MAKING CARDIOVASCULAR DISEASE PREVENTION A REALITY[1]

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IN MEMORIUM

William Feinberg, M.D., suffered an untimely death while this special
issue of *Annals of Behavioral Medicine* was in press. The authors
wish to dedicate this issue in his memory and in honor of his
outstanding contributions to the epidemiology and prevention of
cardiovascular disease.

Cardiovascular disease (CVD) is a major public health problem in the United States and throughout most of the developed and developing world. Despite the continued high incidence and prevalence of cardiovascular diseases, great progress has been made in understanding the pathobiology of coronary artery disease (the major cause of CVD in the U.S.) (1), in reducing the age-adjusted mortality rate in the U.S. due to CVD (2), and in clarifying many of the risk factors that cause the majority of CVD (3). In contrast to the scientific state of affairs of just 10–15 years ago, clinicians and patients alike can now have realistically high expectations for accurate diagnosis, treatment, and prevention of cardiovascular diseases. Indeed, because of the tremendous scientific progress that has been made in the understanding of coronary disease, two distinguished Nobel Laureates, Brown and Goldstein, recently aroused the attention of many, and the ire of some, when they pronounced in *Science* that heart attacks could be eliminated by the year 2000 (4)—if only we would apply the knowledge about CVD treatment and prevention that already exists.

Health behaviors strongly influence the development and progression of cardiovascular disease. From a life span perspective, primary prevention should begin early in childhood with emphasis on the adoption of health-promoting behaviors. Successful modification of certain unhealthy life-styles, however, can reduce the occurrence of CVD or reduce its recurrence in people who already have CVD. Such factors as diet modification (5), physical activity (6), and cigarette smoking (7) are clearly important in causing and controlling CVD. Appropriate modification of these behaviors, in both individual and population-based approaches to primary and secondary prevention, can achieve maximal health outcomes and reduce the burden of CVD.

Psychosocial factors are also related to the risk of developing or surviving CVD. In this regard, consider the hostility component of the Type A Coronary Prone behavior pattern (8), the presence of depression in the myocardial infarction patient (8), the absence of social support (8), or non-adherence to medication regimens and life-style modifications (9) as important factors in CVD risk. While the biology of coronary disease is increasingly clear to researchers studying the vascular wall (1), the psychosocial and behavioral aspects of CVD occurrence and recurrence remain problematic aspects of clinical cardiac care that strongly imply that Brown and Goldstein were overly optimistic when they proclaimed that "heart attacks (will be) gone by the end of the Century." While extensive clinical guidelines exist to channel physicians and other health care providers in the appropriate preventive care of cardiac patients (10), expected benefits of scientific knowledge are still far from realized in a clinical world that often fails to recognize causal factors (11), fails to document recommendations (11), or is unable to get patients to follow directions (9). In this regard, utilization of multidisciplinary teams across the continuum of health care is suggested as the preferred approach for optimizing cardiovascular health promotion and risk reduction (10).

In this issue of the *Annals of Behavioral Medicine*, we present a series of papers focusing on the great potential for CVD prevention. Also included are several papers that highlight scientific areas of some considerable uncertainty, including how to maximize adherence to behavioral or medication prescriptions (9) and how to influence psychosocial risk factors in patients with CVD (8). This introduction provides a brief overview of the major goal of this series—making CVD prevention a reality.

Dietary factors are intimately related to CVD causation, as reviewed by Van Horn and Kavey (5). Low-density lipoprotein cholesterol and other components of the lipid profile are influenced substantially by various dietary interventions. The National Cholesterol Education Program (NCEP) firmly and repeatedly has advised dietary counseling and advice as the cornerstone of the lipid-regulating regimen both for prevention and clinical management of CVD (12). The optimal diet advice is relatively straightforward, almost trite: "rich in fruits and vegetables, whole grains and cereals, low-fat and skim dairy products, fish, lean meats, and/or

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soy protein foods. Food should be cooked without added saturated fat, and when necessary, cooked in a small amount of liquid vegetable oil, preferably olive, canola or other monounsaturated non-hydrogenated liquid oil. Egg yolks should be limited to less than two per week" (5).

Despite overwhelming evidence that various dietary changes can effectively lower blood lipids and even reverse atherosclerotic disease manifestations, there is continued resistance to employing what we already know to control and/or reverse atherosclerosis (5). Physicians are notoriously poorly educated in dietary counseling (13). Dietary assessment methods are poorly understood, unavailable, or cumbersome to use. Nevertheless, Van Horn and Kavey (5) describe promising research results suggesting that dietary modification across the life span is achievable. From a primary prevention perspective, particularly noteworthy population-based approaches to dietary intervention in school-age children are illustrated in the Child and Adolescent Trial for Cardiovascular Health (CATCH) (14). CATCH results indicated that adherence to the NCEP Step I diet in free-living children could be achieved by modifying one meal, the school lunch. Collectively, CATCH methods and results emphasize the importance of multidisciplinary approaches to cardiovascular health promotion and risk reduction beginning in childhood (14). In both individual and population-based dietary intervention strategies focused on children and adults, as Van Horn and Kavey discuss, non-physician counselors, including nurses and dietitians, can be helpful if only physicians would use them and if only insurance plans would pay for them. A number of relatively simple steps are proposed by Van Horn and Kavey to improve dietary counseling efforts (5). They suggest stricter limits on fat intake, frequent (at least monthly) clinical monitoring, vegetarian diets, family involvement, group support, and consideration of an initial residential dietary change component. They also stress much greater attention to the Stages of Change concept than has traditionally been the case in dietary counseling circles. This paper provides a clear agenda both for current clinical practice and for ongoing research to improve current clinical outcomes (5).

