

Nutritional Assessment and Counseling for Prevention and Treatment of Cardiovascular Disease

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Physicians face several barriers to counseling their patients about nutrition, including conflicting evidence of the benefit of counseling, limited training and understanding of the topic, and imperfect and varied guidelines to follow. Because cardiovascular disease remains the leading cause of death in industrialized nations, family physicians should provide more than pharmacologic interventions. They must identify the patient's dietary habits and attitudes and provide appropriate counseling. Tools are available to help, and a seven-step approach to nutritional therapy for the dyslipidemic patient may be useful. These steps include recommending increased intake of plant proteins; increased intake of omega-3 fatty acids; modification of the types of oils used in food preparation; decreased intake of saturated and *trans*-fatty acids; increased intake of whole grains and dietary fiber (especially soluble fiber) and decreased intake of refined grains; modification of alcohol intake, if needed; and regular exercise. Recommendations should be accompanied by patient information handouts presenting acceptable substitutions for currently identified detrimental food choices. (*Am Fam Physician* 2006;73:257-64, 265-8. Copyright © 2006 American Academy of Family Physicians.)

► Patient information:

A handout on nutrition and exercise for the prevention of cardiovascular disease, written by the authors of this article, is provided on page 265.

Lifestyle can be an important risk factor for the development of cardiovascular disease (CVD), the leading cause of death in industrialized nations. Physicians are the most respected source of lifestyle modification information, and they have contact with 60 to 70 percent of the U.S. adult population each year.¹ Unfortunately, most physicians lack adequate nutrition training and resources, and they face many other challenges in delivering such information.

Barriers that challenge physicians in counseling their patients about nutritional change include lack of time, financial disincentives, competing agendas, a perception that nutritional counseling lacks effectiveness, lack of knowledge about nutrition,² lack of training and expertise in lifestyle modification techniques, and uncertainty about changing guidelines. The lay public also is confused about which dietary recommendations should be followed.

Is Nutrition Therapy Effective in Reducing the Risk of CVD?

The U.S. Preventive Services Task Force (USPSTF)³ found good evidence that medium- to high-intensity dietary counseling for patients with hyperlipidemia and other risk factors for CVD can produce medium to large changes in the intake of the core components of a healthy diet. Further, the USPSTF concludes that such counseling is likely to improve health outcomes if it is delivered by a team that includes nutritionists, dietitians, and specially trained primary health care professionals. The National Cholesterol Education Program-Adult Treatment Panel III⁴ recommends lifestyle changes as the primary and most cost-effective means of reducing the risk of coronary heart disease.

Dietary change can be a powerful tool. It is particularly important as a treatment option for patients who cannot tolerate cholesterol-lowering drugs. A diet that includes soluble fiber, plant sterols, soy protein, legumes, and nuts can produce reductions in low-density

The quickest way to screen for typical dietary imbalances is the Food Frequency Screening Questionnaire, which may be used alone for a brief assessment.

SORT: KEY RECOMMENDATIONS FOR PRACTICE

<i>Clinical recommendation</i>	<i>Evidence rating</i>	<i>References</i>
Patients with hyperlipidemia and other risk factors for cardiovascular disease should receive dietary counseling.	B	3
Patients should increase their consumption of plant proteins.	B	18-27
Patients should consume more omega-3 fatty acids (e.g., fatty fish, green leafy vegetables, flaxseed, canola oil, soybeans, walnuts), particularly if they have or are at risk for coronary heart disease or sudden cardiac death.	B	27, 28, 31
Patients should increase their consumption of dietary fiber and whole grains.	B	35

NOTE: All recommendations are based on fairly consistent results from observational studies using cardiovascular disease or mortality as the primary outcome. Randomized controlled trials are largely lacking for dietary interventions.

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, see page 196 or <http://www.aafp.org/afpsort.xml>.

lipoprotein (LDL) cholesterol and C-reactive protein levels similar to those achievable with a low-fat diet combined with a statin.

