

American Medical Association

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Roadmaps

for Clinical Practice:

**A Primer on
Population-Based
Medicine**



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His [the physician's] relationship was formerly to his patient-at most to his patient's family; and it was almost altogether remedial. If the patient had something the matter with him; the doctor was called in to cure it. Payment of a fee ended the transaction. But the physician's function is fast becoming social and preventive, rather than individual and curative. Upon him society relies to ascertain, and through measures essentially educational to enforce, the conditions that prevent disease and make positively for physical and moral well-being.

Abraham Flexner, 1910¹

A physician shall recognize a responsibility to participate in activities contributing to the improvement of the community and the betterment of public health.

A physician shall support access to medical care for all people.

From Principles of Medical Ethics, American Medical Association, Revised June 2001

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About This Series

The American Medical Association (AMA), in partnership with the US Department of Health and Human Services (DHHS), is pleased to offer primary care physicians, and other health care professionals, a new series, *Roadmaps for Clinical Practice*. The series will include this initial volume, *A Primer on Population-Based Medicine*, and subsequent monographs, *Case Studies in Disease Prevention and Health Promotion*, that will be released several times per year. Our overall goal is to help physicians and other health care professionals identify and utilize strategies to reduce disparities in health through integration of disease prevention and health promotion into routine medical care. To achieve this goal, we will ensure that physicians have *information* on health disparities and *suggested actions* that physicians can use with their patients in clinical settings and with the community as advocates for action that will help to close the gap in existing health disparities. This information will include the following:

- The key national health objectives, as identified in *Healthy People 2010 (HP 2010)*² and the subset of 10 objectives that compose the *Leading Health Indicators (LHI)*²
- The importance of population-based and community-based disease prevention and health promotion
- The importance of using evidence-based strategies in intervention activities
- The importance of health literacy to health outcomes and ensuring that patients with low health literacy are managed appropriately
- The importance of providing culturally competent health care
- The importance of fostering collaboration between medicine and public health

It is important for physicians to understand the goals and objectives of *HP 2010* because many of the objectives can be met only by using multicomponent intervention strategies based at the clinic, health care system, and/or community level.

Topics for the monograph series come from *HP 2010*, a compilation of prevention objectives identified by the US Public Health Service. These objectives identify important preventable threats to health and help to focus health care system and community efforts to address these health concerns. The goals of *HP 2010* are to (1) increase quality and years of healthy life and (2) eliminate health disparities. *Health disparity* refers to differences in rates of mortality, morbidity, incidence, prevalence, burden of disease, and other adverse health conditions among specific population groups (Table 1).

Table 1: Examples of Health Disparity

Health Disparity Examples
Children living below the poverty threshold are less likely to have received the combined vaccination series than are children living at or above poverty (ie, 73% compared with 81%).
The age-adjusted prevalence of overweight continues to be higher for black women (53%) and Mexican-American women (52%) than for white women (34 %).

Source: Adapted from Health, *United States, 2001*,³ National Center for Health Statistics, Hyattsville, Md.

HP 2010 is intended to mobilize health professionals, the public community, voluntary and membership organizations, local and state governments, the corporate sector, health advocacy associations, and the public in coordinated disease prevention and health promotion activities during the next decade. The *HP 2010* objectives are designed such that, if achieved, the goal of eliminating health disparity will be realized.

The Leading Health Indicators (LHI) are a subset of the *HP 2010* objectives. The LHI provide a “snapshot” of the nation’s health status and permit medicine and public health professionals to better target health promotion and disease prevention interventions and track changes in population health over time (Table 2).

Table 2: Healthy People 2010 Leading Health Indicators

Physical Activity
Regular physical activity throughout life is important for maintaining a healthy body, enhancing psychological well-being, and preventing premature death. Regular physical activity decreases the risk of death from heart disease, lowers the risk of developing diabetes, and is associated with a decreased risk of colon cancer. Regular physical activity helps prevent high blood pressure and plays a role in decreasing existing high blood pressure. <i>Public Health Priority: Promote daily physical activity.</i>
Overweight and Obesity
Overweight and obesity raise the risk of illness from high blood pressure, high cholesterol, type 2 diabetes, heart disease and stroke, gallbladder disease, arthritis, sleep disturbances and problems breathing, and endometrial, breast, prostate, and colon cancers. Obese individuals may also suffer from social stigmatization, discrimination, and lowered self-esteem. <i>Public Health Priority: Promote good nutrition and healthier weights.</i>
Tobacco Use
Cigarette smoking is the single most preventable cause of disease and death in the United States. Smoking results in more deaths each year in the United States than AIDS, alcohol, cocaine, heroin, homicide, suicide, motor vehicle crashes, and fires—combined. Smoking is a major risk factor for heart disease, stroke, lung cancer, and chronic lung diseases. Smoking during pregnancy can result in miscarriages, premature delivery, and sudden infant death syndrome. Environmental tobacco smoke increases the risk of heart disease and significant lung conditions, especially asthma and bronchitis in children. Environmental tobacco smoke is responsible for an estimated 3000 lung cancer deaths each year among adult nonsmokers. <i>Public Health Priority: Prevent and reduce tobacco use.</i>

Substance Abuse

Alcohol and illicit drug use is associated with many of this country's most serious problems, including child and spousal abuse; sexually transmitted diseases including HIV infection; teen pregnancy; school failure; motor vehicle crashes; rising health care costs; low worker productivity; and homelessness. Alcohol and illicit drug use also can result in substantial disruptions in family, work, and personal life.

Public Health Priority: Prevent and reduce substance abuse.

Responsible Sexual Behavior

Unintended pregnancies and sexually transmitted diseases, including infection with HIV that causes AIDS, can result from unprotected sexual behaviors. Abstinence is the only method of complete protection. Condoms, if used correctly and consistently, can help prevent both unintended pregnancy and sexually transmitted diseases.

Public Health Priority: Promote responsible sexual behavior, including abstinence.

Mental Health

Mental health is a state of successful mental functioning, resulting in productive activities, fulfilling relationships, and the ability to adapt to change and cope with adversity. Mental health is indispensable to personal well-being, family and interpersonal relationships, and one's contribution to society. Approximately 20% of the US population is affected by mental illness during a given year; no one is immune. Of all mental illnesses, depression is the most common disorder. More than 19 million adults in the United States suffer from depression. Major depression is the leading cause of disability and is the cause of more than two thirds of suicides each year.

Public Health Priority: Promote mental health and well-being.

Injury and Violence

More than 400 Americans die each day primarily because of motor vehicle crashes, firearms, poisonings, suffocation, falls, fires, and drowning. The risk of injury is so great that most persons sustain a significant injury at some time during their lives.

Public Health Priority: Promote safety and reduce violence.

Environmental Quality

An estimated 25% of preventable illnesses worldwide can be attributed to poor environmental quality. In the United States, air pollution alone is estimated to be associated with 50,000 premature deaths and an estimated \$40 billion to \$50 billion in health-related costs annually. Two indicators of air quality are ozone (outdoor) and environmental tobacco smoke (indoor).

Public Health Priority: Promote healthy environments.

Immunization

Vaccines are among the greatest public health achievements of the 20th century. Immunizations can prevent disability and death from infectious diseases for individuals and can help control the spread of infections within communities. Immunizations against influenza and pneumococcal disease can prevent serious illness and death. Pneumonia and influenza deaths together constitute the sixth leading cause of death in the United States.

Public Health Priority: Prevent infectious disease through immunization.

Access to Health Care

Strong predictors of access to quality health care include having health insurance, a higher income level, and a regular primary care provider or other source of ongoing health care. Persons with health insurance are more likely to have a specific source of care and to have received appropriate preventive care.

Public Health Priority: Increase access to quality health care.

Source: Reprinted from *Healthy People in Healthy Communities: A Community Planning Guide Using Healthy People 2010*,⁴ Department of Health and Human Services, Rockville, Md.

The 10 LHIs in *HP 2010* were chosen for emphasis because they account for more than 50% of the leading preventable causes of morbidity and premature mortality in the US.⁵ Data on these 10 objectives also point to disparities in health status and health outcomes among population groups in the US. Our new *Roadmaps for Clinical Practice* series will concentrate on strategies to recognize and then reduce the unequal distributions of illness, disease, disability, and death across different subgroups of the population.

HP 2010 and the LHIs do not include specific strategies for addressing the health issues identified, only what the desired outcomes should be. However, guidance on how to achieve these objectives can be found in two companion guides.

The Guide to Clinical Preventive Services (US Preventive Services Task Force) and the *Guide to Community Preventive Services* (US Task Force on Community Preventive Services)⁷ provide evidence-based health promotion and disease prevention strategies. These strategies help integrate prevention into a continuum of care extending from the office into the community. The clinical and community intervention recommendations suggested by the Guides can be useful in reaching many of the objectives in *HP 2010* and the LHIs.

Finally, *Roadmaps for Clinical Practice* will provide recommendations involving physicians' clinical, managerial, and advocacy roles to implement disparity-reducing strategies for low patient health literacy and cultural barriers in medical care. Fostering collaborative partnerships among medicine and public health professionals is also suggested as a strategy for reducing health disparities. Each of the forthcoming monographs will include a list of print and Web-based resources that provide additional strategies and insights useful in the elimination of health disparity.

Relevance to Physicians

As the financing of medical practice has changed, physicians struggle with the need to reduce costs while maintaining responsible, high-quality care. Adding the costs of preventive practices, including the extra time involved, must be carefully weighed in terms of short-term and long-term health benefits. *Roadmaps for Clinical Practice* will provide the background information to enable primary care physicians to put sensible preventive interventions related to the 10 LHIs into everyday practice. This will be accomplished by helping physicians to:

- Identify effective clinical and community preventive strategies to reduce the burden of illness and eliminate health
- Organize clinical practice to become more prevention oriented by using population-based approaches to address the health care needs of patients
- Benefit from rapidly emerging resources and guidelines, including the Internet

Background to This Primer

Physicians and other health professionals have key roles to play in addressing **health disparity**. One way physicians can intervene to reduce and eliminate health disparity involves taking a **population health** perspective for clinical care and using a **population-based medicine** approach. *A Primer on Population-Based Medicine* introduces these concepts and discusses how this *perspective* and *approach* provide a context and strategy for **disease prevention** and **health promotion** to eliminate health disparities. In using the *Primer*, it is important to understand the value of creating strategies for a continuum of preventive health care in which prevention activities are viewed as extending from the clinical to the community setting. The health status of a patient is influenced not only by the conditions he or she brings to the clinic, but also by the context of that patient's family and the community in which that patient resides. For example, a comprehensive approach to health care for patients who are smokers could include preventive strategies that are provided in an individualized clinical encounter (eg, brief advice to quit smoking) and interventions that are provided for the broader population (eg, mass media campaigns).

Background information is presented on *Healthy People 2010* and its 10 Leading Health Indicators. Also, aspects of the *Guide to Clinical Preventive Services* (US Preventive Services Task Force) and *Guide to Community Preventive Services* (Task Force on Community Preventive Services) are described that identify evidence-based recommendations for addressing the Leading Health Indicators. In addition, the *Primer* introduces the series-wide themes of **health literacy**, **cultural competency**, and **medicine-public health collaboration** as these affect health disparity. Finally, readers will find related print and Web-based resources listed in this volume.

We encourage you to review the information provided in this publication. Some sections may be more relevant to you and your practice than others. Physicians will vary in their interest in and practice of health promotion and disease prevention. Regardless of the amount of material you read, please complete and return the brief "Primer Evaluation Form" at the back of this *Primer*. Your feedback is valuable for updating the *Primer* and for planning future physician education programs and materials.

Acknowledgments

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Executive Summary

The American Medical Association (AMA), in partnership with the US Department of Health and Human Services (DHHS), has developed a new series for physicians and other health professionals, *Roadmaps for Clinical Practice*. The series will include this volume, *A Primer on Population-Based Medicine*, and a collection of monographs, *Case Studies in Disease Prevention and Health Promotion*, that will be released several times per year. Our overall goal is to help physicians and other health professionals identify and utilize strategies to reduce disparities in health outcomes through integrating disease prevention and health promotion into routine medical care. The need for this approach is driven by changes in the health status of the population and provision of health care in our nation.⁸⁻¹⁴

- The US population is becoming older and more diverse
- Preventive and chronic care are increasingly joining curative and acute primary care
- Chronic disease management is becoming more prominent in many medical practices
- More patients want active involvement in their health care
- Financial mechanisms supporting health care are changing
- Emphasis is increasingly placed on the health care concerns of access, cost, quality, and outcome.

These changes have had a great impact on how health and health care are viewed. Diseases, especially chronic diseases, are increasingly seen as having multiple causes or exacerbating factors that are best treated with a variety of interventions at multiple levels.¹⁵⁻¹⁸ Many of the diseases and the associated risk factors can be ameliorated through prevention activities in the physician's office and the community.

A population-based perspective, whether considered at the medical practice or community level, is especially helpful when addressing chronic disease management. The health of patients in a medical practice can be addressed at the level of the individual patient and also at the level of patient groups. Physicians need to identify and address factors in the patient's family and community that contribute to their health and well-being.^{19,20} The community may be a resource for physicians to enhance their patient's primary care treatment.²¹ Population-based medicine provides strategies to integrate these clinical and community prevention efforts.

Changes in the causes of morbidity and premature mortality, coupled with a concern for how health dollars should be most effectively directed, have led to a need for a systematic national effort to index and track the health status of the population. The best known of these efforts is the Public Health Service's *Healthy People* initiative. *Healthy People 2010 (HP 2010)* is the third decade-spanning iteration of key health objectives for the nation. New to the *Healthy People* initiative is the creation of a subset of 10 objectives, called the Leading Health Indicators (LHIs). These objectives provide a snapshot of health status and permit medicine and public health professionals to better target health promotion

and disease prevention interventions and track changes in population health over time. The indicators extend beyond the health characteristics of individuals to include social, environmental, and health system factors that affect health, such as violence, air pollutants, and access to health care.

Unfortunately, within each of the 10 health indicators, there is evidence of health disparity. Results of recent research suggest that comprehensive, simultaneous, and coordinated efforts involving prevention across a continuum of settings extending from clinical practice to the community could reduce these health disparities.^{22, 23} Guidelines, such as the *Guide to Clinical Preventive Services* and the *Guide to Community Preventive Services*, are available that can assist physicians and other health professionals in their efforts to reduce health disparities by means of evidence-based disease prevention/health promotion strategies. Attention to the issues of health literacy and cultural competence are also important considerations for physicians and other health care professionals with an interest in implementing effective and appropriate prevention strategies.

Physicians have at least three possible roles in preventive interventions: (1) provision of direct preventive services, (2) management and organization of preventive health services within the office and medical care system, and (3) advocacy within clinical settings, communities, and organized medicine. Physicians will vary in their emphasis on these three roles. Some physicians will focus on prevention as part of a patient's care. Other physicians will incorporate a population health perspective into settings and health systems that they manage. Still other physicians will work in the community as advocates to achieve health outcomes such as reduced teen pregnancy. Other physicians will advocate within organized medicine for preventive health policies. Some physicians may want to consider partnering with public health to work collaboratively on prevention efforts. This *Primer*, and subsequent volumes of the series, will illustrate how each of the three physician roles can contribute to the continuum of preventive interventions from clinical to community settings.

I. Disparities in Health Status and Outcomes

Racial and ethnic inequalities persist in significant measure for many disease categories and service types. Efforts to recognize and then reduce and eliminate the unequal distributions of illness, disease, disability, and death across different subgroups of the population require physician action.

What Is Health Disparity?

During the past decade, the United States has made significant strides to improve health status and reduce morbidity and premature mortality. Examples of these achievements include reductions in infant mortality rates and teenage pregnancies and an increase in the number of children being immunized.²⁴ Although these strides are laudable, disparities in health status and health outcomes persist.²⁵⁻²⁸ *Health disparity* refers to “...differences in the incidence, prevalence, mortality and burden of diseases and other adverse health conditions that exist among specific population groups in the United States.”^{29(p4)} Disparity among population groups is also evident at the health care delivery system level, in differential rates of access and use of services.³⁰⁻³⁴

Disparities in health status and health outcomes can be categorized according to *individual* factors such as sociodemographic characteristics (eg, age, race/ethnicity, gender), socioeconomic status (eg, income, occupation, and education), or other personal characteristics such as disabilities, rural residency, and sexual orientation. While biologic and genetic factors account for some of these group differences, other contributing factors include cultural norms and values, literacy levels, familial influences, environmental and occupational exposures, and patient preferences for care and treatment.^{35, 36} In addition, some health disparity patterns are related to an uneven distribution of societal resources, including social and political advantages such as knowledge and social connections. These resources influence an individual’s ability to avoid risks and to minimize the consequences of disease once it occurs.⁴

Health behaviors also vary by race/ethnicity, income, and education and may explain group differences in mortality and morbidity.³⁷⁻⁴⁰ However, health behavior does not account for all of the disparities found in mortality and morbidity rates; “...the problem of lifestyle and

mortality is not just one of inadequate education or income, and the problem of socio-economic differentials in mortality is not just a problem of lifestyle choices.”^{37(p1708)} Nevertheless, promoting healthy lifestyle and reducing health risk behaviors are areas where physicians and other health care professionals can effectively intervene to reduce health disparity.

Another set of factors related to health disparity concern the health care delivery *system* itself. The rates of access to and utilization of health care vary among population subgroups.^{3, 41-43} Explanations for these differences include the following^{25, 35}:

- Insurance status and affordability
- Transportation and geographic barriers to needed services (eg, distance)
- Health beliefs, attitudes, and level of self-confidence to comply with treatment
- Racial concordance of patient and physician
- Cultural preferences for less invasive procedures
- Provider bias, racism, and discrimination

Some examples of disparities between subgroups of the US population are found in rates of cancer, cardiovascular disease, stroke, infant mortality, HIV/AIDS, smoking, homicide, and suicide (Table 3) (See Appendix A: Resources-Data Sources).

