earn up to 133 percent of the federal poverty level. Other provisions eliminate lifetime limits on coverage, prohibit insurance companies from dropping individuals from their plans, and prohibit denying coverage to children with preexisting conditions. To the extent that these provisions are successfully implemented, the proportion of persons with health insurance is projected to increase. Numerous challenges to the law at both the federal and state level, however, are under way (Doherty, 2010).

Available data indicate that there are negative effects for those without health insurance while such insurance provides great benefits to

those whom it covers. The authoring committee of the IOM report *Health Insurance Is a Family Matter* (2002) concluded that insurance coverage was key to the well-being of the family, and that lack of insurance could negatively affect the health of family members as well as their financial and emotional well-being. Results of a 2008 study by Thornton and Rice, estimating the direct effect of insurance coverage on population health outcomes measured by mortality, indicated that "extending private insurance coverage to the entire uninsured population in the United States would save over 75,000 lives annually and may yield annual net benefits to the nation in excess of $400 billion."

In *America's Uninsured Crisis: Consequences for Health and Health Care* (IOM, 2009a), recent evaluations of enrollment in Medicaid and the State Children's Health Insurance Program (SCHIP) demonstrated considerable benefits for children including increased access to preventive services, more timely diagnosis of serious health conditions, fewer avoidable hospitalizations, improved asthma outcomes, and fewer missed days of school. Among the findings related to adults, the report found that adults without health insurance are more likely to be diagnosed late for conditions such as breast, colorectal, and other cancers, and are, therefore, more likely to die or suffer poorer health outcomes.

AHS 3: Increase the Proportion of Persons with a Usual Primary Care Provider

In a review of the literature, Starfield (2010) found that adults who reported a regular source of primary care are healthier than those who do not have a regular source even after controlling for initial differences in health status, demographic characteristics, health insurance status, health perceptions, reported diagnoses, and smoking status. She also reported that populations served by community health centers that emphasize primary care (a requirement for federal funding) are healthier and receive more of the indicated preventive services than comparable populations that receive care in other types of physician offices or clinics.

Xu (2002) found that "having a regular doctor was found to have a greater impact than having a regular site on discretional preventive services, such as blood pressure and cholesterol level checkups. No statistically significant differences were found between the effects of having a regular doctor and having a regular site on the use of flu shots, pap smears, and mammograms." Laurant and colleagues (2005) found that when nurses provided primary care the patient outcomes did not differ appreciably from the outcomes achieved with physician primary care. Sungkyu and Sunha (2009) found that a regular source of care, "is associated with positive health outcomes, such as compliance with

medication regimens, lower levels of disability, decreases in health care costs, improved control of chronic conditions, and increases in patient satisfaction with care." Federal health reform recognizes the importance of primary care by including provisions to increase Medicaid payments for primary care physician services to 100 percent of the Medicare payment rates (for 2013 and 2014) and by providing a 10 percent bonus payment to primary care physicians in Medicare from 2011 through 2015.

AHS 7: (Developmental) Increase the Proportion of Persons Who Receive Appropriate Evidence-Based Clinical Preventive Services

Clinical preventive services (which include immunizations, screening services, counseling, and chemoprophylaxis) are designed to prevent the occurrence of a health condition or to detect a condition that is already present. HIV screening of pregnant women to reduce mother-to-child transmission rates and colorectal cancer screening are well-known examples of valuable clinical preventive services (Chou et al., 2005; Maciosek et al., 2006). Vaccinations are another highly effective clinical preventive service.

Because the services are provided to individuals (rather than communities), usually in a clinical setting, they are referred to as clinical preventive services. The U.S. Preventive Services Task Force (USPSTF), based upon review of a large body of evidence regarding effectiveness, recommends a set of clinical preventive services that are determined in part by age, sex, and presence of specific known risk factors. Maciosek and colleagues (2010) found that an increase in the use of clinical preventive services could result in more than 2 million life-years saved annually in the United States. Furthermore, they found that "increasing the use of these services from current levels to 90 percent in 2006 would result in total savings of $3.7 billion." The National Commission on Prevention Priorities (2007) found that utilization rates of recommended, cost-effective preventive services remains low and that "increasing the use of just five preventive services would save more than 100,000 lives each year in the United States."

C 1: Reduce the Overall Cancer Death Rate

Cancer is the second leading cause of death in the United States with 563,875 deaths in 2007 (CDC, 2010g). Cancer rates per 100,000 for men of all races and Hispanic origins combined in the United States show that prostate cancer (156.9), lung cancer (80.5), and colorectal cancer (52.7) are the three most common cancers for men. The leading causes of cancer deaths per 100,000 among men are lung cancer (65.2), prostate cancer (23.5),

colorectal (20.0), and liver cancer, which is second among Asian/Pacific Islander men. The 2007 death rates for all cancers combined were highest among black men (284.2 per 100,000). For white males the death rate was 215.2, for Hispanics it was 142.35, for American Indian/Alaska Native it was 141.2, and for Asian/Pacific Islander men it was 131.4 (CDC, 2010b).

For women the three most common cancers are breast cancer (120.4 per 100,000), lung cancer (54.5), and colorectal cancer (39.7). The leading causes of cancer death among women are lung cancer (40.0), breast cancer (22.8), and colorectal cancer (14.1). The 2007 death rates from all cancers combined were highest among black women at 175.2. For white women it was 150.6, for American Indian/Alaska Native women it was 103.1, Hispanic women 99.0, and Asian/Pacific Islander women 90.9 (CDC, 2010b).

EH 1: Reduce the Number of Days the Air Quality Index (AQI) Exceeds 100

The Air Quality Index (AQI) is used to report on how clean or how polluted the air is. It also identifies health effects that might be experienced after breathing polluted air. Five major air pollutants the Environmental Protection Agency (EPA) has established national air quality standards for are calculated in the AQI: "ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide" (AIRNow, 2010).

Table 4 was developed by the EPA. It shows how different pollutants can have an effect on health when AQI values are between 101 and 150, or code orange.

Bell and colleagues (2004) reviewed daily counts of noninjury-related deaths and cardiovascular and respiratory mortality in 95 large American communities from 1987 to 2000 and found that "a 10-ppb [parts per billion] increase in the previous week's ozone was associated with a 0.52 percent increase in daily mortality" and a "0.64 percent increase in cardiovascular and respiratory mortality." The report estimated that a 10-ppb increase in daily ozone would trigger 3,767 premature deaths for the 95 communities studied. A meta-analysis of 39 studies (Bell et al., 2005) found that a 10-ppb increase in ozone was associated with a 0.84 percent increase in all-cause mortality for all seasons and a 1.34 percent increase in the warmer season in the United States. In a study by Carlisle and Sharp (2001), researchers exposed 10 highly trained athletes to differing levels of ozone during intense exercise and found that those exposed to high levels of ozone had significant and progressive decrease in pulmonary function. A study by Mills and colleagues (2007) found that air pollution could worsen heart conditions of people exercising outdoors.

While poor air quality affects all, some populations are particularly affected. For example, Chen and Kan (2008) found that "children, elderly

TABLE 4 Pollutants and Associated Health Conditions

	Pollutant and AQI Category				
	Ozone	Particle Pollution	Sulfur Dioxide	Carbon Monoxide	Any Pollutant
Health Concern	Code Orange	Code Orange	Code Orange	Code Orange	Code Red
Asthma or other lung disease	X	X	X		X
Heart disease		X		X	X
Children (with no specific health concern)	X	X			X
Older adults (with no specific health concern)	X	X			X
Active outdoors (with no specific health concern)	X		X		X
General population (with no specific health concern)					X

SOURCE: EPA, 2010.

people, asthmatics, and those with chronic obstructive airway diseases are more sensitive to ozone exposure." Halonen and colleagues (2010) found that there was a positive association between ozone and hospital admissions for asthma and chronic obstructive pulmonary disease in elderly people. Consistent associations were also found between ozone and asthma emergency room visits in children. In a study by Marshall and colleagues, results "suggest that for nitrogen oxide and other primary pollutants, low-income and nonwhite populations face a disproportionate share of the burden of urban air pollution."

The draft National Prevention and Health Promotion Strategy released by HHS has as one of its cross-cutting strategic directions the area of Healthy Physical, Social, and Economic Environments. Within that area, there is an objective to reduce physical, chemical, biological, and radiological contamination of water, land, and air (indoor and outdoor). The committee believes this is extremely important and would have liked to have been able to include an objective more specifically aimed at these

issues. However, given the fact that such an objective does not exist within *Healthy People 2020*, the committee believes that the objective, reducing the number of days the Air Quality Index (AQI) exceeds 100, can serve as a proxy for the committee's belief in the importance of addressing physical environmental concerns.

EMC 1: (Developmental) Increase the Proportion of Children Who Are Ready for School in All Five Domains of Healthy Development: Physical Development, Social-Emotional Development, Approaches to Learning, Language, and Cognitive Development

According to the Healthy People 2020 website,[4] "There is increasing recognition in policy, research, and clinical practice communities that early and middle childhood provide the physical, cognitive, and social-emotional foundation for lifelong health, learning, and well-being." Zuckerman and Halfon (2003) found that interventions that "focus on school readiness result in better school achievement, and only return the investment to the health care system in reduced disability 60 years later." Anderson and colleagues (2003) found that psychological and physical morbidity in young adulthood was reduced when children, particularly poor children, have school readiness. The report, *Getting Ready: National School Readiness Indicators Initiative: A 17-State Partnership* (Rhode Island KIDS COUNT, 2005) found

- Children's physical development (e.g., motor skills and coordination) are important to their academic achievement;
- Emotional health and social competence help children learn;
- "Language and literacy skills enable children to develop cognitive skills and knowledge";
- Cognitive development is important to learning, solving problems, and asking questions; and
- "Children's school success depends not only on academic skills, but also on learning styles, habits, and attitudes with which they approach learning."

FP 8: Reduce Pregnancy Rates Among Adolescent Females

Forty-six percent of U.S. adolescents 15–19 years old have had sex at least once (Abma et al., 2004). About 10 percent of all births in the United States are to adolescent females (Martin et al, 2005). Hamilton and col-

[4] See http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx? topicid=10 (accessed January 9, 2011).

leagues (2010a) found that in 2008, 15- to 19-year-old women in the United States gave birth to 435,000 infants. A study by Chandra and colleagues (2005) found that unintended births accounted for almost two-thirds of the births to women younger than age 18, while for 18- to 19-year-old women, more than half of the births were unintended (Chandra et al., 2005). Total births per 1,000 women ages 15 to 19 years in the United States were 54.4, more than twice that of Great Britain (28.3) and Canada (24.5), five times that of France (10), and seven times the rate of Sweden (7.8) (Darroch et al., 2001). In the United States in 2006, the birth rate for white women aged 15 to 19 years was 38.2, for black women it was 64.6, and for Hispanic women it was 83.0 (Guttmacher Institute, 2010).

According to Hamilton and colleagues (2009), between 2005 and 2006 the overall teenage birth rate increased 4 percent, and between 2006 and 2007 the rate increased another 1 percent. In 2008, however, the teenage birth rate decreased by about 2 percent to 41.5 per 1,000 and preliminary data for 2009 indicate the rate may have decreased to 39.1 (Hamilton et al., 2010b). Despite this decrease, the immediate and long-term costs of adolescent pregnancies are great, with more than $9 billion U.S. tax dollars spent per year for "health care and foster care, increased incarceration rates among children of teen parents, and lost tax revenue because of lower educational attainment and income among teen mothers" (CDC, 2010k). Furthermore, while high school graduation rates are at almost 90 percent for women who did not give birth in adolescence, teen mothers are much more likely to drop out of high school; only about 50 percent have received a high school diploma by the time they are 22 years of age (Perper et al., 2010). Furthermore, the children of adolescent mothers fare worse than those of older women. Klitsch (2003) reported that "infants born to women aged 15 or younger had a substantially higher postneonatal mortality rate (3.2 per 1,000) than those born to 23- to 29-year-olds (0.8 per 1,000).