USDA EATING GUIDELINES: FURTHER RECOMMENDATIONS

A heart-healthy diet is at the core of recommendations about nutrition counseling. The World Health Organization (WHO)⁵ and other groups⁶ have demonstrated that diets rich in red meats and in fatty, salty, and sweet foods are correlated with an increased risk for heart disease. In contrast, diets high in fruits, vegetables, whole grains, nuts, fish, and poultry may be protective. The Mediterranean diet and diets rich in oily fish are cost-effective and add to the effects of aspirin, beta blockers, statins, and smoking cessation in preventing cardiovascular mortality.⁷

The 1992 U.S. Department of Agriculture (USDA) food pyramid had several limitations, including grouping all carbohydrates and fats equally. The updated guidelines,⁸ released in January 2005, overcome many of these limitations and provide recommendations to help Americans with food choices in a way that is more specific than in the past. For example, food groups now have individual portion size suggestions. However, unless the patient is computer literate and able to access the USDA Web site (<http://www.usda.gov>), information about caloric intake and servings per food group must be provided by the physician. The new pyramid may confuse many persons, creating a need for interpretation and guided applica-

tion by their physicians. The recommended number of servings depends on the person's caloric needs, which in turn depend on his or her age, sex, and activity level. The 2005 guidelines recommend that diets be calorically and nutritionally balanced, with an emphasis on low intake of saturated fat and *trans*-fatty acids and careful attention to the correct proportion of fruit, vegetables, fish, and whole grains.³ This distinction between types of fat and carbohydrate is important because fats may have detrimental effects on overall health (e.g., saturated fats, *trans*-fatty acids) or beneficial effects (e.g., monounsaturated fats, omega-3 fatty acids).⁹ Only whole-grain carbohydrates (i.e., those that include the fiber and germ) are associated with significant reductions in cardiac risk factors¹⁰ and all-cause mortality.⁹

The Healthy Eating Pyramid (*Figure 1*¹¹) is an alternate model that embodies the 2005 recommendations in an easily understood form.¹² This pyramid describes a diet that is palatable and useful for dietary treatment of general populations, including those at risk of CVD.^{13,14}

**Implementing Nutritional Therapy
ESTABLISHING GOALS FOR PATIENTS
AT INCREASED RISK FOR CVD**

During a brief office visit that incorporates nutritional assessment and counseling for patients at risk of heart disease, the physician should consider the following three actions: (1) identify body mass index (BMI) and current dietary intake. Placing a BMI chart at

the scales will allow health care assistants to determine BMI quickly and identify patients whose weight places them at increased risk; (2) ask about the patient's readiness to make dietary changes. If the patient is ready to change, prescribe nutritional therapy or consider referral; and (3) address the patient's concerns about his or her ability to make and maintain needed dietary changes.

IDENTIFYING COMPONENTS OF THE PATIENT'S DIET

Identifying and changing excessive or deficient dietary patterns are crucial to improved outcomes.¹⁵ The quickest way to screen for typical dietary imbalances is by using the Food Frequency Screening Questionnaire, which may be used alone for a brief assessment (*Table 1*). If the results indicate a problematic diet, more detailed dietary evaluation or referral to a dietitian is warranted.

A commonly used nutritional assessment tool is the 24-hour dietary recall. Using this tool, patients report the previous day's intake or, if time is an issue, the meal that represented the largest daily caloric intake, usually lunch or dinner. Physicians should ask about added foods and hidden fats (e.g., cream in coffee, butter on bread). However, they should avoid leading questions such as, "How much milk do you drink?"; instead, patients should be allowed to tell what they ate. If necessary, physicians may ask clarifying questions (e.g., "What did you have on or with the bread?"). Physicians should be sure to ask about beverages and snacks to identify "empty" caloric intake.

CHANGES TO RECOMMEND

Effective nutrition therapy for prevention and treatment of CVD must be in accord with nutrition therapy for diabetes, because diabetes puts patients at the same risk of myocardial infarction as patients with preexisting disease.^{4,10} In essence, nutrition therapy for both diseases amounts to eating a healthy, balanced diet. Patients accustomed to the typical Western diet should consider the following primary dietary changes:

Increase Intake of Plant Proteins. The combination of increased consumption of whole

grains, nuts, legumes, fruits, and vegetables with a diet low in saturated fat and *trans*-fatty acids^{16,17} may significantly decrease cardiac events and mortality.¹⁸⁻²² Soy products have been associated with a beneficial effect on LDL and triglyceride levels.^{23,24} Legumes (e.g., chickpeas, lentils, soybeans, peanuts, kidney beans, black beans, peas, legumes), tree nuts (e.g., almonds, hazelnuts, pistachios, walnuts), and seeds (e.g., sesame seeds, pumpkin seeds, ground flaxseed) are excellent examples of plant proteins that also contain beneficial fats and soluble and insoluble fiber. Patients should use animal protein to garnish vegetables, rather than the reverse, and should choose skinless poultry and fish instead of red meat.^{25,26}