Table 3: Health Disparity in Mortality, Morbidity, Health Behaviors, Prevention, and Access

Disparity in Mortality	
Infant Mortality	<ul style="list-style-type: none"> • Infant mortality rates are higher for infants of black, Hawaiian, and American Indian mothers (13.8, 10.0, and 9.3 deaths per 1000 live births) than for infants of other race groups • Infant mortality decreases as the mother’s level of education increases
Homicide	<ul style="list-style-type: none"> • Homicide is the leading cause of death for black males 15-25 years old and the second leading cause of death for young Hispanic males • Rate for young black males is 17 times the rate for non-Hispanic white males
HIV Disease	<ul style="list-style-type: none"> • HIV disease is the leading cause of death for black males 25-44 years old and third leading cause of death for Hispanic males aged 25-44
Motor Vehicle-Related Injuries	<ul style="list-style-type: none"> • Vehicle injuries for young American Indian males 15-24 years old is about 80% higher than for young white males
Stroke	<ul style="list-style-type: none"> • Stroke rates for Asian American males aged 45-54 and 55-64 are 31%-40% higher than for white males in these age groups
Suicide	<ul style="list-style-type: none"> • Rate for American Indian males is double the rate for young white males

Disparity in Morbidity	
Self-report of health	<ul style="list-style-type: none"> The percentage of persons reporting fair or poor health is higher for non-Hispanic black and Hispanic persons (15% and 12%) than for non-Hispanic white persons (8%) (age adjusted)
AIDS cases	<ul style="list-style-type: none"> 7.5% fewer AIDS cases are reported among non-Hispanic white population aged 13 and above There is a 1.3% increase in new cases reported among non-Hispanic black population
Cancer-Males	<ul style="list-style-type: none"> Incidence rates for black males exceed that of white males by 60% for prostate cancer, 58% for lung and bronchial cancer, and 14% for colon and rectum cancer
Cancer-Females	<ul style="list-style-type: none"> Breast cancer incidence rates for non-Hispanic white females exceed those for black females by 22%, for Asian/Pacific Islanders by 44%, for Hispanic females by 88%
Disparity in Health Behaviors	
Cigarette Smoking	<ul style="list-style-type: none"> Smoking among persons aged 25 and over ranges from 11% among college graduates to 32% for those without a high school diploma 19% of adolescents in the most rural counties smoke compared to 11% in central counties
Alcohol	<ul style="list-style-type: none"> 63% of adults aged 18 and over are current drinkers, 22% are lifetime abstainers, and 15% are former drinkers
Suicide Attempts	<ul style="list-style-type: none"> Girls are 80%-90% more likely to consider suicide than boys and 50% more likely to make an attempt requiring medical attention Adolescent boys (15-19 years old) are 5 times more likely than girls to die from suicide
Disparity in Preventive Health Care	
Prenatal Care	<ul style="list-style-type: none"> Ranges from 70% of American Indian mothers to 91% for Cuban and Japanese mothers
Mammography	<ul style="list-style-type: none"> Poor women are 27% less likely than women with family incomes above the poverty level to have had a recent mammogram

Disparity in Access to Care	
Health Insurance Coverage	<ul style="list-style-type: none"> • 13% of children under age 18 have no health insurance coverage • 28% of children with family incomes of 1-1.5 times the poverty level are without coverage compared to 5% of those with family incomes at least twice poverty level
Health Care Visits to an Office or Clinic	<ul style="list-style-type: none"> • 16% of 6-17-year-olds had no health care visits to an office or clinic in the past year • Poor children are almost twice as likely as those with family incomes at least twice the poverty level to be without a health care visit (23% compared with 12%)
No Usual Source of Care	<ul style="list-style-type: none"> • 8% of 6-17-year-olds have no usual source of health care • Nearly 33% of school-age children without health insurance coverage have no usual source of health care compared with 4% of those with insurance

Source: Adapted from Health, United States, 2001,3 National Center for Health Statistics, Hyattsville, Md.

What Can Be Done to Reduce Health Disparity?

“Disparities in health care are not immutable”^{25(p2583)}

Physicians can help eliminate some but certainly not all disparities through their medical practice and through leadership roles in health policy advocacy. The results of several recent studies indicate that racial/ethnic and socioeconomic disparities can be eliminated with health service interventions. Examples include data from studies of special programs that show no racial differences for necessary cardiac procedures in a hospital system, for breast cancer survival among insurance plan members, and for disparities in mortality rates from a hypertension control program.²⁵ In each of these examples, comprehensive, population-based prevention strategies were used to reduce and eliminate disparities among the groups.

Building quality into the system.

Differences in rates of access and use among population groups have implications for delivery of quality care. One measure of quality of care is consistency in rates of care.^{44, 45} Inconsistency in rates of access to and use of health care point to areas of disparity. Therefore, elimination of health disparities becomes an issue of quality improvement. Medical practices and health care organizations could consider addressing health disparity as a quality improvement function.

Advocating for patient preferences.

Disparity in health status and outcomes is defined not only by racial/ethnic and socioeconomic status but also by patient preferences. These preferences can vary greatly both between and within population groups. Patient preferences have social and economic determinants.³⁵ Some of these determinants are the result of social and economic inequalities in society that can be addressed through social justice advocacy. Using a preference-based model of care, physicians can learn how to better inform patients about the treatment options available and better understand their patient's preferences.

Practice Suggestion A: Identifying Health Disparity

Consider some of the most prevalent diseases or conditions of the patients in your practice. Are there potential or actual variations (ie, disparities) in the outcomes of these patients? Is the variation you are seeing correlated with individual patient factors or system factors? Variation could include excessive incidence or prevalence in diseases or conditions, lack of continuity of care, or poor compliance with treatment. Now consider obtaining data from national, state, or local datasets on incidence and prevalence rates of the health issues in which you are interested (see Appendix A-Resources). Consider using those data as comparison data and for “benchmarking” the rates in your practice to the rates in your local area. Consider implementing an intervention to reduce the disparity you have identified.

Section Summary: Health Disparity
<ul style="list-style-type: none">• Health disparity is subpopulation differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions.
<ul style="list-style-type: none">• Health disparity can also be measured by differences in rates of health care access and utilization among population groups.
<ul style="list-style-type: none">• Health disparities are not immutable.
<ul style="list-style-type: none">• Physicians can intervene effectively to reduce or eliminate health disparity by building systems of care that focus on quality and address patient preferences.

II. Population-Based Medicine

A population-based perspective, whether considered at the medical practice or community level, is helpful when addressing health disparity. The health of patients in a medical practice can be addressed at the level of the individual patient and also at the level of patient groups. Factors in the patient's community should be considered if they contribute to a patient's health and well-being. The patient's community may be a resource for physicians to enhance a patient's primary care treatment. Population-based medicine provides strategies to integrate these clinical and community prevention efforts.

What Is Population-Based Medicine?

Population-based medicine can be defined as various approaches to medical care for specific groups identified by common demographic characteristics, risk factors, or diseases.⁴⁶ Essentially, the approach involves characterizing a population, identifying the health care problems of highest priority, delivering appropriate services and adapting office procedures that are responsive to identified problems, and assessing impacts and providing feedback.⁴⁷⁻⁵³

The promise of population-based medicine depends predominantly on five points:

- Better meeting the needs of individual patients by concentrating on groups of patients
- Understanding where to direct limited resources
- Meeting preventive guideline recommendations
- Developing practice systems to effectively involve staff in meeting needs of patients
- Using available data to get the most “bang for the buck” in caring for patients and managing practices

The traditional medical model focuses on the “one-to-one” physician-patient relationship. A population-based medicine model focuses on the “one-to-many” physician-group relationship.⁵⁴ These models are complementary. In 1984, the Institute of Medicine issued a report that described a population-based model of medical care.⁵⁵ The model consists of identifying a “denominator” population and addressing the population's health needs in a systematic manner.⁵⁶ The denominator population can be classified into three levels:

- Active patient population (eg, those who have visited the office in the last year)
- Practice community (eg, members of the patient's household)

- Larger population (eg, schools, health plan members or geographic communities). Members of the practice community group and the larger population group may not be active patients of the practice.

Examples of population-based approaches include health promotion screening activities (eg, patient reminders for mammography or influenza vaccines), comprehensive preventive services for high-risk populations (eg, adolescents, elderly), or comprehensive chronic illness management programs (eg, diabetes or asthma).⁴⁷⁻⁴⁹ Population-based medicine involves two basic components: a population health perspective and systematic opportunities for health promotion and disease prevention in an office practice.^{47, 48}

A Population Health Perspective

His [the physician's] relationship was formerly to his patient-at most to his patient's family; and it was almost altogether remedial. If the patient had something the matter with him; the doctor was called in to cure it. Payment of a fee ended the transaction. But the physician's function is fast becoming social and preventive, rather than individual and curative. Upon him society relies to ascertain, and through measures essentially educational to enforce, the conditions that prevent disease and make positively for physical and moral well-being.

Abraham Flexner, 1910¹

Advances in medical technologies, vaccines, and pharmaceuticals during the golden age of medicine, along with separation of medical and public health practice, diverted attention from medical education of physicians on their expanded social and prevention roles as envisioned by Flexner more than 90 years ago. However, limitations of a strictly biomedical model of assessment and intervention have become increasingly evident.^{5, 57-59} In addition, disparities in health status and health outcomes have become a major concern at the practice and public policy levels.^{2, 60-63} Reducing disparities in the distribution and impact of diseases and conditions in the population requires strategies that will⁶⁴:

- Reduce the *need* for health care (ie, through health promotion and disease prevention efforts for individuals and communities)
- Reduce the inappropriate *demand* for health care (ie, through health education and decision-making assistance for consumers)
- Reduce the inappropriate *utilization* (underuse and overuse) of health care (ie, through efficient office management systems and better patient-physician communication)
- Increase the *delivery* of appropriate medical care (ie, through use of evidence-based guidelines, continuous quality improvement activities, and better collaboration between medicine and public health)

Population-based medicine provides a roadmap for achieving these outcomes. A population health perspective is “a view of care that places the patient as central while recognizing

that the patient exists in a specified context with geopolitical boundaries as well as socio-cultural definition, each of which creates major effects on care.”^{46(p159)} A *population health perspective* recognizes interdependency of health and societal factors such as the environment, socioeconomic status, physical, emotional, and social functioning, and lifestyle on patients, populations of patients, and communities.⁵⁸ Achieving these outcomes requires implementing a continuum of preventive interventions that involve efforts at both the individual (clinical) level and community (population) level. The Association of American Medical Colleges further asserts that physicians should have the ability to “assess the health needs of a specific population; implement and evaluate interventions to improve the health of that population; and provide care for individual patients in the context of the culture, health status and health needs of the populations of which that patient is a member.”^{65(p17)}

There are several principles that promote a population health perspective. Incorporation of these principles into medical care can help to optimize health⁵⁸:

- A *holistic* view to treat the patient’s unique characteristics and also the societal influences on the patient
- A *systems approach* to coordinate and integrate the delivery of care by using multidisciplinary teams and multiorganizational arrangements for referral
- An *epidemiologic foundation* to improve objectivity in clinical and policy decision making
- An *anthropologic view* to understand the *patient’s* perspective of his/her health
- *Distributive justice* to recognize and reduce the unequal distributions of illness, disease, disability, and death across different groups

The ability to apply population health perspective principles to population-based medicine requires physicians to rely on clinical skills, teamwork, and the power of advocacy for community change. As clinicians, physicians would identify groups of patients on which to focus a concentrated set of preventive interventions and integrate *individual* diagnostic and management strategies in the context of family, cultural, and community factors. In the role as advocate, physicians would strive to ensure access to health care for all people and promote effective community programs for populations of people with specific health needs.

Integrating Population-Based Medicine Into Routine Clinical Practice

Integrating population-based medicine into routine clinical care requires systematic changes in the management of a primary care medical practice. The following guidance for making these changes are not a “cookbook” but, rather, points for discussion among physicians and their staff.⁴⁷⁻⁵³

1. DEFINE THE POPULATION: The first step involves defining the status of the “denominator” population served by the practice. The data should include information

on the population's demographics, health care utilization patterns, and other community health and socioeconomic status indicators. This information can often be obtained from governmental (eg, health department) or other health care system sources (eg, health plans) (see Appendix A: Resources—Health Risk and Disease Prevalence Statistics). If possible, the data should be organized according to the 10 Leading Health Indicators or other objectives identified in *Healthy People 2010* (See Part IV: National Objectives and Guidelines).

2. CREATE AN OFFICE INFORMATION SYSTEM: The next step is to create and maintain a practice-based information system that supports identification, tracking, and monitoring functions of a population-based medicine approach to care. These systems can be as simple as paper registries or as sophisticated as computerized medical record tracking systems or, more likely, a combination of high-technology and low-technology approaches. Most medical practices already utilize patient history questionnaires that can be used to gather baseline information. Physicians may currently rely on chart-based data to determine characteristics of their patient practice or perhaps use reports from the several different health plans of their patients. Although collating paper-based patient information can be done, comprehensive reports on patient risk factors and diseases in a medical practice will be easier with electronic medical records (EMRs).

Whatever system is used, it should permit (1) tracking comprehensive health maintenance protocols for individual patients; (2) identifying populations of patients with the characteristics of interest who are involved in population-based medicine interventions, tracking progress, and monitoring outcomes; (3) providing health maintenance reminders for patients and providers; and (4) producing data reports on both individual-level and population-level information on a timely basis for quality improvement purposes.⁶⁶⁻⁶⁸ The advantages of an EMR system include:

- Ready access to data for decision making
- Provision of reminders and prompts
- Ability to “check” orders (eg, drug-allergy or drug-disease interactions, service duplication)
- Access to clinical guidelines and assistance with diagnosis
- Increased efficiency in documentation

The following are examples of patient information that are valuable for population-based medicine and could be included in the dataset:

- Patient history of diseases and health risks such as tobacco and alcohol
- Family history of diseases and health risks factors such as cancer, heart disease, genetic diseases, alcoholism, depression
- Patient history of health-promoting behaviors such as exercise, healthy diet, stress reduction efforts, and previous successful and unsuccessful attempts to change health behaviors

A template of recommended and optional elements for constructing a computerized health maintenance tracking system⁶⁷ is outlined in Appendix C.

3. IDENTIFY AND PRIORITIZE INTO PATIENT GROUPS: The third step is to identify and prioritize the groups of patients for whom a population-based medicine intervention would be most effective. Consideration should be given to patients with preventable diseases or complications of certain diseases (eg, foot and eye examinations for diabetic patients) or modifiable risk factors. Selection criteria might include risks or preventable diseases that affect the most patients in the practice or the most people in the community, or that have the greatest health consequences or costs. Also consider which preventable health risks or diseases are associated with disparities in health outcomes such as diabetes, asthma, hypertension, and chronic heart failure.⁴⁷ Examples of populations of patients might include patients with a specific disease such as type II diabetes, patients with a specific modifiable risk behavior such as smoking, or patients with a specific modifiable precursor health condition such as high cholesterol.

4. IDENTIFY INTERVENTION: Once an information system has been established and the patient groups on which to focus have been determined, the next step in applying population-based medicine to clinical practice is to identify effective interventions. The quality of the interventions identified can be better ensured by selecting those interventions developed from an evidence-based methodology. There is substantial evidence of the effectiveness of guidelines, disease management protocols, and intervention strategies that physicians can use in population-based care.^{6,7} Guidelines for preventive services directed at both individual patients in clinical settings and populations of people are available (see Part IV: Evidence-Based Guides).

5. ADAPT OFFICE SYSTEM: The fifth step is to work with other colleagues and staff in the medical practice to adapt office policies and procedures for population-based medicine. Key steps in implementing an office system include the following⁶⁸:

- Develop a written practice protocol that includes goals and performance indicators
- In collaboration with office staff, determine how guideline recommendations will be implemented within the office practice
- Appoint a staff member as the coordinator of the process
- Develop or adapt tools (eg, education materials, reminder stickers) to assist in the intervention
- Choose a start date

Findings from a recent clinical trial of office systems suggest that the following approaches and tools, if specifically tailored to the practice, are useful in creating efficient preventive service delivery^{69, 70} (Table 4).

Table 4: Recommended Office System Approaches and Tools

Office System Approaches	Tool Examples
<ul style="list-style-type: none">• Create a short list of services to provide• Emphasize well-care visits• Discuss prevention during illness-care visits• Promote staff and patient involvement• Maximize efficiency of office staff and clinicians	<ul style="list-style-type: none">• Customized patient intake form (collect data of interest to the practice/for intervention)• Stickers, flowsheets, stamps, etc (tracking of services provided)• Preprinted prevention self-adhesive note (clinician prompt to discuss prevention with patient)• Patient education materials and health diary (patient writes down his or her ongoing preventive actions for subsequent patient-physician review)• Prevention posters• Outreach calls and reminder letters

Sources: Adapted from Goodwin et al. A clinical trial of tailored office systems for preventive service delivery. *Am J Prev Med.* 2001;21:22; and Carney et al. Tools, teamwork, and tenacity: an office system for cancer prevention. *J Fam Pract.*, 1992;35:390.

Adapting an office system for population-based medicine takes time, and the process should not be rushed. Protocols need to be developed, materials identified, and staff trained. Staff should be part of the development process and, therefore, contributors to the success of the new practice model.⁷⁰

6. MONITOR AND ASSESS: The final step is to monitor outcomes and assess the impact of the preventive intervention. It is important to assess whether the intervention is working as intended (ie, process evaluation) and is having the desired outcomes (ie, impact evaluation). These concerns can be addressed by (1) obtaining feedback from all persons involved in the intervention and (2) conducting a periodic review of the data being collected through the data information system (step 2). Gaps in care provision or other concerns from members of the team can be identified through the evaluation process and appropriate adjustments implemented.

Implementing a population-based medicine initiative in practice can be a gradual stepwise procedure. Because population-based medicine is a comprehensive approach to care that requires organizational change, consideration should be given to the following issues:

- Physician receptivity to change (ie, adding a physician-group focus to the traditional physician-patient approach)
- Alterations in how physicians work with other clinical and administrative colleagues in the office practice
- Comfort level with computer technology and new approaches to seeking and using data

- Developing new relationships with insurers or community agencies. There may be additional considerations depending on the individual circumstance as well.

Implementing a population-based prevention strategy into routine medical care can be viewed as a form of continuous quality improvement. Staff are involved in each step and, thus, become committed to the process of change. Emphasis is on enhancing the capacity of the medical practice to provide preventive interventions directed at patient groups. This is done through adapting the system of care—the procedures and staff roles—to ensure each person in the office contributes to the intervention. A basic population-based medicine strategy is shown in Figure A.

