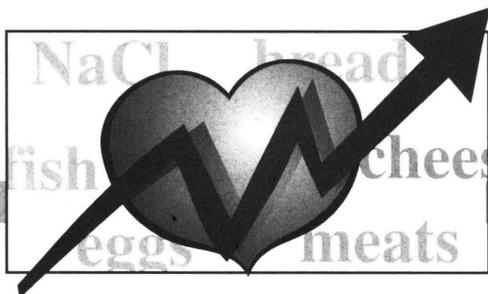


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Human Nutrition,  
Foods and Exercise

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## Heart Healthy Eating – Cholesterol, Fat, Fiber, & Sodium

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### Introduction

Everyone wants to be healthy. (Wealthy and wise, too!) What you eat and do can help you stay healthy. In recent years, there has been much emphasis on changing one's diet to reduce the risk of heart disease and cancer, as these two diseases are the major causes of death in this country.

How to prevent and detect these diseases in the early stages while they are treatable are major areas of study. Too often, the first symptom of heart disease is a fatal heart attack or stroke. Imagine the excitement of doctors when they found that a high level of cholesterol in the blood was often associated with heart disease. The cholesterol content of the blood can be measured by a simple blood test. Dietary and lifestyle changes usually can lower blood cholesterol levels to acceptable ranges for most people — no expensive tests or surgery are required; not even medicine for most persons.

Many of the dietary changes that help to reduce one's risk of heart disease also appear to reduce the risks of cancer. This publication offers suggestions on how to make those dietary changes.

### A Cholesterol Review

Cholesterol is a fatty substance that is carried by the blood to all parts of the body. Most cells of the body can also manufacture it. Some of the cholesterol comes from food (dietary cholesterol), but your body makes the majority of blood cholesterol. If there is too much blood cholesterol, there's a chance that cholesterol will build up or form plaque on the walls of the blood vessels and, in time, even clog them. If that should happen, plaque formation will narrow the blood vessels, which may increase your risk of a heart attack or stroke. Total cholesterol (TC) levels have a desirable, borderline, and high range. It is desirable to have a TC number of less than 200 mg/dl (see chart).

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## Cholesterol Terms

- TC = Total Cholesterol
- HDL= High Density Lipoprotein (Good)
- LDL= Low Density Lipoprotein (Bad)

In addition to knowing the amount of total cholesterol in your blood, the doctor finds it helpful to know how much of the cholesterol is present as HDL-cholesterol (the good kind) and as LDL-cholesterol (the bad kind). Cholesterol teams up with protein to get through the blood vessels. HDL, a high density lipoprotein made up of lipid (another word for fat) and protein, has more protein than fat and appears to carry the cholesterol it contains to the liver for excretion. HDL-cholesterol is known as the “good” cholesterol. Therefore, you want a high HDL number because that indicates a high level of this good cholesterol in your blood. **It is desirable to have a HDL-cholesterol of more than 40 mg/dl.** An average HDL number is in the mid-forties range for a man and in the fifties range for a woman. A HDL number less than 40 is considered low and increases your risk. The higher your HDL number, the better. For more information on coronary heart disease risk factors and cholesterol numbers, refer to VCE Publication 348-018, *Know Your Cholesterol Number*.

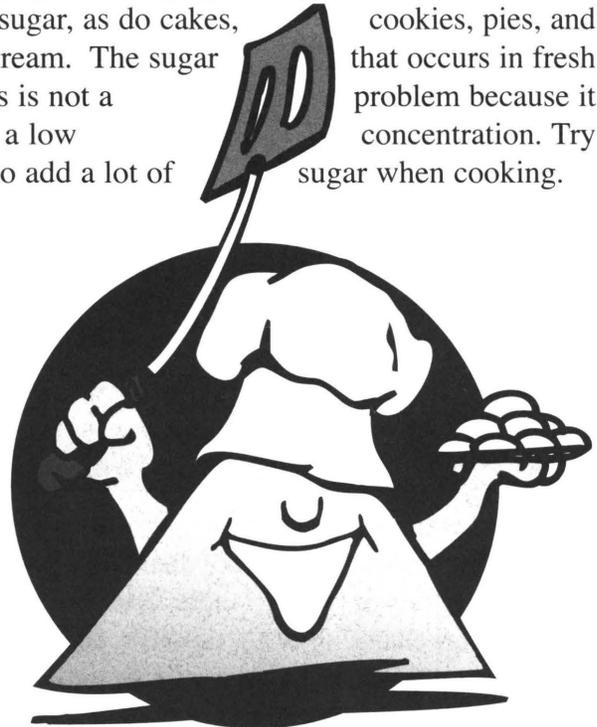
LDL-cholesterol is a low density lipoprotein (more fat, less protein). The cholesterol it contains is carried to the tissues and may be deposited in the blood vessels, which causes plaque formation. It is desirable to have a LDL-cholesterol of less than 100 mg/dl. The LDL number is always larger than the HDL number.