Increase Intake of Omega-3 Fatty Acids. The typical Western diet has a relatively high ratio of omega-6 fatty acids to omega-3 fatty acids. This imbalance is thought to contribute to inflammatory processes, an emerging risk factor for CVD.²⁷ The Physician's Health Study²⁸ found that increased fish intake (i.e., one or two servings per week) reduced the risk of sudden cardiac death compared

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Figure 1. The Healthy Eating Pyramid.

Adapted with permission from Willett W, Skerrett PJ, Giovannucci EL, Callahan M. Eat, drink, and be healthy: the Harvard Medical School guide to healthy eating. New York: Simon and Schuster, 2001:17.

TABLE 1
Food Frequency Screening Questionnaire

Please look through the food items listed. If you eat these foods almost every day, compare the amount you eat to the serving size, and then circle how many of these servings you typically consume *in a day*.

<i>Food</i>	<i>Serving size</i>	<i>Servings per day</i>		
Breads, pasta (not white)	1/2 cup (or 1 slice of bread)	1	2 to 4	5 or more
Fats (cream in coffee, butter, oils)	1 tablespoon	1	2 to 4	5 or more
Fruit	1 medium	1	2 to 4	5 or more
Vegetables	1 cup	1	2 to 4	5 or more
White breads, white rice, pasta, sugary cereal	1/2 cup (or 1 slice of bread)	1	2 to 4	5 or more
Whole grain products such as brown rice, oatmeal, whole-grain cereals	1/2 cup	1	2 to 4	5 or more
Alcohol	One drink: 12 oz of regular beer, 5 oz of wine (12 percent alcohol), 1.5 oz of 80-proof distilled spirits	1	2 to 4	5 or more
Beverages (soda, juices, drinks with caffeine)	8 oz	1	2 to 4	5 or more
Water	8 oz	1	2 to 4	5 or more

Please look through the following food items. Compare the amount you eat to the serving size, and then circle how many of these servings you typically consume *in a week*.

<i>Food</i>	<i>Serving size</i>	<i>Servings per week</i>		
Fish	4 oz	1	2 to 4	5 or more
Legumes (kidney beans, etc.)	1/2 cup	1	2 to 4	5 or more
Meat	3 oz	1	2 to 4	5 or more
Nuts and seeds	1/4 cup	1	2 to 4	5 or more
Poultry	3 oz	1	2 to 4	5 or more
Salty or sweet snacks and desserts	1 oz or 1/2 cup	1	2 to 4	5 or more
Food from restaurants	1 meal	1	2 to 4	5 or more
Beverages (soda, juices, drinks with caffeine)	8 oz	1	2 to 4	5 or more

with consumption of less than one serving per month (relative risk = 0.42 [$P = .02$]).

Green leafy vegetables, flaxseed, canola oil, soybeans, walnuts, and omega-3 fatty acid supplements also are high in polyunsaturated omega-3 fatty acids. Omega-3 fats contribute to the production of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), which inhibit inflammatory immune response and platelet aggregation, are mild vasodilators, and may have antiarrhythmic properties.^{14,27,29} The American Heart Association guidelines³⁰ state that supplements may be recommended to patients with preexisting disease, high risk of disease, or high triglyceride levels, as well as to patients who do not

like or are allergic to fish. The Italian GISSI study³¹ found that the use of 850 mg of EPA and DHA daily resulted in decreased rates of mortality, nonfatal myocardial infarction, and stroke, with particular decreases in the rate of sudden death.

