

Senate Committee on Fitness for Life
Risk assessment and management subcommittee

16 October 2006

Preamble:

Cardiovascular disease (CVD) and type 2 diabetes (TD2) as well as its complications are mostly preventable, especially in individuals under the age of 65 years. The prevention of CVD and T2D depends on 3 key factors: 1.) the identification of those most susceptible to risk factors; 2) the identification of the risk factors; and 3) modifications of the risk factors, both pharmacological and non-pharmacological. This latter component is a function of both pharmacological and non-pharmacological therapies and long term adherence to such therapies.

The AHA/ACC guidelines for primary (Circulation 2006;114:82-96) and secondary prevention (Circulation 2006;113:2263-2372) of CVD as well as a recent statement on diet and lifestyle recommendations on preventing CVD and diabetes from both the AHA and the American Diabetes Association (Circulation 2006;113:2943-2946) and also the recent report from the SHAPE Task Force Executive Committee (Am J Cardiol 2006; 98:2-15) provide a considerable amount of information for the background of this report.

Overview:

Traditionally, most efforts to prevent cardiovascular disease have been aimed at patients who are at highest risk, measured by their Framingham Risk Score (FRS). However, most heart attacks occur, not in the high risk individuals (those whose FRS is in the upper 80th percentile) but in those whose risk scores fall between the 20th-80th percentile, which is 60% of the population. Thus, focusing only on the very high risk group will not identify the majority of participants who will develop CVD, including heart attack, stroke and peripheral vascular disease (PVD). In addition, it has been estimated that 54 million people in the United States have pre-diabetes, a condition in which higher than normal blood glucose levels may be inconspicuously causing long-term cardiovascular damage.

Successful prevention is a long term commitment which should begin at an early age. The later one delays primary prevention, the lower the overall success rate in terms of actual reduction in risk although absolute risk reduction goes up with age mainly because the absolute risk of disease increases substantially with age. Family history of coronary heart disease (CHD), especially before age 50-55, is a strong risk factor but not modifiable. All individuals with such family history should be considered at risk for CHD. Additional risk factors for CVD and T2D should be assessed and modifiable risk factors, including obesity and physical activity, should be intervened upon where appropriate.

The identification of risk factors is inadequate without programs which maximize risk factor reduction, i.e. both pharmacological and non-pharmacological, including long term adherence to therapy. Furthermore, non-pharmacological interventions, such as dietary intervention or increasing physical activity or weight loss are difficult to maintain. Substantial reductions of LDL cholesterol by dietary interventions cannot be done except by very aggressive intervention programs managed by nutritionists, behavioral interventionists, etc. Such programs are effective for a limited number of participants but are relatively expensive to maintain. Short term dietary interventions to reduce either the lipid levels or obesity are usually unsuccessful.

The critical questions are:

- 1) How can we identify those individuals who are most susceptible to sub-optimal risk factor levels? Data collected in multiple longitudinal observational studies demonstrates that this is best accomplished by identifying the presence of “sub-clinical” vascular disease.
- 2) Once one identifies an at-risk person, what is the appropriate time for drug therapy versus continued follow up or lifestyle modification?
- 3) Among lifestyle modification, what is the appropriate time to refer for more expensive lifestyle modifications, i.e. for weight loss, increasing exercise or reduction of lipoprotein levels?
- 4) How does one identify the non-adherent population, especially to pharmacological therapies?

Ideal Risk

An optimal LDLc may be as low as 50-70 mg/dl of LDL. The average LDLc in the United States is now about 130 mg/dl. Thus, average and optimal are not one in the same and should not be confused (O’Keefe et al. J Am Coll Cardiol 2004;43:2142-6).

Individuals who have ideal levels of risk factors are at very low risk of CVD over the long term and, as such, achieving and maintaining ideal risk factor levels should be the goal of any cardiovascular program. These goals are defined below:

- LDL <100 mg/dl (<70 mg/dl for those at very high risk)
- Blood pressure <120 mm Hg and <80 mmHg
- Triglycerides <150 mg/dl
- HDL >50 mg/dl (women)
>40 mg/dl (men)
- Fasting glucose <100 mg/dl
- Waist circumference < 35 inches (women)
< 40 inches (men)
- BMI <25 kg/m²
- Non Smoking Status
- Physical Activity (e.g., brisk walking) 30 minutes most days

A valuable tool in assessing risk of coronary artery disease (CAD), in addition to these standard risk factors, is non-invasive imaging. One can assess an individual’s risk of CVD using non-invasive imaging of intra-coronary artery calcium (CAC) using electron beam CT (EBCT). Studies in Washington, DC for young men and similar recent data from the Hopkins group and the group at the Cooper Clinic for both men and women have documented its effectiveness. (Am Heart J 2006; 151:1139-1146). A further paper has recently reviewed the added value of EBCT screening in those with moderately high risk (asymptomatic 10-20% FRS 10 year risk). We endorse this adaptation of NCEP which forms the basis of the following recommendations.