Adolescent pregnancy carries with it significant costs, for the mother, the child, and for society.

HA 1: Reduce Central Line-Associated Bloodstream Infections (CLABSI)

Central line-associated bloodstream infections (CLABSI) are the third most common health-care associated infection in the United States (CDC, 2005). Between 200,000 and 250,000 CLABSIs occur each year in U.S. hospitals (Doshi et al., 2009; O'Grady et al., 2002). CLABSIs have been associated with prolonged hospitalizations and complications with treating infections as well as an in-hospital mortality rate of 12 to 35 percent. There are between 500 and 4,000 deaths annually due to CLABSIs (Doshi et al., 2009). Because bloodstream infections are serious, they typically

cause a longer hospital stay with increased costs and risks (CDC, 2010e). In a review of the costs of care for patients, Shannon and colleagues (2006) found that, "The costs of CLABSIs and the associated complications averaged 43 percent of the total cost of care" for patients with CLABSIs. Studies have shown that effective action can significantly reduce or eliminate CLABSI infections (Guerin et al., 2010; Pronovost et al., 2006; Royer et al., 2009).

HC/HIT 1: (Developmental) Improve the Health Literacy of the Population

Health literacy is defined as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Ratzan and Parker, 2000). A systematic review of the evidence about the relationship of health literacy and health outcomes found poorer health outcomes and worse health care for adults with low health literacy but also that health literacy appropriate interventions can improve the outcome of knowledge for those with both higher and lower literacy levels (Berkman et al., 2004). Limited health literacy has been linked to less knowledge about managing chronic illness than those with higher health literacy, decreased ability to share in decision making about prostate cancer treatment, lower adherence to anticoagulation therapy, higher likelihood of poor glycemic control, higher rates of hospitalization, and lower self-reported health status (IOM, 2004).

According to the IOM (2004), "Nearly half of all American adults—90 million people—have difficulty understanding and acting upon health information." The National Healthcare Disparities Report found that Hispanic adults were 4.5 times more likely to have below-basic health literacy than were white adults. African American, American Indian, and Alaskan Native adults were nearly three times more likely to have below-basic health literacy than were white adults (AHRQ, 2007).

HDS 2: Reduce Coronary Heart Disease Deaths

Approximately 17.6 million people in the United States have coronary heart disease—about 9.2 million males and 8.4 million females (American Heart Association, 2010). Coronary heart disease (CHD) includes heart attack (myocardial infarction) and angina pectoris. In 2006, the latest date for which figures are available, about 8,500,000 people had a heart attack, and the American Heart Association (2010) estimates that an American suffers a heart attack about every 34 seconds. More than 10 million Americans (10,200,000) have angina pectoris or chest pain (American Heart Association, 2010). The prevalence rate for coronary heart disease among

adults in the United States for non-Hispanic white men is 9.4 percent, for non-Hispanic black men it is 7.8 percent, and for Mexican American men it is 5.3 percent. The prevalence rate for non-Hispanic white women is 6.9 percent, for non-Hispanic black women it is 8.8 percent, and for Mexican American women it is 6.6 percent (Lloyd-Jones et al., 2010). American Indians/Alaska Natives and multiracial persons have a substantially higher rate of coronary heart disease, myocardial infarction, and angina when compared with non-Hispanic whites (HHS, 2006c).

Coronary heart disease is the leading cause of death in the United States today and is responsible for one of every six deaths. The American Heart Association estimates that one American will die every minute from a coronary event (American Heart Association, 2010). The coronary death rate per 100,000 men in 2006 was highest for black men (206.4), followed by white men (176.3), Hispanic/Latino men (132.8), American Indian or Alaska Native men (122.4), and Asian or Pacific Islander men (101.3). Black women had the highest coronary death rate per 100,000 women at 130.0, followed by white women (101.5), Hispanic/Latina women (85.4), American Indian or Alaska Native (76.4), and Asian or Pacific Islander (58.9) (Lloyd-Jones et al., 2010).

HDS 5: Reduce the Proportion of Persons in the Population with Hypertension

An estimated 74,500,000 people in the United States have hypertension (that is, systolic pressure $\geq$ 140 mm Hg and/or diastolic pressure $\geq$ 90 mm Hg (American Heart Association, 2010). Yet according to an analysis by Lloyd-Jones and colleagues, only 78 percent of people with hypertension are aware of their condition, and less than 64 percent of those receiving treatment for hypertension had their condition controlled (Lloyd-Jones et al., 2010). Hypertension is not only a health outcome, it is also a risk factor for cardiovascular disease. Table 5 provides information about the prevalence of hypertension by race/ethnicity and gender.

The death rate from hypertension increased 19.5 percent between 1996 and 2006. Life expectancy for those with hypertension is reduced by 5.1 years for men and 4.9 years for women when compared to life expectancy of those without hypertension. Hypertension also increases mortality from ischemic heart disease and stroke; for every increase of 20 mm Hg systolic and 10 mm Hg diastolic, there is a doubling of mortality from these conditions (Lloyd-Jones et al., 2010).

HIV 17: Increase the Proportion of Sexually Active Persons Who Use Condoms

Using condoms consistently and correctly reduces the risk of sexually transmitted diseases and human immunodeficiency virus (HIV) transmis-

TABLE 5 Prevalence of and Mortality Due to Hypertension by Race/Ethnicity and Gender

	Prevalence rate		Mortality	
Race/Ethnicity	Men	Women	Men	Women
White	34.3%	31.1%	17.6K	24.9K
Black	43.0%	44.8%	6.1K	6.5K
Mexican Americans	25.9%	31.6%	NA	NA
Hispanic/Latino	21.0%*		NA	
Asians	21.0%*		NA	
American Indian/ Alaska Natives	25.3%*		NA	

NOTE: K = thousands; NA = not available.
* Percentage is for individuals ≥ 18 years of age.
SOURCE: American Heart Association, 2010.

sion although condoms do not provide absolute protection (CDC, 2010c; Porche, 1998; Steiner et al., 1999; Warner et al., 2006). Condom use rates decrease with age. According to Reece and colleagues (2010), the condom use rate for males aged 14-17 was 79.1 percent while the rate for females in that age group was 58.1 percent. Males 18-24 had a condom use rate of 45.0 percent and females 38.7 percent. For those aged 25-34, the condom use rate for males was 29.3 percent and for females it was 23.8 percent. For males aged 35-44 the use rate was 21.3 percent while for females in that age group the use rate was 17.5 percent. Males aged 45-60 had a condom use rate of 13.7 percent and for females it was 9.7 percent. The lowest use rate is found among those over 61 with males at 5.1 percent and females at 7.4 percent.

Rates of adult condom use also vary by race and ethnicity. The highest use rate can be found among Black adults (30.9 percent) followed by Hispanics (25.4 percent), those categorized at "Other" (22.9 percent) with the lowest rate by white adults at 17.0 percent (Reece et al., 2010)

IVP 1: Reduce Fatal and Nonfatal Injuries

Unintentional injuries are the leading cause of death for individuals aged 1 through 44,[5] the fifth leading cause of death overall in the United

[5] See http://www.cdc.gov/injury/wisqars/pdf/Death_by_Age_2007-a.pdf (accessed March 19, 2011).

States (7 percent of all deaths or 167,000 deaths per year) and resulted in 1.9 million hospitalizations, 31 million visits to emergency departments, and 35 million initial visits to physicians' offices and outpatient clinics for treatment. One in nine people in the United States sought medical treatment for an injury. The costs of injury, death, and disability in 2000 are estimated to be $80 billion in lifetime medical care treatment costs and another $326 billion in lifetime lost productivity (Bergen et al., 2008).

According to Kung and colleagues (2008) four injury mechanisms accounted for 73.4 percent of all injury deaths: motor-vehicle traffic, poisoning, firearm, and falls. In 2005, 43,667 deaths were due to motor vehicle injuries, which was 25.1 percent of all injury deaths. Poisoning accounted for 32,691 injury deaths or 18.8 percent of all injury deaths. The majority of poisonings were unintentional (72.2 percent) or suicides (17.6 percent) with 9.95 percent being of undetermined intent. Firearms accounted for 30,694 (17.7 percent) deaths. Of these, 54.4 percent were suicides and 40.2 percent were homicides. Falls resulted in 20,426 deaths or 11.8 percent of injury deaths; 96.2 percent of deaths due to falls were unintentional (Kung et al., 2008).

In terms of suicide, the highest suicide rates occur among males 75 and older (36.1 per 100,000). Males commit suicide at four times the rate of females, representing 78.8 percent of all suicides in the United States. Firearms are used in 55.7 percent of male suicides; poisoning is the preferred method for females and is used in 40.2 percent of suicides. Suicide is the second leading cause of death for American Indians/Alaska Natives aged 15 to 34 years. Hispanic and black, non-Hispanic female high school students in grades 9–12 reported a higher percentage of suicide attempts (11.1 percent and 10.4 percent respectively) than their white, non-Hispanic counterparts (6.5 percent).

The committee believes it is also important to note the disparity in homicide rates for whites and blacks. African Americans are murder victims at much higher rates than whites, accounting for 49.3 percent of all murders of individuals in the 17- to 34-year-old age group making up a majority of those murders (U.S. Census Bureau, 2007).

MHMD 4: Reduce the Proportion of Persons Who Experience Major Depressive Episodes (MDE)

Data from the National Survey on Drug Use and Health (SAMHSA, 2009a) indicate that 16.5 million persons aged 18 or older or 1 in 13 Americans had at least one major depressive episode (MDE) during the past year. Those who are younger, female, less healthy, or divorced are more likely to experience an MDE (see Table 6). Adolescents are of particular concern because not only do they have a higher prevalence of MDE, they

TABLE 6 Adults 18 Years and Older Experiencing at Least One MDE in the Past Year by Age, Gender, Marital Status, and Self-Reported Health

	Past Year MDE (%)	Received Treatment for Depression in Past Year Among Adults with MDE (%)
Total	7.5	64.5
By Age		
18–25	8.9	44.2
26-49	8.5	65.6
50+	5.8	74.2
Gender		
Male	5.3	57.8
Female	9.5	68.0
Marital Status		
Married	5.3	71.5
Widowed	7.9	X
Divorced/separated	13.1	70.5
Never married	9.2	52.1
Overall Health		
Excellent	4.3	54.6
Very good	5.9	59.0
Good	9.0	62.5
Fair to poor	14.2	78.4

SOURCE: See http://oas.samhsa.gov/2k9/149/MDEamongAdults.htm (accessed March 21, 2011).

have a much lower treatment rate. Table 6 lists the percentage of adults experiencing a major depressive disorder in the past year by age, gender, marital status, and self-reported health.

In the past year, of the adults who experienced an MDE, "10.4 percent (1.7 million adults) made a suicide attempt during such an episode" (Office of Applied Studies, 2006). Kessler and colleagues (2006) estimated that the cost to workplaces of major depressive disorder and bi-polar disorder (both forms of major depressive episodes) was "96.2 million lost workdays and $14.1 billion salary-equivalent lost productivity per year associated with bi-polar disorder and 225.0 million workdays and $36.6 billion salary-equivalent lost productivity per year associated with major depressive disorder."