Omega-6 fatty acids, which are found in animal foods and are the major fat in most vegetable oils except olive, canola, and flaxseed oils, should be consumed in moderation but have become overabundant in the Western diet. They contribute to the production of arachidonic acid, which may be immunosuppressive; act as platelet aggregators; and compete for absorption with omega-3 fatty acids. The inflammatory properties of

omega-6 fatty acids in diets with unbalanced fatty acid ratios has led to investigation of their role in inflammatory diseases such as asthma, arthritis, and heart disease.³²

Change the Oils Used in Food Preparation. Nonhydrogenated plant oils have been associated with reduced levels of triglycerides, increased levels of high-density lipoprotein (HDL) cholesterol, and improved glycemic control.³¹ Oils that are primarily monounsaturated (e.g., olive oil, canola oil, peanut oil) may be used for cooking and salad dressings, and oils rich in omega-3 fatty acids (e.g., flaxseed oil, walnut oil) work well in cold foods. All of these oils, even the predominantly omega-6 oils (e.g., soybean oil, corn oil, safflower oil), are preferred over saturated fats (e.g., butter, animal fats, lard) and *trans*-fatty acids (e.g., partially hydrogenated oils).

Decrease Intake of Saturated Fats and Trans-Fatty Acids. Saturated fats from meat and dairy products are typically solid at room temperature. However, semi-solids such as mayonnaise, milk, cheese, other dairy products, ice cream, and sauces, may contain significant amounts of saturated fat.

Processed foods, margarine, and baked goods are the main sources of *trans*-fatty acids in the American diet. *Trans*-fatty acids are atherogenic; they increase levels of lipoprotein (a), LDL cholesterol, and triglycerides, and decrease levels of HDL cholesterol.³³ Beginning in 2006, food manufacturers must list *trans*-fatty acid content on nutrition labels. The FDA estimates that by 2009, *trans*-fatty acid labeling will have prevented 600 to 1,200 cases of coronary heart disease and 250 to 500 deaths each year.³⁴

Increase Intake of Dietary Fiber and Whole Grains. Increasing consumption of dietary fiber, particularly the soluble fiber found in oats, barley, rice bran, nuts, seeds, fruit, and vegetables, may reduce LDL cholesterol levels. Soluble fiber binds to bile acids, inhibiting the absorption of cholesterol, and improves insulin sensitivity by affecting the rate of carbohydrate absorption. Wheat fiber, although highly beneficial for intestinal motility, is primarily insoluble and has less of a normalizing effect on LDL cholesterol levels.²⁴

Refined grains, such as those found in

white flour products and pasta, may contribute to diabetes, weight control problems, and imbalances in triglyceride levels.³⁵ These grains are absorbed quickly and contain fewer nutrients than whole grain alternatives. Many products made with refined grains have added sugar, which causes further imbalances.

Persons increasing their fiber intake should introduce fiber slowly over a period of several days to a few weeks and drink more water to ameliorate possible gastrointestinal discomfort while the gut adjusts to the higher fiber consumption.

Modify Alcohol Intake. Compared with moderate drinkers (i.e., those who have one or two standard drinks per day), nondrinkers and heavy drinkers are at higher risk of CVD and other diseases and have higher total mortality rates.³⁶ Moderate alcohol consumption can be part of a healthy overall lifestyle.³⁷ Moderate alcohol consumption is thought to increase HDL cholesterol levels, decrease clotting, and enhance thrombolysis. Studies from the population-based National Heart, Lung, and Blood Institute Family Heart Study³⁸ show that alcohol consumption is the primary lifestyle factor related to HDL cholesterol levels. Adults with no medical or social contraindications to alcohol may benefit from regular consumption of small to moderate amounts of alcohol with a balanced eating pattern. Giving patients accurate information about alcohol consumption may be as important as presenting evidence for other dietary constituents.³⁶

Exercise Regularly. A sedentary lifestyle limits the amount of calories persons may consume without gaining weight. Thirty to 60 minutes of exercise is recommended on most days of the week to achieve and maintain a healthy weight and to reduce the risk of chronic disease.

Tables 2¹ and 3¹ present summaries of the above recommendations.

Commitment to Nutrition

Simple but effective strategies to reduce a patient's risk of CVD include recommending

The high ratio of omega-6 fatty acids to omega-3 fatty acids in the Western diet may contribute to inflammatory processes.

