The University of Maryland Experience in Integrating Preventive Medicine into the Clinical Medicine Curriculum

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The following faculty members of the University of Maryland School of Medicine have taught in the clinical preventive medicine course and contributed to its success: Alan Adelman, MD, Joseph Aisner, MD, Paul Connors, MD, JD, Brad Cushing, MD, Mel Daly, MD, Pat Dischinger, PhD, Kevin Ferentz, MD, Gerald Felsenthal, MD, Eric Fine, MD, Marc Hochberg, MD, MPH, Gayle Hopper, MD, Anita Lasswell, RD, MS, Anita Lally-Cassidy, MD, Jay Magaziner, PhD, MS Hyg, Robert McCarter, ScD, J. Glenn Morris, MD, MPH, Judy Rubin, MD, MPH, Jean Scott, DrPH, Leonard Scherlis, MD, Carl Soderstrom, MD, Barry Stein, MD, Paul Stolley, MD, MPH, Tom Strickland, MD, PhD, George Taler, MD, Robin Whitlock, MDiv, Theodore Woodward, MD, and James Zimmerly, MD, JD.

Dr. Rubin made significant contributions to the development of the course. James Hudson, MD, Acting Chairman of the Department of Epidemiology and Preventive Medicine until July 1991, and Paul Stolley, MD, MPH, Chairman since that time, provided strong support for efforts to modify the course. Steven Barkley and the University of Maryland School of Medicine's Office of Medical Education conducted the review of the medical student evaluations of the clinical preventive medicine course. Medical students from the classes of 1991, 1992, and 1993 provided many insights on how to improve the course. Susan Wozenski, MPH, JD, of the Maryland Public Health Association's Board of Directors, and Leonard Scherlis, MD, made helpful suggestions for modifying the manuscript.

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Synopsis

Lifestyle risk factors play a major role in the etiology of premature mortality, morbidity, and disability in the United States. Numerous professional groups as well as the Surgeon General of the Public Health Service have recommended that increased attention be devoted to training medical students and physicians to improve their knowledge and skills in health promotion and disease prevention. Such training is critical for attaining many of the "Healthy People 2000" objectives.

For a variety of reasons, however, most medical schools have had difficulty in successfully integrating preventive medicine into their clinical curriculums. This article describes the critical elements that allowed the faculty at the University of Maryland School of Medicine to accomplish this goal through its fourth year clinical preventive medicine course. The strategies employed in this course may serve as a model for other institutions to achieve the integration of preventive medicine into their clinical curriculums.

MORE THAN A DECADE AGO, public health experts assessed the contributions of various factors to premature mortality in the United States (*1*). The contribution assigned to these factors were as follows:

- lifestyle ..... 50 percent
- environment ..... 20 percent
- biology ..... 20 percent
- health care organization ..... 10 percent

In 1990, the Department of Health and Human Services (DHHS) estimated that as much as 70 percent of premature mortality may be attributable to lifestyle (*2*).

The U.S. Preventive Services Task Force, composed of experts in medicine, clinical preventive medicine, public health, and health care research, reached a similar conclusion (*3*). They indicated that there would be a far greater effect on reducing premature death and disability if clinicians focused

more attention on helping patients improve their lifestyles and less on performing laboratory and other diagnostic tests.

Implicitly supporting this perspective, numerous individuals and organizations from the academic, governmental, and private sectors have recommended that medical schools increase the amount of time devoted to teaching preventive medicine. For example, in "Report of the Project Panel on the General Professional Education of the Physician," the Association of American Medical Colleges recommended that medical schools refocus their curriculums to place greater emphasis on health promotion and disease prevention (*4*). Recently, the Council on Scientific Affairs of the American Medical Association urged increased medical student and physician training in this area (*5*). These groups have encouraged physicians to devote more time to clinical preventive services and to serve as both educators and role models for their patients.