MICH 8: Reduce Low Birth Weight (LBW) and Very Low Birth Weight (VLBW)

In 2007, 354,333 or 8.2 percent of all babies born were low birth weight while 1.5 percent of babies were born very low birth weight (Martin et al., 2010). Low birth weight "is the major determinant of infant mortality in developed countries" (Paneth, 1995). These infants are subject to cerebral palsy, blindness, deafness, epilepsy, chronic lung disease including asthma, and subnormal cognitive function (Nepomnyaschy and Reichman, 2006; Paneth, 1995; Petrou et al., 2001). Litt and colleagues (2005) found that very low birth weight children had "lower scores in math, IQ, and perceptual-organizational skills" than normal birth weight children, and "also obtained lower scores in reading" than the normal birth weight group. Petrou and colleagues (2001) found that children who were low birth weight had a higher incidence of re-hospitalization, required more specialized attention, and were more likely to require significant social welfare assistance.

In addition to the human costs, there are economic costs associated with low birth weight births. Russell and colleagues (2007) report that there were 4.6 million infant hospital stays in 2001 that included a diagnosis of preterm birth/low birth weight. This was 8 percent of all infant stays nationwide. Yet the costs of these stays represented "47 percent of the costs for all infant hospitalizations and 27 percent for all pediatric stays" and totaled $5.8 billion (Russell et al., 2007).

NWS 10: Reduce the Proportion of Children and Adolescents Who Are Considered Obese

Body mass index (BMI) is used to determine whether adults are overweight or obese because, for most people, it correlates with the amount of body fat. Determining whether children and adolescents (2–19 years old) are overweight requires plotting the BMI value on the CDC growth charts to determine the BMI-for-age percentile. Using this method, "Overweight is defined as a BMI at or above the 85th percentile and lower than the 95th percentile. Obesity is defined as a BMI at or above the 95th percentile for children of the same age and sex (CDC, 2010d)."

Ogden and colleagues (2010), in a study of the prevalence of high BMI in children and adolescents, defined excess weight "based on BMI in relation to the 2000 CDC sex-specific BMI-for-age growth charts." They found that in 2007–2008, 9.5 percent of infants and toddlers were at or above the 2000 95th percentile. For children and adolescents 2 through 19 years old, 11.9 percent were at or above the 97th percentile of the BMI-for-age growth charts; 16.9 percent were at or above the 95th percentile; and 31.7 percent were at or above the 85th percentile of BMI for age. Between

1998 and 2008 the following was found to be true among low income, preschool age children:

- "One of seven low-income, preschool-aged children is obese, but the obesity epidemic may be stabilizing. The prevalence of obesity in low-income 2- to 4-year-olds increased from 12.4 percent in 1998 to 14.5 percent in 2003 but rose to only 14.6 percent in 2008.
- American Indians and Alaska Natives are the only race or ethnic groups with increasing rates between 2003 and 2008. Obesity prevalence among these children continued to rise about a half percentage point each year from 2003 to 2008.
- In 2008, obesity prevalence was highest among American Indian or Alaska Native (21.2 percent) and Hispanic (18.5 percent) children, and lowest among white (12.6 percent), Asian or Pacific Islander (12.3 percent), and black (11.8 percent) children.
- In 2008, only Colorado and Hawaii reported 10 percent or less of low-income preschool-age children were obese. The only group with rates over 20 percent was Indian Tribal Organizations" (CDC, 2010h).

A number of health-related consequences are associated with childhood obesity including

- Cardiovascular disease risks such as high cholesterol, high blood pressure, and abnormal glucose tolerance;
- Asthma;
- Hepatic steatosis (it has been shown that a reduction in weight causes liver enzymes to normalize); and
- Type 2 diabetes (CDC, 2010h).

NWS 17: Reduce Consumption of Calories from Solid Fats and Added Sugars in the Population Aged 2 Years and Older

As the Healthy People 2020 website states, "The Nutrition and Weight Status objectives for Healthy People 2020 reflect strong science supporting the health benefits of eating a healthful diet and maintaining a healthy body weight."[6] Healthy eating is important for healthy development. According to a survey by the Department of Agriculture (1998), less than 40 percent of children and adolescents in the United States meet the dietary guidelines for saturated fat. Children and adolescents consume a

[6] See http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=29 (accessed January 9, 2011).

large amount of their calories from solid fats and added sugars (Center for Nutrition and Promotion, 2010). Kavey notes that sugar and solid fats have virtually no nutritional value and that "high added-sugar consumption in the form of sugar-sweetened beverages is associated with a constellation of cardiovascular risk factors (Kavey, 2010)." De Roos and colleagues (2001) write that solid fats are rich in either saturate or *trans*-fatty acids, both of which increase the risk of coronary heart disease.

PA 2: Increase the Proportion of Adults Who Meet Current Federal Physical Activity Guidelines for Aerobic Physical Activity and for Muscle-Strengthening Activity

HHS and the Department of Agriculture jointly released the *Physical Activity Guidelines* that provide information about the types and amounts of physical activity needed to provide health benefits. Key guidelines for adults include the following:

- All adults should avoid inactivity. Some physical activity is better than none, and adults who participate in any amount of physical activity gain some health benefits.
- For substantial health benefits, adults should do at least 150 minutes (2 hours and 30 minutes) a week of moderate-intensity, or 75 minutes (1 hour and 15 minutes) a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity aerobic activity. Aerobic activity should be performed in episodes of at least 10 minutes, and preferably, it should be spread throughout the week.
- For additional and more extensive health benefits, adults should increase their aerobic physical activity to 300 minutes (5 hours) a week of moderate-intensity, or 150 minutes a week of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity. Additional health benefits are gained by engaging in physical activity beyond this amount.
- Adults should also do muscle-strengthening activities that are of moderate or high intensity and involve all major muscle groups on 2 or more days a week, as these activities provide additional health benefits (HHS, 2006c).

According to the CDC (2010i), 25 percent of adults are not active at all, and 60 percent do not get regular physical activity at the recommended amounts. Inactivity is greater among women, African American and Hispanic adults, older adults, and those with lower income and less

education. Physical activity and muscle-strengthening activity provide the following benefits:

- Reduce the risk of dying prematurely
- Reduce the risk of dying prematurely from heart disease
- Reduce the risk of developing diabetes
- Reduce the risk of developing high blood pressure
- Help reduce blood pressure in people who already have high blood pressure
- Reduce the risk of developing colon cancer
- Reduce feelings of depression and anxiety
- Help control weight
- Help build and maintain healthy bones, muscles, and joints
- Help older adults become stronger and better able to move about without falling
- Promote psychological well-being (CDC, 2010j)

SA 13: Reduce Past-Month Use of Illicit Substances

According to the Substance Abuse and Mental Health Administration (SAMHSA) (2010), 21.8 million people (8.7 percent of the population) in the United States aged 12 years or older used illicit drugs, an increase from the 8.0 percent rate in 2008. Among users of illicit drugs, marijuana was the most commonly used illicit drug with 16.7 million or 76.6 percent of illicit drug users. Seven million people used psychotherapeutic drugs nonmedically; cocaine was used by 1.6 million people, and hallucinogens by 1.3 million users, with higher rates in the use of Ecstasy in 2009 than in 2008 (760,000 and 555,000 respectively). Drug use varied by race/ethnicity with the highest use among American Indians/Alaska Natives (14.3 percent) followed by blacks (9.6 percent), whites (8.8 percent), Hispanics (7.9 percent) and Asians (3.7 percent). In terms of education, those who graduated from college had the lowest rate (6.1 percent) of current illicit drug use, followed by high school graduates (8.8 percent), those with some college (9.8 percent), and those who did not graduate from high school (10.2 percent) (SAMHSA, 2010).

In 2009, 23.5 million people needed substance abuse treatment, of whom 7.1 million needed drug treatment. Only 1.5 million of those received special treatment. It is estimated that 2 million emergency department visits in 2008 involved drug misuse or abuse. "Cocaine was involved in 482,188 visits, marijuana was involved in 374,435 visits, heroin was involved in 200,666 visits, and stimulants (including amphetamines and methamphetamine) were involved in 91,939 visits" (Office of National

Drug Control Policy, 2010). It is estimated that substance abuse in the United States cost $180 billion in 2002 (Harwood and Bouchery, 2004).

SA 14: Reduce the Proportion of Persons Engaging in Binge Drinking of Alcoholic Beverages

In the 2009 National Survey on Drug Use and Health, 130.6 million Americans (51.9 percent of the population aged 12 or older) reported being current drinkers of alcohol, and 59.6 million (23.7 percent) reported binge drinking, which is defined as "five or more drinks on the same occasion (i.e., at the same time or within a couple of hours of each other) on at least 1 day in the past 30 days (SAMHSA, 2009b). Figure 4 provides a graph of current, binge, and heavy alcohol use by age.

Binge drinkers account for 23 percent of the population, but drink 76 percent of the alcohol consumed. For adults over the age of 21 who drink alcohol, 31 percent are frequent binge drinkers, 16 percent are infrequent

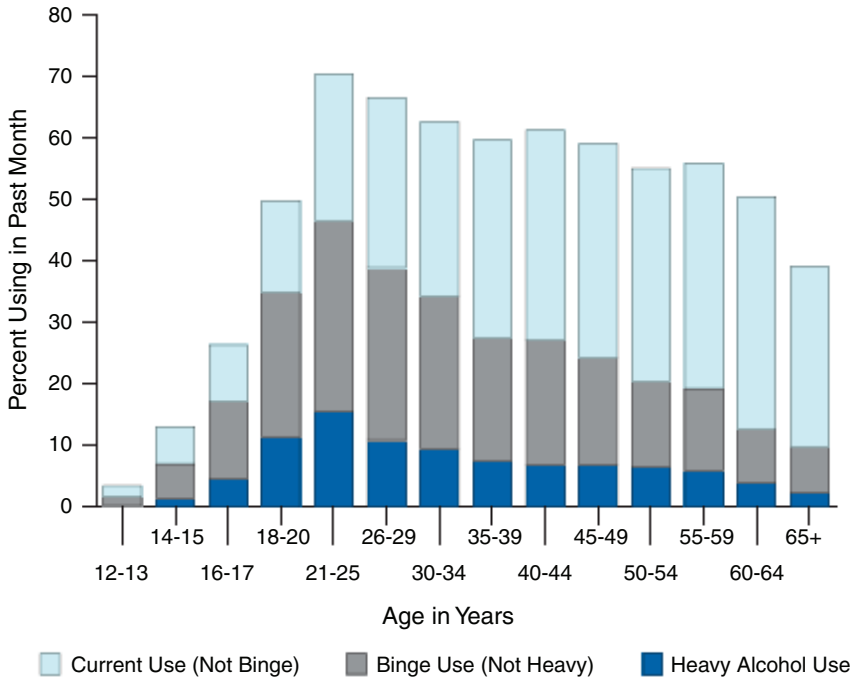

FIGURE 4 Current, binge, and heavy alcohol use among persons 12 or older by age, 2009.
SOURCE: SAMHSA, 2009b.

binge drinkers, and 43 percent of adult drinkers had five or more drinks on one occasion (Office of Juvenile Justice and Delinquency Prevention, 2005). Asians were least likely to binge drink (11.1 percent) followed by blacks (19.8 percent), American Indians or Alaska Natives (22.2 percent), persons reporting two or more races (24.1 percent), whites (24.8 percent), and Hispanics (25.0 percent). In the 26-year-old and older population, binge drinking was lower among college graduates (20.6 percent) than among those who had not completed college (23.2 percent). However, 18- to 22-year-olds enrolled full time in college were more likely to binge drink (43.5 percent) than those not enrolled full time (37.8 percent).

