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Future Directions in the Management of Cardiac Disease

A Bicentennial Viewpoint

Editor

John H. K. Vogel, Santa Barbara, Calif.



7th Conference on Cardiovascular Disease in Snowmass-at-Aspen,
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Coronary Disease Prevention.¹ Practical Approaches to Risk Factor Changes

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The Challenge of Prevention to the Practitioner

What more can the practitioner do than repeat self-evident commonplace to his patients, to encourage them to lead more balanced and reasonable lives? In my view, several preventive concepts should guide us, and more systematic preventive procedures are indicated. First, conceptually, it is important that the practitioner who deals daily with sick people, recognize and accept fully the desirability of prevention, whether or not he decides to play any role in the preventive effort. A full and clear awareness of the current and traditional function of the practitioner in the palliative, patchwork, and emergency role we serve in respect to most of the major adult diseases, is the first step to a preventive approach if the serious CHD situation is to be alleviated. Treating and supporting heart attack victims and stroke patients is neither an effective nor efficient undertaking, nor is it always a joyous one, yet it occupies much of our professional energies [6].

Aspects of chronic disease prevention which involve health attitudes, habits and behavior will, in the long run, become a part of the mainstream of medical thinking, teaching and activity; now they are not. Additional significant and widespread modifications in cultural attitudes and mores will be required for an effective reduction of the prevalent disabling and fatal diseases. More of these changes will undoubtedly come into play if the direct experimental evidence now collecting becomes substantial that reducing risk characteristics is effective. The current decade of preventive trials in adults

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will tell that story. Admittedly, these large trials are tedious and costly. But I have little faith in the alternative that a scientific 'breakthrough' just around the corner, will enable us, for example, to immunize against lung cancer, to dissolve or resolve atheromata, or to render smoking harmless. I doubt that a breakthrough will simply and safely eliminate hypertension in the next period. Though more basic research is essential on these questions, a national health policy should not be based mainly on such hopes of scientific breakthrough. Rather, in the pragmatic view, a remarkable benefit to the individual and to the national health will certainly accrue from lowering the habitual saturated fat intake in this country to palatable levels as found in the Mediterranean countries and the Orient, from lowering the frequency and rate of tobacco smoking, from reducing the excess consumption of calories, in general, and fat and alcohol calories in particular, from an increase in habitual physical activity at all ages, and from the effective detection, treatment and follow-up of hypertensives. Ross [6] believes changes *will* be made, spontaneously, as well as being logically 'engineered' into our daily lives and culture by the efforts of an informed profession and public.

How might these changes come about?

Changes in Professional Attitudes

Needed changes in professional attitudes are already manifest in the immense reduction of cigarette smoking among physicians in recent years and the wide professional support of the campaigns and programs of the American Cancer Society and the American Heart Association, the International Foundation and Society of Cardiology, and WHO. Clearly, however, we need better ways to help our patients stop smoking!

The next major change in professional attitudes has been a greater concern with detection, management and follow-up in hypertension. One of the last attitudinal changes may have to do with eating and exercise habits, where definitive evidence is least likely to be obtained. Will the physician transpose the observations about different eating habits, and the associated low coronary risk in other cultures, to a reasonable preventive approach in our overstuffed industrial culture?

But closer home, there is a great need for common sense and directness in medical practice; after all, no physician really thinks that high serum lipids and blood pressure, indolence, obesity, and cigarette smoking are good for anybody! To emerge from the current professional ambivalence and inertia,

the physician will now have to be unequivocal about the importance to the health of his patients of modifying childish and excessive ways of eating – toward a more prudent diet containing reduced fat calories, reduced fat calories, and reduced saturated fat and alcohol calories. The physician will now have to be unequivocal about the need to reduce blood pressure below 90 mm Hg diastolic, by a progressive scheme depending on the severity of the elevation and the stepwise response to therapy. The physician will have to do his best on all other risk factors present while stressing balanced living with regular moderate exercise and long-term weight control. The physician will have to make attempts to control elevated blood glucose or uric acid and other metabolic problems as needed, by hygienic means where possible, and by the least toxic of medications as required. Finally, the physician, to be credible, will increasingly be expected to provide an example in his own health behavior and attitudes.

