

Heart Smart *Nutrition*



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NCEP-ATP III Implications for Diet

By Frances Johnson, RD



Since its publication in 1993, the guidelines put out by the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (ATP II) have provided the most widely-accepted dietary approach for lowering low density lipoprotein (LDL) cholesterol concentrations.¹ In May 2001, new guidelines were published to replace those recommendations.² The new dietary guidelines in the paper, referred to as the Therapeutic Lifestyle Changes (TLC), replace the previous Step I and II recommendations (Table 1).

The implications for practice do not suggest radical changes to previous recommendations, but incorporate findings from research studies aimed at enhancing LDL cholesterol reduction and reducing cardiac risk.

The recommendation for fat content now suggests a range of fat intake from 25% to 35% of energy intake to reflect the various needs of individuals. Research suggests improved cardiac risk can be achieved by a

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Table 1

ATP III TLC Guidelines Versus Previous ATP II Guidelines

Nutrient	TLC Recommendations	Previous Recommendations
Total fat	25% to 35% of calories	≤ 30% of calories
- Saturated fat	< 7% of calories	7% to 10% of calories
- Polyunsaturated fat	Up to 10% of calories	Up to 10% of calories
- Monounsaturated fat	Up to 20% of calories	Up to 15% of calories
Carbohydrate	50% to 60% of calories	55% to 60% of calories
Protein	Approximately 15% of calories	Approximately 15% of calories
Energy	Balance energy intake and expenditure to maintain/achieve desirable body weight	—
Cholesterol	< 200 mg per day	200 mg to 300 mg per day
Fibre	20 g to 30 g per day	—

ATP: Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults guidelines
 TLC: Therapeutic Lifestyle Changes

Adapted from: Executive Summary of the Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). JAMA 2001; 285(19):2486-97.

low-fat diet, especially when combined with exercise and weight loss. The St. Thomas' Atherosclerosis Regression Study (27% fat), the Stanford Coronary Risk Intervention Project (20% fat), and the Dietary Alternatives Study (18% to 30% fat) are a few of the studies in which improvements in cardiac risk factors were achieved using diets with < 30% fat.³⁻⁵

Other studies using the Mediterranean diet suggest improved cardiac risk can be

achieved not necessarily by reducing the quantity, but by modifying the type of fat consumed.⁶ The Mediterranean diet pattern recommends food choices low in saturated fat, but high in monounsaturated fats and alpha-linolenic acid, with less emphasis on restricting total fat content. Rather than increasing carbohydrate content, monounsaturated fats, therefore, replace saturated fats.

Exactly which dietary pattern and how much fat is optimal for an individual is depen-

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Table 2

Amount of Fat (in grams) as Percentage of Energy Consumed

	25% of calories	30% of calories	35% of calories
1,500 Calories	42 g	50 g	58 g
2,000 Calories	56 g	67 g	78 g
2,500 Calories	67 g	83 g	97 g

*1 tbsp of oil = 14 g of fat

dent on a variety of factors, including genetic background and psychosocial needs. Table 2 summarizes the differences in quantity of fat (in grams) when the percentage of energy from fat is 25%, 30% or 35%.

The TLC diet emphasizes the need to restrict saturated fat by recommending it be restricted to < 7% of energy consumed for all individuals with elevated LDL cholesterol levels, a reduction from the 10% recommended in the Step I diet. There is consensus on the LDL-raising effects of saturated fats, as suggested by a meta-analysis of 37 dietary intervention studies in which multiple regression analyses showed that for every 1% decrease in energy from saturated fatty acids, there was a 1.07% decrease in LDL cholesterol.⁷ Furthermore, the TLC diet recommends trans-fatty acids also be reduced because of their LDL-raising properties.

Various studies, such as one by Judd et al which showed the cholesterol-raising properties of butter, as well as margarines containing trans-fatty acid, support such recommendations.⁸

Dietary cholesterol intake is restricted to < 200 mg per day (one egg yolk contains 214 mg cholesterol), as compared to < 300 mg per day as recommended in the Step I diet. Although there is much individual variation in blood cholesterol concentrations in response to dietary cholesterol, studies suggest individuals with diabetes or high blood triglyceride levels may be more sensitive to cholesterol intake.^{9,10} A meta-analysis of 17 studies suggests dietary cholesterol raises the ratio of total to high density lipoprotein (HDL) cholesterol, adding further support to the recommendation that cholesterol intake be limited.¹¹



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The TLC diet recommends carbohydrates be derived mainly from foods high in complex carbohydrates (*i.e.*, whole grains, fruits, vegetables).

The TLC diet recognizes the prevalence of the metabolic syndrome and its effects on cardiac risk. Weight reduction and increased physical activity are recommended to help increase HDL cholesterol, decrease triglyceride concentrations, improve insulin resistance, and control blood glucose levels. Daily energy expenditure, which includes at least 200 calories per day of moderate physical activity, is suggested. The higher limit for total fat intake also recognizes the triglyceride-raising potential of high carbohydrate diets, and allows the redistribution of calories to increase unsaturated fats, instead

of carbohydrates, in individuals at risk for the metabolic syndrome. The TLC diet also recommends carbohydrates be derived mainly from foods high in complex carbohydrates (*i.e.*, whole grains, fruits, vegetables) to minimize the effects of refined carbohydrates on the metabolic syndrome.


If initial dietary modifications do not bring LDL cholesterol concentrations to desired levels, the TLC diet suggests enhancing LDL-lowering by the use of up to 2 g of plant sterols and 10 g to 25 g per day of soluble fibre. A randomized, double-blinded study in Finland showed that consuming margarine containing 1.8 g or 2.6 g of sitostanol ester per day reduced total blood cholesterol by 10.2% and LDL cholesterol by 14.1%.¹² Such phytosterol-containing margarines are not yet available in Canada, however, they are available in the U.S. Good food sources of plant sterols include soy-

beans, seeds, corn and whole grain products, however, it will be difficult to obtain 2 g per day from food sources without the use of functional foods with added phytosterols.

A meta-analysis of 67 controlled trials supports the recommendation to increase soluble fibre intake using items such as oat, psyllium, or pectin to lower cholesterol levels.¹³ The study suggests a daily intake of 3 g of soluble fiber (that can be achieved by eating three apples or three 28 g servings of oatmeal per day) can decrease total blood cholesterol levels by approximately 2%. Increasing soluble fibre to the recom-

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mended 10 g to 25 g per day, on a regular basis, may require the use of functional food items (i.e., commercial cereal with added soluble fibre).

Although the TLC diet recommendations provide new guidelines, the bottom line is that there is no one optimal diet that suits everyone, and there is no one food that will prevent heart disease. A balanced diet that incorporates the principles of the TLC plan, but is individualized to meet each person's physiological and psychosocial needs, is more likely to facilitate greater adherence and achieve desirable outcomes. 

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Good food sources of plant sterols include soybeans, seeds, corn and whole grain products.