Blood Cholesterol Levels		
	LDL Cholesterol (mg/dl)	Total Cholesterol (mg/dl)
Optimal	less than 100	less than 200
Near Optimal	100-129	
Borderline	130-159	200-239
High	160 or above	240 or above

The doctor or lab report may give you a TC/HDL ratio number. The ratio number is calculated by dividing the total cholesterol (TC) number by the HDL-cholesterol number. In general, a number less than 5 is associated with a decreased risk of heart disease. Make sure you ask your doctor to clarify the ratio number and how it is calculated.

## Triglycerides

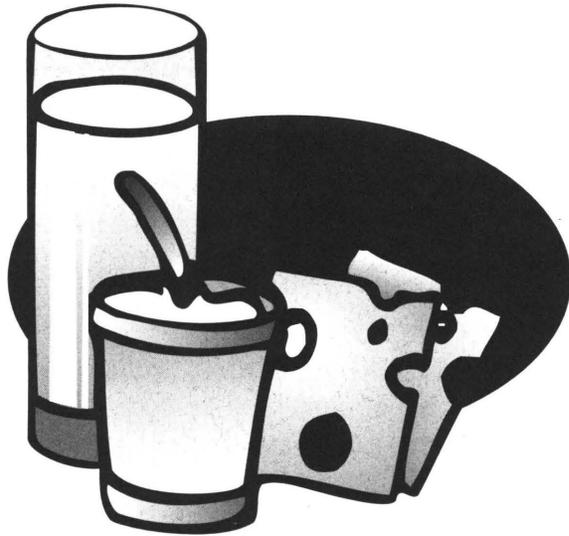
Triglycerides are another form of fat that can be measured in a blood sample. Triglyceride levels may be high even when blood cholesterol is normal. To lower triglyceride levels, you will need to lose weight if you are overweight, and limit the consumption of sugar. Read food labels to find if sugar has been added. High fructose corn syrup, glucose, fructose, corn syrup, mannose, sucrose (table sugar), lactose, and dextrose are words to look for if you are trying to limit sugar. Jellies, honey, pancake syrup, candy, and soft drinks contain sugar, as do cakes, cookies, pies, and ice cream. The sugar that occurs in fresh fruits is not a problem because it is at a low concentration. Try not to add a lot of sugar when cooking.



## Dietary Cholesterol

Cholesterol is found in the foods we eat, but our own bodies make a larger amount. Therefore, limiting foods that contain dietary cholesterol in your diet may or may not help to lower blood cholesterol levels. A cholesterol lowering diet should first be low in total fat, especially saturated fat, as well as cholesterol.

Here is a question to help you understand which foods contain cholesterol. “Which of these sandwich fillings do **not** have cholesterol: tuna, peanut butter, cheese, or ham?” The correct answer is peanut butter. Why? Animal products have cholesterol; plant foods do not. Peanut butter comes from a plant; therefore, it does not contain cholesterol, but it is high in fat.



The amount of cholesterol in a serving of most foods is small (exceptions: egg yolk and organ meats). Two 3-ounce servings of red meat or poultry plus two 8-ounce glasses of 2% milk (the amounts recommended for an adult in the Food Guide Pyramid) would total 186 mg of cholesterol, well under the daily target of 300 mg.

You don't have to give up meat and other animal foods if you are on a cholesterol-lowering diet, but you may need to eat smaller servings or to eat some foods less often. The following table shows the cholesterol content of some selected foods. It does not list every product but should be a helpful guide. No two servings of a food will have exactly the same amount of cholesterol. Cholesterol is found in lean meat as well as in meat with visible fat, and so choosing a lean meat or removing the fat will not reduce the amount of cholesterol per serving. (See Table 1.)

If you are wondering about the cholesterol content of a food product, look at the recipe or the listing of ingredients on the food package. Foods that contain butter, lard, eggs, milk, cheese, or other animal foods will have some cholesterol. One egg distributed in 3 dozen rolls or cookies won't add up to much cholesterol in each roll or cookie.

The cholesterol and fat in an egg are found in the yolk, not the white. Two egg whites can be used to replace one whole egg in many baking products. For other recipes, use one whole egg plus one egg white. Commercial egg substitutes are available but are more expensive than fresh eggs, even if you discard the yolks. A homemade egg substitute product can be made by using 3 egg whites, 1/4 cup skim or nonfat milk, 1 tablespoon of dry nonfat milk solids, and 1 teaspoon vegetable oil. (This is the equivalent of two whole eggs or 1/2 cup egg substitute.)



**Table 1. Cholesterol Content of Selected Protein Foods**

Beef, pork and lamb, cooked	3 oz.	75 mg
Chicken and turkey, dark meat, cooked	3 oz.	75 mg
light meat, cooked	3 oz.	60 mg
Milk, whole	1 cup	33 mg
2%	1 cup	18 mg
nonfat	1 cup	5 mg
Egg yolk	1 large	210 mg
Cheeses	1 oz.	25 to 30 mg
Liver and other organ meats, cooked	3 oz.	372 mg
Fish and shellfish, cooked	3 oz.	70 mg

## Nutrition Facts

A "Nutrition Facts" panel is required on the label of food products to tell the amount of calories, fat, cholesterol, sodium, carbohydrates, protein, and certain vitamins and minerals that are contained in one serving of a product. The size of the serving is also given. Food labels list the cholesterol content of a food in milligrams and the fat content in grams with the percent daily values. The percentage of daily value is based on 2,000 calories. The percentage shows how much a serving of a food contributes to your daily nutrient needs.