Figure A: Integrating Population-Based Medicine Into Medical Practice

Steps/Methods	Resources/Procedures Required
Step 1: Define the Population	via → Public and private datasets and reports
Step 2: Create Office Information System	via → Computer or paper tracking
Step 3: Identify and Prioritize Patient Groups	via → Data on disease impact in practice or community
Step 4: Identify Interventions	via → Published evidenced-based guidelines
Step 5: Adapt Office System	via → Team management
Step 6: Monitor and Assess	via → Continuous quality improvement

***Practice Suggestion B:
Initiating a Population-Based Medicine Approach***

Physicians and their staff decide to develop a population-based prevention program for their practice. Because they do not have a computerized medical record system, they keep a paper record of the diagnoses of patients they see. After 4 weeks, it is clear that the practice serves relatively large groups of patients with asthma and with diabetes mellitus (type II). The physicians review various Internet sites on effective preventive interventions and discuss with the staff ways that they could implement preventive guidelines. Staff inform the physicians that many of these patients are Hispanic and may utilize folk remedies. They are also concerned that many of their patients may not understand how to take their medications and to manage their disease. Working together, the physicians and staff

develop an intervention plan directed at both groups of patients. This plan includes placing chart reminders to prompt the nurses to ask about functional status, self-management, diet, and skin care (diabetes); sending monthly health education materials (obtained from the Internet) to patients' homes; and arranging for group education sessions for diabetes care. The group decides to begin by focusing on current patients with asthma and with diabetes and, through reviews of appointment records, those who were seen with these diseases during the past 2 months. Staff believe that, during the course of 12 months, they will have identified all patients in their practice with these two diseases. Staff create a paper database to track the patients who receive the interventions. This database includes the dates of the clinic visits, the dates of hospitalizations, the dates of the interventions (eg, referral to group health education, educational materials sent to the homes), medications used for disease management, and laboratory and other tests (eg, spirometry) used to track disease status. These data will be used to assess the effectiveness of the program.

Other Population-Based Strategies

Population-based medicine concepts have been applied in various clinical settings, from the physician in solo practice to large group practice arrangements and in community clinics. There are several overlapping strategies for integrating a population health perspective into practice that use principles similar to those of population-based medicine but are distinct in some ways.

Disease management is a systematic approach to the management of high-volume, usually chronic, diseases. Disease management, in which systematic interventions are directed at groups of patients with specific medical disorders, can be considered a subset of population-based medicine.⁴⁷ The components of disease management include:

- Multidisciplinary approaches
- Use of evidence-based clinical guidelines
- Specific implementation procedures
- Patient support programs
- Outcomes measurement that provide data-driven feedback specific to the aspects of care disease management protocols are attempting to impact

Disease management is conceived of as a multistep process that uses a team-oriented approach including both generalists and specialists throughout the entire continuum of care process.⁷¹⁻⁷³

Community-oriented primary care (COPC) uses a population health perspective and is similar to population-based medicine in its focus on identifying and addressing health problems of a defined population.⁷⁴⁻⁷⁷ However, services provided by the medical practice are identified by a variety of inputs, both subjective (eg, focus groups) and objective (eg,

surveillance data). Interventions within a medical practice are then prioritized according to the needs of the community. The specific steps involved in COPC are as follows^{56, 75}:

- The community of concern is defined and involved
- Health problems are identified
- Interventions are developed and implemented
- Interventions are monitored for impact

In distinction to population-based medicine, COPC focuses on the health needs of the broader community, of which patients in a medical practice are only one element. In addition, the role of the community in the decision-making process is much stronger.

Public health has been defined as “the science and art of preventing disease, prolonging life and promoting health and efficiency through organized community effort.”^{78(p185)}

Unfortunately, public health “...remains a generally familiar though somewhat unclear concept both to the general public and to those dedicated to its improvement.”^{79(pxxxii)}

The practice of public health involves 10 essential services⁸⁰:

- Monitor health status to identify and solve community health problems
- Diagnose and investigate health problems and health hazards in the community
- Inform, educate, and empower people about health issues
- Mobilize community partnerships and action to identify and solve health problems
- Develop policy and plans that support individual and community health efforts
- Enforce laws and regulations that protect health and ensure safety
- Link people to needed personal health services and ensure the provision of health care when otherwise unavailable
- Ensure a competent public and personal health care workforce
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services
- Research for new insights and innovative solutions to health problems

Public health uses a number of community-based approaches to implement health promotion and disease prevention initiatives. Among these many approaches, Planned Approach to Community Health (PATCH) is one of the most widely used and comprehensive.⁸¹ The PATCH process is outlined briefly to illustrate some of the commonalities that this public health approach has with the clinical approach of population-based medicine. PATCH involves five phases:

- Mobilization of the community
- Data collection, analysis, and dissemination
- Selection of health priorities

- Development of a comprehensive intervention plan
- Evaluation

PATCH is a planning model that outlines a structured process for communities to identify, prioritize, implement, and evaluate health issues. The steps involved are nearly identical to those outlined for implementing a population-based medicine strategy.

More recently, a practical guideline was published specific to community implementation of the *Healthy People 2010* health objectives. The implementation protocol is known as MAP-IT and involves five steps⁴:

- Mobilize key individuals and organizations
- Assess community needs, strengths and resources
- Plan for action
- Implement the action plan
- Track progress and outcomes

Several community programs have used MAP-IT successfully with community members, health professionals, local government, and university partners. PATCH and MAP-IT are two examples of promising community health improvement programs (CHIP) used by public health.^{20, 82}

Population-based medicine strategies like disease management, COPC, and public health approaches such as PATCH and MAP-IT are all rooted in a population health perspective and can be adapted to the particular circumstances of a given practice and/or community (eg, availability of resources, time constraints, staffing needs, degree of technological sophistication). However, population-based medicine offers a broader framework than the traditional medical model but is more specific to physicians and the medical community. Other health promotion and disease prevention intervention strategies are identified in Appendix A (Resources—Community Health Improvement Process).

Section Summary: Understanding Population-Based Medicine

Population-based medicine involves a change in the traditional medical paradigm:

- From a focus on individual patient care to a focus on groups of patients
- From a focus on the disease process to an inclusion of interventions directed at preventing the progression of disease
- From a focus on the biological contributions to disease to an inclusion of environmental, cultural, and emotional factors in disease and its prevention
- From a role of the physician as the predominant provider of health services to the physician establishing a clinic team to share in the delivery of preventive interventions

III. Disease Prevention and Health Promotion

The problem of health disparity challenges physicians to expand efforts both to prevent disease and to promote healthy lifestyles. A framework for understanding the rationale behind focusing on prevention and the different ways in which disease prevention and health promotion can be conceptualized is presented.

Why Disease Prevention and Health Promotion?

There are two basic reasons for focusing on integrating disease prevention and health promotion services into clinical practice: the burden of disease caused by personal (and preventable) behaviors and the effectiveness of clinical preventive interventions.

Burden of Disease

Approximately half of all deaths that occurred in 1990 could be attributed to personal factors such as tobacco use, diet and activity level, substance abuse, and sexual behaviors—these deaths were mostly preventable.⁵ In 1999, mortality for several leading causes of death, including heart disease and cancer, declined, yet these two diseases remain the leading causes of death in the US, accounting for more than one half of all deaths each year. Stroke, chronic lower respiratory disease, and accidents due to unintentional injuries round out the top five leading causes of death. Suicide, homicide, and firearm mortality also declined an estimated 6% between 1998 and 1999. In addition, mortality from HIV infection decreased approximately 4% but still ranks fifth among 25- to 44-year-olds and is the leading cause of death for black men and the third leading cause of death for black women in this age group. Unfortunately, during the past several years, mortality has increased for septicemia (6.6%), hypertension (5%), chronic lower respiratory diseases (4%), and diabetes (3.3%). Alzheimer disease moved from 12th to eighth in 1999.⁸³

Although data on the contribution of health risk behaviors to disease and premature mortality are clear, many people continue to engage in these personal health practices. A recent study found that only about 3% of people reported engaging in four healthy habits—not smoking, maintaining a normal weight, exercising regularly, and eating a healthy diet. In this study, 4.5% of women and less than 2% of men reported achieving all four healthy behaviors. In addition, only 38% of adults maintained a normal weight, approximately 20% ate fruits and vegetables in the recommended amounts, and only about 25% exercised regularly, while about one quarter smoked.⁸⁴

Tobacco use is associated with an increased risk of lung cancer and chronic obstructive pulmonary disease. Tobacco use results in an estimated 430,000 deaths per year among adults.² The direct medical cost of smoking is at least \$50 billion per year—and even more if losses in worker productivity are included. Obesity had an estimated total cost of \$99 billion in 1995. Substance abuse, unintended pregnancy, and sexually transmitted diseases resulted in a combined cost to the United States of \$291 to \$299 billion in 1995.²

Weight loss and smoking cessation are prevention efforts linked to decreases in morbidity. Weight loss of 5% to 10% is associated with significant decrease in triglyceride levels and levels of high-density lipoprotein (HDL) cholesterol, risk factors for cardiovascular disease.⁸⁵⁻⁸⁷ Researchers have also found that smokers who quit before the age of 40 years have forced expiratory volumes similar to those of people who never smoked, and lung age may also improve.^{88, 89} Physicians have successfully counseled patients to modify unhealthy behavior, resulting in reductions in morbidity and mortality, through early intervention in disease history or before disease develops.^{90, 91}

Successes in Prevention

Recently, a methodology for prioritization of the US Preventive Services Task Force clinical preventive guidelines was published.⁹² Using the joint criteria of clinically preventable burden and cost-effectiveness, the study reported the following rank ordering for the top 10 clinical preventive services ranked from the most cost-effective (childhood vaccination) to the least cost-effective (influenza vaccination of elderly)^{93, 94} (Table 5).

Table 5: Top 10 Clinical Preventive Services

Rank Ordering of Top 10 Clinical Preventive Services (in order of cost-effectiveness)
<ul style="list-style-type: none"> • Vaccinate children • Assess adults for tobacco use and provide tobacco cessation counseling • Screen for vision impairment among adults aged 65 and older • Assess adolescents for drinking and drug use and counsel on alcohol and drug abstinence • Assess adolescents for tobacco use and provide an antitobacco message or advice to quit • Screen for cervical cancer among sexually active women or women aged 18 and older • Screen for colorectal cancer (fecal occult blood testing and/or sigmoidoscopy) among all persons aged 50 and older • Screen for hemoglobinopathies, phenylketonuria, and congenital hypothyroidism among newborns • Screen for hypertension among all persons • Vaccinate adults aged 65 and older against influenza

Note: Services in **boldface** are those for which data indicate #50% of US eligible population receive service.

Source: Adapted from Coffield et al. Priorities among recommended clinical preventive services. *Am J Prev Med.* 2001;21:5.

The study ranked a total of 30 preventive health services recommended for average-risk patients on the basis of health benefits and cost-effectiveness. Services that ranked high on the list but reach 50% or less of the US population include tobacco cessation counseling for adults, screening for undetected vision impairments in older adults, colorectal cancer screening for adults aged 50+, vaccinating older adults against pneumococcal disease, screening and counseling adults for problem drinking, and screening women for chlamydia. Services delivered to more than half of the applicable US population were childhood vaccinations, cervical cancer screening, hypertension screening, cholesterol screening, and older adult influenza vaccination. Key findings from the study are presented in Table 6.

Table 6: Key Findings Regarding Preventive Health Service Recommendations

Preventive Health Service Recommendation Highlights
<p>Tobacco cessation counseling, including treatment with nicotine replacement, is effective and addresses the nation’s leading killer—heart disease—yet a third of smokers enrolled in managed care did not receive advice to quit from their providers in 1999. This proportion is expected to be even higher among all smokers (not just those enrolled in managed care). If counseling were delivered to all smokers on a regular basis, approximately 70,000 deaths could be prevented in 1 year. Preventing adolescents from ever smoking could save even more lives.</p>
<p>Vision screening by primary care providers would help eliminate the high prevalence of correctable poor vision among the elderly. A third of adults 65 and older have undercorrected vision and would benefit from screening. Poor vision reduces quality of life and is a possible cause of falls that result in hip fractures.</p>
<p>Regular screening for colorectal cancer, the second leading cause of cancer death, could prevent at least a third of deaths from the disease. Yet in 1999 only 21% of those 50 and older reported having had a fecal occult blood test (FOBT) in the last year, and only 34% reported having had a sigmoidoscopy or colonoscopy in the previous 5 years. If screening with FOBT and sigmoidoscopy were delivered to all persons 50 and older on a regular basis, many deaths could be prevented in 1 year.</p>
<p>Screening for chlamydia among sexually active women 15-25 years would help reduce this sexually transmitted disease, the most commonly reported infectious disease in the United States. It is estimated that 3 million new cases occur each year. Fewer than one in five women are currently screened. Initial infections may have no symptoms, but without treatment, 40% of women develop pelvic inflammatory disease, which can cause infertility.</p>
<p>The pneumococcal vaccine, which is effective for at least 10 years, would help reduce hospitalizations and premature death due to invasive pneumococcal disease among the elderly, yet more than half of people 65 and older have not received it.</p>
<p>Few providers discuss alcohol use with their patients. Screening and counseling for problem drinking can identify patients whose alcohol use is excessive. Brief counseling following a few screening questions has been shown to reduce alcohol consumption by some patients. Alcohol abuse causes 100,000 premature deaths annually in the US. Preventing adolescents from abusing alcohol could result in immediate reductions in injuries and significant financial benefits.</p>

Source: Adapted from Office of Communications, Centers for Disease Control, Atlanta, Ga.
 URL:<http://www.cdc.gov/od/oc/media/pressrel/r010622.htm>. Last accessed 09/29/01.

Most physicians recognize the importance and promise of providing clinical preventive services. The benefits of disease prevention/health promotion include improved healthy lifestyles, decreased disability, and extended healthy life expectancy.^{95, 96} The provision of certain clinical preventive services has also been incorporated into some performance measurement sets. One set of quality indicators is the Health Plan Employer Data and Information Set (HEDIS) developed by the National Committee for Quality Assurance. HEDIS is currently measuring the following clinical preventive services: immunizations, mammography, and smoking cessation counseling. Yet, many clinical preventive services are underused in the US. For example, according to 1999 HEDIS, 42% of adolescents had not received all appropriate vaccinations by age 13 and approximately 35% of smokers did not receive advice to quit smoking from their physician.^{93, 97}

Despite the documented benefits of clinical and community preventive interventions, numerous barriers to implementation have been identified,^{25, 35, 98-102} including the following:

- Lack of reimbursement for clinical preventive services
- Lack of time to deliver preventive services
- Fragmentation in health care delivery
- Uncertainty among clinicians regarding which services to offer
- Uncertainty of the effectiveness of preventive interventions generally and uncertainty of the relative effectiveness of offering different preventive services
- Tension regarding causing unnecessary harm among healthy individuals (especially true in screening)
- Economic considerations of the population being screened
- Lack of provider or patient interest in preventive services
- Lack of organizational/system support to facilitate the delivery of clinical preventive services

What Is Disease Prevention and Health Promotion?

Prevention is traditionally conceptualized into primary, secondary, and tertiary levels.^{103, 104}

- Primary prevention is treatment or intervention of disease-free individuals to prevent the onset of a particular condition or disease (eg, routine immunization of children).
- Secondary prevention is treatment or intervention of individuals with a preclinical disease, or risk factors for that disease, to prevent clinical expression of the disease (eg, Pap smears to detect cervical dysplasia before development of cancer, screening for high blood pressure to prevent heart disease).
- Tertiary prevention is treatment or intervention of individuals with a clinical disease to prevent further impact from the disease (eg, bypass surgery or angioplasty for angina or a myocardial infarction or insulin therapy to prevent complications of diabetes mellitus).

Although there is some inconsistency in the use of the primary-secondary-tertiary schema, these categories are generally clear enough to be of practical usefulness. Nevertheless, Froom and Benbassat have proposed an alternative classification system in which interventions are grouped according to intervention objective, target population, and type.¹⁰⁵ Table 7 indicates the relationship between the newer classification system and the traditional levels of primary, secondary, and tertiary prevention.

Table 7: Prevention Classification Schema

Level of Prevention	Target Population	Prevention Intervention Objectives	Example of Prevention Action
Primary	Those without medical condition	Reduce exposure to etiologic agent Increase resistance to disease Screen for and treat risk factors of disease in asymptomatic patients, with a view to their reduction Promotion of resistance to a causative agent	Isolation Lifestyle modification Adolescent sexual behavior Immunization
Secondary	Those with medical condition but are asymptomatic	Screen for asymptomatic disease with view of early treatment	Screen for diabetes
Tertiary	Those with medical condition but are symptomatic	Prevention of recurrence Prevention of complications Treatment of acutely symptomatic patients with view of cure, palliation, or reduction of mortality Rehabilitation (adjustment)	Treatment of hyperlipidemia Intensive insulin treatment of diabetes Antibiotics in infection Physical therapy

Source: Adapted from Froom P, Benbassat JB. Inconsistencies in the classification of prevention interventions. *Prev Med.* 2000;31:155.

The prevention diagram, Figure B, depicts the natural course of disease in relationship to dimensions of interest for those engaging in prevention intervention activities. The *disease state* dimension is composed of two stages, no disease and disease. The point at which this stage progresses is noted as disease onset (ie, where no disease progresses to disease).

A second dimension, *symptom status*, also involves two stages, with progression occurring

at the time of ordinary detection (ie, from asymptomatic to symptomatic). The third dimension has to do with prevention activities involving *assessment*. Assessment includes gathering of information through clinical interview, anthropomorphic measurements, or standardized instruments. Screening is done with the hope of detecting risk behavior or disease earlier than the behavior or disease would ordinarily be detected after onset.

Figure B: Prevention Diagram

				Disease Onset	Ordinary Detection
				↓	↓
Natural Course of Disease					
Disease State	No Disease	Disease	Disease		
Symptom Status	Asymptomatic	Asymptomatic	Symptomatic		
Assessment Phase	Screening	Screening	Detection		
Level of Prevention	Primary	Secondary	Tertiary		
Prevention Objectives	Reduce exposure to etiologic agent Increase resistance to disease Screen for and treat risk factors of disease in asymptomatic patients, with a view to their reduction Promotion of resistance to a causative agent	Screen for asymptomatic disease with view of early treatment	Prevention of recurrence Prevention of complications Treatment of acutely symptomatic patients with view of cure, palliation, or reduction of mortality Rehabilitation (adjustment)		

Risk Assessment

Before initiating a preventive service in the clinic or community setting, it is necessary to assess the importance of the *target condition* or the *risk factor*.