There are numerous consequences of binge drinking. Brewer and Swahn (2005) report that "high school students who binge drink are more likely to be involved, injured, or to injure others in physical fights, even after controlling for other factors that might affect this outcome (e.g., age, race, and sex)." Short-term consequences include risky sexual behavior (Wechsler et al., 1994); sexually transmitted diseases (Brewer and Swahn, 2005); miscarriage, stillbirth, and physical and mental birth defects (American Academy of Pediatrics, 2000); unintentional injuries (Smith et al., 1999); and violence (Greenfeld, 1998). Over the long term, excessive use of alcohol can lead to neurological problems, cardiovascular problems, and psychiatric problems (Castaneda et al., 1996; Corrao et al., 2002, 2004; Rehm et al., 2003). According to Chen and Yi (2007) over 4 million emergency room visits and 1.6 million hospitalizations occurred in 2005 due to alcohol-related conditions. It is estimated that approximately 79,000 deaths annually are attributable to excessive alcohol use (CDC, 2010a).

SH 4: Increase the Proportion of Adults Who Get Sufficient Sleep

In 2006 the IOM released a report that documented chronic sleep insufficiency as an important but underrecognized public health problem, affecting 50–70 million Americans (IOM, 2006). The report states that sleep conditions affect "mortality, morbidity, performance, accidents and injuries, functioning and quality of life, family well-being, and health care utilization." Immediate consequences include such things as automobile crashes. Driver sleepiness, independent of alcohol effects, is associated with nearly 20 percent of all serious car crash injuries. Other consequences are more long term, such as obesity and hypertension, according to the report. Physical and mental health problems associated with sleep loss and sleep disorders include hypertension, diabetes, obesity, depression, heart attack, and stroke. The IOM estimates that because of insufficient sleep "hundreds of billions of dollars a year are spent on direct medical costs associated with doctor visits, hospital services, prescriptions, and over-the-counter drugs" (IOM, 2006).

TU 1: Reduce Tobacco Use by Adults

According to the American Lung Association (2010), annual smoking prevalence declined by more than 50 percent between 1965 and 2008. Despite that decline, tobacco use is the leading cause of preventable morbidity and mortality in the United States (CDC, 2009a). One in five deaths annually is attributable to tobacco use (CDC, 2008). It is estimated that, in 2009, 69.7 million people in the United States aged 12 or older were current users of tobacco, of whom 58.7 million smoked cigarettes, 13.3 million smoked cigars, 8.6 million used smokeless tobacco, and 2.1 million smoked a pipe (SAMHSA, 2010).

Tobacco use has numerous health consequences. It is related to many types of cancer (bladder, cervical, esophageal, kidney, laryngeal, leukemia, lung, and oral). It is a major cause of cardiovascular disease and chronic lung disease (emphysema and chronic obstructive pulmonary disease), and has negative reproductive and developmental effects (HHS, 2006a). Male smokers are 23 times more likely and women smokers are 13 times more likely to die of lung cancer than their nonsmoking counterparts (HHS, 2004). Risk of stroke doubles for those who smoke compared to those who don't (HHS, 1998), smokers are 20 times more likely to develop peripheral vascular disease than nonsmokers (Fielding et al., 1998), and smokers are two to four times more likely than nonsmokers to develop coronary heart disease (HHS, 1989). "During 2000–2004, smoking resulted in an estimated annual average of 269,655 deaths among males and 173,940 deaths among females in the United States" (CDC, 2008).

It is estimated that cigarette smoking results in $97 billion in lost productivity and $96 billion in health care costs each year (CDC, 2008) while the costs of secondhand smoke are more than $10 billion (Behan et al., 2005).

TU 3: Reduce the Initiation of Tobacco Use Among Children, Adolescents, and Young Adults

According to the SAMHSA (2009b), the highest rate of current tobacco use (41.4 percent) occurred among young adults 18 to 25 years of age. But use of tobacco products is usually initiated and established during adolescence. Each day, approximately 3,450 people in the 12- to 17-year-old age group smoke their first cigarette, and the rate of tobacco use among these youth is 11.4 percent (CDC, 2010l). Table 7 provides information on the numbers of people under age 18 who initiated tobacco use.

Tobacco products are used by 7.4 percent of African American high school students, 9.7 percent of Asian American high school students, 19.2 percent of Hispanic high school students, and 19.4 percent of white high

TABLE 7 Past Year Initiation of Tobacco Use Among Persons Aged 12 or Older Who Initiated Use Prior to the Age of 18, by Gender: Numbers in the Thousands

	Total		Total		Total	
			Male	Male	Female	Female
Type of Tobacco	2007	2008	2007	2008	2007	2008
Cigarettes	1,333	1,421	665	674	668	747
Daily Cigarette Use	400	350	214	189	186	162
Smokeless Tobacco	681	662	528	510	153	153
Cigars	1,320	1,313	820	768	500	546

SOURCE: SAMHSA, 2009b.

school students. Use of tobacco during adolescence is associated with high-risk sexual behavior, use of alcohol, and use of other drugs (HHS, 2010).

SUGGESTIONS FOR UNPOPULATED HEALTHY PEOPLE 2020 TOPIC AREAS

Social Determinants

As discussed earlier, the committee believes that the three topic areas included in Healthy People 2020 that do not yet have objectives are very important to the health of this nation. Social determinants of health, for example, play an important role in health "in that they impact health outcomes directly as well as indirectly by influencing the other determinants" (IOM, 2009b). In developing social determinants of health as a topic area, Healthy People 2020 recognized that the social determinants of health are related to the health of the U.S. population. The Healthy People 2020 website[7] states:

> The conditions in which people live determine, in part, why some Americans are healthier than others and why Americans are generally not as healthy as they could be. Lack of options for healthy, affordable food or safe places to play in some neighborhoods makes it nearly impossible for residents to make healthy choices. In contrast, people living in neighborhoods with safe parks, good schools, and high employment rates are provided with some of the key requirements to better health.

[7] See http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=39 (accessed January 9, 2011).

> Improving the conditions in which people live, learn, work, and play and addressing the interrelationship between these conditions will create a healthier population and a healthier workforce. Integrating health policy efforts with those related to education, housing, business, transportation, agriculture, media, and other areas outside of the health sector will ultimately improve the health, safety, and prosperity of the nation.

The committee has chosen to suggest that HHS consider an objective related to *economic hardship* and proposes a mechanism for measuring economic hardship as described below.

Economic Hardship

As far back as 1967, Antonovsky (1967) discussed the relationship between socioeconomic status (SES) and health. SES is usually measured using three indicators: educational attainment,[8] income, and occupational status, and there is good evidence linking these variables to health outcomes (IOM, 2006). Other important constructs are housing and food affordability. In addition, other important determinants include social cohesion, support, and engagement (Berkman and Glass, 2000; Kawachi and Berkman, 2001; Stansfield, 1999), as well as discrimination, segregation, and stigma.

Lantz and Pritchard (2010) recently recommended a set of socioeconomic indicators that included the following:

1. Poverty rate
2. Unemployment rate
3. Average household income
4. Affordability of single family home
5. Bankruptcy and foreclosure rate
6. Percentage of household on public assistance
7. Percentage of single parent households
8. Percentage of children receiving free or reduced-priced lunch
9. Concentrated disadvantage and concentrated affluence scales
10. Percentage of adults over 24 with less than a high school education
11. Percentage of adults over 18 with less than an 8th-grade education
12. Public high school graduation and drop-out rates
13. Percentage of 3rd- and 10th-grade students at grade level in reading
14. Percentage of 10th-grade students at grade level in math

[8] The committee has included an objective on educational attainment among the 24 recommended to HHS. That objective is AH 5: Increase educational attainment of adolescents and young adults.

15. Racial segregation
16. Density of voluntary organizations
17. Voter registration and turnout

The committee believes that a more parsimonious and intuitive measure of social determinants, analogous to the Gross Domestic Product or Consumer Price Index would be desirable to allow an easily understood measure that captures many of these dimensions in a single metric. However the committee is unaware of any single metric or index that captures the comprehensive set of social determinants.

The Hardship Index (Intercity Hardship Index, Urban Hardship Index) was developed in 1976 to reflect many of the major social determinants in a single measure that have been used to monitor change in hardship and to compare urban areas. Originally developed in the context of the financing problems in New York City, updates were published in 1989 and 2004 (Montiel et al., 2004; Nathan and Adams, 1989).[9] Data come from the U.S. Census and the Bureau of Labor Statistics. The six key social determinants in the Hardship Index are

1. Unemployment, defined as the percent of the civilian population over the age of 16 who were unemployed;
2. Dependency, the percentage of the population that are under the age of 18 or over the age of 64;

[9] The authors describe the calculation of the index as follows:

X = ((Y-Ymin)/(Ymax-Ymin))*100

where: X = standardized value of component variable (for example, unemployment rate) for each city to be computed.

Y = unstandardized value of component variable for each city.

Ymin = the minimum value for Y across all cities.

Ymax = the maximum value for Y across all cities.

The (Ymax-Ymin) part of the formula was reversed to (Ymin-Ymax) for the calculation of Income Level so that the resulting ratio would be interpreted consistently with the other ratios—a higher value indicating higher hardship. The formula standardizes each of the component variables so they are all given equal weight in the composite Intercity Hardship Index. The index represents the average of the standardized ratios of all six component variables. The Intercity Hardship Index ranges from 0 to 100 with a higher number indicating greater hardship. Adjustments were made to reflect regional cost-of-living differences in order to compare economic conditions between cities in different parts of the country. Because the Bureau of Labor Statistics discontinued the Family Budget Index Nathan and Adams used for this purpose in their original analysis, adjustments were made using the Department of Housing and Urban Development's Fair Market Rents (FMR), defined as the 40th percentile rent for a two-bedroom home, and established for each of the cities in the study. The FMRs were indexed, and the index was applied at 100 percent as an adjustment to the income variable (which Nathan and Adams adjusted by the "intermediate level of living" of the BLS Family Budget Index), and at 67 percent as the poverty adjustment (which Nathan and Adams adjusted by the "lower level of living" of the BLS Family Budget Index).

3. Education, the percentage of the population over the age of 25 who have less than a high school education;
4. Income level, the per capita income;
5. Crowded housing, measured by the percent of occupied housing units with more than one person per room; and
6. Poverty, the percent of people living below the federal poverty level (adjusted for local cost of living [originally the BLS's Family Budget Index and later HUD's Fair Market Rents]).

There are several advantages to this approach including face validity, inclusion of important social determinants, a long history and data that can be tracked longitudinally, sensitivity to change, and available data (though frequency needs to be determined). Furthermore, the failure to include a measure of social determinants would be an enormous deficit, and there are flaws in the individual measures as well (e.g., graduation rates), so the alternatives are limited. Also, while different variables could be selected, they are likely to be highly correlated with these measures. Two other advantages are that income and poverty are adjusted for local cost of living and comparisons can be made in various ways (e.g., suburban to urban for each city or across cities). The individual components of the index are readily separable and can be presented separately which could be advantageous since some are more sensitive to shorter term change (such as employment rates) than others (educational attainment).

There are drawbacks, however. These include uncertain generalizability, the fact that the index has never been studied specifically with regard to health, it is not widely used, and it is not theory based. Although rural areas differ in obvious ways, most components are applicable to rural areas. Although overcrowded housing may seem less an issue in rural areas, many of the same issues that drive overcrowding in urban areas, such as recent immigration and poverty, occur in rural areas as well and, for some, such as migrant laborers, may be particularly acute. Furthermore, the equal weighting of factors is not empirically based although there is undoubtedly collinearity. The index does not include important dimensions of social determinants of health (e.g., social support, cohesion, civic engagement), and, finally, the score may depend on size of jurisdiction (more homogeneity in large jurisdictions than smaller ones). A careful examination of the standardization processes for each of the variables should be undertaken to develop an absolute measure for intertemporal comparisons so the index can be optimized to assess progress or regress in social conditions. Some of the components might need modification.

