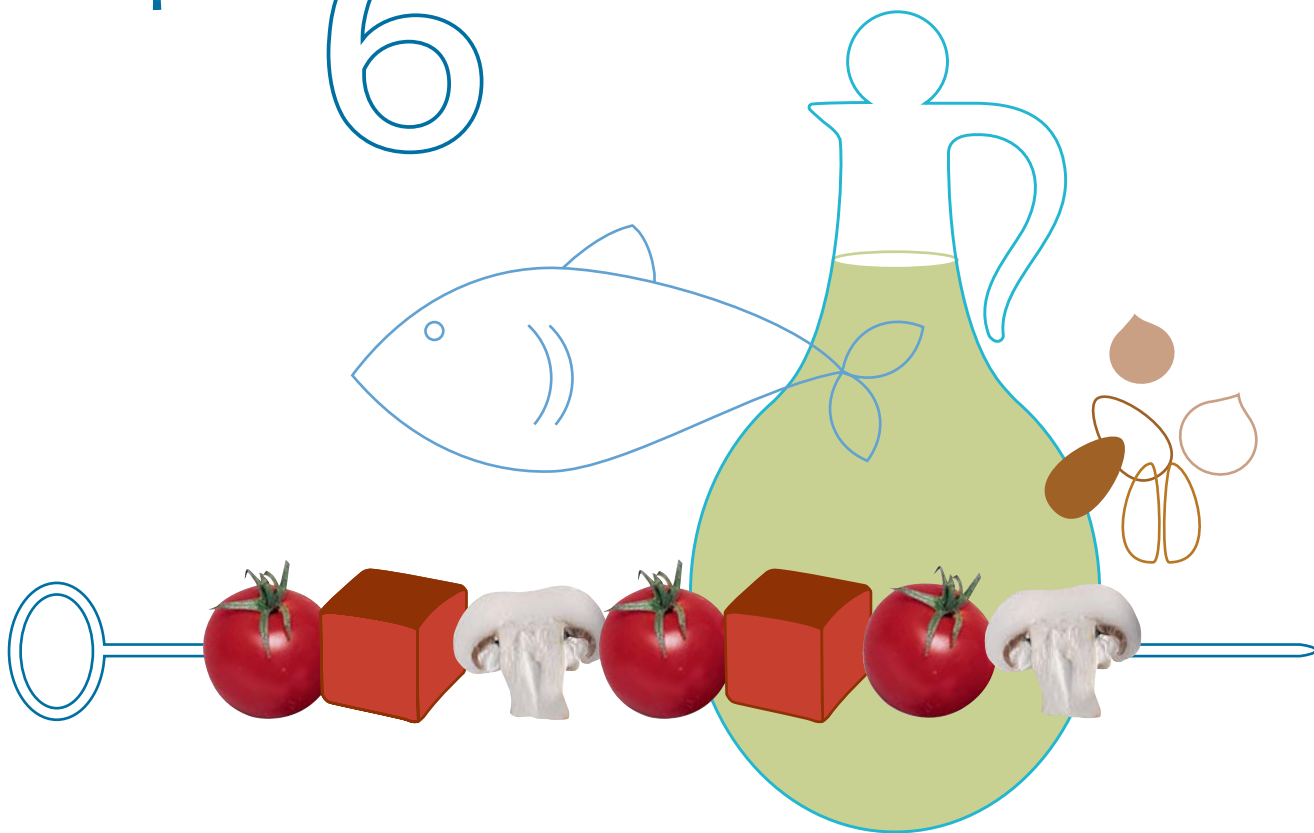


# chapter 6



## Fats

### OVERVIEW

Fats and oils are part of a healthful diet, but the type of fat makes a difference to heart health, and the total amount of fat consumed is also important. High intake of saturated fats, *trans* fats, and cholesterol increases the risk of unhealthy blood lipid levels, which, in turn, may increase the risk of coronary heart disease. A high intake of fat (greater than 35 percent of calories) generally increases saturated fat intake and makes it more difficult to avoid consuming excess calories. A low intake of fats and oils (less than 20 percent of calories) increases the risk of inadequate intakes of vitamin E and of essential fatty acids and may contribute to unfavorable changes in high-density lipoprotein (HDL) blood cholesterol and triglycerides.

