

Seminars in Health Care Delivery

Opportunities for Health Promotion and Disease Prevention in the Clinical Setting

J. MICHAEL MCGINNIS, MD, *Washington, DC*, and MARGARET A. HAMBURG, MD, *Bethesda, Maryland*

Advances in medicine offer unprecedented opportunities to improve health. New diagnostic, care, and treatment approaches are having a tremendous impact; yet, the leading causes of morbidity and mortality in the United States are intimately linked to preventable factors such as smoking, improper nutrition, alcohol misuse, lack of exercise, and maladaptive behaviors. Compelling evidence indicates that reducing risk factors yields substantial overall health benefits and saves lives. Prevention efforts can be applied effectively at many points in a disease process, and clinical medicine has a significant role. Nonetheless, a number of barriers may interfere. These include physician education and attitudes; patient education, expectations, and motivations; and aspects of the health care delivery system itself, such as access and reimbursement. The situation has been complicated by the apparent lack of consensus on the appropriate frequency and scope of such activities.

This feature appears regularly in THE WESTERN JOURNAL OF MEDICINE. It is intended to cover recent developments in a broad range of issues that will have an impact—either directly or indirectly—on clinical practice. Occasionally the seminars may include informed speculation about likely future developments.

STEVEN A. SCHROEDER, MD
Series' Editor

Medicine today has an unprecedented capability to improve health. Scientific advances, with new insights into human biology and disease, present exciting new prospects through both therapeutic and preventive interventions. The readiness of physicians to make use of the full range of these opportunities on behalf of their patients is less certain. Many of today's professional and economic incentives encourage physicians to place an increasing emphasis on technologic approaches to cure or alleviate disease. This perspective is fostered by tertiary medical care and medical education centers and reinforced by media reports of the miracles of modern medicine. Wondrous though progress has been, society has suffered some consequences of too narrow a focus along this dimension—consequences in the form of illness and death that ought to be entirely preventable.

Despite the vast resources—scientific, economic, and human—devoted to health care, it is a disturbing fact that close to 60% of all deaths that occur annually in the United States are premature, and an equivalently high proportion of the disability and illness could be avoided.¹ Cardiovascular disease, cancer, stroke, and injuries—the leading causes of adult death in this country, accounting for nearly 75% of deaths annually—are intimately linked to preventable risk factors (Table 1).^{2,3} Many of these factors, including smoking, improper nutrition, alcohol misuse, overweight,

lack of exercise, and maladaptive responses to stressful experience, can be modified by changes in personal behavior or social choices.⁴ Correspondingly, new health concerns revolve around the impact of behavior and life-style on disease and how preventive measures can be effectively applied.

In fact, we are in the midst of a major transformation in the perception of health and disease. New challenges emerge for the practice of medicine as the traditional roles of physicians, hospitals, and health care settings are broadened. Concerns related to prevention, screening, and behavioral change to reduce health risk factors have not previously been at the center of practitioners' attention but are rapidly gaining in importance.

Potential Benefits of Health Promotion and Disease Prevention

There is compelling evidence that intervention to decrease risk factors yields substantial health benefits and saves lives. For example, a recent assessment by the Carter Center of Emory University (Atlanta) estimated that about 45% of cardiovascular disease deaths, 20% of cancer deaths, and more than 50% of the disabling complications of diabetes mellitus could be prevented through an improved and broadened application of existing preventive measures and risk-reducing strategies.² According to another evaluation, focusing on fewer than ten risk factors could potentially

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From the Office of Disease Prevention and Health Promotion, US Department of Health and Human Services (DHHS), Washington, DC (Dr McGinnis), and the National Institute of Allergy and Infectious Diseases, National Institutes of Health, US DHHS, Bethesda, Md (Dr Hamburg).

Reprint requests to J. Michael McGinnis, MD, Deputy Assistant Secretary for Health, Office of Disease Prevention and Health Promotion, US Department of Health and Human Services, 330 C St SW, Room 2132, Washington, DC 20201.