If you are trying to limit cholesterol or fat, look for foods with low percentages. For more information on understanding food labels refer to VCE Publication 348-018, "Know Your Cholesterol Number."

Nutrient content claims and health claims may be on food packages. These foods must meet legal standards set by the Food and Drug Administration (FDA). Often, other types of media advertisements

may emphasize the fact that a product has no cholesterol and imply that it is better than other products because of that fact. However, all other products in the same group may be cholesterol free, too. Vegetable products do not contain cholesterol and so "cholesterol free" is correct for corn, soybean, olive, peanut, coconut, and all other oils.

## Ingredient Listing

The ingredients used to prepare a product must be listed on the label of most food products. The order in which they are listed can help you make a selection. The first ingredient listed is the main ingredient used or the largest amount by weight.

*The following ingredient lists were taken from containers of margarines or spreads.*

1. Water, liquid soybean oil, partially hydrogenated soybean oil...
2. Vegetable oil blend (partially hydrogenated soybean and cottonseed), water...
3. Liquid corn oil, partially hydrogenated corn oil...

### If the label says:

### The food must have:

Fat free	Less than 0.5 gram or 1/2 gram (g) fat in a serving
Low fat	3 g or less fat per serving*
Reduced or less fat	At least 25% less fat than reference food**
Low saturated fat	1 g or less per serving and not more than 15% of calories from saturated fat
Cholesterol free	Less than 2 milligrams (mg) cholesterol and 2 g or less of saturated fat per serving
Low cholesterol	20 mg or less of cholesterol and 2 g or less of saturated fat per serving*
Lean (meat, poultry, seafood)	Less than 10 g of total fat; less than 4 g saturated fat, and less than 95 mg cholesterol per reference amount
Extra Lean (meat, poultry, seafood)	Less than 5 g total fat; less than 2 g saturated fat, and less than 95 mg cholesterol per reference amount

\* If the serving is 30 g or less or 2 Tbsp. or less, per 50 g of the food.

\*\* A reference food is the full-fat version of the food.

## Dietary Fat

The amount and kind of fat in your diet are actually more important than the cholesterol content. Many foods have some fat. It is important to spot the fat in a piece of meat or in the butter or margarine we spread on bread, or the oil that rises to the top of some salad dressings. It is not as obvious in cakes, biscuits, croissants, other baked products, ice cream, hot dogs, eggs, and peanut butter. If you cook, choose recipes that have small amounts of shortening, lard, butter, margarine, and oil.

Experts recommend that we get about 25-35% of our calories from fat. The rest of the calories would be split between protein (10-15%) and carbohydrate (55-60%). That means that if you regularly eat 2000 calories a day, only 600 calories should come from fat and limiting saturated type fats.

How much fat does it take to provide 600 calories? One pat of butter has about 35 calories and so 18 pats would equal 600 calories. But remember that the 600 calories from fat must include the fat in meat, milk, and baked products, as well as the butter or margarine you use.

Food tables and labels may list the number of grams of fat in a serving, rather than the number of calories from fat. **Each gram of fat is equal to 9 calories.** It is easier to keep track of the number of grams of fat than to figure the percentage of calories for each food or for each day. Refer to VCE Publication 348-900, *Fat Tracker*, for more information on fat grams in food.

Some people like to look at the calories from fat in each food they eat. For example, a glass of whole milk has a total of 150 calories and 72 calories (8 grams x 9 calories per gram) from fat; that's almost half of the 150 calories. A biscuit has 45 calories from fat; about half of the 100 total calories. It makes better sense to look at the percentage of calories from fat in the total day's intake, as a number of foods have no fat unless it is added in cooking or at the table. On the other hand, oils and shortenings get all of their calories from fat. To calculate % calories from fat, multiply the total number of grams of fat by 9; then divide by the total number of calories.

$$\% \text{ Calories from Fat} = \frac{\# \text{ of Total Calories} \times 9}{\# \text{ of Grams of Fat}}$$

If you consume	30% would be	or grams of fat
1200 calories	360 calories	40
1800 calories	540 calories	60
2000 calories	600 calories	67
2400 calories	720 calories	80
2800 calories	840 calories	93

## Types of Fats — Saturated, Monounsaturated, Polyunsaturated

The type of fat you eat is important, too. Fats are made up of fatty acids which may be saturated, monounsaturated, or polyunsaturated, depending on their chemical structure. Saturated fats have a full complement of hydrogens—there is no place to add another. A monounsaturated fatty acid (MUFA) has one double bond to which hydrogen could be added, while a polyunsaturated fatty acid (SAFA) has two or more double bonds to which hydrogen could be added. Foods with more saturated than polyunsaturated fatty acids are solid at room temperature. Most

fats, whether liquid or solid, have some of all three types of fatty acids. Animal fat is usually high in saturated fatty acids. Vegetable oils have more polyunsaturated and monounsaturated fatty acids and are usually liquid at room temperature. There are some exceptions. Coconut, palm, and palm kernel oils are vegetable oils, but they have more saturated fat than polyunsaturated.