Most medical schools have responded slowly, if at all, to these recommendations. As a result, physicians in the United States are ill-prepared to provide many clinical preventive services. Although some clinical courses touch upon a variety of topics in preventive medicine, their primary focus is on the diagnosis and treatment of illness. Medical schools generally devote little curriculum time specifically to preventive medicine. A 1990 survey by the Association of Teachers of Preventive Medicine found that most of the 83 responding schools devoted fewer than 30 curriculum hours to preventive medicine, almost none of it occurring during the clinical years (*6*). Consequently, medical students often perceive this topic to be far less important than more traditional clinical subjects such as medicine and surgery.

Successful models for such training have been lacking. A recent article commented on the pervasive presence of a "Medical Student Myopia Syndrome," characterized by boredom, inattention, and hostility towards preventive medicine courses on the part of medical students (*7*). The author noted that faculty are often disillusioned by their inability to excite student interest in this area and recommends finding new strategies to remedy this situation.

Until July 1990, the attitudes of students and faculty at the University of Maryland School of Medicine (UMSM) were similar. Medical students frequently complained about the required fourth-year course in clinical preventive medicine (CPM) taught by the Department of Epidemiology and Preventive Medicine (DEPM). The course was not closely linked with the school's more traditional clinical courses. Student attendance at class sessions was generally low, at times falling below 20 percent. Faculty were discouraged by the lack of student interest. Due to these problems, the UMSM's Curriculum Committee seriously considered eliminating the course.

In response to this challenge, the DEPM restructured the course. This article delineates the critical elements that contributed to attaining positive outcomes on the part of both students and faculty. It also assesses the relevance of the UMSM experience to other institutions as well as the significance of this issue to the national objectives in health promotion and disease prevention.

Clinical Preventive Medicine Course Content

- Health risk appraisal[1]
- Clinical preventive medicine guidelines
- Preventive cardiology and oncology: nutrition[1]
- Preventive cardiology and oncology: smoking
- Preventive cardiology: high blood pressure and exercise
- Sex hormones, cardiovascular disease, and cancer
- Nutrition assessment and counseling
- Cancer screening
- Management of diabetes
- Stress, social support, and health
- Accident and injury prevention
- Prevention of osteoporosis
- Prevention of musculoskeletal disorders
- Preventive medicine for children and adolescents
- Primary, secondary, and tertiary prevention for the elderly
- Infectious disease control
- Public health aspects of AIDS
- Occupational medicine[1]
- Interpreting the medical literature
- Use of computers in medicine[1]
- Health care policy[1]
- Ethical issues facing the practitioner
- Prevention of medico-legal problems

[1] Includes computer exercises.

Strategies for Attaining Success

Four goals were established for the restructured clinical preventive medicine course: (*a*) to increase students' knowledge of clinical preventive medicine, (*b*) to make the course content personally relevant to the medical students, (*c*) to enhance the clinical relevance of the course, and (*d*) to be sufficiently

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successful in meeting the goals stated previously that the time allocated to CPM in the curriculum would be preserved and, if possible, increased. As described subsequently, eight strategies were used to achieve these goals.

Focusing the course content. The course now focuses primarily on the leading causes of mortality, morbidity, and disability in the United States and what practitioners and patients can do to prevent them. The topics for the sessions are listed in the box on page 333. Specific course objectives are distributed to all students at the outset of the course (see box on page 335). The format of the sessions ranges from primarily lecture to primarily discussion. All instructors strive for active student participation, regardless of format.

The fourth-year students take the 8-week course in 5 rotations with an average of 30 students each. Each rotation begins with 2 full days devoted to addressing key concepts in prevention for outpatient clinical practice, followed by twice weekly afternoon sessions which cover other important subjects. The course concentrates mainly on strategies for health promotion and disease prevention that are appropriate for nonelderly adults. However, it also reviews those preventive services and health care practices that reduce the likelihood of becoming ill for children and for the elderly.

The course is designed to provide students with the knowledge and skills needed to improve the health of their patients, the members of the communities in which they live, and themselves. It builds on the foundation set by the DEPM's first-year course in biostatistics and second-year courses in epidemiology and clinical research methods, organizational aspects of the health care system, and occupational and environmental medicine. The predominant role of lifestyle factors in the etiology of premature mortality is discussed with the students and contrasted with the modest roles of health care organization, biology, and the environment.