Despite these drawbacks, the committee believes that measures of the social determinants of health are crucial to Healthy People 2020 and that the Hardship Index is ripe for monitoring the socioeconomic com-

ponent of social determinants. No single metric provides comprehensive information on social determinants and individual measures (education, income, social cohesion, discrimination), and all suffer from some important limitations. The committee believes that the Hardship Index provides a reasonably comprehensive, understandable measure (analogous to GDP). The objective itself could be either general (e.g., improve education, income, and social cohesion to some level or in some population) or based directly on the Hardship Index (e.g., to decrease economic hardship by a certain percentage).

Health-Related Quality of Life and Well-Being

According to the Healthy People 2020 website, "Health-related quality of life (HRQoL) is a multidimensional concept that includes domains related to physical, mental, emotional, and social functioning. It goes beyond direct measures of population health, life expectancy, and causes of death, and focuses on the impact health status has on quality of life. A related concept of HRQoL is well-being, which assesses the positive aspects of a person's life, such as positive emotions and life satisfaction."[10]

Healthy People 2020 has proposed the new topic area *health-related quality of life and well-being* as an area in which objectives will be developed. As this area is explored, the committee offers two suggestions for consideration.

Health-Adjusted Life Expectancy

There are a number of measures that combine concepts of duration of life with degree of health or quality of life. Generically, these may be referred to as "health-adjusted life-years" (HALY) measures. There are a number of specific metrics within this family, though, that differ in terms of how either duration or quality of life is expressed. Examples include health-adjusted life expectancy (HALE), quality-adjusted life-years (QALY), disability-adjusted life-years (DALY), and years of healthy life (YHL). HALE is described as

> an indicator of overall population health. It combines measures of both age- and sex-specific health status, and age- and sex-specific mortality into a single statistic. HALE represents the number of expected years of life equivalent to years lived in full health, based on the average experience in a population. In this sense, HALE is not only a measure of quantity of life but also a measure of quality of life. (Statistics Canada, 2010)

[10] See http://www.healthypeople.gov/2020/about/QoLWBabout.aspx (accessed January 9, 2011).

HALE summary measures have the ability to take into account the effects of particular illnesses; provide insight into regional differences associated with social, environmental, and behavioral risk factors; and allow examination of the health experiences of subpopulations by race/ethnicity. The use of HALE is growing and the recently released IOM report, *For the Public's Health: The Role of Measurement in Action and Accountability*, referred to HALE as a gross domestic product (GDP) for the health sector, recommending that HHS support and implement "a summary measure of population health that can be used to estimate and track health-adjusted life expectancy for the United States" (IOM, 2010).

The committee suggests that HALE be considered carefully as the primary indicator in the general domain of health-related quality of life. There are two main reasons for this suggestion: first, the expression of duration of life as "life expectancy" provides a prospective focus on the health of Americans in the future and is consistent with commonly understood statistics already calculated on life expectancy. Second, the adjustment for variation in health status is more general than that based on disability (DALYs), and has been developed so as to take into account the effect of multiple illnesses or other health conditions so as to not overcount the health impact of multiple illnesses or disabilities. Calculation of HALE can be done using data from standard national health interview surveys, and comparative data exist for Canada and many other developed countries (Mathers et al., 2006). This conceptual basis and calculation method are somewhat more suitable for population of public health applications than some of the QALY or DALY methods that have been developed in the context of cost-effectiveness analysis of medical care interventions where a more limited time perspective is often appropriate (e.g., duration and quality of survival after diagnosis and treatment of breast cancer). Again, though, the specific metrics are conceptually similar, and other measures in the HALY family may be useful for specific purposes under the general domain of health-related quality of life.

This committee supports the recommendations of the IOM report and urges HHS to consider developing and using a summary measure of population health to estimate and track health-adjusted life expectancy.

Health-Related Quality of Life

There are a wide variety of measures whose developers or others have identified as being about health-related quality of life (Brown et al., 2009; Robert et al., 2009). In a review chapter prepared as part of an earlier IOM report, Dennis Fryback observed a shift in scientific consensus to the effect that a fairly small subset of measures in this larger family were being described as HRQoL measures, and that the others were being

described as health status measures. The distinction between the two sets was that the former included the concept of a health "utility" and were capable of expressing health status in the form of a 0–1 scale based on formal psychometric and econometric measures for valuing defined health states (Fryback, 1998). This distinction seems not to have been widely recognized or adopted by others, though, as there are many other measures than those listed by Fryback that are still commonly referred to as HRQoL measures (Kapp et al., 2009; Mula et al., 2009). The committee believes, though, that the distinction is worthwhile, as the subset of HRQoL measures that can produce summary utility scores have the unique ability to have those scores used directly in metrics like QALYs or other similar measures used for cost-effectiveness analyses and other broad health policy decisions.

One of the major components of HALE is self-rated health using HRQoL measures under the narrow definition described above (Fryback et al., 2007). These metrics have recently been applied to population health, especially in Canada and Europe (Fryback et al., 2010). Most HRQoL indices are based on interviewer- or self-administered questionnaires, and each of the instruments listed in Table 8—except for the HALex—has been evaluated and scored using one of four assessment methods: standard gamble, time trade-off, direct rating, or visual analogue scale (Fryback, 1998; Fryback et al., 2007). Basically, a population-based or convenience sample of individuals is asked to judge the relative value of different levels of function or distress, usually on a scale of 0 to 1. For example, living for a certain number of years with partial loss of eyesight is compared with living in excellent health for fewer years (Fryback, 1998). The HALex, and four utility indices are currently used in the United States: the EuroQol EQ-5D (EQ-5D); the Health Utilities Index Mark 2 (HUI2) and Mark 3 (HUI3); and the Quality of Well-Being Scale self-administered form (QWB-SA) (Fryback et al., 2007). See Fryback (Fryback, 1998; Fryback et al., 2007, 2010) for more detailed descriptions and comparisons of these indices. As mentioned above, the CDC has also developed HRQoL measures, which are used in the Behavioral Risk Factor Surveillance System and NHANES; these measures were recently validated against the SF-36v2 (CDC, 2009b; Mielenz et al., 2006).

The National Institutes of Health, through a network of researchers, began development in 2004 of a method to measure "patient-reported outcomes," currently known as the Patient Reported Outcomes Measurement Information System (PROMIS). Although PROMIS is based on a conceptual framework similar to existing HRQoL indices, PROMIS measurement is based on item response theory. In contrast to the fixed sets of questions used by existing HRQoLs and their single summary indices of health, PROMIS uses dynamic sets of questions that address a variety

TABLE 8 Health-Related Quality-of-Life (HRQol) Indices

Index	Domains	Number of Response Levels[a]	Time Frame	Scoring Algorithm	Data Collection Method
EQ-5D	Mobility, self-care, usual activities, pain/ discomfort, anxiety/ depression	3	"your health today"	Trade-off assessment (population sample, USA)	5 questions
HUI2	Sensation, mobility, emotion, cognition, self-care, pain, fertility	4 or 5	1 week recall period	Standard gamble assessment (population sample, Hamilton, Ontario)	40-item interviewer-administered questionnaire or 18-item, self-administered questionnaire
HUI3	Vision, hearing, speech, ambulation, dexterity, emotion, cognition, pain	5 or 6	1 week recall period	Standard gamble assessment (population sample, Hamilton, Ontario)	40-item interviewer-administered questionnaire or 18-item, self-administered questionnaire
QWB-SA	Mobility, physical activity, social activity	Multiple	Each of the past 3 days	Visual analogue scale (convenience sample, clinics, San Diego, USA)	Self-administered using a two-sided optical scan form
HALex	Activity limitation, self-rated health	5 or 6	"your health in general"	Ad hoc; HALex is not a utility measure	Interviewer-administered questionnaire

[a] Number of response levels available for each question. For example, the EQ-5D provides three levels of response: no problems, moderate problems, and severe problems. The HALex uses six levels for activity limitation (ranging from "no limitations" to "unable to perform activities of daily living") and five levels for self-reported health (excellent, very good, good, fair, and poor).

SOURCE: Table generated by R. Gibson Parrish for use in this report. Data adapted from Fryback et al., 2007, and Fryback, 2010.

of health conditions and does not produce a single summary measure of an individual's general health state expressed as a utility score (Fryback et al., 2010; NIH PROMIS Network, 2010). The PROMIS Global Health measure, though, may become widely used and developed so that it can function as a standard HRQoL measure.

In developing objectives and related metrics and indicators under the broad label of health-related quality of life, then, the committee suggests that HHS pay particular attention to those measures that are capable of producing summary measures of health in the form of a 0–1 health utility score.

Quality of Life or Well-Being

Overall quality-of-life measures have also been developed and conceptualized as measuring subjective well-being through the assessment of happiness and life satisfaction (Helliwell, 2005). Well-being has been linked to "positive health" (Cameron et al., 2006; Carlisle and Hanlon, 2008). The focus of the examination of well-being on health is in the sense of thriving and flourishing rather than ill health. Given that the widely cited WHO definition of health includes well-being, the measurement of well-being at the population level has grown, particularly in European countries. The committee notes, though, that the conceptual framework for well-being in most of these assessments includes health as one of many components, indicating that well-being is treated as a broader and more inclusive concept than health only.

Happiness has been employed as a key indicator of well-being with its measurement being a commentary on how people live as well as their subjective experience of both physical and mental health (Yang, 2007). Happiness has been defined as state of stable, global judgment of life quality and the extent to which an individual evaluates the overall quality of his or her life in a positive fashion (Easterlin, 2003; Veenhoven, 1997). Life satisfaction shares many of the same properties as happiness and is viewed as a component of well-being, particularly subjective well-being. Subjective well-being has been defined as having three components: positive affective appraisal, negative affective appraisal, and life satisfaction. Life satisfaction is distinguished from affect appraisal in that it is more cognitively than emotionally driven. Life satisfaction is also often assessed specific to a particular domain of life (e.g., work, family) or globally (Diener, 2000; Diener et al., 1999; Frey and Stutzer, 2002; Putnam, 2000).

The data on the relationship between health and positive and negative emotions are growing. In the area of CVD and mortality, a state of positive health is associated with longevity and improved prognosis: Seligman (2008) gives as an example the study by Giltay and colleagues (2004) that

followed approximately 1,000 Dutch seniors for 10 years. Those with high optimism had a low hazard ratio of 0.23 for CVD death (upper vs. lower quartile of optimism, 95 percent confidence interval, 0.10–0.55) when controlling for age, sex, chronic disease, education, smoking, alcohol, history of CVD, body mass, and cholesterol level. Positive emotions have also been linked to recovery after a major cardiac event (Leedham et al., 1995). Veenhoven (2008) reviewed the literature on the relationship between happiness and physical health and the consequences for preventive health care. Strong evidence is provided indicating that happiness cannot cure already existing diseases; nonetheless, happiness or subjective well-being is important in increasing healthy behaviors and positive health status. Veenhoven (2008) presents a series of ways that health promotion and prevention policies can benefit from an inclusion of the focus on increasing happiness. Helliwell (2005), using data on subjective well-being drawn from three successive waves of the World Values Survey (Inglehart, 2009), was able to show clear relationships between health and subjective well-being. There are also a growing number of studies that indicate that negative affect is detrimental to the pursuit of healthy behaviors, health care activities, and even recovery from disease and disorders (Diener, 2000; Diener et al., 1999; Frey and Stutzer, 2002; Putnam, 2000).

Well-being in a population has been measured in a number of ways. Yang (2007) provides a discussion of its assessment in a population through a measure of happy life expectancy (HapLE), which is combined with an assessment of length of life.