It should be noted that although these goals represent the ideal, the degree of effort that any particular patient should make to achieve these goals depends on their personal risk of developing cardiovascular disease. It may not be rational for many patients to incur the inconvenience, expense, and risk of interventions if they perceive their actual risk of developing cardiovascular disease to be low. Since most heart attacks occur in patients at moderate risk (rather than those at high risk), EBCT can be used to help to identify those patients who would

most benefit from intensive efforts (both non-pharmacologic and pharmacologic) to achieve these goals.

Proposal:

Education

First, there needs to be a continual and major educational program for both members of the University of Pittsburgh Health Plan, and for physicians and staff who care for participants of the Health Plan concerning the optimal goals for the prevention of CVD and T2D and continued emphasis that prevention of these conditions is feasible, improves active life expectancy, and potentially reduces health care costs. Without that message, none of these programs have any chance of being successful.

Prevention Screening/Risk Identification

We recommend that patients be screened according to current guidelines (AHA, ADA, JNC7, etc.) and that those identified as being at risk for CVD and/or T2D should be targeted for appropriate intervention.

CVD/T2D Prevention Strategies

Dietary intervention. Dietary intervention to reduce risk factors is the cornerstone of a successful CV prevention program but is difficult to implement. The nutritional educational goals should be based on the dietary and lifestyle recommendations of both the AHA (Lichtenstein, et al., *Circulation* 2006;114:82-96) and the ADA recent guidelines (*Diabetes Care* 2006;29:2140-57). Dietary intervention in doctors' offices and/or by brief visits, mail, printed materials, etc. is usually very unsuccessful. We therefore recommend that dietary, (nutritional), programs, should be done by certified, qualified nutritionists and behavioral interventionists and that this resource be provided through the Health Plan. Programs provided by the Health Plan should be certified as meeting high-quality standards for these interventions by a Risk Evaluation Committee. Referral for dietary and behavioral interventions should be done through physicians within the Health Plan and coordinated through the physicians' practices. Participants in the Health Plan requesting nutritional intervention advice should be provided dietary guidelines from the AHA and ADA as above as well as have the opportunity of brief dietary counseling for implementation of the guidelines. These participants can request more detailed and aggressive dietary intervention but would have to go through their physicians' offices.

Group Lifestyle Balance. A year long lifestyle change program is available through the Diabetes Prevention Support Center (DPSC) of the University of Pittsburgh Diabetes Institute for those individuals identified with pre-diabetes and/or metabolic syndrome. The highly successful individual intensive lifestyle intervention utilized in the Diabetes Prevention Program, which was based on diet, activity and behavioral modification, has been adapted from a 16-session individual intervention to a 12-session group-based program called Group Lifestyle Balance (GLB). The GLB was recently implemented in a pilot primary care practice setting with significant decreases in weight, BMI, waist circumference and glucose noted. This program is now being expanded to a variety of primary care practices where either a local professional working in the practice delivers the program following training at a DPSC workshop or the DPSC supplies an interventionist. The year long program, which includes the GLB 12-week series of one hour sessions and all necessary materials, as well as monthly maintenance group meetings thereafter, is available at a cost of approximately \$200-250/individual. The program is delivered

by preventionists who have been trained and certified through the DPSC. In addition to training preventionists for primary care practice the DPSC also provides intervention groups at its Oakland location, and will be able to supply certified preventionists to deliver the program in other settings, e.g. the workplace or other local community locations. It is strongly recommended that the University, presumably through UPMC Health Plan, cover the cost of this one year program for all those identified as being at risk of T2D and who are willing to attend a local or central program. As the qualification for this intervention is based on diabetes risk (pre-diabetes and/or metabolic syndrome) this should be seen as a complimentary approach to the provision of improved CVD risk management, and is not intended in any way as an alternative. Other nutrition programs that focus on weight loss, lipid lowering, etc. are also available throughout the UPMC Health System. .

Lipid Management

We recommend that patients should be assessed initially following NCEP ATPIII guidelines for risk factor counting and that those found to be in the moderately high risk group using Framingham Risk Score (10-20% 10 year risk) should have noninvasive testing to identify coronary atherosclerosis using EBCT. This EBCT screening should be restricted, at present, to the Preventive Cardiology Center within the UPMC Cardiovascular Institute because of issues of low radiation exposure using EBCT vs. higher radiation with spiral multi-slice CT; cost and throughput. We strongly recommend that such imaging be done prior to the use of lipid-lowering drug therapy, as a substantial number of such individuals placed on lipid-lowering drug therapy have very low CAC scores and, similarly, individuals with high CAC scores are often missed by just looking at the risk factors. Many studies have now shown that both men and women with relatively high CAC scores, especially >100-400, are at high risk of CHD and are equivalent to those in the high risk category previously described, i.e. 20% risk.