Eating mostly saturated fat will raise blood cholesterol levels. Substitute monounsaturated and polyunsaturated sources of fat for saturated to lower blood cholesterol levels. The American Heart Association recommends increasing the intake of monounsaturated fats (MUFA) to an

intake of 10-15% range. **Eat 20-25% of fat calories from unsaturated fat (MUFA & PUFA) food sources, and limit saturated fats to 5-7%.**

As you can see below in Table 2, food of animal origin usually contains both saturated and monounsaturated fatty acids but little polyunsaturated fat. Olive, peanut, canola, and sesame oil are especially rich sources of monounsaturated fatty acids. Polyunsaturated fatty acids are found primarily in vegetable oils and margarines, spreads, salad dressings, and other foods which have oil as an ingredient. Safflower, sunflower, corn, soybean, and cottonseed oils are the best sources of polyunsaturated fat.

### Omega-3 Fatty Acids

Omega-3 refers to the location of the unsaturated bonds in a fatty acid. The fat of many varieties of fish and seafood is high in Omega-3 fatty acids. Eskimos who get a lot of Omega-3 fatty acids in their diet have a lower incidence of heart disease,

lower levels of blood cholesterol and triglycerides, and higher levels of HDL cholesterol than the population at large. Feeding trials in the U.S. have not been clear cut, so at this time it doesn't appear that taking large amounts of Omega-3 in capsules or supplements is worth the expense. It does make sense to eat fish and seafood frequently as a good source of low-fat, high-quality protein.

### Hydrogenated Fats

Vegetable oils are often hydrogenated in the making of shortening and margarines to make them solid at room temperature. This process enables the making of stick margarine from corn oil and of shortening from soybean oil. Hydrogenation is a process that produces a solid spreadable fat from an unsaturated liquid oil. It is really another way of describing saturation. An oil may be only partially hydrogenated in the making of soft margarines and spreads.

**Table 2.** Profile of Fatty Acid and Cholesterol Content of 100 grams<sup>1</sup> of Selected Vegetable Oils and Animal Fats.

	Saturated	Monoun-saturated	Polyun-saturated	Cholesterol
Oil / Fat	g	g	g	mg
<b>Vegetable</b>				
Canola	7 <sup>2</sup>	56 <sup>2</sup>	33 <sup>2</sup>	0
Coconut	87	6	2	0
Corn	13	24	59	0
Cottonseed	26	18	52	0
Olive	14	74	8	0
Palm kernel	81	11	2	0
Peanut	17	46	32	0
Safflower	9	12	75	0
Sesame	14	40	42	0
Soybean	14	23	58	0
Sunflower	10	20	66	0
<b>Animal</b>				
Beef tallow	50	42	4	109
Butter	51	23	3	219
Chicken	30	45	21	85
Lard	39	45	11	95

<sup>1</sup>100 grams is equal to about 3.5 ounces or about 7.5 tablespoons of oil or almost a stick of butter.

<sup>2</sup>Numbers rounded to nearest gram weight.

## Trans Fatty Acids

Recently, information in the media has focused on trans fatty acids in margarine. Foods made with hydrogenated fats, such as margarine or common processed foods (crackers and cookies), will also have trans fatty acids. Another significant source of trans fatty acids are **deep fat fried foods**.

Research has estimated the amount of trans fatty acids from all dietary sources to provide as little as 2-3% or as much as 5-8% of total calories. This compares with 14% from saturated fat and 34% from total fat.

A trans fatty acid is made when unsaturated fatty acids are hydrogenated. Again, this means adding hydrogen atoms on the fatty acid molecule to make a solid product. In a trans fatty acid, the two added hydrogen atoms are placed on the opposite side of the chain of carbon atoms. This makes the shape of trans fatty acids straight rather than curved, like the natural occurring cis fatty acid. A cis fatty acid has the two hydrogen atoms added on the same side of the carbon atoms.

Research continues, but trans fatty acids appear to raise blood levels of total cholesterol and LDL-cholesterol and possibly lower HDL-cholesterol levels. **The best dietary advice remains unchanged—reduce fat intake to 30% of calories or fewer and saturated fat to less than 7% of calories or fewer. In general, limit your consumption of high-fat snacks.**

**Table 3. Trans Fatty Acid Content**

Foods	Trans Fatty Acid (g)
1 biscuit	1.1-1.4
1 slice pound cake	1.6
1 slice fat-free pound cake	0.1
10 saltine crackers	0.5-0.9
1 ounce snack crackers	1.8-2.3
1 glazed donut	0.3-3.8
1 ounce potato chips	0.0-3.0
1 cup French fries	0.6-2.8
1 Tbsp. hard margarine	1.7-3.4
1 Tbsp. tub margarine	0.4-1.6
1 Tbsp. shortening	1.4-4.2
1 Tbsp. corn oil	0.0-0.1

Based on figures from USDA Nutrient Database for Standard Reference, release 12, U.S. Department of Agriculture, Agricultural Research Service, 1998

## Butter vs. Margarine

There is no longer a simple choice between butter and margarine as there are now a number of margarines and spreads. Margarine, an imitation of butter, has now been imitated. Which you should choose depends on whether you are concerned about the calorie content, the total fat content, the cholesterol content, or the amount of unsaturated fats (PUFA & MUFA) it contains.