Cigarette smoking is also a well-established risk factor for both the development and recurrence of CVD. About half of all smoking-related deaths are from CVD, and about 30% of all CVD morbidity and mortality is due to smoking (7). The paper in this issue by Fiore, Jorenby, and Baker (7) summarizes the findings and recommendations of the "Smoking Cessation Clinical Practice Guideline" of the Agency for Health Care Policy and Research (AHCPR) (15). The paper presents a simple, proven four-step model for clinical smoking cessation interventions. The model advises systematic identification of smoking status in all patient encounters, brief cessation advice from a clinician, assessment of a smoker's motivation to quit, and detailed assistance for those willing to try to stop smoking. This model has been studied in various practice settings by several groups of investigators, and it clearly increases quit rates when routinely applied. Pharmacologic treatment, especially with nicotine replacement therapy, is a proven adjunct to smoking cessation counseling and is recommended for virtually universal application.

The picture for smoking and CVD seems simple. Here is a risk factor that is well-known, non-controversial, and almost universally acknowledged by U.S. physicians and other health care providers as unhealthy (15). What is the problem? As with dietary intervention, the inability to apply assessment techniques on a regular and reliable basis for smoking is a deficiency in most clinical practices (7). In addition, while physicians readily agree

that smoking is unhealthy, many say that they are unprepared to help patients quit (15), and many patients require a range of interventions (largely behavioral) with which physicians are unfamiliar. Time, especially in the managed care environment, may also be a realistic obstacle that must be overcome (16). But time is also often simply an excuse for relegating preventive and behavioral interventions to the bottom of the clinical priority list (16). The recommendations of the AHCPR Panel are relevant to clinicians, patients, insurers, health care provider organizations, and researchers (15). The paper by Fiore and colleagues (7) provides a valuable summary of this important approach to smoking assessment and treatment.

Physical activity exerts numerous beneficial effects on the cardiovascular system and the overall well-being of the individual (6). Increased physical activity is associated with greater longevity, greater physical fitness, improved blood lipid levels, lower blood pressure, less frequent diabetes, more favorable clotting profiles, and numerous other health benefits (17). Exercise rehabilitation, especially in the setting of multiple risk factor intervention, has also been shown to reduce recurrence rates of CVD in myocardial infarction survivors (6). The long list of supportive data and benefits of regular physical exercise are reviewed in this issue by Miller, Balady, and Fletcher (6). Exercise appears to be good for men, women, children, younger and older adults, and for most patients who already have CVD. If only we could put it in a pill! Once again, despite clear evidence that this behavior is strongly inversely related to CVD, most people in our society, both before and after CVD occurrence, fail to exercise on a regular basis (6). Miller and colleagues state that everyone should, of course, be encouraged to exercise more regularly. They describe some ways that health care professionals can assist patients in this quest for better health. They refer to work on the Physician-Based Assessment and Counseling for Exercise (PACE) project—a physical activity counseling module designed for use in a physician's office (18).

PACE was developed to address the need to increase physical activity in most Americans, as discussed by Miller and colleagues (6). PACE is intended to address many of the same obstacles to prevention-related counseling in office settings that were discussed above for smoking cessation and dietary counseling: (a) lack of training, skill, and perceived effectiveness of many clinicians to perform exercise counseling; (b) lack of time; (c) lack of reimbursement; and (d) lack of standardized recommendations. PACE functions very much like the clinical guideline for smoking cessation counseling described by Fiore and colleagues (7). It begins with a Pace Assessment Form, completed in less than one minute by the patient before seeing the clinician. Responses to this form help to determine readiness to accept counseling; mutually-exclusive (patient) categories are "precontemplators," "contemplators," or "already active."

For each type of patient, the PACE module identifies brief, focused counseling messages that can be accomplished in the medical office setting. The most important counseling skills are similar to those advised for smoking cessation: giving specific advice (based on Stage of Change), setting realistic goals, engaging in joint problem-solving with the patient to overcome barriers, and ensuring positive reinforcement and follow-up. PACE was initially developed for use in healthy adults, but its use is currently being considered for adaptation to other populations including children, frail elderly, certain minority groups, and others with special needs (18). PACE project materials are available from the program developers at San Diego State University (18).

A large number of pharmacologic agents also have proven efficacious in the prevention of cardiovascular disease. As discussed by Pearson and Feinberg (19), a surprisingly low proportion of patients who are candidates for proven drug treatments are actively receiving and reliably taking these agents. Explanations for this lack of adherence to recommended therapies include barriers at the level of the patient, health care provider, and health care institution, all discussed further by Pearson and Feinberg (19).