Changes in Medical Practice

How can the practitioner intervene more effectively and preventively? Actually, quite simple steps are involved in the evaluation and intervention on patients' health habits and behavior. These steps are compatible with solo or group patient treatment programs, in solo or group medical practice. They can be carried out with considerable effectiveness by an intelligent and cordial office staff under the training, support and direction of the physician [3]. Let's touch briefly on some of the steps in intervention, assuming that the practicing physician is the central figure:

- 1) Do a traditional medical workup – check-up. A traditional medical workup (diagnosis) is obviously required to establish baseline risk factor values for the prevention plan (treatment) as well as to achieve full understanding of any medical conditions present, and to give credibility and authority to the preventive program (prescription). In addition to the traditional workup, there needs to be a more complete and systematic coverage of health behavior – in terms of eating and drinking patterns, diet diary, smoking and physical activity questionnaires.

- 2) *Make a clear recommendation to change.* The biggest professional omission in preventive practice has been the ambivalence with which we recommend that people stop smoking, or otherwise change health behavior. The physician prefers to play the role of permissive and pleasant Benedictine, traditionally relegating hygienic advice to the last, backpatting patients out

of the office while murmuring platitudinous nonsense such as, 'You should lose some weight, cut down on smoking and slow down a bit!' A clear, unambiguous, positive and authoritative recommendation of the course of action should follow immediately the medical history, physical and laboratory evaluation. An explicit prescription for a preventive program should emphasize that good 'hygiene' is as important as any prescription given a patient for medication.

3) *Set a personal example.* The physician's credibility and authority with patients and community alike require that he make a strong effort to live what he recommends.

4) *Seek a firm commitment.* A commitment of the patient to adhere, or to try to adhere, to a preventive program connotes the seriousness of this matter of prevention, fully equivalent to that of any existing disease problem found. Even more effective may be a simply written and *signed* contractual agreement on the specifics of the preventive prescription, such as stopping smoking or change in eating or drinking pattern.

5) *Provide the basic information.* Essential to any intervention is a knowledge of what factors need to be changed and why. Instructions and audio-visual aids are increasingly available in the areas of concern, i.e. smoking, eating, drinking, physical activity, and pill-taking behavior.

6) *Set distinct realistic goals.* Specific short-term goals are preferable to vague, distant or unrealistic targets for change.

7) *Offer alternatives.* Having set the specific goals, alternative ways of reaching them are spelled out for the patient to choose. To this extent, the treatment may be 'tailored' and self-determined.

8) *Encourage participation in decisions for change.* To the extent that the individual can understand his problem, seek information, set his own goals, make choices, explore alternatives, and generally participate and take responsibility for change in his health behavior, rather than depending entirely on the physician, his staff, or on his own wife, the more propitious may be the long-term results.

9) *Provide skills and framework for change.* As crucial as the information and, presumably, skills provided in the prevention program, the real framework for change is given by a physician known to practice preventive care. It is a large part of the motivation required for the patient to make his individual change.

10) *Establish a systematic follow-up.* Evaluation, treatment, new knowledge, and long-term support are maintained by appointments as systematic as those made with the dentist, and more often. A very short visit for measure-

ment of risk characteristics may be followed by a return visit for more complete discussion of preventive treatment, based on the patients' progress.

These then are ten of the essentials in an effective practice of prevention in the area of health habits and reduction of risk characteristics. Involvement of the physician is central. I believe that it is feasible for *any* practitioner of good will to master the simple information and the straightforward methods and organizational aspects of such a practice. Results will then depend on the warmth, enthusiasm and curiosity brought to the task.