ABBREVIATIONS USED IN TEXT

AIDS = acquired immunodeficiency syndrome
 CDC = Centers for Disease Control
 HIV = human immunodeficiency virus
 LDL = low-density lipoprotein

prevent between 40% and 70% of all premature deaths, a third of cases of acute disability, and two thirds of those of chronic disability.⁵ While physicians cannot be held accountable for the life-style choices of a patient population, it is clear that a number of potentially life-saving opportunities are now being missed.

Clinical medicine has traditionally taught and practiced an organ-system approach to disease. Yet, heightened awareness and improved identification of risk factors contributing to the development or progression of disease may ultimately prove more valuable in attempts to combat disease. It may be helpful to briefly summarize the contributions of selected risk factors to mortality and morbidity in the country.

Tobacco Use

Cigarette smoking is the single most important preventable health problem in the United States today.⁶ All told, smoking is the major cause of diseases that kill at least 350,000 Americans each year.³ Authorities estimate that tobacco use contributes to 30% of cardiovascular disease deaths, 30% of cancer deaths, and 30% of respiratory disease deaths. More specifically, smoking is a powerful risk factor for atherosclerosis, coronary artery disease, peripheral vascular disease, and stroke.⁶ Moderate smokers have a tenfold increased likelihood of lung cancer as compared with nonsmokers, while the figures for heavy smokers are even higher.⁷ Smoking is associated with at least 50% of the cancers of the mouth, larynx, and esophagus and roughly 30% of kidney and pancreatic cancer.⁸ It is a major cause of chronic lung disease, accounting for 80% to 90% of cases of chronic obstructive lung disease. Smokers in whom even

common respiratory tract infections develop have more difficulty recovering as compared with nonsmokers.⁹

New research has shown that the dangers of smoking extend to include those nonsmokers passively exposed to the sidestream smoke from the cigarettes of others. Studies have shown that nonsmoking spouses of smokers suffer about two-fold increased rates of lung cancer as compared with spouses of nonsmokers. Children who live with adult smokers appear to be at risk for more frequent respiratory tract illnesses.¹⁰

Diet and Nutrition

Diet and nutrition are clearly essential ingredients in good health, although the aggregate contribution of appropriate nutrition to promoting health and preventing disease is difficult to measure. Poor dietary patterns play a role in many of the leading causes of death and disease in this country, including cardiovascular disease, cancer, stroke, diabetes, and cirrhosis.

The most distorted dietary practice among Americans is the disproportionate emphasis on dietary fats and cholesterol—at the expense of complex carbohydrates and fiber. Over the past several decades, experimental and epidemiologic evidence has accumulated to support the role of elevated serum cholesterol levels in the development of cardiovascular disease.¹¹ In clinical trials there has been a decrease in disease with a reduction of serum cholesterol levels, achieved through both pharmacologic and dietary interventions.¹¹ Work is now underway to assess the extent to which reducing cholesterol levels actually may lead to a reversal of coronary artery disease.¹²

The Lipid Research Clinics Coronary Primary Prevention Trial, a controlled clinical trial using placebo versus a lipid-lowering resin cholestyramine, looked at middle-aged men with primary hypercholesterolemia but without clinical evidence of heart disease. The long-term results reported in 1984 showed that the cholestyramine group had significantly greater reductions in cholesterol levels and a 19% reduction in the risk for coronary artery disease.¹³ Two recently completed, multicenter, randomized, controlled trials indicate that a new type of cholesterol-lowering drug, lovastatin, appears to be more effective in lowering cholesterol levels and better tolerated than cholestyramine.^{14,15} Rather than binding cholesterol, lovastatin acts by inhibiting cholesterol synthesis in the liver, producing a compensatory increase in hepatic low-density-lipoprotein (LDL) receptors and an accompanying increased uptake of circulating LDL. The overall effect is that of lowering plasma LDL concentrations with a decrease in total plasma cholesterol. High-density-lipoprotein concentrations appear to increase or remain unchanged.^{14,15}

Long-term studies to show the effect of the use of lovastatin on coronary artery disease have not been done. Because the drug is at least as effective in lowering cholesterol as cholestyramine, however, the use of lovastatin can be anticipated to show significant reductions in coronary artery disease mortality rates.