Indexes are fairly standard approaches in the measurement of subjective well-being in a number of countries. Currently, well-being is being measured at a population level by the Organisation for Economic Cooperation and Development (OECD), Australia, Canada, and the Netherlands, and here in the United States by Gallup-Healthways. These indexes vary in their assumptions, their metrics, and extent to which their measures are directly related to health outcomes.

As HHS staff develop objectives for the concept of well-being, either under that topic heading in Healthy People 2020 or under the label of foundation health measures, the committee suggests that they review measures and datasets related to the concepts of happiness and well-being as a basis for defining specific objectives in these domains. In general terms, the objectives could take the form of "increase happiness" or "increase well-being," but they could be stated in more precise terms based on available norms or trends over time in already-available datasets. It will be important to determine whether these concepts and measures fall under the conceptual domain of "healthy people" or represent broader social concepts that go beyond the implicit definition of health used to guide the development of Healthy People objectives.

Lesbian, Gay, Bisexual, and Transgender Health

Healthy People 2020 has created a new topic area called lesbian, gay, bisexual, and transgender (LGBT) health, citing the importance of eliminating disparities faced by LGBT individuals. According to the Healthy People 2020 website, these disparities include the following:

- LGBT youth are two to three times more likely to attempt suicide (Garofalo et al., 1999).
- LGBT youth are more likely to be homeless (Conron et al., 2010; Kruks, 2010; Van Leeuween et al., 2006).
- Lesbians are less likely to get preventive services for cancer (Buchmueller and Carpenter, 2010; Dilley et al., 2010).
- Gay men are at higher risk of HIV and other sexually transmitted diseases, especially in Hispanic and African American men (CDC, 2010f).
- Lesbians and bisexual females are more likely to be overweight or obese (Struble et al., 2010).
- Transgender individuals have a high prevalence of HIV/STDs (Herbst et al., 2008), victimization (Whitbeck et al., 2004), mental health concerns (Diaz et al., 2001), suicide (Kenagy, 2005), and are less likely to have health insurance than heterosexual or LGB individuals (National Gay and Lesbian Taskforce, 2009).
- Elderly LGBT individuals face additional barriers to health because of isolation and a lack of social services and culturally competent providers (Grant et al., 2009).
- LGBT populations have the highest rates of tobacco use (Lee et al., 2009; Xavier et al., 2007), alcohol use (Hughes, 2005; Xavier et al., 2007), and illicit drug use (Hughes, 2005; Lyons et al., 2006; Mansergh et al., 2001) of all other specific populations.

Additional disparities include:

- Women in same-sex relationships are significantly less likely than women in opposite-sex relationships to have seen a medical provider in the previous 12 months, and to have a usual source of health care (Heck et al., 2006).
- Early homosexual activity is related to reduced educational achievement (Barrett et al., 2002).
- Partnered lesbians and gay men are twice as likely to be uninsured as heterosexual couples (Ponce et al., 2010).
- Gay, lesbian, and bisexual youth are more likely than heterosexual youth to meet criteria for major depressive episode (Whitbeck et al., 2004).

The committee reviewed the 24 objectives it selected for inclusion in the Healthy People 2020 Leading Health Indicators and noted that, while these objectives are relevant to all, there are particular disparities in many of the underlying indicators that are related to LGBT populations. As discussed earlier in this report, educational achievement is related to improved health which may be of particular importance in LGBT populations, many of whom face high rates of special and complex health problems (e.g., HIV/AIDs) and difficulties in dealing with the health care system more generally. Therefore, the committee offers the following modifications of the selected objectives for use in tracking LBGT health. For ease of comparison with the original Healthy People 2020 objective, the number of the objective has been modified by placing an *L* immediately after the number to indicate its use with LGBT populations:

- AH 5L: Increase the educational achievement of lesbians, gay men, and bisexual and transgender adolescents and young adults.
- AHS 1L: Increase the proportion of lesbians, gay men, and bisexual and transgender persons with health insurance.
- AHS 5L: Increase the proportion of lesbians and transgender persons with a usual primary care provider.
- HIV 17L: Increase the proportion of condom use among gay or bisexual males aged 15 and above who are sexually active with other men or women.
- MHMD 4L.1: Reduce the proportion of gay, bisexual or questioning males and females aged 12 to 17 years who experience major depressive episodes (MDEs).
- MHMD 4L.2: Reduce the proportion of lesbian, gay men, bisexual, and transgender persons aged 18 years and older who experience major depressive episodes (MDEs).
- NWS 10L: Reduce the proportion of lesbian and bisexual female adolescents who are considered obese.
- SA 13L: Reduce the proportion of lesbians', gay males', bisexuals', and transgender persons' past-month use of illicit drugs.
- SA 14L: Reduce the proportion of lesbian, gay males, and bisexual persons engaging in binge drinking of alcoholic beverages.
- TU 1L: Reduce tobacco use by lesbian, gay men, and transgender adults.

The committee believes that by including objectives that address issues of disparities in health for the LGBT populations, there will be a focus for implementing actions to lesson disparities and improve the health of LGBT populations.

A major difficulty in examining LGBT health relates to the availability

of data for analysis. According to the Healthy People website,[11] "Sexual orientation and gender identity questions are not asked on most national or state surveys, making it difficult to estimate the number of LGBT individuals and their health needs." Therefore, the committee believes HHS should focus on improving and developing datasets that will facilitate analysis of disparities in LGBT health, thereby leading to action that can improve the quality of life and well-being of LGBT populations.

CONCLUSION

Based on a framework that integrates the life course model with a model of health determinants and health outcomes, the committee selected 24 objectives and grouped them into two sets of topics and indicators. The first set is the approach recommended by the committee. This thematic approach categorizes the objectives into 12 health-related themes. The second set, the framework approach, places the objectives into each of the categories of the overarching framework. Either or both of these two approaches can be used by HHS to focus on health domains of particular interest or to identify priority areas for collecting and reporting information.

The committee also suggested that HHS consider several ideas for populating the three Healthy People 2020 topic areas that do not currently have objectives. These include

- Social Determinants of Health
  - Explore the use of the Hardship Index for use in monitoring socioeconomic aspects of the social determinants of health.
- Health-Related Quality of Life and Well-Being
  - Use health-adjusted life expectancy as an indicator for health-related quality of life.
  - Focus particular attention on measures that are capable of producing summary measures of health in the form of a 0–1 health utility score.
  - Review measures and datasets related to the concepts of happiness and well-being as a basis for defining specific objectives.
- Lesbian, Gay, Bisexual, and Transgender (LGBT) Health
  - Modify objectives identified by the committee to focus specifically on lesbian, gay, bisexual and transgender populations.

[11] See http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=25 (accessed January 9, 2011).

Healthy People 2020 objectives are framed to drive action to improve health, and targets are set to allow for measuring progress over time. The committee believes that the selected objectives and indicators will help focus both national and local action aimed at achieving the Healthy People 2020 goals of attaining high-quality, longer lives free of preventable disease, disability, injury, and premature death; achieving health equity, eliminating disparities, and improving the health of all groups; creating social and physical environments that promote good health for all; and promoting quality of life, healthy development, and healthy behaviors across all life stages.

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Appendix A

Health Reform Crosswalk: Patient Protection and Affordable Care Act

Topic	Indicator	Objective	Federal Health Reform Crosswalk
Access to Care	Proportion of the population with access to health care services	1. AHS 1: Increase the proportion of persons with health insurance. 2. AHS 3: Increase proportion of persons with a usual primary care provider. 3. AHS 7: (Developmental) Increase the proportion of persons who receive appropriate evidence-based clinical preventive services.	• Primary goal of federal health reform—projected to increase coverage to 32 million Americans through Medicaid expansion to 133% of federal poverty level (FPL) (16 million) and creation of state-based insurance exchanges (another 16 million). • Increase Medicaid payments in fee-for-service and managed care for primary care services provided by primary care doctors (family medicine, general internal medicine, or pediatric medicine) to 100% of the Medicare payment rates for 2013 and 2014. States will receive 100% federal financing for the increased payment rates (effective January 1, 2013). • Provide a 10% bonus payment to primary care physicians in Medicare from 2011 through 2015. (Effective for 5 years beginning January 1, 2011).

continued

Topic	Indicator	Objective	Federal Health Reform Crosswalk
			• (Sec. 3024) Directs the secretary to conduct a demonstration program to test a payment incentive and service delivery model that uses physician- and nurse practitioner-directed home-based primary care teams designed to reduce expenditures and improve health outcomes in the provision of items and services (Sec. 5405, as modified by Sec. 10501). Requires the secretary, acting through the director of AHRQ, to establish a Primary Care Extension Program to provide support and assistance to educate primary care providers about preventive medicine, health promotion, chronic disease management, mental and behavioral health services, and evidence-based and evidence-informed therapies and techniques. • Requires the secretary to award grants to states for the establishment of Primary Care Extension Program State Hubs to coordinate state health care functions with quality improvement organizations and area health education centers. • Requires Medicare incentive payments to: (1) primary care practitioners providing primary care services on or after January 1, 2011, and before January 1, 2016; and (2) general surgeons performing major surgical procedures on or after January 1, 2011, and before January 1, 2016, in a health professional shortage area.

Topic	Indicator	Objective	Federal Health Reform Crosswalk
			• (Sec. 5503) Reallocates unused residency positions to qualifying hospitals for primary care residents for purposes of payments to hospitals for graduate medical education costs. • Authorizes the secretary to award grants to teaching health centers for the purpose of establishing new accredited or expanded primary care residency programs. • Improve prevention by covering only proven preventive services and eliminating cost sharing for preventive services in Medicare and Medicaid (effective January 1, 2011). For states that provide Medicaid coverage for and remove cost-sharing for preventive services recommended by the U.S. Preventive Services Task Force and recommended immunizations, provide a 1% increase in the Federal Medical Assistance Percentages (FMAP) for these services. Increase Medicare payments for certain preventive services to 100% of actual charges or fee schedule rates (effective January 1, 2011). Require qualified health plans to provide at a minimum coverage without cost-sharing for preventive services rated A or B by the U.S. Preventive Services Task Force, recommended immunizations, preventive care for infants, children, and adolescents, and additional preventive care and screenings for women (effective 6 months following enactment).