Specific Interventions

Preventive practice for coronary heart disease involves a baseline measurement and evaluation of the major elements of coronary risk, i.e. establishing a 'true value' for serum lipid levels, blood pressure and smoking habit, and with complete notations about food pattern and choices, alcohol intake, relative body weight, habitual physical activity and behavior. This requires at least two baseline visits, to include examinations where indicated for 'secondary' causes of elevated lipids and blood pressure, elevated triglycerides or glucose intolerance. Then follows the specific intervention program [3].

Eating Pattern

High level nutritional expertise is not required to intervene effectively on the amount and quality of diet. A prevention plan is within the ken of all physicians and the scope of an office practice. It may be considered worthwhile to attempt to lower any serum cholesterol levels over 200 mg%, first by dietary means. The major food groups in which saturated fats, calories, and in turn, lipid levels can be effectively reduced are: (1) red meats and meat products; (2) dairy products and eggs, and (3) fats and oils used in food preparation. 90% of fats are contained in the above three food groups. The other two major groups, cereals and starches and fruits and vegetables, are 'neutral' in serum cholesterol effect, *when* there is caloric balance. (Cholesterol may go up or down on *any* diet when there is respectively, weight gain or loss.) The basic instructions about fat-containing foods are relatively simple: (a) reduce the frequency and the serving size of beef, pork and lamb; (b) select lean cuts of these meats and use more poultry and fish; (c) avoid sausage, bacon, cold cuts, frankfurters, bologna and hamburger; (d) reduce the fre-

quency, fat content and serving size of cream, whole milk, butter, ice cream, and cheese; (e) emphasize low fat dairy products, sherbets, cottage cheese, and yogurt and replace butter with soft margarines; (f) reduce egg consumption and encourage substitutes; (g) reduce the use of hard shortenings and butter in food preparation; (h) emphasize the use of liquid oils as partial replacement of shortenings and butter; (i) reduce calorie intake overall from fats, alcohol, and simple sugars, and (j) emphasize cereals, legumes, vegetables and fruits.

Weight and Activity

The oft-cited computations of the exercise required to lose 1 lb., i.e. 3,500 kcal or 10 h of walk-jogging, are a cause of confusion – and inaction! Rather, the important issue about physical activity and body weight is the very small amount of long-term frequent caloric excess which eventuates in the common variety of moderate obesity. This is often on the order of only 50–150 cal daily excess average intake over expenditure. Such a small but regular excess intake translated into regular daily activity is only 10–30 min of brisk walking. In contrast to the frustrating problem of weight reduction, this provides a much happier perspective i.e. the long-term potential for *prevention* of obesity by moderate exercise.

A large segment of middle-aged men and women would find little problem with energy balance if they simply eliminated one cocktail, switched to skimmed milk and walked briskly for 15–30 min! Most would find no long-term weight problem whatever if they also adopted the A. H. A. prudent diet with its reduced frequency of meat eating, and reduced portion sizes and reduced butterfat consumption. This would have the beneficent side effect socially of reducing the conspicuous overconsumption of the world's food energy resources by a few affluent nations!

Speaking clearly to patients about an exercise or activity prescription should be in terms as forceful and precise as when medications are given. Beyond this, the patient is led to a self-image as an active person – in control of his own health and functions. The patient may be informed that regular muscular activity is one of the best means known to achieve, please excuse the hucksterism, 'vibrant' good health, self-confidence, physical and mental balance, weight control, and a good night's sleep. These are the strong but largely unmeasurable impressions obtained about exercise.

However, one *cannot*, at the present stage of knowledge, tell patients that intensive *high level* exercise is either desirable or effective in preventing heart

attacks, or for that matter, in reducing blood pressure or blood lipids. This is not known [1]. Rather, the decision about an *intensive* exercise program rests on the desires of the individual and the interest and competence of the physician in prescribing such activity. However, more and regular moderate exercise is accepted and encouraged, in the form of graduated walking, cycling and large muscle, endurance activity. It is good hygiene and the 'secret' of long-term weight control. *Daily* activity prescribed should be that preferred by the patient, and within his capacity as demonstrated by stress testing.