### DISCUSSION

Fats supply energy and essential fatty acids and serve as a carrier for the absorption of the fat-soluble vitamins A, D, E, and K and carotenoids. Fats serve as building blocks of membranes and play a key regulatory role in numerous biological functions. Dietary fat is found in foods derived from both plants and animals. The recommended total fat intake is between 20 and 35 percent of calories for adults. A fat intake of 30 to 35 percent of calories is recommended for children 2 to 3 years of age and 25 to 35 percent of calories for children and adolescents 4 to 18 years of age. Few Americans consume less than 20 percent of calories from fat. Fat intakes that exceed 35 percent of calories are associated with both total increased saturated fat and calorie intakes.



To decrease their risk of elevated low-density lipoprotein (LDL) cholesterol in the blood, most Americans need to decrease their intakes of saturated fat and *trans* fats, and many need to decrease their dietary intake of cholesterol. Because men tend to have higher intakes of dietary cholesterol, it is especially important for them to meet this recommendation. Population-based studies of American diets show that intake of saturated fat is more excessive than intake of *trans* fats and cholesterol. Therefore, it is most important for Americans to decrease their intake of saturated fat. However, intake of all three should be decreased to meet recommendations. Table 8 shows, for selected calorie levels, the maximum gram amounts of saturated fat to consume to keep saturated fat intake below 10 percent of total calorie intake. This table may be useful when combined with label-reading guidance. Table 9 gives a few practical examples of the differences in the saturated fat content of different forms of commonly consumed foods. Table 10 provides the major dietary sources of saturated fats in the U.S. diet listed in decreasing order. Diets can be planned to meet nutrient recommendations for linoleic acid and  $\alpha$ -linolenic acid while providing very low amounts of saturated fatty acids.

Based on 1994–1996 data, the estimated average daily intake of *trans* fats in the United States was about 2.6 percent of total energy intake. Processed foods and oils provide approximately 80 percent of *trans* fats in the diet, compared to 20 percent that occur naturally in food from animal sources. Table 11 provides the major dietary sources of *trans* fats listed in decreasing order. *Trans* fat content of certain processed foods has changed and is likely to continue to change as the industry reformulates products. Because the *trans* fatty acids produced in the partial hydrogenation of vegetable oils account for more than 80 percent of total intake, the food industry has an important role in decreasing *trans* fatty acid content of the food supply. Limited consumption of foods made with processed sources of *trans* fats provides the most effective means of reducing intake of *trans* fats. By looking at the food label, consumers can select products that are lowest in saturated fat, *trans* fats,<sup>13</sup> and cholesterol.

To meet the total fat recommendation of 20 to 35 percent of calories, most dietary fats should come from sources of

## KEY RECOMMENDATIONS

- Consume less than 10 percent of calories from saturated fatty acids and less than 300 mg/day of cholesterol, and keep *trans* fatty acid consumption as low as possible.
- Keep total fat intake between 20 to 35 percent of calories, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils.
- When selecting and preparing meat, poultry, dry beans, and milk or milk products, make choices that are lean, low-fat, or fat-free.
- Limit intake of fats and oils high in saturated and/or *trans* fatty acids, and choose products low in such fats and oils.

### Key Recommendations for Specific Population Groups

- *Children and adolescents.* Keep total fat intake between 30 to 35 percent of calories for children 2 to 3 years of age and between 25 to 35 percent of calories for children and adolescents 4 to 18 years of age, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils.

polyunsaturated and monounsaturated fatty acids.

Sources of omega-6 polyunsaturated fatty acids are liquid vegetable oils, including soybean oil, corn oil, and safflower oil. Plant sources of omega-3 polyunsaturated fatty acids ( $\alpha$ -linolenic acid) include soybean oil, canola oil, walnuts, and flaxseed. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are omega-3 fatty acids that are contained in fish and shellfish. Fish that naturally contain more oil (e.g., salmon, trout, herring) are higher in EPA and DHA than are lean fish (e.g., cod, haddock, catfish). Limited evidence suggests an association between consumption of fatty acids in fish and reduced risks of mortality from cardiovascular disease for the general population. Other sources of EPA and DHA may provide similar benefits; however, more research is needed. Plant sources that are rich in monounsaturated fatty acids include vegetable oils (e.g., canola, olive, high oleic safflower, and sunflower oils) that are liquid at room temperature and nuts.