Butter has no more calories or fat than the first two margarines listed. It does contain a small amount of cholesterol (31 mg per tablespoon) and most of the fat it contains is saturated. The soft margarine is the highest in unsaturated fats and has no cholesterol, but it has just as much fat and as many calories as butter. The imitation margarine has the smallest amount of fat, the fewest calories, and no cholesterol.

## Butter, Margarines, & Spreads

	Calories	Total fat grams	Saturated fat grams	PUFA grams
<b>1 Tablespoon:</b>				
Butter, (80% fat)	100	11	7.1	0.4
Margarine, reg (80% fat)	100	11	2.2	3.6
Margarine, soft (80% fat)	100	11	1.9	4.8
Margarine, imitation (40% fat)	50	5	1.1	1.9
Spread (60% fat)	75	9	2.0	2.5

Margarines and spreads are made from vegetable oils, which are high in polyunsaturated fatty acids and contain no cholesterol. However, the oil is partially hydrogenated (saturated) in the process of making a margarine or spread to give the product shape. If you are looking for the margarine or spread with the most unsaturated fats (MUFA & PUFA), look for one that lists liquid oil as the first ingredient.

### Other Dietary Changes—Fiber

What other changes should you make in your diet? Be sure you are getting enough fiber. Some kinds of fiber help lower blood cholesterol levels; other kinds help regulate your bowel function and may reduce your risk of cancer. Fiber is found in fruits, vegetables, breads, cereals, and other grain products. Animal products have little fiber no matter how chewy they are.

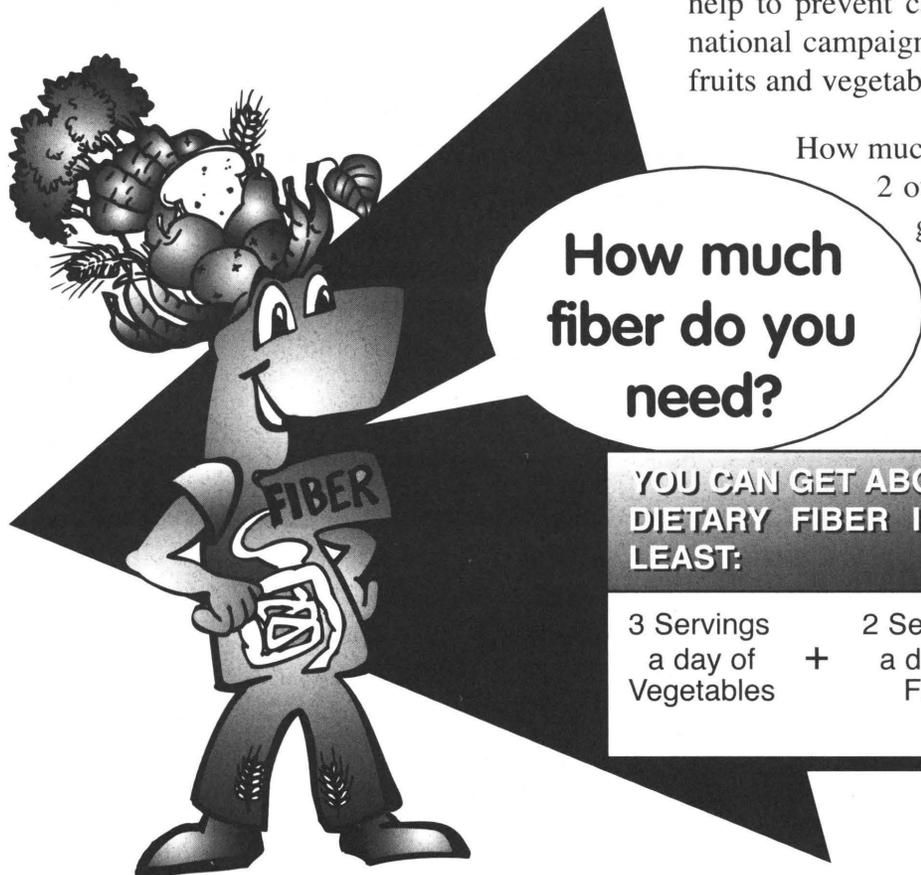
Soluble fiber helps to lower blood cholesterol levels in most individuals when added to the diet. Oat bran is the most talked about source of soluble fiber, but dry beans and peas, many vegetables, and most fruits also contain soluble fiber.

Insoluble fiber produces the tough, chewy texture of wheat bran, whole grains, and vegetables. Cellulose, hemicellulose, and lignin are insoluble fibers. Eating foods containing insoluble fiber is important for proper bowel function and can reduce symptoms of chronic constipation, diverticular disease, and hemorrhoids.

You may see conflicting information about the fiber content of foods. Until recently, crude fiber was the measure used. Now we know that foods don't have to be "rough" or eaten raw in order to have fiber. Pectin, present in most fruits, is a form of soluble fiber, which is not at all crispy or crunchy. The food label lists the number of grams of dietary fiber and the percent daily value. Manufacturers may also list the amount of insoluble and soluble fiber in a food.