- A *target condition* is defined variously as the disease or health outcome that the preventive care intervention avoids (primary prevention), identifies early (secondary prevention), or prevents from occurring (tertiary prevention).¹⁰⁶ The relative importance of a target condition can be assessed by its frequency and severity. Frequency is measured by *incidence rates* and *prevalence rates* and severity can be measured by *mortality*, *morbidity*, and *survival rates* as well as by cost and quality of life (See Appendix B: Key Concepts 1 and 2). Specific populations that exhibit higher frequencies or greater severity of target conditions are good candidates for prevention interventions.
- *Risk factors* are defined as characteristics that are either directly related to or more likely to lead to the target condition(s). Risk factors may include demographic qualities (eg, age, race/ethnicity, gender, or income), behaviors (eg, smoking, being overweight, or

drinking while driving), environmental factors (eg, occupation and geographic location), and system factors (eg, access to and preferences for health care).

As with target conditions, the relative importance of risk factors can be ascertained by *frequency* (ie, incidence and prevalence) and *magnitude*. The magnitude of an association between a risk factor and a target condition is calculated as measures of risk—*absolute*, *relative*, and *attributable*. Each of these has different implications for disease prevention at the clinical or community level (see Appendix B: Key Concepts 3).

- Relative risk measures the association between exposure to a factor (eg, smoking) and a disease (eg, lung cancer). Relative risk is reported as a ratio of exposure to disease. It shows how a change in amount of exposure leads to a change in amount of disease. Relative risk is often applied in thinking about the individual/patient. Attributable risk is the proportion of disease or risk attributed to a specific exposure.
- Attributable risk shows the potential for prevention of disease or risk (in a population) if the exposure is eliminated. For example, attributable risk might address the question: Among those who smoke, how much lung cancer would be prevented if they stopped smoking? Sometimes the focus is an entire group, both those exposed and not exposed, such as all the patients in a physician’s practice. In this context, attributable risk answers a slightly different question: what proportion of all the physician’s patients would be spared lung cancer if all the patients who smoke were persuaded to give up smoking?

Practice Suggestion C: Thinking About Risk

Think of two strategies for handing out a pamphlet on how to quit smoking. Every patient in a physician’s practice could be given a pamphlet (ie, primary prevention) or first the smokers could be identified and then a pamphlet could be given only to them (ie, secondary prevention). Slightly different forms of attributable risk are used in these two situations, and the meaning of the attributable risk differs somewhat in the two circumstances.

Community or “population” interventions can succeed by making small changes in a large number of people, rather than making big changes in small numbers of people. “[A] population approach is considered a viable strategy for disease prevention because societal benefit that accrues from large numbers of people lowering their risk a small amount often exceeds the benefits obtained from larger risk changes among the smaller number of people at highest risk.”^{107(p228)}

Therefore, interventions that demonstrate minor effectiveness in terms of relative risk may have significant impact on the population in terms of attributable risk if the target condition is *common* and associated with *significant morbidity and mortality*. In this situation, highly effective interventions (ie, in relative risk) that are applied to a small high-risk group may

save fewer lives than an intervention with less clinical effectiveness that is applied to large numbers of affected people, as demonstrated in Table 8 .

Table 8: Effect of Mortality Rate on Total Deaths Prevented

Reduction in Mortality With Intervention	Deaths per Year From Target Condition	Total Deaths Prevented With Intervention
50%	10	5
1%	100,000	1000

Source: Reprinted from *Guide to Clinical Preventive Services*. US Preventive Services Task Force; 1996.

Physicians are accustomed to medical interventions that change the health status of most patients they treat. With population-based medicine, they are faced with a paradigm shift to also value both prevention efforts applied to many patients to obtain success with a few patients and disease prevented as much as disease cured. Public smoking cessation campaigns are examples of successful population prevention. In fact, physician efforts to promote smoking cessation are also an example of a successful population prevention if thousands of physicians each day provide smoking cessation counseling to their patients—many people are reached through such office-based efforts. Unlike public health, physicians are often in the enviable position of being able to tailor interventions to patient risks (ie, to determine which patients are smokers and then to intervene in specific ways with these patients or to provide interventions geared to patients with low health literacy). General public health campaigns then serve as reinforcement of the physician’s specific interventions.

Both strategies have merit. Physicians are more likely to focus on the groups at high risk because of costs and time; public health is more likely to focus on larger populations because that is its mission and it is good public policy. However, physicians may counsel their patients to eat better and not smoke (all people), while public health may develop programs for high-risk families. The critical issue is that a shared sense of responsibility using both strategies is better for all concerned.

Prevention with a population perspective provides an unprecedented opportunity for collaboration between primary care physicians and community health professionals. Interventions such as screening for obesity or sexually transmitted diseases, counseling for smoking cessation, and promotion of physical activity fall under the purview of physicians. There are also effective preventive interventions that fall outside of the physician office or hospital care system, such as regulation of tobacco and alcohol prices and legislation on seat belt use and drunk driving. Broader public policy initiatives generally fall within the purview of the public health sector. Physicians can actively participate in this type of prevention activity through their advocacy roles and by fostering collaborative relationships with public health.

Health Promotion

Health promotion is an important aspect for prevention. The term *health promotion* is a broad concept and refers to the variety of strategies for improving conditions associated with health (eg, adequate physical activity or good diet). Health promotion can take place with individuals, groups, and communities or society at large. It is generally considered to be a key component of primary prevention. Strategies used in health promotion include education, environmental modifications to improve health, or public policy advocacy.¹⁰⁸ Thus, health promotion is another intervention “tool” that can be used by physicians or public health practitioners in prevention activities.

Population-based medicine is an integrated, comprehensive strategy for a better coordinated and more comprehensive approach to prevention. Appropriate population-based strategies are needed to effectively identify groups of patients that can best benefit from disease prevention and health promotion activities.

Section Summary: Prevention

- Although personal behaviors account for much unnecessary morbidity and premature mortality, people continue to engage in health risk behaviors.
- Prevention strategies are traditionally classified according to primary, secondary, and tertiary interventions. A more practical model might be to consider interventions according to their objective, target population, and type.
- Relatively small percentage changes with large populations might produce more substantial results than large percentage changes with small populations.
- Health promotion (ie, advocating for health) is an important aspect of prevention.

IV. National Objectives and Guidelines

Changes in the causes of morbidity and premature mortality, coupled with a concern for how health dollars should be most effectively directed, have led to a need for a systematic national effort to index and track the health status of the United States population. The best known of these efforts is the Public Health Service's Healthy People initiative. Healthy People 2010 (HP 2010) is the third decade-spanning iteration of key health objectives for the nation. New to the Healthy People initiative is the creation of a subset of 10 objectives, entitled the Leading Health Indicators (LHIs). These objectives provide a snapshot of the nation's health status and permit medicine and public health professionals to better target health promotion and disease prevention interventions and track changes in population health over time.

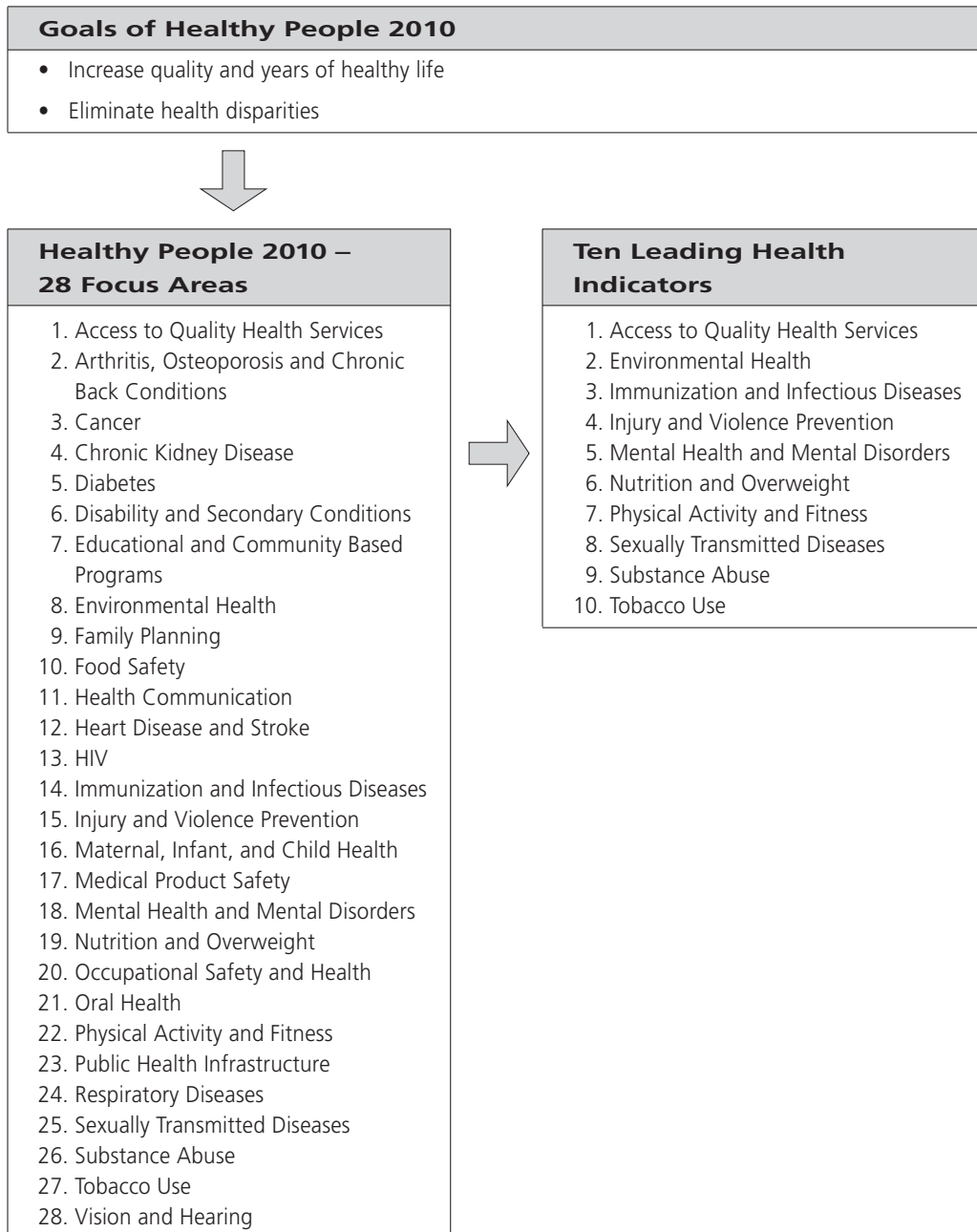
Healthy People 2010

Early in 2000, the US Department of Health and Human Services (DHHS) released *Healthy People 2010 (HP 2010)*, the third in its series of decade-spanning sets of health objectives for the Nation. *HP 2010* represents a comprehensive, national agenda for health promotion and disease prevention. *HP 2010* builds on previous national efforts to promote health and prevent illness, disability, and premature death. The first of these efforts, *Promoting Health/Preventing Disease: Objectives for the Nation*, spanned the period 1980 to 1990 and included 226 health objectives for the nation.¹⁰⁹ The second set of health improvement goals, *Healthy People 2000: National Health Promotion and Disease Prevention Objectives*, included 319 health objectives and spanned the decade 1990 to 2000.¹¹⁰ Development of *HP 2010* involved input and consensus from numerous individuals and organizations. The Healthy People Consortium represents more than 500 national and state organizations from across the health sector, including individual physicians, organized medicine, and the medical specialty society communities. The Consortium serves to guide and monitor the progress of this ongoing effort. *HP 2010* includes two major goals:

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

These goals are guided by a set of 467 objectives in 28 focus areas (Figure C). The vision for *HP 2010* is “Healthy People in Healthy Communities.” This theme emphasizes that the health of the individual is closely linked with the health of the community. One of the most effective methods for improving the health of the population is to work in *partnership* with communities.

Figure C: Diagram of Healthy People 2010 Components



Source: Adapted from *Healthy People 2010*, Department of Health and Human Services, Rockville, Md.

Leading Health Indicators

To help prioritize issues and encourage participation from all sectors of the population toward increasing the quality of life and years of healthy life and eliminating health disparities, the DHHS identified 10 Leading Health Indicators (LHIs). These indicators reflect major public health concerns for the decade, national relevance, and data available for monitoring progress. The LHIs represent the broad array of individual behaviors, physical, social, and environmental factors, and health system issues that impact on the health and well-being of individuals and communities. Rather than using the full set of objectives associated with each LHI, indicators only include one to three measurable objectives. For some of the LHIs, there are multiple focus areas/objectives associated with the indicator. Each objective contains an underlying rationale, a targeted outcome measure to be achieved by 2010, and current baseline data from which to evaluate future progress (Table 9).

The indicators serve as initial “building blocks” for clinical and community health initiatives. The LHIs may also serve as the basis for national and state-level “report cards” to monitor progress toward meeting the *HP 2010* goals of increasing the quality of life and the years of healthy life and eliminating health disparities. Personal behavior, environmental, physical, and social factors and health system issues affect the LHIs.

Table 9: Healthy People 2010 Leading Health Indicators, Goals, and Associated Health Objectives

Indicator Focus and Goal(s)	Measurable Health Objectives
<p>Immunization and Infectious Diseases</p> <p>Goal: Prevent disease, disability, and death from infectious diseases, including vaccine-preventable diseases</p>	<p>Increase the proportion of young children who receive all vaccines that have been recommended for universal administration for at least 5 years 1998 Baseline: 73% → 2010 Target: 80%</p> <p>Increase the proportion of noninstitutionalized adults who are vaccinated annually against influenza and who were ever vaccinated against pneumococcal disease Influenza: 1998 Baseline: 64% → 2010 Target: 90% Pneumococcal: 1998 Baseline: 46% → 2010 Target: 90%</p>
<p>Nutrition and Overweight</p> <p>Goal: Promote health and reduce chronic disease associated with diet and weight</p>	<p>Reduce the proportion of children and adolescents who are overweight or obese 1988-1994 Baseline: 11% → 2010 Target: 5%</p> <p>Reduce the proportion of adults who are obese 1988-1994 Baseline: 23% → 2010 Target: 15%</p>
<p>Tobacco Use</p> <p>Goal: Reduce illness, disability, and death related to tobacco use and exposure to secondhand smoke</p>	<p>Reduce cigarette smoking by adolescents 1999 Baseline: 35% → 2010 Target: 16%</p> <p>Reduce cigarette smoking by adults 1998 Baseline: 24% → 2010 Target: 12%</p>
<p>Physical Activity and Fitness</p> <p>Goal: Improve health, fitness and quality of life through daily physical activity</p>	<p>Increase the proportion of adolescents who engage in vigorous physical activity 1999 Baseline: 65% → 2010 Target: 85%</p> <p>Increase the proportion of adults who engage regularly, preferably daily, in moderate physical activity for at least 30 minutes per day 1997 Baseline: 15% → 2010 Target: 30%</p>
<p>Mental Health and Mental Illness</p> <p>Goal: Improve mental health and ensure access to appropriate, quality mental health services</p>	<p>Increase the proportion of adults with recognized depression who receive treatment 1997 Baseline: 23% → 2010 Target: 50%</p>
<p>Substance Abuse</p> <p>Goal: Reduce substance abuse to protect the health, safety, and quality of life for all, especially children</p>	<p>Increase the proportion of adolescents not using alcohol or illicit drugs in past 30 days 1998 Baseline: 79% → 2010 Target: 89%</p> <p>Reduce the proportion of adults using any illicit drug during the past 30 days 1998 Baseline: 5.8% → 2010 Target: 2.0%</p> <p>Reduce the proportion of adults engaging in binge drinking of alcoholic beverages during the past month 1998 Baseline: 16.6% → 2010 Target: 6.0%</p>

<p>Sexually Transmitted Diseases and HIV</p> <p>Goals: <i>Promote responsible sexual behaviors, strengthen community capacity, and increase access to quality services to prevent STDs and their complications. Prevent HIV infection and its related illness and death</i></p>	<p>Increase the proportion of adolescents who abstain from sexual intercourse or use condoms if currently sexually active 1999 Baseline: 85% → 2010 Target: 95%</p> <p>Increase the proportion of sexually active persons who use condoms Partners of unmarried females: 1995 Baseline: 23% → 2010 Target: 50%</p>
<p>Injury and Violence Prevention</p> <p>Goal: <i>Reduce injuries, disabilities, and deaths due to unintentional injuries and violence</i></p>	<p>Reduce deaths caused by motor vehicle crashes 1998 Baseline: 15.6% → 2010 Target: 9.2%</p> <p>Reduce homicides 1998 Baseline: 6.5% → 2010 Target: 3.0%</p>
<p>Environmental Health (and Related Use of Tobacco)</p> <p>Goals: <i>Promote health for all through a healthy environment. Reduce illness, disability, and death related to tobacco use and exposure to secondhand smoke</i></p>	<p>Reduce the proportion of persons exposed to air that does not meet the US Environmental Protection Agency's health-based standards for ozone 1997 Baseline: 43% → 2010 Target: 0%</p> <p>Reduce the proportion of nonsmokers exposed to environmental tobacco smoke 1988-1994 Baseline: 65% → 2010 Target: 45%</p>
<p>Access to Quality Health Services and Maternal, Infant, and Child Health</p> <p>Goals: <i>Improve access to comprehensive, high-quality health care services. Improve the health and well-being of women, infants, children, and families</i></p>	<p>Increase the proportion of persons who have a specific source of ongoing care 1998 Baseline: 87% → 2010 Target: 96%</p> <p>Increase the proportion of pregnant women who begin prenatal care in the first trimester of pregnancy 1998 Baseline: 83% → 2010 Target: 90%</p> <p>Increase the proportion of persons with health insurance 1997 Baseline: 83% → 2010 Target: 100%</p>

Source: Adapted from *Healthy People 2010*, Department of Health and Human Services, Rockville, Md.