<sup>13</sup> Including the amount of *trans* fats on the Nutrition Facts Panel is voluntary until January 2006.



### Considerations for Specific Population Groups

Evidence suggests that consuming approximately two servings of fish per week (approximately 8 ounces total) may reduce the risk of mortality from coronary heart disease and that consuming EPA and DHA may reduce the risk of mortality from cardiovascular disease in people who have already experienced a cardiac event.

Federal and State advisories provide current information about lowering exposure to environmental contaminants in fish. For example, methylmercury is a heavy metal toxin found in varying levels in nearly all fish and shellfish. For most people, the risk from mercury by eating fish and shellfish is not a health concern. However, some fish contain higher levels of mercury that may harm an unborn baby or young child's developing nervous system. The risks from mercury in fish and shellfish depend on the amount of fish eaten and the levels of mercury in the fish. Therefore, the Food and Drug Administration (FDA) and the Environmental Protection Agency are advising women of childbearing age who may become pregnant, pregnant women, nursing mothers, and young children to avoid some types of fish and shellfish and eat fish and shellfish that are lower in mercury. For more information, call FDA's food information line toll-free at 1-888-SAFEFOOD or visit <http://www.cfsan.fda.gov/~dms/admehg3.html>.

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Lower intakes (less than 7 percent of calories from saturated fat and less than 200 mg/day of cholesterol) are recommended as part of a therapeutic diet for adults with elevated LDL blood cholesterol (i.e., above their LDL blood cholesterol goal [see table 12]). People with an elevated LDL blood cholesterol level should be under the care of a healthcare provider.

**TABLE 8. Maximum Daily Amounts of Saturated Fat To Keep Saturated Fat Below 10 Percent of Total Calorie Intake**

The maximum gram amounts of saturated fat that can be consumed to keep saturated fat intake below 10 percent of total calorie intake for selected calorie levels. A 2,000-calorie example is included for consistency with the food label. This table may be useful when combined with label-reading guidance.

Total Calorie Intake	Limit on Saturated Fat Intake
1,600	18 g or less
2,000 <sup>a</sup>	20 g or less
2,200	24 g or less
2,500 <sup>a</sup>	25 g or less
2,800	31 g or less

<sup>a</sup> Percent Daily Values on the Nutrition Facts Panel of food labels are based on a 2,000-calorie diet. Values for 2,000 and 2,500 calories are rounded to the nearest 5 grams to be consistent with the Nutrition Facts Panel.

**TABLE 9. Differences in Saturated Fat and Calorie Content of Commonly Consumed Foods**

This table shows a few practical examples of the differences in the saturated fat content of different forms of commonly consumed foods. Comparisons are made between foods in the same food group (e.g., regular cheddar cheese and low-fat cheddar cheese), illustrating that lower saturated fat choices can be made within the same food group.

Food Category	Portion	Saturated Fat Content (grams)	Calories
Cheese			
• Regular cheddar cheese	1 oz	6.0	114
• Low-fat cheddar cheese	1 oz	1.2	49
Ground beef			
• Regular ground beef (25% fat)	3 oz (cooked)	6.1	236
• Extra lean ground beef (5% fat)	3 oz (cooked)	2.6	148
Milk			
• Whole milk (3.25%)	1 cup	4.6	146
• Low-fat (1%) milk	1 cup	1.5	102
Breads			
• Croissant (med)	1 medium	6.6	231
• Bagel, oat bran (4")	1 medium	0.2	227
Frozen desserts			
• Regular ice cream	½ cup	4.9	145
• Frozen yogurt, low-fat	½ cup	2.0	110
Table spreads			
• Butter	1 tsp	2.4	34
• Soft margarine with zero <i>trans fats</i>	1 tsp	0.7	25
Chicken			
• Fried chicken (leg with skin)	3 oz (cooked)	3.3	212
• Roasted chicken (breast no skin)	3 oz (cooked)	0.9	140
Fish			
• Fried fish	3 oz	2.8	195
• Baked fish	3 oz	1.5	129

Source: ARS Nutrient Database for Standard Reference, Release 17.