The framework for this course derives from two landmark documents: "Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention" (*1*) and "Healthy People 2000" (*8*). The "Guide to Clinical Preventive Services," written by the U.S. Preventive Services Task Force, serves as the required text for the course (*3*). This reference provides an excellent assessment of the effectiveness of a large variety of screening tests and interventions aimed at disease prevention. It has been recommended by the Association of Teachers of Preventive Medicine as an important resource for medical education (*9,10*).

The major studies that identify risk factors for the leading causes of death are reviewed, as are the important clinical trials and community-based intervention studies aimed at preventing these diseases. National guidelines for risk factor identification and management are presented in detail, and copies of them are distributed (*11–13*). The advantages, disadvantages, and components of both high-risk and population-based strategies for disease prevention are discussed (*14,15*). The poor performance of physicians in assisting their patients in lifestyle modification and the reasons for this inadequacy are analyzed (*16–21*). Students are taught how to counsel patients to modify lifestyle behaviors such as smoking and unhealthy nutrition and are given useful patient education materials. The roles of primary, secondary, and tertiary prevention are reviewed for diseases such as coronary heart disease and diabetes.

At the request of students, a session has been added addressing the quality of studies reported in the medical literature. Another session demonstrates how computers can be used to assist practitioners both in clinical preventive medicine as well as other areas of medicine. Major issues in health care policy (for example, practice guidelines, assessment of clinical effectiveness and outcomes, reimbursement, problems of the under- and uninsured) and possible solutions are reviewed. Both an ethicist and a clinician discuss ethics; they emphasize the importance of ethical conduct. A physician attorney presents strategies to improve the quality of medical care and to prevent malpractice.

Clinical Preventive Medicine Course Objectives

The student will:

1. Be able to perform and interpret a health risk appraisal.
2. Understand the strengths and limitations of health risk appraisals.
3. Understand the advantages and disadvantages of high-risk and population-based approaches to disease prevention.
4. Be familiar with the scientific evidence linking various factors to the risk of developing heart disease, cancer, and stroke.
5. Be familiar with the evidence linking reduction of risk factors for heart disease, cancer, and stroke to reduced incidence and mortality of these diseases.
6. Be familiar with current national guidelines concerning diet, high blood cholesterol, high blood pressure, smoking, and exercise.
7. Understand the strengths and limitations of dietary assessment methods.
8. Be able to counsel patients on dietary modification to reduce risks.
9. Be familiar with the common barriers to dietary adherence and be able to help patients surmount these barriers and modify their eating habits.
10. Be able to develop an individualized plan to help a patient quit smoking.
11. Understand the effects of stress and limited social support on health status and be able to assist patients in reducing these effects.
12. Understand the epidemiology of the major causes of accidental death and injury and the role of the physician in preventing such injuries.
13. Be familiar with preventive medicine recommendations for a pediatric population and be capable of carrying them out in a practice setting.
14. Understand the distinction between primary, secondary, and tertiary prevention and be able to give examples as applied to the elderly.
15. Be familiar with the physical, mental, and functional changes that often accompany old age.
16. Be familiar with the public health system for controlling communicable diseases and the related reporting requirements and procedures.
17. Understand the causes of osteoporosis, osteoarthritis, and other musculoskeletal problems and strategies which may help prevent them.
18. Be familiar with the epidemiology of AIDS in Maryland and public health efforts to control the disease.
19. Understand the uses of computers in medical practice.
20. Be familiar with current trends in health care delivery.
21. Be knowledgeable about the major reasons for and concerns about the rising costs of health care and possible remedies.
22. Be able to perform comparative analyses from Maryland data on individual hospitals concerning mortality, lengths of stay, and costs.
23. Be aware of the major regulatory and legislative developments that will affect the practice of medicine.
24. Be able to apply the fundamental principles of ethics that govern medical practice and health care policy.
25. Understand some of the major causes of malpractice and effective means of preventing their occurrence.