Each objective has data on disparity among subpopulations and presents a target rate. Each population group has the same target rate, thus helping promote the goal of eliminating health disparity by 2010. As an example of this approach, Table 10 highlights some of the disparity associated with childhood immunizations.

Table 10: HP 2010 Objective for Childhood Immunizations

Objective 14-24a	Baseline 1998	Target 2010
Fully immunized young children and adolescents— Children aged 19 to 35 months	73%	80%
Race and ethnicity		
American Indian or Alaska Native	65%	80%
Asian or Pacific Islander	73%	80%
Asian	DNC	80%
Native Hawaiian and other Pacific Islander	DNC	80%
Black or African American	66%	80%
White	74%	80%
Hispanic or Latino	69%	80%
Not Hispanic or Latino	74%	80%
Black or African American, not Hispanic/Latino	67%	80%
White, not Hispanic/Latino	76%	80%
Gender		
Female	72%	80%
Male	73%	80%
Family income level		
Poor	70%	80%
Near poor	72%	80%
Middle/high income	77%	80%
Disability status		
Persons with disabilities	DNC	80%
Persons without disabilities	DNC	80%

Source: Adapted from *Healthy People 2010*, Department of Health and Human Services, Rockville, Md.

Practice Suggestion D: Using Healthy People 2010

Objective 14-24a concerns fully immunized young children and adolescents-children aged 19 to 35 months. Information measuring the objective includes a baseline measure rate and a 2010 target rate for the overall objective and for specific population groups. As examples, in this instance, disparity at baseline can be seen among race and ethnic groups (eg, white, 74%, vs African American, 66%) and in income (eg, poor, 70%, vs middle/high, 77%). What are some other disparities associated with this objective?

Target-Setting Methods

One of the three overarching goals for the *Healthy People 2000* prevention initiative was to reduce health disparities among Americans. The framework of *HP 2010* has taken this a step further by proposing to “eliminate health disparities” as one of the two primary goals for the next decade.

To support this goal of eliminating health disparities, a *single national target* that is applicable to all select populations has been set for each measurable, population-based objective. Three guiding principles were used in setting targets for the measurable, population-based objectives:

- For objectives that address health services and protection (eg, access to prenatal care, health insurance coverage), the targets have been set so that there is an improvement for all racial/ethnic segments of the population (ie, the targets are set “better than the best” racial/ethnic subgroup shown for the objective).
- For objectives that can be influenced in the short term by policy decisions, lifestyle choices, and behaviors (eg, physical activity, diet, smoking, suicide, alcohol-related motor vehicle deaths), the target setting method is also “better than the best” group.
- For objectives that are unlikely to achieve an equal health outcome in the next decade, regardless of the level of investment (eg, occupational exposure and resultant lung cancer), the target represents an improvement for a substantial proportion of the population and is regarded as a minimum acceptable level.

Assessing Progress

Most objectives are tracked by a single measure. For these objectives, progress will be assessed by the change from the baseline measure toward the target. Some objectives seek to increase positive behaviors or outcomes, while others are stated in terms of decreasing negative behaviors or outcomes. The tracking data and methods for assessing progress will be reviewed during the midcourse review in 2005, and a determination will be made at that time whether any changes will be made.

Relevance to Physicians

The LHIs can be adapted for clinical or community use as targeted areas for health promotion and disease prevention interventions. Data pertaining to the LHIs can be collected, tracked, and monitored for any population of patients or community. Population-based medicine provides a framework for physicians, and other health care providers, to address the LHIs in a medical practice or community of concern. The LHI objectives, baseline measures, and the 2010 targets can be used as “benchmarks” for initiating and tracking population-based medicine activities, including the identification of appropriate subpopulations for interventions or for monitoring reductions in rates of disparity among the groups of interest. Implementation of a population-based medicine approach will help the physician to reduce inequalities by improving access to needed care for the whole practice population.

Section Summary: National Health Objectives (*Healthy People 2010*, Leading Health Indicators)

- By identifying a variety of health objectives, the *Healthy People 2010* initiative will focus national, state, and community efforts for both private and public preventive strategies.
- The 10 Leading Health Indicators provide a more “user-friendly” snapshot of the national objectives.
- The health objectives are organized to focus on disparities among different population groups.

V. Evidence-Based Guides

HP 2010 establishes goals, objectives, and targets to be reached in health promotion and disease prevention activities. Methods for obtaining the desired outcomes are not specified by HP 2010. However, recent efforts to develop evidence-based methods and strategies for reaching the national health objectives are available. There are complementary guidelines that provide evidence-based recommendations for the clinical setting (ie, *Guide to Clinical Preventive Services*) and the community setting (ie, *Guide to Community Preventive Services*). Furthermore, for a comprehensive continuum of preventive care, both Guides can be used in combination. The recommendations can assist the physicians in prioritizing prevention strategies for individual patients and/or the practice population.

Guide to Clinical Preventive Services

During the past decade, physician decisions regarding preventive services have increasingly been guided by recommendations developed by the US Preventive Services Task Force (USPSTF). The USPSTF is sponsored by the Agency for Healthcare Research and Quality. These recommendations, based on levels of scientific evidence, inform physicians of effective *screening*, *counseling*, and *immunization* procedures for patients seen in clinical settings. By design, clinical preventive service recommendations are directed for asymptomatic persons seen in clinical settings. Identifying effective preventive interventions that are evidence-based is a key component for implementing population-based medicine into routine clinical care. The term evidence-based refers to “the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.”¹¹¹

The most recent recommendations and rationale are published in the *Guide to Clinical Preventive Services, 2nd Edition, 1996: Report of the U.S. Preventive Services Task Force*. Included are reviews and recommendations for more than 80 interventions. Clinical preventive services topics are listed in Table 11.

Table 11: Guide to Clinical Preventive Services Recommendations

Screening Recommendations
<ul style="list-style-type: none"> • Cardiovascular Diseases • Congenital Disorders • Infectious Diseases • Mental Disorders and Substance Abuse • Metabolic, Nutritional, and Environmental Disorders • Musculoskeletal Disorders • Neoplastic Diseases • Prenatal Disorders • Vision and Hearing Disorders
Counseling Recommendations
<ul style="list-style-type: none"> • Tobacco Use • Physical Activity • Healthy Diet • Motor Vehicle/Household and Recreational Injuries • Youth Violence • Low Back Pain • Dental and Periodontal Disease • HIV Infection and Other Sexually Transmitted Diseases • Unintended Pregnancy • Gynecologic Cancers
Immunizations and Chemoprophylaxis Recommendations
<ul style="list-style-type: none"> • Childhood Immunizations • Adult Immunizations • Postexposure Prophylaxis for Selected Infectious Diseases • Postmenopausal Hormone Prophylaxis • Aspirin Prophylaxis for Primary Prevention of Myocardial Infarction • Aspirin Prophylaxis in Pregnancy

Source: Adapted from *Guide to Clinical Preventive Services*, 1996, US Preventive Services Task Force.

This material, and other information from the USPSTF, can be accessed from the Internet site: <http://www.ahcpr.gov/clinic/cpsix.htm>.

Recommendations for intervention effectiveness in the *Guide to Clinical Preventive Services* are based on letter grades ranging from A to E. A rating of A indicates “good evidence to support the recommendation,” while a rating of E indicates “good evidence to support the recommendation to exclude.” A rating of C indicates an evaluation of the recommendation as having “insufficient evidence.” Recommendations are updated as new scientific evidence becomes available.

The USPSTF has recently released four new recommendations:

1. Screening for Bacterial Vaginosis in Pregnancy
2. Screening for Chlamydial Infection
3. Screening for Lipid Disorders in Adults
4. Screening for Skin Cancer

Additional recommendations will be released as they are completed; they will be made available in print and as electronic versions on the *US Preventive Services Task Force* Web page (see Appendix A: Resources – Clinical Practice Materials).

There are a variety of aids to help physicians incorporate preventive services into their offices and practice.¹¹² An excellent companion to *Guide to Clinical Preventive Service* is *Put Prevention Into Practice (PPIP)*.¹¹³ This program helps overcome clinician, office, and patient barriers that interfere with the integration of clinical preventive services into a physician's practice. Waiting room posters, preventive care flow sheets, patient reminder postcards, preventive care timelines, and patient health pamphlets are available as part of a package of materials. Patient pamphlets are available in English and Spanish. The program includes a practical guide to clinical preventive services entitled *Clinicians Handbook of Preventive Services* (second edition). This user-friendly manual is divided into two sections: children/adolescents and adults/older adults. Chapters in each section provide information on screening guidelines, immunization and prophylaxis recommendations, and counseling information. The manual and coordinated materials are suitable for prevention efforts for the general population without special risk factors and for asymptomatic patients but not for tertiary prevention. A new aid has been recently released, *A Step-by-step Guide to Delivering Clinical Preventive Services: A Systems Approach*. Copies are available for download at the Internet site: <http://www.ahrq.gov/ppip/manual/manual.htm>. Additional information concerning PPIP is located in Appendix A: Resources – Clinical Practice Materials.

Practice Suggestion E: Implementing a Clinical Preventive Service Recommendation

Consider implementing clinical preventive service recommendations or a subset using the Put Prevention Into Practice (PPIP) protocol. Continuous quality improvement programs might be established for implementing one or more preventive interventions. Existing practice patterns could then be compared with the recommendations from the USPSTF. If discrepancies are found, then strategies from PPIP for improving the delivery of preventive interventions could be implemented.

Guide to Community Preventive Services

“For some health problems, community-level interventions may be more effective than clinical preventive services.”^{6(pxxxii)}

Since 1996, the Centers for Disease Control and Prevention (CDC) has convened a Task Force on Community Preventive Services (CPS) to review the scientific literature on the effectiveness of preventive interventions directed at populations.⁷ These interventions could include the following:

- Strategies to educate the general public (eg, mass media) or specific populations (eg, school health education)
- Strategies to mandate compliance (eg, health legislation and regulations)
- Strategies that could be used in the clinical setting to increase delivery of preventive interventions (eg, chart reminders)

Data from the scientific reviews are used to create recommendations for medical and public health practice. Recommendations target three general areas for intervention, within which particular topics will be addressed (Table 12).

Table 12: Guide to Community Preventive Service Outline

Prevention Areas	Chapter Topics
<i>Changing Risk Behaviors</i>	Tobacco* Alcohol Other Addictive Drugs Physical Activity Nutrition Sexual Behavior
<i>Reducing Specific Diseases, Injuries, and Impairments</i>	Vaccine-Preventable Diseases Cancer Diabetes Improving Pregnancy/Infant Mortality Outcomes Depression and Comorbid Conditions Violent/Abusive Behavior Motor Vehicle Occupant Injury Oral Health
<i>Addressing Environmental and Ecosystem Challenges</i>	Sociocultural Environment

***Boldface** type indicates completed chapters.

Source: Adapted from *Guide to Community Preventive Services*, 2001, US Community Preventive Services Task Force.

Topics included in the *Guide* are chosen on the basis of four criteria¹¹⁴:

- Burden of disease, injury, impairment or exposure
- Opportunities for prevention
- Related initiatives such as the Health Plan Employee Data and Information Set (HEDIS) and *Healthy People 2010*
- Usefulness of the set of topics selected to the target audience

Recommendations: Each topic undergoes a systematic literature review for effectiveness. Strength of recommendations (eg, strongly recommended for or against, recommended for or against, insufficient evidence for recommendation) are assigned to each specific community intervention.¹¹⁵ For more information on the *Community Guide*, see the Internet site: <http://www.thecommunityguide.org>.

Using the *Guides*

There is substantial correspondence between the topics addressed by the Clinical and Community Preventive Services Task Forces and the LHIs. Table 13 identifies the recommendations that address common conditions contained in these three documents.

Table 13: Correspondence Between *Healthy People 2010* Leading Health Indicators and the Community and Clinical Prevention Guides

Leading Health Indicator	Community Guide Intervention Target	Clinical Guide Intervention Target
Tobacco	Reduce exposure to environmental smoke Prevent initiation Increase cessation	Increase cessation
Substance Abuse	Prevent misuse and abuse	Identify problem drinking Prevent household and recreational injuries Identify drug abuse Prevent youth violence Reduce illicit drug use
Physical Activity	Increase physical activity	Increase physical activity
Obesity and Overweight	To be determined	Promote healthy diet Identify iron-deficiency anemia Promote breast-feeding
Responsible Sexual Behavior	Prevent STDs and unintended pregnancy HIV risk reduction and testing	Identify STDs Prevent unintended pregnancy HIV risk reduction and testing
Mental Health	Identify depression Increase self-help	Identify dementia, depression, and suicide risk
Injury and Violence	Prevent alcohol-related injuries Increase occupant safety devices Primary prevention Prevent violence among high-risk people and family groups	Prevent alcohol-related injuries Increase use of safety devices Increase use of motorcycle helmets Identify family violence Prevent youth violence
Immunizations	Improve vaccination coverage in childhood, adolescents, and adults	Increase childhood, adolescent, and adult immunizations Identify tuberculosis and hepatitis B infections
Environmental Quality	Promote early childhood development Promote mixed-income housing developments Promote cultural competency of health care systems	Not Included
Access to Health Care	Promote use of community preventive services	Promote use of clinical preventive services

Sources: Adapted from *Healthy People 2010*, 2000, US Department of Health and Human Services; *Guide to Clinical Preventive Services*, 1996, US Preventive Services Task Force; *Guide to Community Preventive Services*, 2000, US Community Preventive Services Task Force.

Relevance to Physicians

The recommendations that address common conditions contained in the LHIs, the *Clinical Guide*, and the *Community Guide* provide especially strong “roadmaps” for focusing and addressing disease prevention and health promotion. By utilizing both sets of *Guides*, a range of effective, evidence-based approaches can be developed in the office practice.

An example of how the two *Guides* provide complementary recommendations for tobacco control and cessation is shown in Tables 14 and 15.

Table 14: Intervention Strategies in the Clinical and Community Guides

Intervention Strategies	Guide Source/Setting
Screening patients for tobacco use	Clinical Guide/Office
Provider gives brief advice to quit to patients who use tobacco*	Clinical Guide/Office
Provider counseling to patients on tobacco cessation	Clinical Guide/Office
Self-help education materials for patients who use tobacco	Clinical Guide/Office
Pharmacologic treatment for tobacco and dependence	Clinical Guide/Office
Provider reminder systems**	Community Guide/Office
Multicomponent clinical program (provider reminder + education)	Community Guide/Office
Patient-oriented interventions (telephone support; sliding fee scales)	Community Guide/Office
Policies, regulations, and laws (smoking ban and restrictions)	Community Guide/Office
Mass media campaigns	Community Guide/Office

Sources: Adapted from *Guide to Clinical Preventive Services*, 1996, US Preventive Services Task Force; *Guide to Community Preventive Services*, 2000, US Community Preventive Services Task Force.

Table 14 illustrates that evidence-based recommendations concerning smoking fall along a continuum of preventive interventions. The first column in the table lists the various evidence-based recommendations contained in the two sets of *Guides*. The second column identifies which *Guide* the recommendation came from (ie, *Clinical* or *Community Guide*) and the location where the recommended intervention strategy should take place (ie, office or community). The recommendations with the asterisks simply indicate that these two will be used in the Practice Suggestion exercise below.

Table 15 is an illustration of the actual recommendations for the two evidence-based intervention strategies of interest in this example, including the “level of effectiveness” ratings for the two. For example, the *Clinical Guide* indicates that the strategy “Health care provider delivery of brief advice to quit to patients who use” is an “A” (highest) recommendation. Tobacco cessation counseling on a regular basis is, thus, recommended for all persons who use tobacco products. The *Community Guide* indicates that the strength

of the evidence is positive but not very strong (recommended) for the effectiveness of “Provider reminder systems.” A Practice Suggestion utilizing this information is presented.

Table 15: An Example of the Clinical and Community Guides Recommendations – Smoking

Guide to Clinical Preventive Services
* Recommendation: Health care provider delivery of brief advice to quit to patients who use tobacco
Strength of Evidence = A Tobacco cessation counseling on a regular basis is recommended for all persons who use tobacco products
Guide to Community Preventive Services
** Recommendation: Provider reminder systems: System efforts (such as chart stickers) to identify tobacco-using patients, to prompt providers to discuss tobacco use with patients, to advise patients to quit, or a combination <i>Recommended</i>

Sources: Adapted from *Guide to Clinical Preventive Services*, 1996, US Preventive Services Task Force; *Guide to Community Preventive Services*, 2000, US Community Preventive Services Task Force.

Practice Suggestion F: Integrating Clinical and Community Preventive Service Recommendations

Using a population-based medicine approach, the physician might become aware that smoking is a prevalent problem for patients in the practice and, thus, decide to begin screening all patients for smoking status. The physician could then implement one or more of the recommended strategies suggested in Table 14. The physician should consult both of the Guides to determine the level of evidence for each recommendation and then decide around which one(s) to develop interventions. One set of strategies might include delivering brief advice to quit smoking. Another approach might be to add a provider reminder system to the previous intervention and couple these efforts with advocacy for development of a mass media campaign in the community.

Physicians are encouraged to seek out other community health and social service professionals as team members in the effort to provide patients and communities with adequate and appropriate health care service delivery when implementing a comprehensive prevention intervention as described above.

Finally, physicians are reminded that there may be additional relevant program recommendations that can assist in intervention development. Evidence-based recommendations are often issued by medical specialty societies, the National Institutes of Health, and other governmental and policy/research/advocacy groups (eg, Institute of Medicine). The PPIP's *Clinicians Handbook to Clinical Preventive Services* compiles recommendations from these various sources into one location so that access to each of these guidelines can be facilitated.

Section Summary: Evidence-Based Guidelines

- The *Guide to Clinical Preventive Services* provides recommendations for preventive interventions directed at individual patients in the clinical settings.
- The *Guide to Community Preventive Services* provides recommendations for preventive services directed at groups of people, including patients in clinical and community settings.
- There are various topics addressed by both clinical and community guides—these provide especially promising roadmaps for preventive interventions along a continuum from clinical to community settings.
- Various programs exist to aid physicians in providing preventive services, include Put Prevention Into Practice (Agency for Health Research and Quality) and the AMA's Guidelines for Adolescent Preventive Services.