In some cases, CAC scoring may be indicated for selected patients with less than moderately high Framingham risk (<10%). Such cases may include those with a strong family history, particularly when found in siblings. In addition, there may be certain instances when CAC scoring is warranted for those in the highest-risk group, particularly for those who may be intolerant of statins or who may prefer alternative medicine approaches, however, it is expected that the number of these cases will be minimal.

LDL treatment goals shall be based on the table below.

¹Guidelines for treatment in asymptomatic patients classified as **moderately high-risk** patients by NCEP (Framingham 10-20% 10-year risk)

| CAC score/percentile | Framingham risk group equivalent | LDL goal (mg/dL) | Drug therapy (mg/dL) |
|---|---|------------------|------------------------|
| 0 | Lower risk | <160 | ≥190 |
| | | | 160-189: drug optional |
| 1-10 and ≤75 th percentile | Moderate risk (10-y risk <10%) | <130 | ≥160 |
| 11-100 and ≤75 th percentile | Moderately high risk; 2+ risk factors (10-y risk: 10-20%) | <130 | ≥130 |
| | | | 100-129: consider |

| CAAC score/percentile | Framingham risk group equivalent | LDL goal (mg/dL) | Drug therapy (mg/dL) |
|---|--|-------------------|----------------------|
| | | | drug |
| 101-400 or >75 th percentile | High risk; CAD risk equivalent (10-y risk: >20%) | <100 | ≥100 |
| | | Optional goal <70 | <100: consider drug |
| >400 or >90 th percentile | Highest risk | <100 | Any LDL level |
| | | Optional goal <70 | |

Consider β blockers and angiotensin-converting enzyme inhibitors for CAC score >1000.

¹Hecht HS, Budoff MJ, Berman DS, Ehrlich J, Rumberger JA: Coronary artery calcium scanning: Clinical paradigms for cardiac risk assessment and treatment. *Am Heart J* 151:1139-1146, 2006

Referral for lipid nutritional therapy by physician should be provided for individuals whose LDL level is above goal (see discussion of weight loss, pre-diabetes and exercise programs); adjunct drug therapy should be considered as discussed below. The nutrition intervention should aim for at least a 15% decrease in LDLc.

Lipid lowering therapy stratification. Drug therapy for lipid-lowering is at the discretion of the physician however, for those at moderately high risk who have had CAC assessment we recommend that treatment be based on the table above. Although the final decision to initiate drug therapy rests with the physician and the patient, we believe that lipid-lowering drug therapy should be strongly considered for all individuals with Agatston CAC score >400 and considered for those with Agatston scores between 100-400. The goal should be to lower LDL to <100 mg/dl for such individuals and efforts should be made to modify other risk factors such as raising HDLc, lowering blood glucose levels, decreasing blood pressure (BP), smoking cessation, increasing physical activity, etc. Such individuals will also benefit from aggressive dietary intervention in combination with the lipid-lowering drug therapy and other interventions, i.e. weight reduction, exercise, etc. For individuals with a CAC score of <100 but >0, efforts should be made to aggressively reduce their risk factors and some of these individuals may also be candidates for lipid-lowering drug therapy. Individuals with CAC scores of 0, probably about 50-60% of women and 30-40% of men, are at very low risk and are generally not candidates for lipid-lowering drug therapy. Therefore, patients who otherwise might be considered candidates for lipid-lowering medications may reasonably forgo this, saving them the risk and expense of these medications. The probability of an increase in CAC scores over time in such individuals is low. In general, CAC scores will double or triple about every 3 years, so an individual with a CAC score of 100 will probably have a score of 300 within the next 3-5 years and 600 within the next 8 or so years. This is one of the reasons for beginning lipid-lowering drug therapy fairly early. Individuals with CAC scores of 0, however, have a very low risk of increasing their CAC substantially over the next 5-6 years. About 6% per year will develop new CAC but only about 1% will develop scores as high as 100. Individuals with CAC scores of 0 are at very low risk of heart attack and generally are not candidates for lipid-lowering therapy.

We recommend that the Health Plan publicize the availability and provide coverage for lipid consultation services such as the Nutrition Lipid Program of the University of Pittsburgh or the UPMC Cardiovascular Institute at University Center.