Despite the effectiveness of cholesterol-lowering medications, these should not replace a low-fat diet as the initial and preeminent approach to reducing cholesterol levels. Several recent clinical trials have shown that modifying dietary habits can reduce high cholesterol levels and therefore the risk for cardiovascular disease.¹³ In addition to being effective, dietary modification avoids the costs, side effects, and

TABLE 1.—5 Leading Causes of Death in the United States and Associated Risk Factors Commonly Encountered in Clinical Practice

<i>Cause of Death*</i>	<i>Risk Factors</i>
Cardiovascular disease . . .	Tobacco use Elevated serum cholesterol High blood pressure Obesity Diabetes mellitus Sedentary life-style
Cancer	Tobacco use Improper diet Alcohol Occupational or environmental exposures
Cerebrovascular disease . .	High blood pressure Tobacco use Elevated serum cholesterol
Accidental injuries	Safety belt noncompliance Alcohol or substance abuse Reckless driving Occupational hazards Stress or fatigue
Chronic lung disease	Tobacco use Occupational or environmental exposures

*Adapted from National Center for Health Statistics.³

compliance problems of long-term drug therapy. A low-fat diet also offers many advantages beyond simply reducing the risk for coronary artery disease.

Dietary factors are implicated in the etiology of various forms of cancer, although the magnitude of the contribution is exceedingly difficult to quantify. Multiple influences are involved, including both possible causal agents such as dietary fat, nitrites, aflatoxins, and polycyclic hydrocarbons, as well as possible protective agents such as vitamins A and E (and their precursors), selenium, and dietary fiber. Following a considerable analysis of available information, Doll and Peto provided an estimate used by the National Cancer Institute that approximately 35% of cancer deaths are related to dietary factors.⁸

Dietary excess, generally reflected in excess fat and calories, is an important and not uncommon contributor to morbidity and mortality. As noted, diets high in saturated fats are associated with increased rates of coronary artery disease and other atherosclerotic diseases, as well as various forms of cancer such as those of breast, colon, and prostate.⁵ At 37% of total calories, dietary fat is consumed in the United States at levels far higher than the 30% recommended by the American Heart Association or the approximately 25% found in the Japanese diet. Additionally, dietary excess contributes to the problem of obesity. An estimated nearly 23% of adult Americans are significantly overweight, defined as 120% or more of ideal weight.¹⁶ Obesity is a contributing risk factor in a range of health problems, notably heart disease, diabetes mellitus, and musculoskeletal conditions.

Dietary deficits also are important to consider, contributing to increased disease susceptibility and decreased resistance, perinatal mortality, low-birth-weight infants, and sterility, to name a few of the associated health problems.⁵

Alcohol

While a large proportion of Americans who drink do so in moderation, an excessive use of alcohol remains an important contributor to avoidable death and disease. Surveys indicate that almost 23% of adults have consumed five or more drinks on an occasion one or more times in the preceding month, with almost one out of seven young adults reporting drinking and driving.¹⁶

Alcohol misuse is estimated to contribute to more than 100,000 deaths annually from a variety of causes. It is implicated in at least 3% of cancers, and excessive consumption is associated with cancers of the mouth, esophagus, larynx, and liver.²

Not surprisingly, the single largest contributor to chronic liver disease is excessive alcohol consumption. Conservative estimates suggest that 60% of cases of cirrhosis in the United States are caused by alcohol abuse, although many experts believe that the proportion is closer to 80% to 90%.²

Alcohol abuse is a considerable risk factor for accidents and injury.¹⁷ The misuse of alcohol is felt to be involved in 40% to 50% of motor vehicle deaths and 10% to 30% of vehicular injuries each year.^{2,17} Alcohol abuse, along with other substance abuse, is estimated to contribute to about 9% of fires, accidents, and violent crimes.⁵

Trauma, Accidents, and Injury

Injuries—intentional and unintentional—represent a major source of death and disability in the United States. Following cardiovascular diseases and cancer, injuries represent the next leading cause of death. Because such injuries

affect a greater proportion of young people than other major health problems, they constitute the most important source of potential years of life lost or premature death. For the age group between 5 and 44, injuries, including accidents, homicides, and suicides, kill more people than all other causes combined.⁵

Motor vehicle accidents account for about half of all fatal unintentional injuries. Common and preventable risk factors linked to motor vehicle trauma and death are not using a seat belt, reckless driving, and alcohol misuse. Properly using seat belts, for example, can prevent deaths and limit injuries in as much as 60% of motor vehicle crashes.^{1,18}

As mentioned, alcohol and substance abuse greatly increase the risk for both accidents and violence-related injuries.