VI. Health Literacy and Cultural Competence

H *health literacy and cultural competence are two complementary issues that contribute to disparities in health status and health outcomes. Physicians might reduce disparities by addressing these issues within their role as provider of direct medical services, manager of health services within the office, and advocate for change in the community and in organized medicine.*

Low Health Literacy

Literacy in the US has been defined as an individual's ability to read, write and speak, and compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals and develop one's knowledge and potential.¹¹⁶ Results of a 1992 National Adult Literacy Survey indicate that one quarter of adult Americans (more than 40 million people) are functionally illiterate—they cannot perform the basic reading tasks necessary to fully function in society.¹¹⁷ Another 25% of the population have only limited reading skills (eg, they cannot read and decipher a bus schedule) and may have difficulty with numeracy concepts such as those used in most health care communications.

Health literacy has been defined as the ability to read, understand, and act on health care information.¹¹⁸ People with low health literacy have difficulty reading and interpreting patient educational brochures, prescription labels, consent forms, and appointment cards.^{119, 120} People who have low health literacy are surprisingly heterogeneous. However, most of these individuals tend not to have completed high school, and many come from lower socioeconomic status. A disproportionate number represent racial/ethnic minority groups, but the largest numbers are native to the US and are white. Approximately 25% of people with low health literacy are immigrants, and 44% are over the age of 65.¹¹⁷ When health literacy is examined directly through use of specific research tools (ie, the Test for Functional Health Literacy in Adults or TOHFLA), the relationship between low health literacy and poor health outcomes becomes clearer. Results from a study of 2659 patients at two public hospitals indicate that 33% of patients had inadequate health literacy. These patients were more than twice as likely to report poor health status and twice as likely to be hospitalized than the more literate population.¹²¹ In another study of more than 3000 Medicare patients enrolled in managed care, results indicate that more than 50% of the Medicare patients could not understand a prescription label to take a medicine on an empty

stomach.¹²² Evidence suggests that low health literacy may be related to adverse health outcomes, such as more outpatient visits and a greater likelihood of being hospitalized,¹¹⁹ and cause confusion with verbal physician-patient communication.¹²³ Low health literacy may also affect clinical test results such as those for dementia¹²⁴ and self- or interviewer-administered health status questionnaires.¹²⁵

The relationship between low health literacy and disparities in health outcomes has not been clarified. However, a linkage is suggested by data that indicate low literacy was a better predictor than race or age of advanced disease at the time of diagnosis of prostate cancer.¹²⁶ Several mechanisms have been suggested to explain the persistent relationship of low literacy to poor health, especially in some groups of the population. The mechanisms include:

- A lack of self-efficacy or self-empowerment to negotiate through the health care system, less understanding about disease
- Poorer understanding about self-care
- More risky behavior
- Greater noncompliance with treatment

Although more research is needed to clarify these relationships, the physician does have a variety of roles to play in addressing low health literacy as a contributing factor to health disparity and poor health outcomes.

Practice Suggestion G: Roles of the Physician in Addressing Health Literacy

Clinician Role: *Physicians must be alert to the possibility of low health literacy among all patients. Patients may be unaware of how inadequate their literacy skills actually are, and many who are aware are deeply ashamed.¹¹⁶ Most people with low literacy hide their problem-67% have never told their spouse.¹²⁷*

Physicians can formally or informally assess patient health literacy. Numerous instruments exist for a formal assessment (see Appendix A: Resources – Health Literacy). However, many experts in the field are strongly opposed to routine testing of patients to assess level of health literacy because of the risk of causing embarrassment. Instead, physicians are urged to address the possibility of low health literacy through a two-step approach. First, informally assess patients' comprehension by reviewing with them written and oral treatment instructions. Second, enhance effective communication through simplifying and organizing the essential patient education information, providing only two or three concepts at a time and then checking for understanding by asking the patient to "teach back" the information ("Tell me how you will do this at home" or "Show me what you will do"). A recent study by the Agency for Healthcare Research and Quality found strong scientific evidence that "asking that patients recall and restate what they have been told" improved patient safety.¹²⁸

However, the results of some studies suggest that physicians assess patients' understanding of their instructions less than 2% of the time.¹²⁸

Manager Role: *The typical physician's office presents unnecessary barriers to patients with limited health literacy. Medical history and insurance forms use complex language; even signage to find the office or clinic can be confusing. Patient education materials are too difficult for many to read and understand. Office staff may be unaware of these problems. These "systems" issues can be addressed by:*

- *Health education audiotapes*
- *Material in a patient's primary language*
- *Materials at a lower educational level*
- *Connections for patients to community groups who provide medical support*
- *Arrangements for patients to bring with them a relative or trusted friend to help them understand the medical diagnosis and disposition*

Advocate Role: *An important advocacy role for physicians concerned with improving the general level of health literacy in the local community is to increase awareness among colleagues, educational institutions, and policymakers about the health care issues and challenges presented by patients with limited health literacy. Physicians can give talks to local civic groups, hospital staff, and other medical groups. The AMA has a videotape and other materials to aid in presentations (Appendix A: Resources – Health Literacy). Numerous potential partners are available to collaborate with, including local health care providers, medical and specialty societies, social service agencies, and health education and literacy advocacy organizations. There is great need for coordination at a local level so those physicians will be able to refer patients with limited literacy to community resources that can provide individual or small group assistance.*

Cultural Competence

Cultural competence for physicians is the ability to perform clinical duties without diminished effectiveness caused by the culture, including language, of the patient. Culturally, patients differ in many ways that are relevant to their health care. These differences arise from a variety of personal and social influences that collectively can be labeled as culture. *Culture* refers to integrated patterns of human behavior that include the language, thoughts, communications, actions, customs, beliefs, values, and institutions of racial, ethnic, religious, or social groups. *Competence* implies having the capacity to function effectively as an individual and an organization within the context of the cultural beliefs, behaviors, and needs presented by consumers and their communities.¹²⁹

There is growing recognition of the heterogeneity both *within* and *among* groups of individuals according to race/ethnicity, socioeconomic status, religious affiliation, age, gender,

sexual orientation, and/or disability and how these dimensions influence health care decisions and health behaviors. Cultural competence involves two levels of knowledge and understanding. At one level, the physician must have an understanding of the sociocultural background of the patient, the family, and the living environment. At another level, the physician must also understand how personal values, beliefs, and assumptions are shaped by the contexts in which patients work and live and how these sociocultural factors might influence care provision. If these issues are appropriately and honestly addressed by both the patient and the physician, most likely the health outcomes will be improved, the health care encounter will become more efficient and cost-effective, and quality of care will be enhanced.¹³⁰

A particular aspect of cultural competence involves that of language. Data from the 1990 Census indicated that 14% or 31.8 million residents of the US did not speak English at home.¹³¹ The most commonly spoken language other than English was Spanish, followed by French or Creole, German, Chinese, and Italian. Non-English-speaking or limited-English-speaking individuals can present a challenge to the physician and other health care practitioners. The patient may have difficulty in understanding medical terminology even with an adequate comprehension of basic English language. Some patients may not possess reading or writing skills in their native language, making it even more difficult to learn these skills in English. This may result in the patient delaying the scheduling of an appointment, miscommunication in the details of the appointment (eg, date, time, location), or misunderstanding of the tests required, preparation for these tests, and the subsequent treatment plan.

The provision of health care services that are culturally and linguistically appropriate for diverse population groups remains a significant health disparity issue. The physician can play a major role in reducing health disparity by assessing and ensuring that cultural competence is being addressed at the clinical, managerial, and advocacy levels.

Practice Suggestion H: Roles of the Physician in Addressing Cultural Competence

Clinician Role: *At the level of the clinical encounter with an individual patient, the physician can ensure cultural competence by becoming aware of the impact that sociocultural factors have on the physician-patient encounter. Recognition of the influence of these factors on the patient's experience of disease, illness, and health and the patient's interaction with medicine can help physicians build a stronger therapeutic alliance with their patients. Physicians can gain a better understanding of the contribution of culture to their patient's health beliefs through at least two mechanisms. First, they could learn from the leaders of the predominant racial/ethnic minority groups of their area how these groups view both traditional and nontraditional medicine—what are likely sources of health information;*

what are folk remedies that are likely to be used; what are medical taboos. Second, physicians can ask these and other questions directly of their patients. Learning from patients helps build the therapeutic relationship and enhances compliance.

Manager Role: *The physician's role as manager is primarily to ensure that the medical care itself is accessible by considering transportation issues, working hours, language and communication needs, disability status, and financial situation of the patients. Accessibility can be increased by working with staff to institute cultural sensitization programs, easier access to interpreters (including telephone access), use of appropriate written materials, closer communication with community resources, and ombudsmen.*

Advocate Role: *By forming collaborative relationships with members and entities of the larger community, physicians can locate and utilize other community resources and advocacy groups that may provide needed information or services that can improve patient care. Several culturally competent model health service delivery programs have been developed by physicians in collaboration with community-based organizations. Physicians can form or support community coalitions that engage in advocacy activities around linguistically and culturally competent health care services and policies.*

Section Summary: Health Literacy and Cultural Competency

- Health literacy and cultural competency are complementary factors related to disparities in health outcomes.
- The level of patients' health literacy is best assessed subjectively during the clinical interview.
- Low health literacy can lead to medication errors and noncompliance.
- Physicians and their staff should be aware of the influence of cultural issues on health care and health behaviors.
- Asking patients directly about their health behaviors helps promote the therapeutic relationship and recognizes the important role of culture.

VII. Collaboration Between Medicine and Public Health

Meeting the public health challenges of today and in the future will require that the medical, scientific, and public health communities work together.

In a recent article in the *Journal of the American Medical Association*, Koplan and associates suggested that the challenges of medicine-public health collaboration are both complex and diverse. They conclude that physicians and public health professionals “share in the responsibility and have an unprecedented opportunity to apply current knowledge to improve the health of the nation.”^{132(p1696)}

A Shared History

Medicine and public health are natural partners in guarding the well-being of patients and communities. The two disciplines have a rich history of interconnection. For example, in ancient Greece, the god Aesculapius had two daughters, one representing the field of medicine and the other, the field of public health. Panacea, the goddess of healing, presided over individuals and relieved their pain and suffering, while her sister Hygeia, the goddess of health, presided over preventing disease through promoting healthy conditions in the community. In the fourth century BC, Hippocrates urged physicians to look beyond that which ails the individual patient and to consider the contexts in which the patient lives: the airs “peculiar to each particular region,” the “properties of the waters,” and “the mode of life of the inhabitants, whether they are heavy drinkers, taking lunch, and inactive, or athletic, industrious, eating much and drinking little.”^{133(p28)}

In the early years of the US, the major issue confronting both medicine and public health was infectious disease. Physicians and public health officials had to contend with influenza, tuberculosis, pneumonia, streptococcal infections, cholera, smallpox, and typhoid. Medical science could offer little to victims of these afflictions except palliation. Meanwhile, public health focused on improving sanitation and establishing public health boards. In the late 19th century, the discovery of bacteria as the causative agents in infectious disease resulted in a transformation in the professionalization and practice of medicine and public health.

As a consequence of the emerging new science of bacteriology, doctors were held to new standards of knowledge and public health officers were required to have specialized training.

In public health, the discovery of bacteria led to new environmental initiatives. Efforts focused on clean drinking water, milk pasteurization, and the eradication of mosquitoes to eliminate yellow fever. Meanwhile, in the medical sector, the science of bacteriology led to the biomedical paradigm for explaining the causes of disease and for the development of antitoxins and antibiotics.

Divergent Pathways

In the 20th century, the professions of medicine and public health began to diverge. Longer life expectancy, paired with the drastic lifestyle changes, spawned a set of new afflictions, chronic illnesses like cancer and cardiovascular disease, illnesses that link directly to reduced physical labor, fat-filled diets, smoking, and alcohol consumption.

Medicine emphasizes biological causes of disease and develops treatments and therapies consistent with these causes. Public health focuses on environmental, social, and behavioral risk factors that cause chronic illnesses and develops population-based interventions to minimize or change these risk factors.

Lasker and colleagues suggest several reasons why medicine and public health have diverged rather than converged.¹³⁴ One major cause has to do with the lack of an adequate infrastructure to support collaboration between the two sectors. The heterogeneity of the US health care system has resulted in several obstacles to collaboration:

- Fragmentation of the public health system
- Separate education institutions and curricula
- Categorical grant funding and unequal reimbursement of diagnostic/therapeutic vs preventive services
- Competition between the medical and public health sectors to provide patient services, perceived infringement on the doctor-patient relationship, and physician autonomy
- Health care reform
- Advances in medical technology (ie, curative vs preventive) and differing levels of available resources in the two sectors

Moving Toward Collaboration

In the rapidly changing health care environment of today, collaboration among medical care providers and public health organizations has become an effective strategy for improving population health given the mix of health-related skills and resources maintained by each type of organization.¹³⁵⁻¹³⁷

A growing body of research and policy recommendations provides a basis for fostering joint work among the two health sectors.¹³⁸ This is evidenced by the cosponsorship of the Medicine and Public Health Initiative (MPHI) by the American Medical Association (AMA) and the American Public Health Association (APHA). The mission statement of the MPHI acknowledges the evolving nature of the collaborative process in that the MPHI “...seeks to join medicine and public health in a search to explicate problems and produce innovative solutions to deal with the health needs of the people of the United States.”¹³⁸ Further, the publications of *The Cooperative Actions for Health Program: Lessons Learned in Medicine and Public Health Collaboration, Medicine and Public Health—The Power of Collaboration* by the New York Academy of Medicine and the companion volume *Pocket Cases of Medicine and Public Health Collaboration* provide “real-world” examples of medicine and public health collaboration.^{134, 139, 140} Six strategies or “synergies” have been identified through case study as successful collaboration methods for medical care and public health professionals to work together¹³⁴:

- Improve health care through coordinated medicine and public health services for individuals
- Improve access through frameworks to provide care for the uninsured and underinsured
- Improve the quality and cost-effectiveness of care through application of a population perspective to medical practice
- Use medical practice to identify and address community health problems
- Strengthen health promotion and health protection through community campaigns
- Shape the future direction of the health system through policy, training, and research

Practice Suggestion I: Medicine and Public Health Collaboration

From *Healthy People in Healthy Communities*⁴:

- Speak with your patients about forming local groups to target problems that you think are important in your community
- Use your professional contacts, such as medical societies or professional associations, to find other health professionals concerned about improving the health of your community
- Contact other health professionals (eg, physician assistants, nurses, dentists, pharmacists, dietitians, social workers) and the nearest health department (eg, public health officer) about ways in which you can lend support to community-based health issues
- Develop collaborations with social service agencies, community health clinics, hospital, and groups, including universities (medical and public health schools)
- Speak to the media, local civic groups, religious organizations, and other concerned citizens about issues that may be important in your community

From *Clinicians Handbook of Preventive Services*¹¹²:

- Be cognizant of community programs
 - Encourage patients to participate and become involved in community health care issues
 - Act as consultant for communities implementing programs or introducing legislation
 - Serve as advocate to initiate and maintain effective community interventions
-

Section Summary: Medicine – Public Health Collaboration

- Medicine and public health are natural partners in the provision and protection of health.
- There are numerous examples of ways for physicians to become involved in public health and community-based activities, including being aware of community programs, encouraging patient participation in community health issues, and serving as a resource to communities

Summary

Improving the health of a population involves a continuum of strategies. The continuum stretches from disease prevention and health promotion directed toward individuals and entire communities to intensive treatment strategies for those who have a disease. *Healthy People 2010*, the *Guide to Clinical Preventive Services*, and the *Guide to Community Preventive Services* provide data, policy recommendations, and tools to address the continuum and thus improve the nation's health. The 10 LHIs identified by the Public Health Service prioritize the preventable causes of morbidity and premature mortality. The US Preventive Services Task Force provides recommendations for physicians during a clinical encounter that addresses these health indicators, while the Task Force on Community Preventive Services offers recommendations on effective group and population-wide strategies—some of which occur in the clinical setting and some in the broader community setting.

Healthy People 2010 provides targets that, if reached through public and private health efforts, would eliminate health disparities. The Leading Health Indicators are helpful for identifying disparities in health in various groups of the population. Furthermore, evidence-based guidelines (ie, *Guide to Clinical Preventive Services* and *Guide to Community Preventive Services*) exist to assist in addressing the health needs of patients and communities as a means of reducing disparities in health status and outcomes. Increased collaboration between medicine and public health, including joint utilization of evidence-based guidelines to promote comprehensiveness of care, can also help to foster improvements in health.

The concepts and methods incorporated in the practice of population-based medicine provide numerous innovative and challenging opportunities for increased collaboration between medicine and public health, as both address health disparities. Such efforts are consistent with recent calls for the two disciplines to work more closely together. A population-based perspective, as employed in the practice of population-based medicine, is useful in the identification of the needs of health care in a diverse society. The population perspective provides a balanced approach to address issues of concern to physicians and other health care providers, such as disparities in health status and health outcomes, low health literacy, cultural competence, and the role of physician as advocate and collaborator. Taken together, these elements form logical “roadmaps” for choosing what to do and how to do it.

Glossary of Terms*

Access: According to the Institute of Medicine, “The timely use of personal health services to achieve the best possible health outcomes.” This definition includes both the use and effectiveness of health services. The concept of access also encompasses physical accessibility of facilities.

Accuracy: Content that is valid and without errors of fact, interpretation, or judgment.

Advocacy: Communication directed at policymakers and decision makers to promote policies, regulations, and programs to bring about change.

Asymptomatic: Without symptoms. This term may apply either to healthy persons or to persons with preclinical (prior to clinical diagnosis) disease in whom symptoms are not yet apparent.

Availability: Content (whether a targeted message or other information) that is delivered or placed where the audience can access it. Placement varies according to audience, message complexity, and purpose—from interpersonal and social networks to billboards, mass transit signs, prime-time television, and radio and from public kiosks (print or electronic) to the Internet.

Clinical preventive services (CPS): Common screening tests, immunizations, risk assessment, counseling about health risk behaviors, and other preventive services routinely delivered in the clinical setting for the primary prevention of disease or for the early detection of disease in persons with no symptoms of illness.

Community: A specific group of people, often living in a defined geographic area, who share a common culture, values, and norms and who are arranged in a social structure according to relationships the community has developed over a period of time.