**TABLE 10. Contribution of Various Foods to Saturated Fat Intake in the American Diet (Mean Intake = 25.5 g)**

The major dietary sources of saturated fats in the U.S. diet listed in decreasing order.

Food Group	Contribution (percent of total sat fat consumed)
Cheese	13.1
Beef	11.7
Milk <sup>a</sup>	7.8
Oils	4.9
Ice cream/sherbet/frozen yogurt	4.7
Cakes/cookies/quick breads/doughnuts	4.7
Butter	4.6
Other fats <sup>b</sup>	4.4
Salad dressings/mayonnaise	3.7
Poultry	3.6
Margarine	3.2
Sausage	3.1
Potato chips/corn chips/popcorn	2.9
Yeast bread	2.6
Eggs	2.3

<sup>a</sup> The milk category includes all milk, including whole milk, low-fat milk, and fat-free milk.

<sup>b</sup> Shortening and animal fats

Source: Adapted from Cotton PA, Subar AF, Friday JE, Cook A, Dietary Sources of Nutrients among U.S. Adults, 1994–1996. *JADA* 104:921-931, 2004.

**TABLE 11. Contribution of Various Foods to *Trans* Fat Intake in the American Diet (Mean Intake = 5.84 g)**

The major dietary sources of *trans* fats listed in decreasing order. Processed foods and oils provide approximately 80 percent of *trans* fats in the diet, compared to 20 percent that occur naturally in food from animal sources. *Trans* fats content of certain processed foods has changed and is likely to continue to change as the industry reformulates products.

Food Group	Contribution (percent of total <i>trans</i> fats consumed)
Cakes, cookies, crackers, pies, bread, etc.	40
Animal products	21
Margarine	17
Fried potatoes	8
Potato chips, corn chips, popcorn	5
Household shortening	4
Other <sup>a</sup>	5

<sup>a</sup> Includes breakfast cereal and candy. USDA analysis reported 0 grams of *trans* fats in salad dressing.

Source: Adapted from *Federal Register* notice. *Food Labeling; Trans Fatty Acids in Nutrition Labeling; Consumer Research To Consider Nutrient Content and Health Claims and Possible Footnote or Disclosure Statements; Final Rule and Proposed Rule*. Vol. 68, No. 133, p. 41433-41506, July 11, 2003. Data collected 1994-1996.

**TABLE 12. Relationship Between LDL Blood Cholesterol Goal and the Level of Coronary Heart Disease Risk**

Information for adults with elevated LDL blood cholesterol. LDL blood cholesterol goals for these individuals are related to the level of coronary heart disease risk. People with an elevated LDL blood cholesterol value should make therapeutic lifestyle changes (diet, physical activity, weight control) under the care of a healthcare provider to lower LDL blood cholesterol.

If Someone Has:	LDL Blood Cholesterol Goal Is:
CHD or CHD risk equivalent <sup>a</sup>	Less than 100 mg/dL
Two or more risk factors other than elevated LDL blood cholesterol <sup>b</sup>	Less than 130 mg/dL
Zero or one risk factor other than elevated LDL blood cholesterol <sup>b</sup>	Less than 160 mg/dL

<sup>a</sup> CHD (coronary heart disease) risk equivalent = presence of clinical atherosclerotic disease that confers high risk for CHD events:

- Clinical CHD
- Symptomatic carotid artery disease
- Peripheral arterial disease
- Abdominal aortic aneurysm
- Diabetes
- Two or more risk factors with >20% risk for CHD (or myocardial infarction or CHD death) within 10 years

<sup>b</sup> Major risk factors that affect your LDL goal:

- Cigarette smoking
- High blood pressure (140/90 mmHg or higher or on blood pressure medication)
- Low HDL blood cholesterol (less than 40 mg/dL)
- Family history of early heart disease (heart disease in father or brother before age 55; heart disease in mother or sister before age 65)
- Age (men 45 years or older; women 55 years or older)

Source: NIH Publication No. 01-3290, U.S. Department of Health and Human Services, National Institutes of Health, National Heart, Lung, and Blood Institute, National Cholesterol Education Program Brochure, High Blood Cholesterol What You Need to Know, May 2001. [http://www.nhlbi.nih.gov/health/public/heart/cho/hbc\\_what.htm](http://www.nhlbi.nih.gov/health/public/heart/cho/hbc_what.htm).