Fruits and vegetables are low-fat, no-cholesterol foods that you can use to replace some of the high-fat foods you are now eating. Cook and eat them with little or no added fat. If you are worried about calories, go easy on the sugar, too. A bonus for fruits and vegetables is their Vitamin A and Vitamin C content. Some research indicates that foods containing vitamins and phytochemicals may help to prevent cancer. Thus, there is a 5 A Day national campaign to encourage people to eat five fruits and vegetables a day.

How much fiber do you need? It takes just 2 ounces of oat bran a day (about 6 grams of soluble fiber) to lower blood cholesterol levels when added to a low-fat, low-cholesterol diet. That equals 2 servings



How much fiber do you need?

**YOU CAN GET ABOUT 20 GRAMS OF DIETARY FIBER IF YOU CHOOSE AT LEAST:**

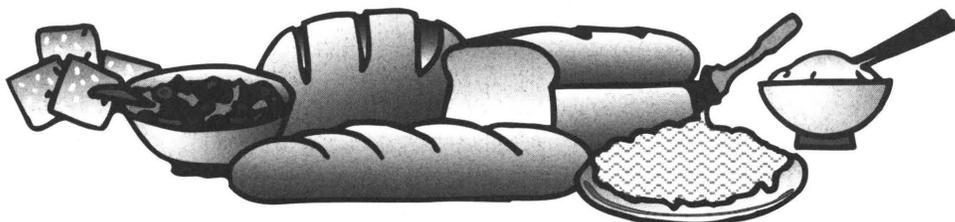
3 Servings a day of Vegetables	+	2 Servings a day of Fruit	+	3 Servings a day of Whole-Grain Products
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of cooked oat bran or oatmeal but you should get more total dietary fiber than that—20 to 35 grams every day is the usual recommendation.

The Food Guide Pyramid recommends 6 to 11 servings of bread, cereal, rice, and pasta products, 3 to 5 servings of vegetables, and 2 to 4 servings of fruits each day. If you selected all of the servings from the listing of foods with 1 to 3 grams of fiber, you would get 8 to 24 grams of fiber. That is marginal, so select at least one food each day with 3 or more grams of fiber. VCE Publication 348-050, *The Bottom Line: Eating up to 6-11 Servings*, can help you calculate how much fiber is in your diet.

Fiber is apt to cause a feeling of fullness and gas, so you may want to increase fiber consumption gradually. Drink plenty of liquid to get the greatest benefit.

The following groupings of foods in Table 3 have about the same amount of fiber. The serving size is 1/2 cup unless otherwise indicated. Notice that meat, poultry, fish, and dairy products are not included as they do not contain fiber.



**Table 4. Fiber Content of Foods\***

	Fruits	Vegetables	Legumes, Nuts, Seeds	Grain Products	
Less than 1 gram	Apple juice, 3/4 C Apricot, dried halves, 3 Apricot nectar, 3/4 C Cherries, 10 raw Grapes, 10 Kiwifruit, 1 Orange juice, 3/4 C Peach half, canned, 1 each Watermelon	Beans, snap Carrot, raw, 1 each Celery, 1 stalk Cucumbers, 6 slices Green onion, 6 Lettuce, 1 cup Mushrooms Olives, green, 4 medium Parsley, 10 sprigs Spinach, raw Tomato, 1 each Watercress, 1 cup Zucchini, cooked	Tahini, 1 tbsp	Biscuit, 1 medium Bread, French, 1 sl. Bread, Italian, 1 sl. Bread, oatmeal, 1 sl. Bread, white pita, 1 sl. Bread, Vienna, 1 sl. Bread, wheat, 1 sl. Bread, white, 1 sl. Bread crumbs, 1 cup Cake, yellow, 1 piece Cookies, 1 brownie Cookies, 2 chocolate chip Cookies, peanut butter, 4 Corn flakes, 1 C	Crackers, 2 graham Crackers, 1 melba toast Crackers, 4 saltines Crackers, 4 wheat Crackers, 2 whole wheat Danish pastry Doughnuts, 1 each Graham cracker, 4 squares Noodles, chow mein Oat flakes, 1 C Pancake/waffle, 1 each Pretzel, 10 sm. sticks Rice, white Rice Krispies, 1 1/4 c
1 to 2 grams	Applesauce Banana, 1 Blueberries Cantaloupe, 1/2 melon Fruit cocktail Grapefruit, raw, 1/2 medium Nectarine, 1 Peach, 1 Pineapple, chunks Prune juice, 3/4 C Raisins, 2 tbsp Strawberries	Beets Broccoli, cooked Cabbage, 1/2 C Cauliflower Potato, baked (no skin), 1 Potato, boiled, 1 Potato, 10 french fries Potato, hashed browns, 1 C Spinach, cooked Tomato sauce, 1 C Turnips Water chestnuts	Peanut butter, 2 tbsp Sunflower seed, 1/4 C Tofu, 1 piece	Bagel, 1 Bread, 1 sl. cracked wheat Bread, 1 sl. mixed grain Bread, 1 sl. pumpernickel Bread, 1 sl. rye Bread, 1 sl. whole wheat Corn chips, 10 Crackers, 2 rye Crackers, 4 whole wheat Egg Noodles, 1 C	English Muffin, 1 Fig bars, 2 Fruitcake, 1 piece Gingerbread, 1 piece Granola, 1/2 C Macaroni, 1 C Muffin, blueberry Oatmeal cookie, 4 Pie, cherry, 1 piece Popcorn, 2 C Rice, brown Spaghetti, 1C Tortilla chips, 7-10 chip Tortilla, corn, 1 Wheat flakes, 1 C