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Topic	Indicator	Objective	Federal Health Reform Crosswalk
Healthy Behavior	Proportion of the population engaged in healthy behaviors	4. PA 2: Increase the proportion of adults who meet current Federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity. 5. NWS 10: Reduce the proportion of children and adolescents who are considered obese. 6. NWS 17: Reduce consumption of calories from solid fats and added sugars in the population aged 2 years and older. 7. SH 4: Increase the proportion of adults who get sufficient sleep.	• Requires the secretary to provide for the planning and implementation of a national public-private partnership for a prevention and health promotion outreach and education campaign to raise public awareness of health improvement across the life span. • Provide grants for up to 5 years to small employers that establish wellness programs (funds appropriated for 5 years beginning in fiscal year 2011). • Provide technical assistance and other resources to evaluate employer-based wellness programs. Conduct a national worksite health policies and programs survey to assess employer-based health policies and programs (conduct study within 2 years following enactment). • Permit employers to offer employees rewards in the form of premium discounts, waivers of cost-sharing requirements, or benefits that would otherwise not be provided—of up to 30% of the cost of coverage for participating in a wellness program and meeting certain health-related standards. Employers must offer an alternative standard for individuals for whom it is unreasonably difficult or inadvisable to meet the standard. The reward limit may be increased to 50% of the cost of coverage if deemed appropriate (effective January 1, 2014). Establish 10-state pilot programs by July 2014 to permit participating states to apply similar

Topic	Indicator	Objective	Federal Health Reform Crosswalk
			rewards for participating in wellness programs in the individual market and expand demonstrations in 2017 if effective. Require a report on the effectiveness and impact of wellness programs (report due 3 years following enactment). • Require chain restaurants and food sold from vending machines to disclose the nutritional content of each item (proposed regulations issued within 1 year of enactment).
Chronic Disease	Prevalence and mortality of chronic disease	8. HDS 2: Reduce coronary heart disease deaths. 9. HDS 5: Reduce the proportion of persons in the population with hypertension. 10. C 1: Reduce the overall cancer death rate.	• Requires the essential health benefits package to provide essential health benefits and limit cost sharing. Directs the secretary to: (1) define essential health benefits and include emergency services, hospitalization, maternity and newborn care, mental health and substance use disorder services, prescription drugs, preventive and wellness services and chronic disease management, and pediatric services, including oral and vision care; (2) ensure that the scope of the essential health benefits is equal to the scope of benefits provided under a typical employer plan; and (3) provide notice and an opportunity for public comment in defining the essential health benefits. Establishes: (1) an annual limit on cost sharing beginning in 2014; and (2) a limitation on the deductible under a small group market health plan. • (Sec. 3503) Directs the secretary, acting through the Patient Safety Research Center, to establish a

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Topic	Indicator	Objective	Federal Health Reform Crosswalk
			program to provide grants or contracts to eligible entities to implement medication management services provided by licensed pharmacists, as a collaborative multidisciplinary, interprofessional approach to the treatment of chronic diseases for targeted individuals, to improve the quality of care, and reduce overall cost in the treatment of such disease. • Requires the secretary, acting through the director of CDC, to award grants to state and local governmental agencies and community-based organizations for the implementation, evaluation, and dissemination of evidence-based community preventive health activities in order to reduce chronic disease rates, prevent the development of secondary conditions, address health disparities, and develop a stronger evidence base of effective prevention programming. • Requires the secretary to: (1) conduct an evaluation of community-based prevention and wellness programs and develop a plan for promoting healthy lifestyles and chronic disease self-management for Medicare beneficiaries; and (2) evaluate community prevention and wellness programs that have demonstrated the potential to help Medicare beneficiaries reduce their risk of disease, disability, and injury by making healthy lifestyle choices. • (Sec. 10413) Young Women's Breast Health Education and

Topic	Indicator	Objective	Federal Health Reform Crosswalk
			Awareness Requires Learning Young Act of 2009, or the EARLY Act, requires the secretary, acting through the director of CDC, to conduct: (1) a national education campaign to increase awareness of young women's knowledge regarding breast health and breast cancer; (2) an education campaign among physicians and other health care professionals to increase awareness of breast health of young women; and (3) prevention research on breast cancer in younger women.
Environmental Determinants	Proportion of the population experiencing a healthy physical environment	11. EH 1: Reduce the number of days the Air Quality Index (AQI) exceeds 100.	• (Sec. 10323) Amends SSA title XVIII (Medicare) to deem eligible for Medicare coverage certain individuals exposed to environmental health hazards.
Social Determinants	Proportion of the population experiencing a healthy social environment	12. HC/HIT 1: (Developmental) Improve the health literacy of the population. 13. EMC 1: (Developmental) Increase the proportion of children who are ready for school in all five domains of healthy development: physical development, social-emotional development, approaches to learning, language, and	• (Sec. 3501) Requires that research of the AHRQ's Center for Quality Improvement and Patient Safety be made "available to the public through multiple media and appropriate formats to reflect the varying needs of health care providers and consumers and diverse levels of health literacy." • (Sec. 3506) Authorizes a "program to update patient decision aids to assist health care providers and patients." "Decision aids must reflect varying needs of consumers and diverse levels of health literacy." • (Section 3507) Directs the secretary to determine whether the addition of certain standardized information to prescription drug labeling and

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Topic	Indicator	Objective	Federal Health Reform Crosswalk
		cognitive development. 14. AH 5: Increase educational achievement of adolescents and young adults.	print advertising would improve health care decision making by clinicians and patients and consumers; to consider scientific evidence on decision making; and to consult with various stakeholders and "experts in health literacy." • (Sec. 5301) Preference for training grant awards in the medical specialties are for qualified applicants that "provide training in enhanced communication with patients and in cultural competence and health literacy."
Injury	Proportion of the population that experiences injury	15. IVP 1: Reduce fatal and nonfatal injuries.	
Mental Health	Proportion of the population experiencing positive mental health	16. MHMD 4: Reduce the proportion of persons who experience major depressive episodes (MDE).	• (Sec. 5306) Authorizes the secretary to award grants to institutions of higher education to support the recruitment of students for, and education and clinical experience of the students in, social work programs, psychology programs, child and adolescent mental health, and training of paraprofessional child and adolescent mental health workers. • (Sec. 5604) Authorizes the secretary, acting through the administrator of the Substance Abuse and Mental Health Services Administration, to award grants and cooperative agreements for demonstration projects for the provision of coordinated and integrated services to special populations through the colocation of primary and specialty care

Topic	Indicator	Objective	Federal Health Reform Crosswalk
			services in community-based mental and behavioral health settings. • (Sec. 10410) Establishing a Network of Health-Advancing National Centers of Excellence for Depression Act of 2009, or the ENHANCED Act of 2009, requires the secretary, acting through the administrator of the Substance Abuse and Mental Health Services Administration, to: (1) award grants to establish national centers of excellence for depression; and (2) designate one such center as a coordinating center. Requires the coordinating center to establish and maintain a national, publicly available database to improve prevention programs, evidence-based interventions, and disease management programs for depressive disorders using data collected from the national centers. • (Sec. 1302, as modified by Sec. 10104) Requires the essential health benefits package to provide essential health benefits and limit cost sharing. Directs the secretary to: (1) define essential health benefits and include emergency services, hospitalization, maternity and newborn care, mental health and substance use disorder services, prescription drugs, preventive and wellness services and chronic disease management, and pediatric services, including oral and vision care; (2) ensure that the scope of the essential health benefits is equal to the scope of benefits

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Topic	Indicator	Objective	Federal Health Reform Crosswalk
			provided under a typical employer plan; and (3) provide notice and an opportunity for public comment in defining the essential health benefits. Establishes: (1) an annual limit on cost sharing beginning in 2014; and (2) a limitation on the deductible under a small group market health plan.
Maternal and Infant Health	Proportion of healthy births	17. MICH 8: Reduce low birth weight (LBW) and very low birth weight (VLBW).	
Responsible Sexual Behavior	Proportion of the population engaged in responsible sexual behavior	18. FP 8: Reduce pregnancy rates among adolescent females. 19. HIV 17: Increase the proportion of sexually active persons who use condoms.	• (Sec. 2953, as modified by Sec. 10201) Directs the secretary to allot funds to states to award grants to local organizations and other specified entities to carry out personal responsibility education programs to educate adolescents on both abstinence and contraception for the prevention of pregnancy and sexually transmitted infections, as well as on certain adulthood preparation subjects. Makes appropriations for FY2010–FY2014. • (Sec. 2954) Makes appropriations for FY2010–FY2014 for abstinence education.
Substance Abuse	Proportion of the population engaged in substance abuse	20. SA 14: Reduce the proportion of persons engaging in binge drinking of alcoholic beverages. 21. SA 13: Reduce past-month use of illicit substances.	• (Sec. 10410) Establishing a Network of Health-Advancing National Centers of Excellence for Depression Act of 2009, or the ENHANCED Act of 2009, requires the secretary, acting through the administrator of the Substance Abuse and Mental Health Services Administration, to: (1) award grants to establish national centers of excellence for depression; and (2)

Topic	Indicator	Objective	Federal Health Reform Crosswalk
			designate one such center as a coordinating center. Requires the coordinating center to establish and maintain a national, publicly available database to improve prevention programs, evidence-based interventions, and disease management programs for depressive disorders using data collected from the national centers.
Tobacco	Proportion of the population using tobacco	22. TU 1: Reduce tobacco use by adults. 23. TU 3: Reduce the initiation of tobacco use among children, adolescents, and young adults.	• (Sec. 1201, as modified by Sec. 10103) Prohibits a health plan ("health plan" under this subtitle excludes any "grandfathered health plan" as defined in section 1251) from: (1) imposing any preexisting condition exclusion; or (2) discriminating on the basis of any health status-related factor. Allows premium rates to vary only by individual or family coverage, rating area, age, or tobacco use. • (Sec. 4107) Provides for Medicaid coverage of counseling and pharmacotherapy for cessation of tobacco use by pregnant women.
Quality of Care	Proportion of the population receiving quality health care services	24. HA 1: Reduce central line-associated bloodstream infections (CLABSI).	• (Sec. 3508) Authorizes the secretary to award grants to eligible entities or consortia to carry out demonstration projects to develop and implement academic curricula that integrate quality improvement and patient safety in the clinical education of health professionals.

Appendix B

24 Selected Objectives with Subobjectives

AHS 5: Increase educational achievement of adolescents and young adults.

AH 5.1: Increase the proportion of students who graduate with a regular diploma 4 years after starting 9th grade. Baseline: 74.9 percent. Target: 10 percent improvement. Data Source: Common Core of Data (CCD), State Nonfiscal Survey of Public Elementary/Secondary Education, ED, IES, NCES

AH 5.2: Increase the proportion of students who are served under the Individuals with Disabilities Education Act who graduate high school with a diploma. Baseline: 59.3 percent of students aged 14 to 21 years. Target: 10 percent improvement. Data Source: Individuals with Disabilities Education Act, ED, OSEP, DANS

AH 5.3: Increase the proportion of students whose reading skills are at or above the proficient achievement level for their grade.

AH 5.3.1: Fourth (4th) grade Baseline: 33.0 percent. Target: 10 percent improvement. Data Source: National Assessment of Educational Progress, ED, IES, NCES

AH 5.3.2: Eighth (8th) grade. Baseline: 32.4 percent. Target: 10 percent. Data Source: National Assessment of Educational Progress, ED, IES, NCES

AH 5.3.3: Twelfth (12th) grade. Baseline: 35.4 percent. Target: 10 percent improvement. Data Source: National Assessment of Educational Progress, ED, IES, NCES

AH 5.4: Increase the proportion of students whose mathematics skills are at or above the proficient achievement level for their grade.

AH 5.4.1: Fourth (4th) grade. Baseline: 39.1 percent. Target: 10 percent improvement. Data Source: National Assessment of Educational Progress, ED, IES, NCES

AH 5.4.2: Eighth (8th) grade. Baseline: 33.9 percent. Target: 10 percent improvement. Data Source: National Assessment of Educational Progress, ED, IES, NCES

AH 5.4.3: Twelfth (12th) grade. Baseline: 23.0 percent. Target: 10 percent improvement. Data Source: National Assessment of Educational Progress, ED, IES, NCES

AH 5.5: Increase the proportion of adolescents who consider their school work to be meaningful and important. Baseline: 26.6 percent. Target: 10 percent improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

AH 5.6: Decrease school absenteeism among adolescents due to illness or injury. Baseline: 14.6 percent. Target: 10 percent improvement. Data Source: (National Health Interview Survey (NHIS), CDC, NCHS.

AHS 1: Increase the proportion of persons with health insurance.