Anti-hypertension therapy

We recommend that efforts be made to maximize BP reduction to $<120/80$ mm Hg. Per JNC-7 guidelines, non-pharmacologic therapy should be recommended to patients who have systolic BP between 120-140 or diastolic BP between 80-90, with medications being reserved for those with systolic BP ≥ 140 or diastolic BP ≥ 90 , except in cases where the BP goal is lower, such as patients with diabetes mellitus or chronic kidney disease. Drug therapy for high BP should follow current guidelines to reduce cost and complications.

Pre-Diabetes Management

Lifestyle changes including weight loss and increasing physical activity have been found to be effective in reducing risk for T2D, as described above. For those found to be at risk for T2D (fasting plasma glucose 100-125 mg/dl), we recommend physician referral to a lifestyle change program such as the Group Lifestyle Balance program offered through the DPSC as described above, or other appropriate lifestyle change program.

Compliance

Maximizing adherence to therapies is a major obstacle to any successful program. At the present time, it appears difficult to specifically identify the pool of non-adherent participants within the Health Plan. One of the major limitations to adherence to therapy is cost of the drugs. A second major limitation to adherence is lack of feedback to the patient about the importance of continued drug therapy, especially in the absence of symptomatology, i.e. prophylactic therapies. A third is belief or misinterpretation of the patients of side effects that are potentially related to the drug therapy. Faculty at the Graduate School of Public Health, Medicine and especially in the School of Nursing have extensive experience in maximizing adherence to therapies. We strongly suggest that the Health Plan consider the establishment of an advisory group on maximizing adherence to therapies within the Health Plan. The most successful approach to maximizing adherence has been the use of health counselors who maintain frequent contact with the participants, encourage them to maximize their therapies and reduce the barriers to successful therapies, including transportation to obtain the medications, advice on side effects and development of simple approaches to reduce likelihood of non-adherence, such as timing of the drugs, etc. Support from pharmacists can also play an important role. The advisory group can guide the development of a health counselor program to promote adherence in this manner. The experience of physicians caring for Health Plan patients with CV risk factors is that some do not adhere to treatment because of the cost in co-payments. We recommend that the Health Plan consider waiving or reducing co-payments for antihypertensive, lipid-lowering, and diabetes medications for patients participating in health counselor programs.

Smoking Cessation

Cigarette smoking remains the most important risk factor for CVD. Smoking should be banned from the University and from all events sponsored by the University. It is imperative that the Health Plan provide adequate resources to help individuals stop smoking using both pharmacological and the best behavioral approaches. Such smoking cessation programs should be widely known and available at convenient times to members of the health plan and should be of highest quality. Similarly, all students of the University should be encouraged to stop smoking and efforts should be made to provide smoking cessation programs also for the students.

Monitoring plan effectiveness

We suggest that a data base be generated that would provide information on the incidence of CV events requiring hospitalization. Such information does not require individual identifiers but

should provide information regarding age, race, sex distribution and any potentially available income data along with similar information for the baseline population. Furthermore, it would be extremely valuable to be able to determine how many of the CV events are occurring among individuals who have been identified as being high risk and second, whether they were treated, i.e. adherent or not adherent, prior to the event. Such information should be readily available from health care data bases without identification of individual patients. It would be important information for successfully enhancing the effectiveness of the health program and especially feedback to physicians and Health Plan administrators. The absence of good data is a major limitation for evaluating and determining the needs and successes of the prevention program(s).

We should assume that every heart attack, stroke or PVD under 65 is a failure of health care prevention systems and attempt to reduce such failures by improving the prevention programs. Education about the importance of key risk factor reduction for both participants in the Health Plan and physicians is essential but must include effective methods for risk factor prevention or reduction.

Proposal Health Plan Initiative summary

We propose that:

1. 1. The Health Plan launch an educational intervention aimed at physicians and patients to disseminate information about the principles of prevention of CVD as outlined in this proposal.
2. The Health Plan pay for qualified behavioral interventions aimed at reducing CV risk factors in members with the metabolic syndrome, pre-diabetes, diabetes, Agatston CAC score >400 by EBCT, and known CVD.
 - a. These interventions would have to be ordered by the patient's physician to be eligible for reimbursement.
 - b. Qualifying interventions would be based on programs which have been proven to result in improved control of CV risk factors and should be certified by a Risk Evaluation Committee.
3. The Health Plan reimburse EBCT for individuals who are determined to be at intermediate risk by their physician
4. The Health Plan publicize the availability of and reimburse lipid consultation services.
5. The Health Plan develop an adherence health counselor program and tie participation in this program to reduced co-payments on certain medications and certain individuals for whom less stringent adherence of risk reduction strategies places them at high risk of acute CV events.
6. The Health Plan monitor the effect of these interventions by looking at the rate of hospitalizations and procedures for CVD.

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