Hypertension

High blood pressure is a risk factor for stroke, myocardial infarction, congestive heart failure, and renal disease. Controlled trials suggest that even a modestly elevated blood pressure increases the risk of cardiovascular, cerebrovascular, and renovascular disease.¹⁹ In one analysis, hypertension was associated with 7% of all deaths.⁵ As clinicians are well aware, significant improvements in blood pressure control have been achieved through both drug therapy and behavioral interventions such as dietary change, weight loss, and exercise.

Exercise

Emerging scientific evidence strongly supports the long-held notion that exercise is beneficial to health in a number of ways, including reducing the risk of cardiovascular disease; enhancing musculoskeletal integrity; improving weight control, hypertension control, and glucose tolerance; and enhancing mood and energy levels.⁴ In one community-based study of cardiovascular disease, physical inactivity was estimated to account for as much as 23% of cardiovascular risk.²⁰ Other studies support the notion that regular exercise can reduce coronary artery disease risk significantly, even when other factors such as elevated cholesterol levels, smoking, and hypertension are controlled.²¹

Nonetheless, in 1985 less than half of the US adult population reported exercising on a regular basis, and only a quarter had done so for five years or more.³ The current best estimate is that only about 10% to 20% of adults participate in exercise required for cardiorespiratory benefit—30 minutes of activity at least three times a week at an intensity requiring 50% maximal oxygen consumption.²²

Stress, Social Isolation, and Bereavement

Stress and how it is dealt with appear to contribute, by as yet poorly understood mechanisms, to health and disease. Immune response and disease resistance are modified by factors related to stress.²³ Social isolation also influences health status. Interestingly, persons who live alone with relatively few social contacts seem to have a risk of mortality from all causes that is two to three times the risk for others. Several studies have also shown that the loss of a spouse exposes the bereaved spouse to a higher risk of death in the year following the death of the spouse.⁴

Although relatively few in number, it can be seen that these risk factors are responsible for a large proportion of mortality, morbidity, and health care expenditures in this country. Moreover, these risk factors generally do not act in

isolation. Rather, they tend to occur together and often act in a synergistic fashion, exacerbating their harmful effects. For example, the additive effects of smoking, elevated cholesterol levels, and hypertension are well documented: smoking doubles the risk for heart disease, while combining smoking with elevated cholesterol or hypertension increases the risk fourfold. Combining all three factors together places a person at eight times greater risk.⁶ Another example is the apparent interaction between alcohol use and smoking in the etiology of certain cancers of the upper gastrointestinal tract, including cancers of the esophagus, pharynx, and larynx.⁵

A large proportion of health problems commonly encountered in clinical practice are associated with these same risk factors.

Acquired Immunodeficiency Syndrome

Clinicians today face a new and growing health challenge, the acquired immunodeficiency syndrome (AIDS). This disease process, caused by infection with the human immunodeficiency virus (HIV), represents one of the most pressing public health problems in this country and around the world. As there is presently no known vaccine or cure for the disease, prevention strategies are the most powerful tools for controlling the spread of HIV infection.²⁴

There is a wide spectrum of HIV infection, ranging from asymptomatic HIV antibody positive to full-blown AIDS. AIDS represents the terminal and, to date, always fatal stage of HIV infection. The predominant modes of HIV transmission are sexual contact with an infected person, infected intravenous equipment, contaminated blood and blood products, and from an infected mother to her infant perinatally.²⁵

The number of persons actually infected with HIV is difficult to determine adequately but has been variously estimated.²⁵ Currently in the United States, roughly 1.5 million people are thought to be infected, although many remain totally without symptoms. Over the period since 1981 when the first cases of the disease were reported to the Centers for Disease Control (CDC) of the United States Public Health Service through the end of December 1987, close to 50,000 of those infected were reported to suffer from AIDS, and almost 28,000 had died.²⁶ Given the estimate that AIDS develops in roughly 20% to 30% of infected persons within five years of infection, it is projected that there will be at least 270,000 cumulative cases of AIDS by 1991.²⁷