A basic program for most middle-aged persons may be based on 15 min to 1 h of brisk walking – unsupervised and self-limited. In fact, a very wide range of exercise is quite possible in walking – by augmenting the frequency, the duration, the rate, and the incline. The next higher levels of activity, and those less associated with cardiovascular and musculo-skeletal disability, are swimming and cycling. These are usually easier on aging joints, cartilage, and tendons than are jogging or running.

The *highest* levels of physical activity commonly available to Americans are running, cross-country skiing, competitive sports and snow shoveling. If you or your patient desires to take up such vigorous pursuits, the *Exercise Handbook for Physicians* provides useful guidelines to progressive stress testing and exercise prescription in healthy persons (American Heart Association, 7320 Greenville Ave., Dallas, TX 75231), as does the International Society of Cardiology brochure, entitled *Myocardial Infarction. How to Prevent. How to Rehabilitate*, available from the Society offices (22, rue de l'Athénée, Case Postale 127, 1211 Geneva, 12, Switzerland).

Elevated Blood Pressure

The therapeutic approach toward hypertension is a part of the conventional medical armamentarium. It involves a stepped care approach leading from weight reduction, exercise, and moderate salt restriction to the use of diuretics, or to combined drug therapy, plus a careful, systematic persistent and long-term follow-up.

Cigarette Smoking

The fact that there exist so many anti-smoking approaches and gimmicks is pretty good evidence that none is superior. In fact, the theoretical bases of

current anti-smoking research are not strong, the controlled trials are few and long-term maintenance is largely ignored. The physician may therefore choose and polish the available approaches with which he is most comfortable, or devise his own. It should, however, be common practice that the physician use a simple and forceful recommendation about the important health matter of stopping smoking. A simple and direct approach might be to ask: 'What do you smoke?' when examining the throat, and 'How much are you smoking these days?' on examining the chest, etc. When finished with the examination, outline the findings by system, explain the effect of smoking, and say, 'The first thing to do is stop smoking: we'll give you all the help we can. If you can't quit cold now, we'll outline a reduction program leading up to a quitting date in a few weeks; let's set the date now.'

Results of this sort of direct and authoritative approach are far from 100% over the long-term. They may average out around a 25% sustained effect. But how often does the physician recommend much more aggressive, invasive, even heroic surgical and pharmacological intervention for far lesser successes! How often does the physician persuade patients to accept advice for angiography, drugs and surgery, while ignoring the simplest hygienic therapeutic approaches which may offer as much benefit?

On the other hand, if the physician approaches his patients ferociously about stopping smoking, or appears a self-righteous fanatic; if he attempts to bully or charm his patients into stopping before they have prepared their decisions, the rate of recidivism may be higher. So the physician must add support, give a reasonable time for the patient to prepare himself for change, guide the patient to his personal decision to quit and finally, never reject the failing patient. The old-fashioned and thoughtless professional attitude of: 'Do as I say or get another doctor', has never been good medical practice; neither is it now for risk factor reduction therapy.

But *quitting* smoking is the goal, while reduction of the amount smoked and change of type of smoking is later held out to those who cannot, for the time being, quit absolutely. Finally, education on the noxious nature of tobacco smoke and its effects on the body may contribute to the success rate and should be provided by the physician - with aids.

Audio-visual aids and brochures are widely available for use in individual or group counselling. These appear to be useful adjuncts if for no other reason than they start people thinking seriously about stopping smoking. They illustrate the frequent rationalizations used for continued smoking and they provide a platform for preventive action.

For referral to special anti-smoking clinics, many larger communities

have several sorts of group approaches. They are usually of two types, a short-term evangelical type or a longer term behavior modification approach. Though there is no established way of choosing between them, the behavior modification approach may be best for people who are more organized and meticulous, or who have more time, and perhaps the 'hard sell' works for less 'rational' or more harried types.