Community-based program: A planned, coordinated, ongoing effort operated by a community that characteristically includes multiple interventions intended to improve the health status of members of the community.

Community health planning or community health improvement process: A process that helps a community mobilize to collect and use local data; set health priorities; and design, implement, and evaluate comprehensive programs that address community health and quality of life issues.

Community health promotion program: A program that includes all of the following: (1) community participation with representation from at least three of the following community sectors: government, education, business, faith organizations, health care, media, voluntary agencies, and the public, (2) community assessment, guided by a community assessment and planning model, to determine community health problems, resources, perceptions, and priorities for action, (3) targeted and measurable objectives to address at least one of the following: health outcomes, risk factors, public awareness, services, and protection, (4) comprehensive, multifaceted, culturally relevant interventions that have multiple targets for change, and (5) monitoring and evaluation processes to determine whether the objectives are reached.

* Source: Adapted from *Healthy People 2010*.

Continuum of care: The array of health services and care settings that address health promotion, disease prevention, and the diagnosis, treatment, management, and rehabilitation of disease, injury, and disability. Included are primary care and specialized clinical services provided in community and primary care settings, hospitals, trauma centers, and rehabilitation and long-term care facilities.

Core competencies: A defined set of skills and knowledge considered necessary in the educational curricula for training health care providers. Examples of core competencies include skills in prevention education; skills in using sources of health data to identify what clinical preventive services should be delivered to the individual patient on the basis of that person's age, gender, and risk factor status; an understanding of the US public health system (local and state health departments) and its role in monitoring and maintaining the health of the community; and skills to evaluate and translate medical and scientific research reports into clinical practice.

Cost-effective: A characteristic indicating that the cost of a particular intervention compares favorably to life-saving interventions associated with other diseases.

Cost-saving: A characteristic indicating that a particular intervention averts health care costs in excess of the cost of the intervention.

Culturally appropriate: An unbiased attitude and organizational policy that values cultural diversity in the population served. It reflects an understanding of diverse attitudes, beliefs, behaviors, practices, and communication patterns that could be attributed to race, ethnicity, religion, socioeconomic status, historical and social context, physical or mental ability, age, gender, sexual orientation, or generational and acculturation status. It includes an awareness that cultural differences may affect health and the effectiveness of health care delivery. Cultural appropriateness implies knowledge of disease prevalence in specific cultural populations, whether defined by race, ethnicity, socioeconomic status, physical or mental ability, gender, sexual orientation, age, disability, or habits.

Cultural competence: The design, implementation, and evaluation process that accounts for special issues of select population groups (ethnic and racial, linguistic) as well as differing educational levels and physical abilities.

Essential public health services: The services identified in Public Health in America (defined below): monitoring health status; diagnosing and investigating health problems; informing, educating, and empowering people; mobilizing community partnerships; developing policies and plans; enforcing laws and regulations; linking people to needed services; ensuring a competent workforce; conducting evaluations; and conducting research.

Evidence base: Relevant scientific evidence that has undergone comprehensive review and rigorous analysis to formulate practice guidelines, performance measures, review criteria, and technology assessments for telehealth applications.

Evidence-based: Empiric proof that accurately validates professional guidance or recommendations, or illustrates how an approach has been used successfully in the past.

Health: A state of physical, mental, and social well-being and not merely the absence of disease and infirmity.

Health communication: The art and technique of informing, influencing, and motivating individual, institutional, and public audiences about important health issues. The scope of health communication includes disease prevention, health promotion, health care policy, and the business of health care as well as enhancement of the quality of life and health of individuals within the community.

Health education: Any planned combination of learning experiences designed to predispose, enable, and reinforce voluntary behavior conducive to health in individuals, groups, or communities.

Health intervention: Any measure taken to improve or promote health or to prevent, diagnose, treat, or manage disease, injury, or disability.

Health literacy: The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.

Health outcomes: The results or consequences of a process of care. Health outcomes may include satisfaction with care as well as the use of health care resources. Included are clinical outcomes, such as changes in health status and changes in the length and quality of life as a result of detecting or treating disease.

Health promotion: Efforts to create healthy lifestyles and a healthy environment to prevent medical and other secondary conditions, such as teaching people how to address their health care needs and increasing opportunities to participate in usual life activities; any planned combination of educational, political, regulatory, and organizational supports for actions and conditions of living conducive to the health of individuals, groups, or communities.

Health promotion activity: Broadly defined to include any activity that is part of a planned health promotion program, such as implementing a policy to create a smoke-free workplace, developing walking trails in communities, or teaching the skills needed to prepare healthy meals and snacks.

Health Status Indicators: Eighteen measures of health status defined in 1991 that represent a broad overview of a community's health and that can be used by various levels of government. Health Status Indicators include infant mortality, death rates for selected diseases, incidence rates of selected infectious diseases, measures regarding pregnancy and birth, childhood poverty, and air quality.

Leading Health Indicators: A set of 10 key determinants that influence health and can serve as a barometer for evaluating the health of the nation. Leading Health Indicators include individual behaviors, the social and physical environment, and community health programs and address areas that most influence the health of individuals, communities, and the nation.

Linguistically competent: Possessing skills for communicating effectively in the native language or dialect of the targeted population, taking into account general educational levels, literacy, and language preferences.

Literacy: The ability to read, write, and speak in English and to compute and solve problems at levels of proficiency necessary to function on the job and in society, to achieve one's goals, and develop one's knowledge and potential.

Major health data systems: Data systems that provide tracking data for five or more national *Healthy People 2010* objectives, including the Vital Statistics Cooperative Program, National Health Interview Survey, National Health and Nutrition Examination Survey, National Hospital Discharge Survey, and Behavioral Risk Factor Surveillance System.

Outcome evaluation (sometimes called impact evaluation): Evaluation that examines the results of a communication intervention, including changes in awareness, attitudes, beliefs, actions, professional practices, policies, costs, and institutional or social systems.

Patient barriers to medical care: Any mental, physical, or psychosocial condition that prevents an individual from accessing needed health care. Examples include attitudes or biases, mental disorders or illnesses, behavioral disorders, physical limitations, cultural or linguistic factors, sexual orientation, and financial constraints.

Patient communication: Information for individuals with health conditions to help them maximize recovery, maintain therapeutic regimens, and understand alternative approaches. Patient communication includes educational resources, provider-patient communication, and, increasingly, peer-to-peer communication.

Physician barriers to medical care: Any mental, physical, psychosocial, or environmental condition that prevents or discourages physicians or other health care providers from offering preventive services. Examples of provider barriers include a poor practice environment, lack of knowledge, and lack of efficacy studies.

Population-based prevention research: Research to identify effective public health prevention practices for particular populations.

Prevalence rate: A measure of the total number of cases of disease existing in a specific population at a certain point in time (point prevalence) or over a certain period of time (period prevalence). Point prevalence rates reflect the number of individuals at the stated date.

Primary care: According to the Institute of Medicine, “The provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community.”

Primary prevention: Health care services, medical tests, counseling, and health education and other actions designed to prevent the onset of a targeted condition. Routine immunization of healthy individuals is an example of primary prevention.

Process evaluation: Monitors the administrative, organizational, or other operational characteristics of an intervention. Process evaluation includes monitoring the dissemination of communication products to intended users (whether gatekeepers or audiences) and audience members’ exposure to a message. For an interactive health communication application, process evaluation may include testing how the application functions.

Public Health in America: Statement that defines the public health vision and mission and describes the essential public health services. It was adopted in 1994 by the Public Health Functions Steering Committee, which included representatives of the US Public Health Service agencies, American Public Health Association, Association of Schools of Public Health, Association of State and Territorial Health Officials, Environmental Council of the States, National Association of County and City Health Officials, National Association of State Alcohol and Drug Abuse Directors, National Association of State Mental Health Program Directors, and Public Health Foundation.

Public health infrastructure: The resources needed to deliver the essential public health services to every community—people who work in the field of public health, information and communication systems used to collect and disseminate accurate data, and public health organizations at the state and local levels in the front lines of public health.

Public health workers: Individuals who are responsible for providing the essential public health services, whether or not they work in an official health agency. At the state level, many workers have public health responsibilities even though they may work for nonpublic health agencies, such as environmental, agricultural, and education departments. This definition does not include those workers, such as physicians in medical practice, who occasionally contribute to the public health effort while fulfilling other responsibilities.

Quality: According to the Institute of Medicine, “The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.” Simply stated, it is doing the right thing, for the right patient, at the right time, with the right outcome.

Quality of life: An expression that, in general, connotes an overall sense of well-being when applied to an individual and a pleasant and supportive environment when applied to a community. On the individual level, health-related quality of life (HRQOL) has a strong relationship to a person’s health perceptions and ability to function. On the community level, HRQOL can be viewed as including all aspects of community life that have a direct and quantifiable influence on the physical and mental health of its members.

Reliability: Content that is credible in terms of its source and is kept up to date.

Risk factor: Something that increases a person’s chance of developing a disease.

School health education: Any combination of learning experiences organized in the school setting to predispose, enable, and reinforce behavior conducive to health or to prepare school-aged children to cope with the challenges to their health in the years ahead.

Secondary prevention: Measures such as health care services designed to identify or treat individuals who have a disease or risk factors for a disease but who are not yet experiencing symptoms of the disease. Pap tests and high blood pressure screening are examples of secondary prevention.

Social ecology: Refers to the complex interactions among people and their physical and social environments and the effects of these interactions on the emotional, physical, and social well-being of individuals and groups

System barriers: Conditions within a health care system that prevent people from accessing needed services or prevent health care providers from delivering those services. System barriers include physical, cultural, linguistic, and financial barriers as well as the availability of health care facilities or providers with special skills, such as eye, ear, nose, and throat specialists.

Target population: The group of persons (usually those at high risk) whom program interventions are designed to reach.

Tertiary prevention: Preventive health care measures or services that are part of the treatment and management of persons with clinical illnesses. Examples of tertiary prevention include cholesterol reduction in patients with coronary heart disease and insulin therapy to prevent complications of diabetes.

Underserved: Individuals or groups who lack access to health services or information relative to the national average. The underserved population may include residents of rural, remote, or inner-city areas; members of certain racial and ethnic groups; socioeconomically disadvantaged persons; or people with disabilities.

Universal preventive interventions: Interventions targeted to the public or a whole population group that has not been identified on the basis of individual risk. The intervention is desirable for everyone in that group. Universal interventions have advantages in terms of cost and overall effectiveness of large populations

Vulnerable and at-risk populations: High-risk groups of people who have multiple health and social needs. Examples include pregnant women, people with human immunodeficiency virus infection, substance abusers, migrant farm workers, homeless people, poor people, infants and children, elderly people, people with disabilities, people with mental illness or mental health problems or disorders, and people from certain ethnic or racial groups who do not have the same access to quality health care services as other populations.

Years of potential life lost (YPLL): A statistical measure used to determine premature death. YPLL is calculated by subtracting an individual's age at death from a predetermined life expectancy. The Centers for Disease Control and Prevention generally uses 75 years of age for this purpose (eg, a person who died at age 35 years would have a YPLL of 40).

* Source: Adapted from *Healthy People 2010*.

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Appendix A: Resources

1. GENERAL

Healthy People 2010 and the Leading Health Indicators

For more information about the *Healthy People 2010* initiative or full text of the document, visit the Web site at <http://www.health.gov/healthypeople/> or call (800) 367-4725. The full text of *Healthy People 2010* can be ordered in print form or on a CD-ROM from the US Government Printing Office Web site at <http://bookstore.gpo.gov/>.

Health, United States, 2001 with Urban and Rural Chartbook

This is the 25th report on the health status of the nation. It is part of a series that presents national trends in health statistics. It can be downloaded as PDF files or purchased from the Government Printing Office.

<http://www.cdc.gov/nchs/products/pubs/pubd/hs/hs.htm>

2. DATA SOURCES

County Health Data:

Community Health Status Indicators

These indicators provide more than 3000 reports of health status indicators, one for each county in the nation. For most counties, data are available for population characteristics, four summary measures of health, leading causes of death, measures of birth and death, vulnerable populations, environmental health, preventive services use, risk factors for premature death, and access to care.

<http://www.communityhealth.hrsa.gov/searchcounty.asp>

State-Level Data:

CDC Recommends

This Web site is known as the prevention guidelines system and contains up-to-date and archived guidelines and recommendations approved by the CDC for the prevention and control of disease, injuries, and disabilities.

<http://www.phppo.cdc.gov/cdcrecommends/advsearchv.asp>

Web-Based Injury Statistics Query and Reporting System

This is an interactive system developed by CDC that provides injury-related mortality aggregated by year, age, race, sex, Hispanic origin, and state. You can request reports by 5-year age ranges (eg, 0-4, 5-9) or define your own (eg, 13-19, 6-6). Race categories are white, black, American Indian/Alaskan Native, Asian and Pacific Islander, and other.

<http://www.cdc.gov/ncipc/osp/data.htm>

CDC WONDER

This web site, developed by Centers for Disease Control and Prevention (CDC), is an integrated information and communication system that provides a wealth of health data on injuries. Unlike other systems, CDC Wonder has individual ICD-9 and ICD-9E codes.

<http://wonder.cdc.gov>

National Center for Health Statistics: State Health Statistics by Sex and Race

This CDC Web site provides a wealth of state-level data on health behaviors and risk factors by sex and race/ethnicity. Included are body mass index, physical exercise, tobacco use, alcohol consumption, HIV/AIDS, hypertension, diabetes awareness, cholesterol awareness, colorectal cancer screening, women's health (breast exam, mammogram, Pap smear, hysterectomy), health status, immunizations, and health care access.

<http://www.cdc.gov/nchs/statestatsbysexrace.htm>

10 Leading Causes of Death, United States

CDC Office of Statistics and Programming, National Center for Injury Prevention produces a one-page chart of the leading causes of death by age group.

<http://webapp.cdc.gov/sasweb/ncipc/leadcaus.html>

3. CLINICAL PRACTICE MATERIALS

The National Guideline Clearinghouse: The NGC is a comprehensive database of evidence-based clinical practice guidelines and related documents produced by the Agency for Healthcare Research and Quality, the American Medical Association, and the American Association of Health Plans. It provides physicians and other health professionals an accessible, Web-based resource for obtaining objective, detailed information on clinical practice guidelines produced by both private and public organizations.

<http://www.guideline.gov/index.asp>

Guide to Clinical Preventive Services (2nd edition) (US Preventive Services Task Force): Recommendations for clinical practice on preventive interventions (screening tests, counseling, interventions, immunizations, and chemoprophylactic regimens) for the prevention of more than 80 target conditions.

<http://www.ahcpr.gov/clinic/cpsix.htm>

Put Prevention Into Practice (Agency for Healthcare Research and Quality): Guide and materials to assist the integration of prevention into routine medical care. Targets all ages. Provides concrete materials to integrate preventive services into medical care, such as waiting room posters, adult/child preventive care flow sheets and immunization schedules, patient reminder postcards, patient booklets on health habits, screening tests, and immunizations.

<http://www.ahcpr.gov/clinic/ppipix.htm>

Clinicians Handbook of Preventive Services (2nd edition) (Agency for Healthcare Research and Quality): This user-friendly manual is divided into two sections: children/adolescents and adults/older adults. Chapters in each section provide information on screening tests, immunizations, and counseling.

<http://www.ahcpr.gov/clinic/ppiphand.htm>

Guides for Adolescent Preventive Services (American Medical Association): A set of 24 recommendations that help direct the content and delivery of clinical preventive services for adolescents (ages 11 to 21 years). Materials include:

- Questionnaires for young and older teens (Spanish and English)
- Questionnaires for parents
- Parent information
- Teen information
- Monograph containing the recommendations
- Clinical algorithms for assessing teens according to each recommendation

<http://www.ama-assn.org/ama/pub/category/1980.html>

Guide to Community Preventive Services (Centers for Disease Control and Prevention): Recommendations for preventive interventions that are directed at populations of people. These inventions include strategies to educate the general public (eg, mass media) or specific populations (eg, school health education), strategies to mandate compliance (eg, health legislation and regulations), and strategies that could be used in the clinical setting to increase delivery of preventive interventions (eg, chart reminders). <http://www.thecommunityguide.org>

Other Evidence-Based Resources

Cochrane Collaboration was developed in response to a call for systematic, up-to-date reviews of all relevant randomized controlled trials of health care. <http://www.cochrane.org/cochrane/general.htm>

4. COMMUNITY HEALTH IMPROVEMENT PROCESS

National Association of County and City Health Officials (NACCHO). This organization provides education, information, research, and technical assistance to local health departments and facilitates partnerships among local, state, and federal agencies in order to promote and strengthen public health. <http://www.naccho.org/tools.cfm>

Mobilizing for Action Through Planning and Partnerships (MAPP) is a community-wide strategic planning tool developed by the National Association of County and City Health Officials (NACCHO) and CDC for improving community health. Facilitated by public health leadership, this tool helps communities prioritize public health issues and identify resources for addressing them. http://nacchoweb.naccho.org/mapp_home.asp

Assessment Protocol for Excellence in Public Health. Released in March 1991, APEXPH guides local health departments through an organizational capacity assessment and a community health assessment process. <http://www.naccho.org/project47.cfm>

Association of State and Territorial Health Officers (ASTHO) is the national nonprofit organization representing the state and territorial public health agencies of the United States, the US territories, and the District of Columbia. ASTHO is dedicated to influencing sound public health policy and to ensuring excellence in state-based public health practice. <http://www.astho.org>

Collaborating to Improve Community Health. The HealthCare Forum in 1996 produced a workbook and guide to best practices in creating healthier communities and populations. This book publishes tools that have been used by a number of Healthy Communities sites (Jossey-Bass, San Francisco, 1996).

Improving Health in the Community: A Role for Performance Monitoring. Produced in 1997 by the Institute of Medicine, this book gives a framework for the community health improvement process and tools for measurement of progress (Institute of Medicine, 1997).