TABLE 2
Medical Evaluation of Food Frequency and General Recommendations for Dietary Intake

<i>Food</i>	<i>Recommended amount</i>
Added fats	Small amounts of unsaturated, <i>trans</i> -fat-free additions such as <i>trans</i> -fat-free spreads, oil-based salad dressings, and oil-based sauces. Regular use of added saturated fats, such as lard, bacon fat, or butter, cream, and other full-fat dairy products, should be avoided.
Fish	1 or more 4-oz servings per week, especially fatty fish
Fruit	2 or 3 medium fruits per day, with variety
Legumes	1/2 cup several times per week
Meat	Less than 6 oz of lean meat per day, trimmed as appropriate
Nuts and seeds	1/4 cup per day
Poultry	Less than 6 oz of skinless poultry per day
Refined grains	White bread, pasta, and processed salty or sweet snacks should be limited
Vegetables	2 or 3 servings of raw and cooked vegetables per day, with variety (1 serving = 1/2 cup raw vegetables or 1 cup cooked vegetables)
Whole grain products	6 or more servings of predominantly whole grains per day, including cereal, pasta, breads, rice, and other whole grain products (1 serving = 1/2 cup or 1 slice of bread). Starchy vegetables such as potatoes and corn may be consumed as part of the grain guidelines.
Food from restaurants	The above guidelines for food choice and portion control should be followed; saturated fats and extra calories from appetizers, breads, and desserts should be limited.
Alcohol	Use in moderation, if at all (i.e., up to two drinks per day for men and up to one drink per day for women; 1 drink = 12 oz of regular beer, 5 oz of wine, or 1.5 oz of 80-proof distilled spirits)
Beverages	Regular use of sweetened beverages should be avoided; juices should be diluted; patients with arrhythmias may need to avoid or moderate caffeine intake.
Water	As directed by thirst; approximately 64 fl oz per day will benefit persons who increase their fiber intake.

Information from reference 1.

foods such as fish and other lean proteins, fruit, whole grains, and vegetables for their increased nutrient content. Replacing juices and sweetened beverages with whole fruit reduces the amount of calories consumed, increases volume and nutrient content, and lowers insulin and triglyceride levels by slowing absorption. Portion control is crucial at restaurants, because most establishments serve portions that are larger than necessary.¹¹ Once the physician has set dietary goals with the patient, it is likely that the patient will require additional visits and referral to a registered dietitian for education and maintenance of lifestyle changes. Lifestyle changes may make a significant difference over time.

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Author disclosure: Nothing to disclose.

TABLE 3
Summary of Nutrition Recommendations

Recommendation	Examples	Possible mechanisms of action	Likely improvements			
			LDL	HDL	TG	Weight
Maintain a high ratio of plant to animal proteins	Increase intake of nuts (e.g., almonds, hazelnuts, pistachios, walnuts), seeds (e.g., sesame seeds, flaxseed), and legumes (e.g., chickpeas, lentils, soybeans, kidney beans, peanuts, peas)	1	X			X
Increase omega-3 fatty acid intake	Increase intake of fatty fish, green leafy vegetables, flaxseed, walnuts, and flaxseed oils	1		X	X	
Decrease intake of <i>trans</i> -fatty acids	Choose nonhydrogenated cooking oils (e.g., canola, olive, peanut oils for cooking; flaxseed and walnut oils for cold recipes like salad dressings)	3	X	X	X	
Decrease intake of saturated fat	Decrease intake of meats, mayonnaise, eggs, margarine, full-fat dairy products (e.g., whole milk, cheese, ice cream, butter), baked goods, and processed foods	1, 3	X			
Decrease caloric intake for weight loss, if indicated	Increase intake of soups, fruits, vegetables, and soluble fiber; decrease intake of juices, sweetened beverages, and refined grains; use portion control	1, 2	X		X	X
Increase intake of soluble dietary fiber	Increase intake of whole grains (e.g., oats, rice bran, barley), nuts, seeds, fruits, and vegetables; decrease intake of refined grains	2	X	X	X	X
Decrease alcohol consumption (for patients with elevated triglyceride levels, diabetes, hypertension, liver disease, or excessive intake)	Men: ≤ 2 drinks per day; women: ≤ 1 drink per day			X		
Increase physical activity	30 to 60 minutes of exercise most days of the week			X	X	X

LDL = low-density lipoprotein; HDL = high-density lipoprotein; TG = triglycerides.

1 = reducing inflammation by maintaining a proper ratio of omega-3 fatty acids to omega-6 fatty acids and blocking arachidonic acid metabolism; 2 = reducing the absorption of lipids by binding to bile acids; 3 = reducing lipophilic atherogenesis.

Information from reference 1.

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