Prevention at the Social Level

This symposium has emphasized the importance to an efficient and effective preventive practice of identifying and treating prophylactically persons in that proportion of the population of industrial nations having excess risk of IHD. But it has also indicated that even optimal intervention among this high risk element will not eliminate the major population burden of IHD if the overall risk level of that population is pervasively high. Mass prevention will require mass intervention [2]. Early results are exciting from the Stanford 'Three Towns Study' [4] and the North Karelia Study [5], each of which demonstrates that health behavior *can* be effectively and efficiently modified, in the mass of people outside direct medical care. These efforts, to work, must be supported by the practicing physician.

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Coronary Disease Prevention.¹ Controversy and Professional Attitudes

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The Potential for Prevention

The basic facts which represent the potential for prevention of ischemic heart disease (CHD) are no longer controversial. There are large differences in the frequency of CHD between cultures (fig. 1). This basic fact provides the potential for prevention.

The next basic fact in this picture is the monotonous consistency and congruence of evidence from many studies, around the world, that individuals in apparently good health have vastly different future risk of developing manifest CHD. Prediction equations separate individuals at 10 times different future coronary risk as computed from the 'big three' risk factors: hypertension, cigarette smoking and serum cholesterol (fig. 2).

Controversy about Diet

Now let's touch briefly on some of the controversies about risk factors and prevention which I will introduce by quotations from distinguished physicians. 'When we look for good links between diet and serum cholesterol, we find they can't be correlated too well.' This is an example that much of the controversy is unnecessary and misdirected; it evolves from a basic difference in the physician's clinical approach to problems and the preventive approach. It may help to separate individual cases with their individual risk from the

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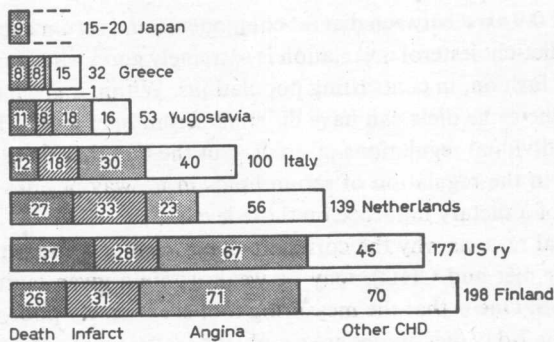


Fig. 1. Age-standardized average yearly CHD incidence rates per 10,000. 12,529 men, aged 40-59, judged to be free of CHD at the outset [11].

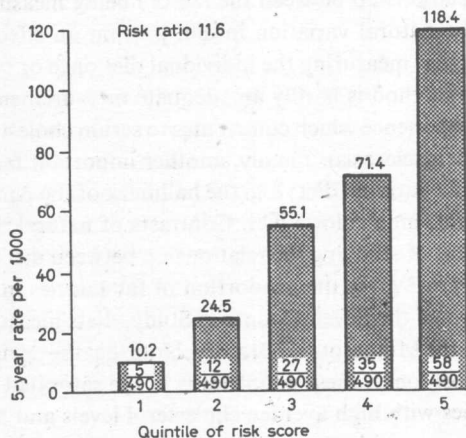


Fig. 2. Combined risk factor score and first coronary event in men aged 40-59 computed from entry levels of systolic blood pressure, serum cholesterol, and number of cigarettes smoked daily [11].

population and its risk, i.e. risk characteristics of a population as distinct from those of the individual.

Correlations between *average* saturated fat composition in the habitual diet and average serum cholesterol levels found in populations are very strong where diets are analyzed chemically, during all seasons of the year. Correla-

tions on the order of 0.9 exist between diet fat components and serum cholesterol levels. So this diet-cholesterol correlation is extremely good when measured in an objective fashion, in contrasting populations. Within a given culture, people eating the same diets can have different serum lipid levels. This is due to intrinsic individual regulations of lipids. But the fact that there are inherent differences in the regulation of serum lipids in no way negates the overall importance of a dietary influence on those levels.