Personalizing the course material. In an effort to make the course material more personally relevant, several different strategies are used. Most importantly, the small class size allows for substantial interaction between faculty and students.

Five techniques are used to make control of risk factors meaningful to the students. First, students conduct two different health hazard appraisals on themselves as a computer exercise, one written by the Centers for Disease Control and the other by the senior author in collaboration with Susan Wozenski, MPH, JD, of the Maryland Public Health Association's Board of Directors. The first assesses the student's risk over the next 10 years and the second assesses the student's lifetime risks.

Second, they are encouraged to have their total blood cholesterol, HDL cholesterol, and triglycerides measured without charge at the outset of the course. Approximately 80 percent take advantage of this opportunity. Students also can have their total blood cholesterol measured at the end of the course.

Third, students perform a computerized assessment of their own diets which analyzes dietary fat, saturated fat, cholesterol, fiber, and calories. Fourth, they are shown data on the increasing prevalence of risk factors as the population ages, such as elevated blood cholesterol levels, high blood pressure, and physical inactivity, to emphasize the importance of taking early steps to prevent

their occurrence (*22–24*). Fifth, students are shown data indicating that there is no clear threshold at which risk begins and that lower levels generally are associated with reduced risk.

Students are strongly urged to modify unhealthy lifestyle behaviors identified through these techniques. More than 80 percent have at least one such behavior. Most common recommendations include consuming a healthy diet, exercising regularly, moderating alcohol consumption, and reducing stress.

Aligning the course with the ambulatory medicine curriculum. In the 8-week ambulatory medicine rotation, which occurs during the same time block as clinical preventive medicine, students practice outpatient internal medicine, family medicine, or pediatrics under the guidance of faculty preceptors in a variety of primary care sites (for example, private office-based and hospital-based). Their preceptors focus largely on building students' skills in providing outpatient medical care.

An effective, standardized curriculum in clinical preventive medicine that focused on improving their knowledge, attitudes, skills, and practice behaviors concerning health promotion and disease prevention was therefore needed to complement the students' clinical training. To enlist the support of the clinical preceptors for the restructured CPM course, the course directors for the clinical preventive medicine and ambulatory medicine courses visited each training site and discussed the changes being made and their desire to enhance the integration of the sites' clinical activities and preventive medicine.

Empowering the students. In July 1991, a project requirement was instituted for the CPM course aimed at further integrating that course with the ambulatory medicine course. The project required students to conduct chart audits to assess how well a particular clinical preventive medicine guideline was being implemented in their ambulatory care practice setting. Students were to write a paper summarizing their findings and give an oral presentation at their clinical site.

The level of enthusiasm for the project among both the students and the ambulatory preceptors was quite varied. Three major concerns were raised: (*a*) the difficulty of such an undertaking, (*b*) the time that would be needed to complete it, and (*c*) its questionable relevance to clinical practice.

It became clear that further involvement by students in the development of ideas for the project would enable them to have a greater sense of "ownership." As a result, the project was made optional for that academic year, and it could be conducted by those who were interested in receiving an honors grade. The students then formed task forces to design a series of options for future projects. One group developed a self-administered, anonymous questionnaire to assess how frequently students carry out a variety of recommended preventive practices with their ambulatory patients; all students now complete this survey at the end of each rotation. Prior to their becoming senior medical students, the third-year class was asked to provide additional input on the projects; as a result, several new options were added.

Selecting appropriate faculty. Faculty members have been chosen based on their expertise in a particular topic and their effectiveness as teachers. They include faculty members from the previous preventive medicine course and additional new instructors. Faculty members are expected to base their presentations on a review of the scientific evidence on their topic. They also are asked to present practical information that will assist students in controlling risk factors in clinical practice. If a faculty member does not follow these guidelines, another is chosen as a replacement.

The use of faculty from the Departments of Medicine, Family Medicine, and Surgery has been expanded both because of their expertise and to emphasize the clinical relevance of this material. About one-half of the clinical preventive medicine course faculty is from departments other than the DEPM. Approximately 60 percent are currently active and 20 percent were formerly active health care practitioners.