**Table 4. (continued) Fiber Content of Foods\***

	<b>Fruits</b>	<b>Vegetables</b>	<b>Legumes, Nuts, Seeds</b>	<b>Grain Products</b>	
3 to 5 grams	Apple with peel, 1 Orange, 1 large Pear, 1 Prunes, 5 large	Broccoli, 1 raw spear Pea, green Potato, baked with skin, 1 medium Squash, summer Squash, winter Sweet potato, 1/2 C. cooked Vegetables, mixed	Coconut, raw English walnuts, 1 C Hazelnuts, 1 C Lentils, cooked Pecans, 1 C	Barley, pearled, cooked Bread stuffing, 1 C English muffin, 1 whole wheat Cornmeal, 1 C Farina, 1 C Macaroni or pasta, whole wheat, 1 C Muffin, 1 oat bran Pecan pie, 1 piece Wheat germ, 1/4 C Wheat crackers, 7 cracker	English Muffin, 1 Fig bars, 2 Fruitcake, 1 piece Gingerbread, 1 piece Granola, 1/2 C Macaroni, 1 C Muffin, blueberry Oatmeal cookie, 4 Pie, cherry, 1 piece Popcorn, 2 C Rice, brown Spaghetti, 1C Tortilla chips, 7-10 chips Tortilla, corn, 1 Wheat flakes, 1 C
6 grams or more grams	Date, 10 whole Mango, 1 raw medium Peaches, dried, 1 C Prunes, stewed	Artichoke, 1 Corn Tomato paste, 1 C Tomato puree, 1 C	Almonds, slivered, 1 C Black walnut, 1 C Chickpeas Dried beans (Black-eyed, Kidney, Pinto, Baked beans, etc.) Lima beans Pistachio, 1 C	100% Bran cereal, 1/3 C Bran flakes, 3/4 C Bran Flakes with Raisins, 1 C Bulgur, 1 C Cornmeal, whole-grain Oats, 1/4 C	Wheat bran Whole wheat flour

\*Serving size is 1/2 cup unless otherwise indicated.

Source: USDA - Human Nutrition Information Service HNIS/PT - 106, 1988.

## Sodium

How much sodium should you have? Experts suggest that 3,000 mg would be a good target for healthy adults. Low sodium diets may be planned at 2,000, 1,000, or even 500 mg.

People with high blood pressure are often advised to eat less sodium. Salt is the most usual source of sodium: one teaspoon has 2,325 mg of sodium. Use less salt in cooking and at the table, but also go

easy on prepared foods that have sodium added. Canned soups, frozen dinners, cured meats and luncheon meats, chips, crackers, dill pickles, and sauerkraut are examples of foods that can have high amounts of sodium per serving.

The sodium content of a serving of food will be listed on the new food label as the number of milligrams of sodium in a serving and percent daily value.

### If the label says:

### then the amount of sodium per serving is:

Low sodium	140 mg or less
Very low sodium	35 mg or less
Sodium free or salt free	5 mg or less
"Light in sodium" or "Lightly salted"	50% less than usual product
Reduced sodium	75% less than usual product
Unsalted or no salt added	None added but may contain sodium

## Homocysteine

New research reveals that high levels of homocysteine and low levels of B vitamins (B6, B12, and folate) may increase your risk for coronary heart disease. Homocysteine, an amino acid in your blood, is an emerging risk factor that is independently associated with an increased risk of heart disease.

Homocysteine is formed from methionine, an essential amino acid found in protein-rich foods such as meat and fish. After eating, protein-rich foods are broken down into methionine. Methionine is released and makes proteins and other important compounds for your body. Excess methionine is converted into homocysteine. Eating too many protein-rich foods results in excess homocysteine in your blood, which increases your risk for heart disease.

The most frequently cited cause of elevated homocysteine is linked to low amounts of folate. Folate or folic acid is a B vitamin and is found in fruits, vegetables, greens, orange juice, and eggs. Research suggests that homocysteine levels can be high when there is a deficiency of dietary vitamins—B6, B12, or folate. These B vitamins are needed to metabolize homocysteine. Measuring folate levels in the blood may be a “marker” to identify high homocysteine levels.