The range of pharmacologic agents with proven or high likelihood of efficacy in coronary disease prevention includes aspirin and certain other antiplatelet agents, beta-receptor blockers, lipid-lowering drugs, angiotensin-converting enzyme inhibitors, and hormone replacement therapy in postmenopausal women (19). According to data presented by Pearson and Feinberg (19), the most commonly utilized drug on this list of potential agents for heart disease prevention is aspirin; however, even this simple and inexpensive drug is used appropriately only about 70% of the time. This paper raises many of the same barriers to adherence discussed herein including time constraints, lack of provider expertise in behavioral aspects of health care, and problems with the organization and delivery of preventive services.

Can anything be done to improve patient compliance? The topic is reviewed in this issue of *Annals* by Burke, Dunbar-Jacob, and Hill (9). As these authors discuss, empirical literature has developed over the past 20 years which addresses compliance with drug interventions, exercise, dietary interventions, and smoking cessation. Burke and colleagues summarize a host of strategies that have led to improved compliance, including behavioral skill training to improve provider effectiveness, patient self-monitoring, a variety of telephone or postal contact devices to improve and enhance patient supervision, self-efficacy enhancement techniques, and external cognitive aids (9). Unfortunately, many of the proven techniques are not regularly applied, and there is a continued gap between what is known and what is practiced. Compliance is a final common pathway in a host of interventions designed to prevent or reverse cardiovascular disease. The review by Burke and colleagues indicates that much has been learned about improving compliance (see their paper, Table 6, page 259) and yet much still needs to be learned to improve health care provider and patient compliance with a range of medical and/or behavioral interventions.

Psychological and social aspects of cardiovascular disease are reviewed in this issue of *Annals* by King (8). Type A behavior and its components, particularly anger and hostility, continue to be topics of research interest. Of more intense interest recently is the work relating to depression and coronary heart disease. Depression is common after a coronary event and is associated with an increased risk of mortality (8). Lack of support and social isolation also increases risk of death after a cardiac event (8). The work of Frasure-Smith and colleagues (20) aroused considerable interest in the value of interventions designed to reduce risk associated with these psychosocial factors in cardiac patients. Unlike many of the other risk factors discussed earlier in this overview, the research on psychosocial factors remains very much a work in progress. No clear clinical guidelines exist and no treatment algorithms have been agreed upon. The role of health care providers and the health care system remains to be defined. As discussed by King, a multicenter National Institutes of Health (NIH)-funded study called Enhanced Recovery in Coronary Heart Disease Patients (ENRICHD) should be helpful in defining interventions and assessing their efficacy (8). A considerable research opportunity remains in this aspect of CVD prevention and treatment.

Finally, this issue of *Annals* concludes with a paper by Solberg and colleagues (11) describing the empirical basis for their current work on the organization and delivery of preventive services in health care settings. They focus on the practice environment as a main source for both problems and solutions to the optimal delivery of clinical preventive services. As we have noted, the typical office practice is not organized in a manner that maximizes preventive interventions. Patients who need preventive services are commonly overlooked in the busy practice environment. Counseling and follow-up systems are inadequate. Resources for prevention activities are disorganized, missing, or simply forgotten. Solberg and colleagues make clear in their review that there is a common systems problem that seems to underlie many failures of clinical preventive services delivery. They propose a solution—The Prevention System—which integrates all of the aspects of service delivery in a setting that can provide continuous feedback and system improvement. They are testing their concepts in an ongoing trial in 22 clinics in the Midwest. Key features of the proposed prevention system are as follows: (1) minimize missed opportunities for prevention, (b) maximize multidisciplinary approaches (delegate to non-physicians if possible), and (c) emphasize a population approach and standardization of service delivery. The system incorporates these basic principles into a logical ten-step process (11). It calls for:

1. Development of prevention guidelines with broad organizational acceptance
2. Systematic screening for disease risk
3. Summarization of risk data and stages of change assessment
4. Cueing to remind all system providers
5. Follow-up with patients as demanded by initial assessment or interventions
6. Making resources available in an organized and systematic fashion
7. Counseling patients and families as required
8. Development and implementation of a system of patient tracking and recall
9. Encouraging patients to be more active in their own health maintenance
10. Prevention-focused visits as an option

To conclude this overview, there is tremendous potential for the prevention of cardiovascular disease. The optimistic view of Brown and Goldstein (4), based primarily on a detailed understanding of coronary disease pathobiology and vascular biology, fails to recognize the tremendous obstacles to application of the biologic, pharmacologic, and behavioral knowledge in the care of apparently healthy people and in patients with CVD. The papers in this issue of *Annals* demonstrate that further progress in CVD prevention is critically dependent on improving behavioral interventions, optimally organizing service delivery, and maximizing patient and provider adherence to current and future practice guidelines. There is much more work to be done and a large agenda for behavioral scientists, health care providers, and health care organizations.

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