Developing an effective mechanism to evaluate students. Many medical students previously stated that they knew most of the course material prior to enrollment. Although the faculty knew that this material was not covered elsewhere in the curriculum, they believed that it was important to acquire data to assess the students' baseline level of knowledge of the essential information needed to attain the course objectives listed in the box on page 000. To accomplish this, a 70-question, multiple-choice pretest was developed, which is administered on the first day of the course. After taking the pretest, students typically acknowledge both the importance of the questions and their lack of knowledge of the answers.

A posttest is given at the end of the course. For the first 2 years, most of the questions from the pretest were included on the posttest, with 30 new questions. Beginning in July 1992, the posttest was changed to a combination of short answers and essays. After grading the examinations, the course director sends each student a letter listing the class mean, range, and his or her score on the tests.

Utilizing student and faculty course evaluations. Anonymous student course evaluations are routinely collected at the end of the course. Students rate each presenter and the overall course as excellent, good, fair, or poor, and provide specific comments. Approximately 90 percent of the students complete the forms at the end of each rotation.

The information pertaining to each faculty participant, the range of faculty ratings, and the overall course comments are sent to each instructor following each rotation. In addition, either the course director or one of the three assistant course directors attends each session for the rotation which they supervise and provides feedback to the faculty. Information from the student and faculty evaluations assists in identifying problems in the quality of the presentations and the need for modifications.

Empowering the course director. To achieve this restructuring of the course, it was clear that the course director had to be given the necessary authority to make changes. The department chairman did this, appointing as course director a physician with experience in a variety of areas of preventive medicine at the clinical, community, and policy-making levels.

The course director and assistant course directors have been allowed time to attend all class sessions in their rotations. This commitment lends the course coherence and continuity. It also enables clarification of inconsistencies among faculty presentations. Through this process, the course director has been able to recommend modifications to ensure that the course maintains a consistently high quality.

Outcomes

Five positive outcomes occurred as a result of the changes noted previously. First, substantial improvements in students' knowledge concerning preventive medicine have been demonstrated. Of the first 300 students taking the pretest, none passed. The mean score was 49 percent, with a range of 25 percent to 61 percent. All but three students passed the posttest; the mean score was 85 percent with a range of 67 percent to 97 percent. Students score well above the national mean on the preventive medicine section of the national board examination.

Second, student responses to the survey regarding their practice habits in ambulatory medicine indicate that the vast majority are performing recommended prevention counseling and tests for most of their patients. They indicate that they counsel their outpatients as appropriate in such diverse areas as nutrition, smoking, exercise, and stress.

Third, students' evaluations of the faculty and of the overall course have improved substantially during the past 2 years. Recent comments include "very useful and informative course, one of the most important in medical school," "most up-to-date class I've had in a long time," and "the amount of time devoted to this subject should be increased." Almost all students indicate that the course meets its stated objectives. Class attendance now averages 80 percent, a significant improvement.

Fourth, UMSM faculty members now perceive the course to be well-taught and relevant. Faculty

Options for Student Projects

1. Critique one of the current guidelines on which new evidence has been published since the original guideline was developed and provide recommendations concerning how it should be modified.
2. Select a topic in clinical preventive medicine for which a guideline has not yet been written and develop a guideline for this topic.
3. Critique seminal papers on a particular topic in Clinical Preventive Medicine.
4. Design a flowsheet for preventive health services to be used in the ambulatory setting and provide your rationale for the choices.
5. Conduct a survey of ambulatory patients to assess their level of compliance with certain clinical preventive medicine practices and reasons for compliance or noncompliance.
6. Design your own project on a topic in clinical preventive medicine.
7. Honors option: perform an audit on 50–100 charts at your clinical site in which you assess physician practices concerning one or more clinical preventive medicine guidelines. Write a report which summarizes your findings and provides recommendations.

from both the Department of Epidemiology and Preventive Medicine and other departments are enthusiastic about teaching in the course. Most modify their presentations for each rotation to keep students apprised of new research and clinical applications. Course faculty from other departments have also shown interest in gaining secondary appointments in the DEPM.