The AIDS crisis has focused renewed attention on physicians' multiple roles as scientists, objective clinicians, compassionate care givers, and public health advocates. Physicians and other health care providers have a particularly vital part to play in preventing and controlling HIV infection. Beyond the appropriate care and treatment of those with known AIDS, persons who may be infected need to be identified, counseled, and informed about risks to themselves and others. When patients are seropositive, physicians should counsel them regarding responsible behavior to prevent the spread of HIV, along with health strategies to protect their compromised immune system insofar as possible and the advisability of notifying sexual contacts, past (five to ten years) and present. Those who are not infected need to be made aware of what are high-risk behaviors and how to change their behavior to minimize their risk of infection (Centers for Disease Control, United States Immunization Survey, US Department of Health, Education, and Welfare, unpublished data, 1979).

As the medical profession strives to reduce the burden of illness for this disease and many others, preventive measures and health promotion techniques must receive increased emphasis in the clinical domain.

Levels of Prevention

Prevention strategies are often classified according to where in the natural history of the disease the intervention is made. The concepts of primary, secondary, and tertiary prevention are applied.²⁸ These so-called levels of prevention provide a useful framework to guide how and when meaningful interventions can be made. Complications often do arise, however, because many conditions have multiple etiologic and contributing factors and certain conditions may also be risk factors for other outcomes.

Primary prevention equips healthy persons with the means of preventing the occurrence of disease or disability. Examples of primary interventions include immunizations and general health information, education, and counseling programs about health risk behaviors.

Secondary prevention intercedes to detect asymptomatic or early disease. The goal, at best, is to reverse the disease and, at a minimum, to reduce complications and the progression of disease. Controlling high blood pressure may be the best example of secondary prevention.

Finally, tertiary prevention seeks to control the progress of disease in persons with symptomatic illness or injury. These activities have the potential to effectively reduce the burden of death and disability from chronic conditions.

Across all these levels of prevention, clinical medicine has an important role to play. Most medical professionals are involved predominantly in secondary and tertiary preventive care. The focus is on restoring health after it is lost. On the other hand, in some specialty areas, health maintenance has long been an important part of practice. For example, pediatrics has traditionally had a strong focus on prevention and health promotion. Central components of pediatric care have included immunizations against disease, well-baby-care visits, an emphasis on dietary and behavioral influences on health, and working closely with parents to foster healthy growth and development. Similarly, for several decades now, obstetricians have placed considerable emphasis on careful health monitoring during pregnancy. The encouragement of appropriate health promotion regimens and periodic assessments of maternal and infant health during pregnancy has led to notable declines in perinatal morbidity and mortality.³

There is encouraging evidence that most physicians recognize the importance of health promotion and risk reduction.²⁹ For some, health promotion is equated with a fairly narrow set of activities including immunization and screening for asymptomatic disease, but many physicians are receptive to the notion of providing broader health counseling and preventive services. Nonetheless, clear discrepancies exist between the acknowledged importance of prevention and providing appropriate preventive care.

Poor compliance to preventive care standards and an underemphasis on the role of health promotion have been noted in private practice settings, university-based practices, and among house staff and residents training in primary care. A number of studies have documented a low use of preventive procedures by physicians, both by self-report and by examining patterns of performance in practice.³⁰⁻³³ Interestingly, one recent study indicated a tendency for some physicians to

overestimate the amount of preventive care that they actually provided.³²

Several sources indicate that the delivery of even the most fundamental preventive services falls short of recommended practices. Data reported from the CDC indicated that perhaps as many as half to three quarters of 1-year-old children had not received a complete set of immunizations.³¹ This general finding was supported by a study that documented that only 45% of infants received appropriate immunization for diphtheria, pertussis, tetanus, and polio (CDC, unpublished data, 1979).

Barriers to Implementation

What, then, are some of the barriers that interfere with the appropriate provision of health care services? Perhaps more than other aspects of medicine, health promotion and disease prevention rely on the coordinated participation of patient and physician, as well as a health care system capable of supporting that effort. Obstacles can occur at many places along the spectrum.