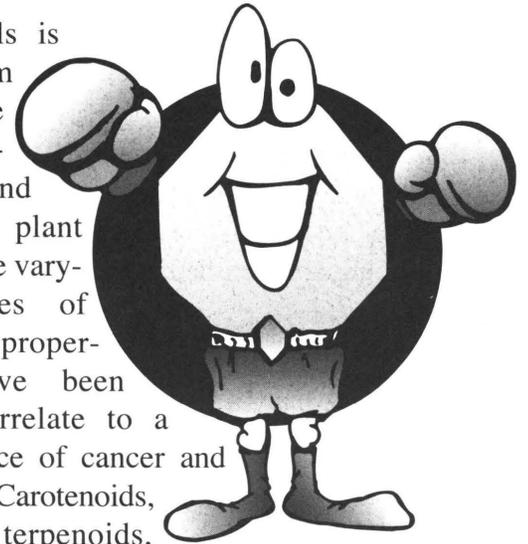
Researchers continue to examine the relationships among vitamin B6, vitamin B12, folate, homocysteine, and cardiovascular disease. Eating a diet based on the Food Guide Pyramid that is rich in fruits and vegetables and with adequate, but not excessive, protein-rich foods will increase the B vitamins and decrease homocysteine levels in your blood.

## Antioxidants

Antioxidants are compounds that interrupt the production of free radicals, a natural process that occurs in metabolism of body tissues. Free radicals are known to do damage to various compounds or tissue structures in the body and are hypothesized to injure cell membranes or “bodies” that can lead to atherosclerosis in heart vessels or cancer.

Several vitamins that are known to be antioxidants are Vitamins E and C, and Beta-carotene. Several clinical trials and epidemiological surveys have established that Vitamin E reduces oxidation of LDL. The risk of heart disease is significantly lowered in populations that consume the highest levels of Vitamin E. Vitamin E supplements (100-400 IU per day) may decrease your risk of getting heart disease. Beta-carotene and various carotenoid compounds from Vitamin A rich foods show great promise of antioxidant activity and protection from heart disease. Vitamin C is well known for being an antioxidant, but appears only to protect Vitamin E relative to prevention of heart disease.

Phytochemicals is a general term for a wide range of compounds found naturally in plant foods that have varying degrees of antioxidant properties, or have been shown to correlate to a lower incidence of cancer and heart disease. Carotenoids, flavonoids, terpenoids, saponins, and phytosterols are just a few of the groups of compounds found in fruits, vegetables, and grains that have protective activity relative to heart disease and cancer. The controlled feeding studies and long-term intervention studies are currently underway, but the research data has, to date, shown the wisdom of consuming more fruits and vegetables, whole grains, and soy products. This area of research is very exciting and holds the promise of even greater effectiveness in dietary prevention of two of the more deadly of western diseases—heart disease and cancer.



## Recipe Modification

Change your own favorite recipes to lower the amount of cholesterol or fat they contain, or to include more polyunsaturated fat and less saturated fat or to reduce the amount of sugar and salt or to increase the amount of fiber. Many of these changes will also lower the calorie content.

If a recipe calls for:	use:
1 cup butter or margarine	3/4 cup oil
1 tablespoon butter or margarine	3/4 tablespoon oil

You can either change the way the food is cooked or change ingredients. Bake or boil a potato or chicken rather than frying. Stew an apple instead of making an Apple Dumpling. To change ingredients, use less of an ingredient or leave it out altogether. You might substitute something else for an ingredient. Using oil in a muffin recipe instead of melted butter increases the polyunsaturated fat and lowers the saturated fat content of the muffins.

It isn't always possible to substitute one kind of a shortening for another, however. Solid shortenings (butter, margarine, hydrogenated shortenings, lard) work better than oils in cakes where the sugar and shortening are creamed together.

Oils, lard, and hydrogenated shortenings are 100% fat. Butter and regular margarines are just 80% fat; spreads and imitation margarines have only 40-60% fat, which means they have less "shortening" power.

## Children

Should children in the family change their eating habits? Infants and teens are growing at a very rapid rate. It is important that the food they eat supply the calories and other nutrients they need. There's a danger that cutting out or down on foods that contain fat (meat, milk, egg) will mean there are not enough calories and other needed nutrients such as calcium and iron for normal growth to occur. In fact, some physicians have reported seeing children whose growth has been stunted because parents severely restricted fat intake. **Experts agree that diets of infants and children up to age two should not be changed.**

## Lifestyle Changes

There is not such a clear-cut answer for older children and teens. If there is a strong family history of heart disease, it is a good idea to have blood cholesterol tested, perhaps even a blood profile

done. Most physicians will suggest dietary changes if the total cholesterol level is above 175; certainly, if above 200.

What you eat is important to your health, but so are other health habits. Physical activity, whether for work or recreation, is a key element in health. Exercise can help to control weight, to lower total plasma cholesterol, and to increase the good HDL and decrease the bad LDL cholesterol.

There is stronger evidence to support the relationship of smoking to risk of heart disease and cancer than for diet. If you are going to change dietary practices, you should first consider stopping smoking. Seek medical advice as a preventive health measure. Don't wait until you are sick.

Remember eating a diet based on the Food Guide Pyramid is a family priority, whether your goal is to keep blood cholesterol low or to lower elevated cholesterol levels.

- Eat a variety of foods.
- Eat 5 fruits and vegetables every day.
- Eat 6-11 grain and cereal foods every day.
- Select low-fat dairy products.
- Eat poultry, fish, and dried beans and peas as well as moderate (or smaller) portions of lean pork, beef, lamb, and veal as protein sources.
- Eat 20-25% of fat calories from unsaturated fats (MUFA & PUFA) food sources and limit saturated fats to 5-7%.

## References

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