Fifth, the goal of maintaining and expanding the course and enhancing its integration with clinical medicine has been achieved. The clinical preventive medicine and the ambulatory medicine course directors recommended to the Curriculum Committee that the two courses be combined and renamed ambulatory and clinical preventive medicine effective July 1992. The recommendation was unanimously approved in November 1991. Clinical preventive medicine has been given 25 percent of the course time, the amount of time devoted to this subject having been doubled. The DEPM was also offered a seat on the UMSM Curriculum Committee for the first time.

Ambulatory and clinical preventive medicine now has one course director with overall responsibility for the course and a course co-director with primary responsibility for the CPM component. These persons work together to ensure full coordination of the course. One-third of the course grade is determined by the clinical preventive medicine faculty and two-thirds of the grade is determined by the ambulatory medicine faculty.

Students choose from among six options for a required student project (see box on page 337). They have been approaching the project very seriously and writing papers that show considerable sophistication. They also present the results of their paper to their ambulatory site preceptors. Feedback from the clinical preceptors has been very positive.

Discussion

In 1990, the DHHS released detailed national health promotion and disease prevention objectives for the year 2000 (*8*). "Healthy People 2000" notes the critical importance of improving access to and increasing the use of clinical preventive services for attaining many of the national objectives. It has been almost 15 years since the Surgeon General first made similar recommendations (*1*). Yet, limited preventive medicine training is provided to most medical students and residents. It is not surprising, therefore, that numerous articles over the past decade have reported that, while physicians generally believe in the importance of counseling patients about lifestyle-related risk factors, they rarely feel that they are successful in these endeavors.

An early study of primary care physicians in Massachusetts documented that a substantial percentage believed that reduction or elimination of various risk factors was very important for their patients (ranging from 30 percent for stress to 93 percent for cigarette smoking). The researchers found, however, that depending on the risk factor, only 3 percent to 8 percent of the physicians believed they were very successful in modifying these behaviors (*16*). Similar results have been reported for primary care physicians in Maryland (*17*) and in Wisconsin, Pennsylvania, and Florida (*18*).

Moreover, a number of studies report that physicians often fail to provide recommended preventive services. For example, a random population survey in Michigan indicated that only 44 percent of smokers reported ever being advised by their physicians to stop smoking (*19*). Another study, a review of charts of patients seen by family practice residents in Texas, found that only 0 to 27.3 percent had received any of nine different recommended preventive interventions (*20*).

A national public telephone survey conducted by the National Cancer Institute showed that only 10.6 percent of respondents had ever talked with their physician about ways to prevent cancer (*21*). The same survey revealed that more than 90 percent of the public stated that if they received advice from their physician about ways to reduce their risk of developing cancer, they would be either very likely or likely to try to follow that advice.

Another study surveyed family practitioners' patients to assess their attitudes toward what physicians should do concerning various health promotion practices (*25*). When asked whether their physicians should offer counseling to all patients who need or request it, responses included 92 percent for smoking cessation, 89 percent for healthy nutrition, 90 percent for stress reduction, and 87 percent for exercise programs. Less than 10 percent of those surveyed recommended that physicians refer their patients to other providers to receive these services. Fewer than 1 percent believed that their physicians should not be involved at all in these issues.

It is clear from these studies that both medical students and practicing physicians need assistance in improving their knowledge and skills to promote health and prevent disease among their patients. The greatest improvements in public health will

occur only if enhanced attention is paid to health promotion and disease prevention. Physicians can play a vital role in improving their patients' future health by helping them reduce the incidence and the severity of risk factors for premature mortality, morbidity, and disability.

Modest changes in medical school curriculums can play an important part in achieving this goal. Although preventive medicine is discussed occasionally in other clinical courses such as medicine and pediatrics, our pretest results show this training to be insufficient to attain much of the knowledge and skills practicing physicians need. Most medical schools face challenges that are analogous to those at the University of Maryland. Our experience may provide a helpful model for these institutions.