Healthy Cities Healthy Communities. A partnership of entities from the public, private, and nonprofit sectors collaborating to focus attention and resources on improving the health and quality of life of communities through community-based development. Includes a Community Health Toolbox. <http://www.healthycommunities.org/healthycommunities.html>

Volunteers in Health Care. Organization provides resources to health care providers looking to organize or expand volunteer-led medical or dental services for the uninsured in their communities
<http://www.volunteersinhealthcare.org/>

Turning Point. Information about projects designed to transform and strengthen the public health infrastructure at the state and local level to better protect and improve the public's health.
<http://www.naccho.org/search.cfm?topicID=45&numresults=all&showabstract=yes>

5. HEALTH LITERACY

AMA Health Literacy Introductory Kit (American Medical Association, 2000). Obtain through writing to Clinical and Public Health Practice and Outcomes, American Medical Association, 515 N. State Street, 8th floor, Chicago, IL 60610 or calling (312) 464-4526.

Current Bibliographies in Medicine: Health Literacy (National Library of Medicine, Bethesda, Md, CBM 2000-1).
<http://www.nlm.nih.gov/pubs/cbm/hliteracy.html>

An Overview of Medical and Public Health Literature Addressing Literacy Issues: An Annotated Bibliography, by Rudd RE, Colton T, Schacht R, Harvard School of Public Health, National Center for the Study of Adult Learning and Literacy (NCSALL) Harvard graduate School of Education. 101 Nichols House, Appian Way, Cambridge, MA 02138 (NCSALL Reports #14, January 2000).
<http://ncsall.gse.harvard.edu/research/reports.htm>

Teaching Patients With Low Literacy Skills, by Doak CC, Doak LG, Root, JH; JBLippincott Company, Philadelphia, Pa, 1996.

Sources of Low-Literacy Education Materials:

National Institute for Literacy, Health & Literacy Special Collection. This is a Web site for anyone teaching health to adults with limited literacy skills.
<http://www.nifl.gov/lincs> – Click on “Collections” and then on “Health and Literacy.”

World Education

Two compendia: “*Health and Literacy Compendium: An Annotated Bibliography of Print and Web-Based Health Materials for Use With Limited-Literacy Adults*” and “*Culture, Health and Literacy: A Guide to Health Education Materials for Adults With Limited English Literacy Skills.*”
<http://www.worlded.org/us/health/lincs>.

National Work Group on Literacy and Health: Work Group Report

<http://gateway2.ovid.com:80/ovidweb.cgi#149>

National Foundations and Governmental Agencies

- National Cancer Institute, Cancer Information Service. (800) 4-CANCER.
- American Cancer Society. (800) ACS-2345.
- National Heart Lung and Blood Institute. (301) 251-1222
- American Heart Association. (800) 242-1793.
- National Institute for Literacy. (202) 632-1500.
- American Dietetic Association. (312) 899-0400.

Regional Organizations

- Health Promotion Council of Southeastern Pennsylvania. (215) 546-1276.
- AIDS Action Committee. 131 Clarendon Street, Boston, MA 02116.

Universities

- Novela Health Education, University of Washington, Campus Box #359932, 1001 Broadway, Suite 100, Seattle, WA 98122.
- Health Literacy Center, University of New England, 11 Hills Beach Road, Biddeford, Maine 04005. (207) 283-0171.

6. CULTURAL COMPETENCE

Diversity Rx: Promoting language and cultural competence to improve the quality of health care for minority, immigrant, and ethnically diverse communities
<http://www.diversityrx.org/html/divrx.htm>

Assuring Cultural Competence in Health Care (Office of Minority Health, Public Health Service, Department of Health and Human Services):
<http://www.omhrc.gov/clas/cultural1a.htm>

Cultural Competence Compendium (American Medical Association):
<http://www.ama-assn.org/ama/pub/category/2661.html>

Cultural Competence Works (Health Resources and Services Administration, US Department of Health and Human Services)
<http://www.hrsa.gov/cmc> – Click on the Cultural Competence Works file (PDF).

Recommended Core Curriculum Guidelines on Culturally Sensitive and Competent Health Care (Society of Teachers of Family Medicine):
<http://stfm.org/corep.html>

Cross Cultural Health Care Program: A limited bibliography of cultural competency assessment tools, including individual and organizational self-assessment instruments
<http://www.xculture.org/training/overview/cultural/assessment.html>

Kavanagh KH, Kennedy PH. *Promoting Cultural Diversity: Strategies for Health Care Professionals*. Newbury Park, Calif: Sage Publications; 1992.

7. MEDICINE AND PUBLIC HEALTH COLLABORATION

Medicine and Public Health at the American Medical Association
Web site is the homepage of the AMA's Unit on Medicine and Public Health.
<http://www.ama-assn.org/ama/pub/category/3611.html>

AMA Public Health Internet Resources

Provides Internet linkages to a variety of medical and public health-oriented organizations and information deemed useful to fostering medicine and public health collaboration.
<http://www.ama-assn.org/ama/pub/category/3622.html>

Medicine and Public Health at the American Public Health Association

Web site is the homepage of the APHA's medicine and public health activities.

<http://www.apha.org/ppp/medicine.htm>

Medicine and Public Health Initiative

Web site is the homepage of the National Committee of the Medicine-Public Health Initiative hosted by the University of Texas-Houston.

<http://www.mphi.net>

State and Local Public Health Associations

Contact listing to state and local public health associations sponsored by the American Public Health Association.

http://www.apha.org/state_local/afflinks.htm

State and Local Public Health Departments – ASTHO

Links to state public health departments from ASTHO.

<http://www.astho.org/state.html>

Association of Schools of Public Health

Link to all schools of public health in the US.

http://www.asph.org/aa_section.cfm/151

Association of American Medical Colleges

Link to all medical colleges in the US.

<http://pnet400.aamc.org/directories/schools/msalpha.cfm>

Case Examples of Medicine – Public Health Collaboration

Cooperative Actions for Health Program: Lessons Learned in Medicine and Public Health Collaboration

Provides direct link to the Cooperative Actions for Health Program (CAHP) Lessons Learned in Medicine and Public Health Collaboration monograph (.pdf file)

<http://www.ama-assn.org/ama/pub/category/6211.html>

New York Academy of Medicine, Center for the Advancement of Collaborative Strategies in Health

Web site is the homepage of the New York Academy of Medicine's Center for the Advancement of Collaborative Strategies in Health.

<http://www.cacsh.org/>

Medicine and Public Health: The Power of Collaboration

Monograph describing history and successful medicine and public health collaboration strategies.

<http://www.cacsh.org/mph.html>

Pocket Guide to Medicine and Public Health Collaboration

Guide to case studies of successful medicine and public health collaboration.

<http://www.cacsh.org/mphguide.html>

Appendix B: Key Concepts in Prevention

Key Concepts 1: Incidence Rate and Prevalence Rate for Target Condition

Incidence Rate during a given time period = $\frac{\text{number of new cases of a target condition during the given time period}}{\text{population at risk for developing the target condition during the given time period}}$

The denominator, "population at risk for developing the target condition," does not refer to any specific high-risk group, but includes all members of the population of interest whose probability of becoming a new case is greater than zero. Thus, if one is studying the annual incidence of HIV seropositivity among US adolescent males, then the population at risk for developing the target condition (HIV seropositivity) includes all adolescent males residing in the US, with the exception of those who are already HIV positive before the beginning of the time period. One cannot become a new case of HIV seropositivity if one is already HIV positive before the start of the time period.

EXAMPLE:

In a year, there are an estimated 1,500,000 new or recurrent episodes of coronary attacks* among 101,570,000 Americans aged 29 years and over. The annual incidence of new or recurrent coronary attacks* among Americans aged 29 years and over is

$$\frac{1,500,000}{101,570,000} = 0.015 = 1.5\%$$

Each year, 15 of every 1000 Americans aged 29 years and over (1.5%) have a new or recurrent episode of coronary attack.*

Prevalence Rate during a given time = $\frac{\text{total number of cases (new and old) of a target condition at the given time}}{\text{total population at the given time}}$

EXAMPLE:

In 1994, approximately 13,670,000 of 185,390,000 Americans aged 20 years and over had a history of coronary heart disease.* The prevalence of coronary heart disease* among Americans aged 20 years and over in 1994 is

$$\frac{13,670,000}{185,390,000} = 0.074 = 7.4\%$$

In 1994, 74 of every 1000 Americans aged 20 years and over (7.4%) had a history of coronary heart disease.*

*Both terms, "coronary attack" and "coronary heart disease," refer to a group of diagnoses under the general heading of ischemic heart disease, specifically ICD-9 410-414.

Source: American Heart Association. *1997 Heart and Stroke Statistical Update*. Dallas, Tex: American Heart Association; 1996.

**Key Concepts 2:
Incidence Rate and Prevalence Rate for Risk Factors**

Incidence Rate during a given time period = $\frac{\text{number of new individuals exhibiting the risk factor during the given time period}}{\text{population at risk for developing the risk factor in the given time period}}$

EXAMPLE:

In 1995, approximately 4.5 million of 22.2 million youths aged 12-17 were current smokers. If approximately 1 million youths become smokers annually, the annual incidence rate of smoking among youths aged 12-17 is

$$\frac{1,000,000 \text{ new smoking youths}}{17,700,000^* \text{ million nonsmoking youths}} = 0.056 = 5.6\%$$

In 1995, 56 of every 1000 youths aged 12 to 17 (5.6%) who had not been smokers began to smoke.

*The 17.7 million nonsmoking youths are calculated by subtracting the already smoking youths from the total population of 12- to 17-year-old youths (22.2 million – 4.5 million).

Prevalence Rate at a given time period = $\frac{\text{total number of individuals exhibiting the risk factor at the given time}}{\text{total population at the given time}}$

EXAMPLE:

In 1995, approximately 56.4 million of the 189.3 million adults aged >18 years were current cigarette smokers. The prevalence of current cigarette smoking in the United States among adults aged >18 years is

$$\frac{56,400,000 \text{ million current adult smokers >18 years}}{189,300,000 \text{ million adults >18 years}} = 0.298 = 29.8\%$$

In 1995, 298 of every 1000 Americans aged 18 years or older (29.8%) were current smokers.

Source: Substance Abuse and Mental Health Services Administration, US Department of Health and Human Services. *Preliminary Estimates From the 1995 National Household Survey on Drug Abuse*. Rockville, Md: Substance Abuse and Mental Health Services Administration, US Department of Health and Human Services; 1995.

Key Concepts 3:

Absolute, Relative, and Attributable Risk

The **absolute risk** is the incidence of the target condition in the population with the risk factor.

EXAMPLE:

Of 1000 men who smoke, 172 will develop lung cancer. The absolute risk for lung cancer in men who smoke is $172/1000 = 0.172 = 17.2\%$.

The **relative risk ratio** is the ratio of the incidence of disease among persons with the risk factor to the incidence of disease among those without the risk factor. Relative risk does not measure the probability that any given person with the risk factor will develop the condition.

EXAMPLE:

The risk of death from lung cancer in men who smoke is 341.3 deaths per 100,000 person-years. The risk of death from lung cancer in men who do not smoke is 14.7 deaths per 100,000 person-years. The relative risk of death from lung cancer in men who smoke is

$$\frac{341.3 \text{ deaths from lung cancer per } 100,000 \text{ person-years}}{14.7 \text{ deaths from lung cancer per } 100,000 \text{ person-years}} = 23.2$$

Men who smoke have 23.2 times the risk of dying of lung cancer of men who do not smoke.

The **attributable risk** measures the amount of risk that can be attributed to one particular risk factor and is calculated by subtracting the incidence rate of the population without the factor from the incidence rate among the population with the factor. The excess amount experienced by the exposed group represents the attributable risk.

EXAMPLE:

The attributable risk for death from lung cancer that is associated with smoking is

$$\begin{array}{r} 341.3 \text{ deaths from lung cancer per } 100,000 \text{ person-years} \\ - 14.7 \text{ deaths from lung cancer per } 100,000 \text{ person-years} \\ \hline 326.6 \end{array}$$

Of the 341.3 lung cancers occurring in smokers, 326.6 can be attributed to smoking.

Source: Office on Smoking and Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention; US Department of Health and Human Services.

Appendix C: Computerized Health Maintenance Tracking System*

The necessary (N) and optional (O) components of a computerized system are presented. The system is organized in three sections: (1) inputs; (2) information management system; and (3) outputs.

Overview of computer-based preventive reminder system, including summary of necessary components in each section

1. INPUTS	2. INFORMATION MANAGEMENT SYSTEM	3. OUTPUTS
Practice-specific preventive protocol	System linked to demographic data system	Provider reminders
Multiple status codes	Option to track all or selected patients	Patient reminders sent regardless of visit status
Patient-specific alternate frequency option	Identification of primary provider	Summary report of patient compliance
Linkages for external data import	Paper or computer provider interface	Summary report of provider compliance
		Detailed report of patients overdue for specific procedures

A description of the components by each of the three sections follows. **Boldface** indicates component is included in the Figure above.

1. Inputs

1. The system should allow tracking the full spectrum of effective preventive services, including primary and secondary preventive procedures and counseling interventions, for any age range (N).

- A. The system should provide a format into which users can fit their own preventive care protocol or nationally recognized protocols (N). It might be desirable for the system to come initially loaded with a set of nationally recognized guidelines that the user could adopt or modify (O).
- B. The basic procedure criteria are determined by patient age and sex (N).
- C. Protocols based on risk factors other than age or sex, including diagnoses, or specific medication use are desirable (O).
- D. Most procedures are indicated in multiples of yearly intervals; however, a few procedures (eg, childhood immunizations) require the capability of tracking multiple procedures within a given year (N).
- E. It must be possible for the practice to modify the preventive protocol or add new items easily without need for an outside consultant (N).

*Source: *A Report of the American Cancer Society Advisory Group on Preventive Health Care Reminder Systems*, 1995 (Frame P, senior author).

2. Multiple entry codes must be available to inform the provider of the patient's health maintenance status (N). A simple yes or no (procedure either done or not done) alternative is not sufficient to allow providers to understand the patient's health maintenance status. Suggested status options include (1) test done and normal, (2) test done and abnormal, (3) test refused, (4) test not indicated, and (5) test done elsewhere.

- A. The system must be efficient. Provider and clerical data entry time must be minimized, as should the process of creating provider and patient reminders (N).
- B. It must be possible to record procedures done both at the current visit and at other dates (N).
- C. The system should indicate that a test has been ordered but not yet completed (O). For some tests, the system should allow entering the actual test value (O). Entering actual test values is most easily accomplished if the system is part of an electronic record that directly imports laboratory test and radiograph data.
- D. Tracking the follow-up of abnormal results is desirable (O). Such tracking requires that the system recognize abnormal values and the ability to enter additional data at the time of addressing the abnormal result.

3. There should be an alternate frequency option, which allows providers to change the frequency of doing specific procedures for individual patients (N).

- A. It should be possible to cancel all or specific procedures for individual patients (N).

4. External linkages for transferring data files of laboratory test and radiograph results and for remote data entry are desirable, especially if the system is part of an electronic medical record (O).

2. Information Management System

1. The system should run under a commonly used operating system in a language or format for which programming and support are widely available (N).

2. The system should be linked to or capable of exchanging data with the practice billing or other demographic data systems. It could also be part of a more complete electronic medical record (N).

- A. A stand-alone system is less desirable. At a minimum, a stand-alone system needs to be able to receive demographic data by electronic transfer from a preexisting source.

3. It must be possible to set up the system so that health maintenance is tracked for all patients or for only enrolled patients (N). If all patients are tracked, the computer includes them unless specifically excluded by the provider. Tracking only enrolled patients means the computer excludes patients unless specifically included (enrolled) by the provider.

- A. Tracking all patients is the preferred option for most primary care practices; however, the provider will have to cancel health maintenance tracking for inappropriate patients (eg, out-of-town visitors, terminally ill patients, patients who have died, or patients seen while covering for another clinical practice).
- B. Practices tracking only enrolled patients will have fewer problems with inappropriate patient reminders but will risk not reaching infrequently seen patients.

C. The system should be capable of readily selecting active (seen within a defined time period) patients (O).

4. It should be possible to identify the patient's primary provider, a necessary feature for feedback and quality assurance activities (N).

A. Methods of identifying the primary provider in order of preference include (1) external assignment, (2) the provider who has seen the patient for the majority of visits, and (3) the provider with the most recent patient contact.

5. Interface with providers can either be on paper, by computer screen (N), or both. Few practices will have an entirely paperless system.

6. Support and system maintenance services must be available (N).

A. It must be possible periodically to delete or archive older or unneeded data (N).

B. Appropriate security is needed to protect patient confidentiality and system integrity (N).

C. Written instructions describing the installation and operation of the system must be available (N).

D. An archival function is desirable to document generation of provider and patient reminders and patient correspondence (O).

7. The system should have been tested in actual primary care practice situations. It should be possible to observe the system in operation (O).

A. Data should be available describing the costs of installation and operation of the system (N).

3. Outputs

1. A provider reminder should be generated that includes a history of procedures done, when procedures are next due, and the procedure status (normal, abnormal, done elsewhere, etc) (N).

A. It is ideal for this reminder to be generated at each patient visit. If computer printouts are not generated for each visit, reminders can be placed on the chart at predetermined intervals (eg, annually).

B. It should be possible to produce an ad hoc provider reminder for a specific patient at times other than a patient encounter (N).

2. Patient reminders should be sent to all patients in the system regardless of appointment status (N).

A. Patient reminders should inform the patient about overdue procedures (N). A listing of procedures previously done would be desirable (O). Patient reminders should include instructions for contacting the practice if health maintenance is due (N).

B. Notification of actual procedure results might be desirable but requires additional data entry or direct importing of external data (O).

C. Additional patient reminders should be obtainable on an ad hoc basis or at the time of patient visits (O).

- 3. The following reports should be available for provider feedback, quality assurance, and patient follow-up:**
- A. A summary report should show patient compliance, by procedure, with the health maintenance protocol. This report should include compliance of all patients enrolled in the system by provider or office or both for each procedure (N). It tells the practice what percentage of the practice population is overdue for each specific procedure.**
 - B. A summary report should show provider compliance by procedure, similar to 3A, except only patients currently active are included (N). Thus, it includes only patients actually seen by the provider.**
 - C. A detail report listing all patients overdue for a particular procedure by provider or office should include the patient's address and telephone number to allow easy follow-up (N).**
 - D. A detailed report should list patients with a currently abnormal procedure. This report is applicable only if the system has provisions for follow-up and tracking of abnormal results (O).

*Source: *A Report of the American Cancer Society Advisory Group on Preventive Health Care Reminder Systems*, 1995 (Frame P, senior author).

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