Physician Barriers

Many factors may influence physicians' attitudes toward prevention and health promotion, leading to the noted failure to provide adequate preventive services. Many of the reasons are readily apparent to practitioners. Medical training and practice are traditionally oriented toward recognizing and treating disease. Medical education affords little attention to preventive health practices. In many instances, physicians may not be sufficiently knowledgeable about specific health practices, potential benefits, or existing standards for preventive care. This problem is exacerbated by an apparent lack of consensus on recommendations or disagreements with indications for screening. Even with respect to preventive services of acknowledged value, physicians may cite lack of time, forgetfulness, or inadequate facilities as reasons for not performing these activities.^{32,34}

Many physicians feel uncomfortable in dealing with health problems that are primarily behavior related such as smoking or weight reduction.³⁵ Health education and counseling may be perceived as peripheral to the practice of medicine, especially because they do not require the services of a trained physician. Furthermore, doubts about the effectiveness of such counseling may often lead to silence about important health concerns. For example, several studies have found that only 25% to 30% of current smokers report receiving a physician's advice to quit, although a national poll indicates that 70% of moderate to heavy smokers say they would quit if their physicians urged them to do so.⁹ It has been suggested that physicians who recommend cessation to patients who smoke can increase 12-month smoking cessation rates from 1% to 5%.⁹ Behavior change is a complex, difficult, and often slow process. The maintenance required for optimal outcomes is even harder to achieve. Even with an intensive commitment by physicians to foster prevention and health promotion, the reward principally must take the form of anticipated reductions in morbidity and mortality—not the more immediate evidence of benefit and the gratification experienced with diagnosis, treatment, and cure.

Patient Barriers

A range of factors may influence a patient in seeking or accepting health promotion and preventive services. Patients

may lack knowledge of the options and potential benefits entailed in preventive care. They may be reluctant to receive certain screening and assessments based on denial or fears of discovering a dreaded disease. Reluctance to receive a procedure may also arise from concerns of discomfort, embarrassment, or inconvenience. Patients may be aware of poor health habits but resent interference by their physicians, or they may be reluctant, uncooperative, or feel unable to undertake difficult behavioral changes. Many patients seeking a physician's care simply want and expect care and treatment for acute conditions, not behavioral advice.

Health Care Delivery System

It is often suggested that the major obstacle to optimally providing preventive services derives from the organization of the health care delivery system. Medical insurance emphasizes "acute care" over prevention and generally reimburses poorly or not at all for basic forms of prevention such as counseling, screening, and routine examination. Third-party payers are beginning to explore reimbursement mechanisms for preventive services as an approach to improving client health and reducing costs. Project INSURE, for example, is presently evaluating a health care delivery system in which primary care physicians are reimbursed for cognitive services such as counseling and education.³⁶ A recently published study of enrollees in the Rand Health Insurance Experiment indicated, however, that an adequate reimbursement for preventive services did not ensure that physicians provided the recommended services.³⁰ This is reinforced by experience in other countries such as Great Britain, where despite minimal or no charge for preventive services, they are in fact delivered at far lower rates than in the United States.³⁷

Although payment barriers clearly are important, there are many other disincentives to preventive care within the health care system.³⁴ Generally, physical access to services is no longer a major obstacle for low income and minority populations in this country. The types of services used by these populations, however, are not the types most conducive to the delivery of preventive services. Studies have indicated a twofold to threefold increased likelihood that such persons will use hospital and emergency department settings as their primary source of care rather than comprehensive regular and continuing care settings.³⁸ For this reason and perhaps others, minorities are less likely to have diagnostic tests for various health problems, particularly those related to cancer.

In addition to problems of economic and physical access to preventive services, a major obstacle exists simply in the traditional structure of the medical care encounter. The reality of modern practice is that physician-patient visits are time limited and problem oriented. As noted earlier, expectations generally are held by both physicians and patients that the medical encounter will focus on the acute or chronic problem that prompted the visit. Attempts to modify potentially health-damaging behavior or identify evidence of asymptomatic disease may have greater long-term effects in terms of a patient's health outcome, but expressed satisfaction from the visit may be lower for both patient and physician. Trends suggest, however, that the perception of the health care system as the source of disease treatment and care has been expanding to include concepts of health promotion and disease prevention.³⁹

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