References

1. Healthy people. The Surgeon General's report on health promotion and disease prevention. DHEW (PHS) Publication No. 79-55071, U.S. Government Printing Office, Washington, DC, 1979.
2. Sullivan, L. W.: Healthy people 2000. New Engl J Med 323: 1065-1067, Oct. 11, 1990.
3. Report of the U.S. Preventive Services Task Force: Guide to clinical preventive services. An assessment of the effectiveness of 169 interventions. Williams & Wilkins, Baltimore, MD, 1989.
4. Report of the Project Panel on the General Professional Education of the Physician and College Preparation for Medicine: physicians for the twenty-first century. J Med Educ 59: 1-208 (1984).
5. Council on Scientific Affairs: Education for health. A role for physicians and the efficacy of health education efforts. JAMA 263: 1816-1819, Apr. 4, 1990.
6. Association of Teachers of Preventive Medicine: Directory and profile of academic units of preventive medicine. Washington, DC, 1990.
7. Riegelman, R.: Medical student myopia syndrome: a recently recognized pandemic. Am J Prev Med 7: 254 (1991).
8. Public Health Service: Healthy people 2000. National health promotion and disease prevention objectives. DHHS Publication No. (PHS) 91-50212. U.S. Government Printing Office, Washington, DC, 1990.
9. Altekruse, J., et al.: Implementing the Association of Teachers of Preventive Medicine's recommendations into the undergraduate medical school curriculum. Acad Med 66: 312-316 (1991).
10. Collins, T. R., et al.: The Association of Teachers of Preventive Medicine's recommendations for postgraduate education in prevention. Acad Med 66: 317-320 (1991).
11. Report of the National Cholesterol Education Program's Expert Panel on Detection, Evaluation, and Treatment of Adults. Arch Int Med 148: 36-69 (1988).
12. The 1988 report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. Arch Int Med 148: 1023-1038 (1988).
13. Hava, S., and Pohl, S.: Exercise and your heart. NIH Publication No. 81-1677, U.S. Department of Health and Human Services, Bethesda, MD, May 1981.
14. Rose, G.: Sick individuals and sick populations. Int J Epidemiol 14: 32-38 (1985).
15. Report of the Expert Panel on Population Strategies for Blood Cholesterol Reduction. Circulation 83: 2154-2232 (1991).
16. Wechsler, H., et al.: The physician's role in health promotion—a survey of primary-care practitioners. New Engl J Med 308: 97-100, Jan. 13, 1983.
17. Valente, C. M., et al.: Health promotion: physicians' beliefs, attitudes, and practices. Am J Prev Med 2: 82-88 (1986).
18. Rosen, M., Logsdon, D. N., and Demak, M. M,: Prevention and health promotion in primary care: baseline results on physicians from the INSURE project on lifecycle preventive health services. Prev Med 13: 535-548 (1984).
19. Anda, R. F., Remington, P. L., Sienko, D. G., and Davis, R. M.: Are physicians advising smokers to quit? The patient's perspective. JAMA 257: 1916-1919, Apr. 10, 1987.
20. Morris, P. D., and Morris, E. R.: Family practice residents' compliance with preventive medicine recommendations. Am J Prev Med 4: 161-171 (1988).
21. Office of Cancer Communications, National Cancer Institute: Technical report. Cancer Prevention Awareness Survey. Wave II. Bethesda, MD, 1986.
22. Hypertension prevalence and the status of awareness, treatment, and control of high blood pressure in the United States. Final report of the Subcommittee on Definition and Prevalence of the Joint National Committee on the Detection, Evaluation, and Treatment of High Blood Pressure. Hypertension 7: 457-468 (1983).
23. Caspersen, C. J., Christensen, G. M., and Pollard, R. A.: Status of the 1990 physical fitness and exercise objectives—evidence from NHIS, 1985. Public Health Rep 101: 587-592, November-December 1986.
24. Fulwood, R., et al.: Total serum cholesterol levels of adults 20-74 years of age in the United States, 1976-80. Vital Health Stat [11] No. 236 (1986).
25. Price, J. H., Desmond, S. M., and Losh, D. P.: Patients' expectations of the family physician in health promotion. Am J Prev Med 7: 33-39 (1991).