There are several reasons why the correlations between diet and serum cholesterol levels (or diet and CHD), may be weak *within* a given culture, such as within the US. One is that the measuring tool is extremely poor, for 24-hour recall or 3- or 7-day diet diaries are simply inadequate ways of measuring the diet of an individual. Secondly, in using such tools the variability of diet so measured in the individual is about as great as the variability in diet *between* individuals. In such a situation, it is simply mathematically impossible to demonstrate any sharp relationship between the factors being measured. So the measure itself and the natural variation in diet prevent an effective study of the question. Moreover, measuring the individual diet once or twice or even four times by such a method is hardly an adequate measurement of the *lifetime* habitual dietary experience which contributes to serum cholesterol level (and presumably to atherosclerosis). Finally, another important factor is the relative homogeneity of a national diet; e. g. the hallmark of the American way of eating is a high fat, high calorie diet. Contrasts of natural diets are more interesting as a means of studying the relationship between diet and serum cholesterol levels. Figure 3 gives the proportion of fat calories in the habitual diets in various areas of the Seven Countries Study, diets measured chemically, systematically, in the Minnesota laboratory. Note that the primary difference between fat composition in these countries is in the saturated fat. The characteristic of countries with high average cholesterol levels and high CHD rates is a saturated fat composition over 15% of calories, as in the US, Finland and The Netherlands. The characteristic of countries with extremely low serum cholesterol levels and CHD rates, Japan and Greece, is saturated fatty acid composition under 10% of calories. Again, the correlations between saturated fat and serum cholesterol levels and CHD are really quite strong. These correlations are not discounted by any other similarly careful and systematic work that I know of.

Finally, we can hardly deny a strong correlation between diet and serum cholesterol if we consider what happens to serum lipid levels from experimental *changes* in diet. In Minnesota, on the basis of over 120 carefully controlled isocaloric substitutions of different fats in the diet, it is possible to

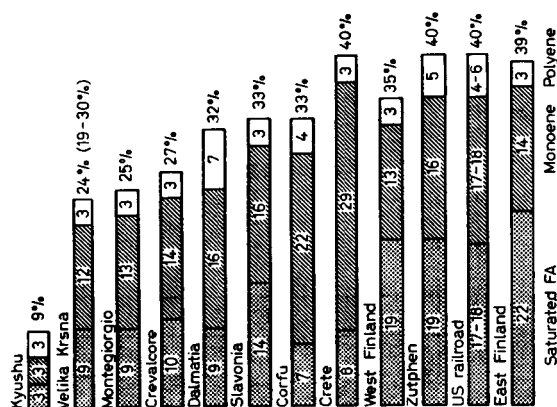


Fig. 3. Average percentage of dietary calories provided by saturated, mono-ene, and polyunsaturated fatty acids in men aged 40-59 [11].

predict mathematically the serum cholesterol response from a change in diet in small groups of people, expressed in an equation (2S-P). This indicates that the cholesterol-raising power of saturated fatty acids is approximately twice the cholesterol-lowering power of polyunsaturated fatty acids and that the contribution of dietary cholesterol is significant, but may be largely overwhelmed in high fat diets by the saturated fat contribution, particularly where cholesterol consumption is high.

Polyunsaturated Fats

Another issue raised in figure 3 is the question of polyunsaturated fats. I quote a West Coast physician: 'Polyunsaturated fats are toxic; they cause premature aging and wrinkling of the skin and may accelerate atherosclerosis.' Figure 3 indicates the generally similar level of polyunsaturated fat intake in a number of countries which differ greatly in serum cholesterol level and in CHD incidence. There is no correlation at all between average polyunsaturated fat intake and average serum cholesterol or CHD rates. Note also that in no country eating these natural diets is there an intake of polyunsaturated fats over 7% of calories; so obviously higher 'poly' intakes are not 'essential' to a low population rate of CHD. I doubt the 'toxicity' idea but see no reason to distort the American diet by an excess of polyunsaturates.