AHS 1.1: Medical insurance. Baseline: 82.3 percent. Target: 100 percent. Data Source: National Health Interview Survey (NHIS), CDC, NCHS

AHS 1.2: (Developmental) Dental insurance. No baseline or target given. Data Source: National Health Interview Survey (NHIS), CDC, NCHS

AHS 1.3: (Developmental) Prescription drug insurance. No baseline or target given. Data Source: National Health Interview Survey (NHIS), CDC, NCHS

AHS 3: Increase the proportion of persons with a usual primary care provider. Baseline: 76.3 percent. Target: 83.9 percent. Data Source: Medical Expenditure Panel Survey (MEPS), AHRQ

AHS 7: (Developmental) Increase the proportion of persons who receive appropriate evidence-based clinical preventive services. No baseline or target given. Data Source: Medical Expenditure Panel Survey (MEPS), AHRQ

C 1: Reduce the overall cancer death rate. Baseline: 178.4 cancer deaths per 1,000 population. Target: 10 percent improvement. Data Source: National Vital Statistics System (NVSS), CDC, NCHS

EH 1: Reduce the number of days the Air Quality Index (AQI) exceeds 100. Baseline: 11 days exceeded 100 on the Air Quality Index (AQI) in 2008. Target: 10 days. Data Source: Air Quality System (formerly the Aerometric Information Retrieval System), EPA

EMC 1: (Developmental) Increase the proportion of children who are ready for school in all five domains of healthy development: physical development, social-emotional development, approaches to learning, language, and cognitive development. No baseline or target given. Data Source: National Survey of Children's Health (NSCH), HRSA, MCHS; CDC, NCHS; National Household Education Surveys (NHES), ED

FP 8: Reduce pregnancy rates among adolescent females.

FP 8.1: Reduce the pregnancy rate among adolescent females aged 15 to 17 years. Baseline: 40.2 pregnancies per 1,000. Target: 10 percent improvement. Data Source: Abortion Provider Survey, Guttmacher Institute; Abortion Surveillance Data, CDC, NCCDPHP; National Vital Statistics System–Natality (NVSS–N), CDC, NCHS; National Survey of Family Growth (NSFG), CDC, NCHS

FP 8.2: Reduce the pregnancy rate among adolescent females aged 18 to 19 years. Baseline: 117.7 pregnancies per 1,000. Target: 10 percent improvement. Data Source: Abortion Provider Survey, Guttmacher Institute; National Vital Statistics System (NVSS), CDC, NCHS; National Survey of Family Growth (NSFG), CDC, NCHS; Abortion Surveillance Data, CDC, NCCDPHP

HA 1: Reduce central line-associated bloodstream infections (CLABSI). Baseline: 1.0 Standardized Infection Ratio (SIR). Target: 0.25 SIR or 75 percent reduction. Data Source: National Healthcare Safety Network (NHSN), CDC

HC/HIT 1: (Developmental) Improve the health literacy of the population.

HC/HIT 1.1: Increase the proportion of persons who report their health care provider always gave them easy-to-understand instructions about what to do to take care of their illness or health condition. No baseline or target given. Data Source: Medical Expenditure Panel Survey (MEPS), AHRQ

HC/HIT 1.2: Increase the proportion of persons who report their health care provider always asked them to describe how they will follow the instructions. No baseline or target given. Data Source: Medical Expenditure Panel Survey (MEPS), AHRQ

HC/HIT 1.3: Increase the proportion of persons who report their health care providers' office always offered help in filling out a form. No baseline or target given. Data Source: Medical Expenditure Panel Survey (MEPS), AHRQ

HDS 2: Reduce coronary heart disease deaths. Baseline: 126.0 CHD deaths per 1,000. Target: 20 percent improvement. Data Source: National Vital Statistics System–Mortality (NVSS–M), CDC, NCHS

HDS 5: Reduce the proportion of persons in the population with hypertension.

HDS 5.1: Reduce the proportion of adults with hypertension. Baseline: 29.9 percent aged 18 years and older. Target: 10 percent improvement. Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS

HDS 5.2: Reduce the proportion of children and adolescents with hypertension. Baseline: 3.5 percent aged 8 to 17 years. Target: 10 percent improvement. Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS

HIV 17: Increase the proportion of sexually active persons who use condoms.

HIV 17.1: Unmarried females aged 15 to 44 years. Baseline: 34.5 percent. Target: 10 percent improvement. Data Source: National Survey of Family Growth (NSFG), CDC, NCHS)

HIV 17.2: Unmarried males aged 15 to 44 years. Baseline: 55.2 percent. Target: 10 percent improvement. Data Source: National Survey of Family Growth (NSFG), CDC, NCHS

IVP 1: Reduce fatal and nonfatal injuries.

IVP 1.1: Reduce fatal injuries. Baseline: 59.2 deaths per 100,000. Target: 10 percent improvement. Data Source: National Vital Statistics System–Mortality (NVSS–M), CDC, NCHS

IVP 1.2: Reduce hospitalization for nonfatal injuries. Baseline: 617.6 per 100,000. Target: 10 percent improvement. Data Source: National Hospital Discharge Survey (NHDS), CDC, NCHS

IVP 1.3: Reduce emergency department visits for nonfatal injuries. Baseline: 8370.4 per 100,000. Target: 10 percent improvement.

Data Source: National Hospital Ambulatory Medical Care Survey (NHAMCS), CDC, NCHS

MHMD 4: Reduce the proportion of persons who experience major depressive episode (MDE).

MHMD 4.1: Adolescents aged 12 to 17 years. Baseline: 8.3 percent. Target: 10 percent improvement. Data Source: National Survey on Drug Use and Health, SAMHSA

MHMD 4.2: Adults aged 18 years and older. Baseline: 6.8 percent. Target: 10 percent improvement. Data Source: National Survey on Drug Use and Health, SAMHSA

MICH 8: Reduce low birth weight (LBW) and very low birth weight (VLBW).

MICH 8.1: Low birth weight (LBW) Baseline: 8.2 percent of live births. Target: 5 percent improvement. Data Source: National Vital Statistics System (NVSS), CDC, NCHS

MICH 8.2: Very low birth weight (VLBW) Baseline: 1.5 percent of live births. Target: 5 percent improvement. Data Source: National Vital Statistics System (NVSS), CDC, NCHS

NWS 10: Reduce the proportion of children and adolescents who are considered obese.

NWS 10.1: Children aged 2 to 5 years Baseline: 10.7 percent. Target: 10 percent improvement. Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS

NWS 10.2: Children aged 6 to 11 years Baseline: 17.4 percent. Target: 10 percent improvement. Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS

NWS 10.3: Adolescents aged 12 to 19 years Baseline: 17.9 percent. Target: 10 percent improvement. Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS

NWS 10.4: Children and adolescents aged 2 to 19 years Baseline: 16.2 percent. Target: 10 percent improvement. Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS

NWS 17: Reduce consumption of calories from solid fats and added sugars in the population aged 2 years and older.

NWS 17.1: Reduce consumption of calories from solid fats. Baseline: 18.9 percent of daily calorie intake. Target: 16.7 percent. Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS and USDA, ARS

NWS 17.2: Reduce consumption of calories from added sugars. Baseline: 15.7 percent of daily calorie intake. Target: 10.8 percent. Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS and USDA, ARS

NWS 17.3: Reduce consumption of calories from solid fats and added sugars. Baseline: 34.6 percent of daily calorie intake. Target: 29.8 percent. Data Source: National Health and Nutrition Examination Survey (NHANES), CDC, NCHS and USDA, ARS

PA 2: Increase the proportion of adults who meet current federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity.

PA 2.1: Increase the proportion of adults who engage in aerobic physical activity of at least moderate intensity for at least 150 minutes/week, or 75 minutes/week of vigorous intensity, or an equivalent combination. Baseline: 43.5 percent. Target: 10 percent improvement. Data Source: National Health Interview Survey, CDC, NCHS

PA 2.2: Increase the proportion of adults who engage in aerobic physical activity of at least moderate intensity for more than 300 minutes/week, or more than 150 minutes/week of vigorous intensity, or an equivalent combination. Baseline: 28.4 percent. Target: 10 percent improvement. Data Source: National Health Interview Survey, CDC, NCHS

PA 2.3: Increase the proportion of adults who perform muscle-strengthening activities on 2 or more days of the week. Baseline: 21.9 percent. Target: 10 percent improvement. Data Source: National Health Interview Survey, CDC, NCHS

PA 2.4: Increase the proportion of adults who meet the objective for aerobic physical activity and for muscle-strengthening activity. Baseline: 18.2 percent. Target: 10 percent improvement. Data Source: National Health Interview Survey, CDC, NCHS

SA 14: Reduce the proportion of persons engaging in binge drinking of alcoholic beverages.

SA 14.1: Reduce the proportion of students engaging in binge drinking during the past 2 weeks—high school seniors. Baseline: 25.2 percent. Target: 10 percent improvement. Data Source: Monitoring the Future Survey (MTF), NIH

SA 14.2: Reduce the proportion of students engaging in binge drinking during the past 2 weeks—college students. Baseline: 40 percent. Target: 10 percent improvement. Data Source: Monitoring the Future Survey (MTF), NIH

SA 14.3: Reduce the proportion of persons engaging in binge drinking during the past month—adults aged 18 years and older. Baseline: 27 percent. Target: 10 percent improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

SA 14.4: Reduce the proportion of persons engaging in binge drinking during the past month—adolescents aged 12 to 17 years. Baseline: 9.4 percent. Target: 10 percent improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

SA 13: Reduce past-month use of illicit substances.

SA 13.1: Reduce the proportion of adolescents reporting use of alcohol or any illicit drugs during the past 30 days. Baseline: 18.3 percent. Target: 10 percent improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

SA 13.2: Reduce the proportion of adolescents reporting use of marijuana during the past 30 days. Baseline: 6.7 percent. Target: 10 percent improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

SA 13.3: Reduce the proportion of adults reporting use of any illicit drug during the past 30 days. Baseline: 7.9 percent. Target: 10 percent improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

SH 4: Increase the proportion of adults who get sufficient sleep. Baseline: 69.6 percent. Target: 70.9 percent. Data Source: National Health Interview Survey (NHIS), CDC, NCHS

TU 1: Reduce tobacco use by adults.

TU 1.1: Cigarette smoking Baseline: 20.6 percent. Target: 12.0 percent. Data Source: National Health Interview Survey (NHIS), CDC, NCHS

TU 1.2: Smokeless tobacco products. Baseline: 2.3 percent. Target: 0.3 percent. Data Source: National Health Interview Survey (NHIS), CDC, NCHS

TU 1.3: Cigars. Baseline: 2.2 percent. Target: 0.2 percent. Data Source: National Health Interview Survey (NHIS), CDC, NCHS

TU 3: Reduce the initiation of tobacco use among children, adolescents, and young adults.

TU 3.1: Children and adolescents aged 12 to 17 years—Tobacco products. Baseline: 7.7 percent. Target: 2 percentage point improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

TU 3.2: Children and adolescents aged 12 to 17 years—Cigarettes. Baseline: 6.2 percent. Target: 2 percentage point improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

TU 3.3: Children and adolescents aged 12 to 17 years—Smokeless tobacco products. Baseline: 2.5 percent. Target: 2 percentage point improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

TU 3.4: Children and adolescents aged 12 to 17 years—Cigars. Baseline: 4.8 percent. Target: 2 percentage point improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

TU 3.5: Young adults aged 18 to 25 years—Tobacco products. Baseline: 10.8 percent. Target: 2 percentage point improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

TU 3.6: Young adults aged 18 to 25 years—Cigarettes. Baseline: 8.3 percent. Target: 2 percentage point improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

TU 3.7: Young adults aged 18 to 25 years—Smokeless tobacco products. Baseline: 2.2 percent. Target: 2 percentage point improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA

TU 3.8: Young adults aged 18 to 25 years—Cigars. 6.1 percent. Target: 2 percentage point improvement. Data Source: National Survey on Drug Use and Health (NSDUH), SAMHSA