

## 56. Counseling to Promote a Healthy Diet

### RECOMMENDATION

Counseling adults and children over age 2 to limit dietary intake of fat (especially saturated fat) and cholesterol, maintain caloric balance in their diet, and emphasize foods containing fiber (i.e., fruits, vegetables, grain products) is recommended. There is insufficient evidence to recommend for or against counseling the general population to reduce dietary sodium intake or increase dietary intake of iron, beta-carotene, or other antioxidants to improve health outcomes, but recommendations to reduce sodium intake may be made on other grounds. Women should be encouraged to consume recommended quantities of calcium (see *Clinical Intervention*). Parents should be encouraged to breastfeed their infants. Providing pregnant women with specific nutritional guidelines to enhance fetal and maternal health is recommended. Although there is insufficient evidence to recommend for or against special assessment of the dietary needs and habits of older adults, recommendations to do so can be made on other grounds. There is insufficient evidence that nutritional counseling by physicians has an advantage over counseling by dietitians or community interventions in changing the dietary habits of patients. See Chapter 22 regarding the role of iron during pregnancy and in the diets of newborns and young children, and Chapter 42 regarding the use of folic acid by women of childbearing age. See Chapter 61 regarding intake of refined sugars and adherent carbohydrates that may affect dental health. Counseling regarding alcohol consumption is discussed in Chapter 52.

### Burden of Suffering

Diseases associated with dietary excess and imbalance rank among the leading causes of illness and death in the U.S. Major diseases in which diet plays a role include coronary heart disease, some types of cancer, stroke, hypertension, obesity, and non-insulin-dependent diabetes mellitus.<sup>1</sup> Heart disease is the leading cause of death in the U.S.,<sup>2</sup> with coronary heart disease accounting for up to 1.5 million myocardial infarctions and nearly 500,000 deaths each year.<sup>2,3</sup> Cancer of the colon, breast, and prostate, the three forms of cancer most closely associated epidemiologically with nutritional risk factors, together, cause over 140,000 deaths annually.<sup>4</sup> Cerebrovascular disease, the third leading cause of death,

accounted for about 150,000 deaths in 1993.<sup>2</sup> Hypertension, another disease with nutritional risk factors, occurs in about 43 million Americans.<sup>5</sup> Caloric intake, when it exceeds energy expenditure, can also lead to overweight and obesity, which affects about 58 million American adults aged 20 and older.<sup>6</sup> Obesity is a risk factor for a number of serious disorders (see Chapter 21), including both hypertension and adult-onset diabetes mellitus. An estimated 14 million persons in the U.S. have diabetes mellitus, which accounts for over 55,000 deaths each year and is a leading cause of neuropathy, peripheral vascular disease, renal failure, and blindness.<sup>2,7</sup>

Nutritional factors have also been linked to osteoporosis, constipation, diverticular disease, iron deficiency anemia (see Chapter 22), oral disease, and malnutrition. An estimated 40% of women in the U.S. will suffer from osteoporosis-related fractures by the time they reach age 70.<sup>8</sup> Hip fractures in particular are associated with significant pain and disability, decreased functional independence, and high mortality; there is a 15–20% reduction in expected survival in the first year following a hip fracture.<sup>9</sup> Constipation is a complaint of over 4.5 million Americans,<sup>10</sup> and intestinal diverticular disease is reported by nearly 1.5 million persons.<sup>11</sup> The average schoolchild has at least one cavity in permanent teeth by age 9, three cavities by age 12, and eight by age 17.<sup>12</sup> The average adult in the U.S. has 10–17 decayed, missing, or filled permanent teeth and one untreated decayed permanent tooth.<sup>13</sup> Disorders of both overeating and undereating are common among older adults, up to 40% of whom have inadequate dietary intake of three or more nutrients.<sup>14</sup> Many older adults suffer from protein-calorie malnutrition—up to 50% of nursing home residents in the U.S. may be malnourished,<sup>15</sup> and an additional number suffer from marginal malnutrition that is less clinically evident.

### Efficacy of Risk Reduction

Eating habits over a lifetime can have a significant impact on the incidence and severity of many health disorders. The complete body of literature regarding the health effects of foods is beyond the scope of this report and has been the subject of extensive reviews.<sup>1,16</sup> In summary, it is clear that a direct relationship exists between nutritional risk factors and certain key diseases. It is well established, for example, that caloric imbalance (intake exceeding expenditure) can lead to overweight and obesity. Persons who are overweight are at increased risk of glucose intolerance, hypertension, high blood cholesterol, and other disorders (see Chapter 21); reduction of body weight has been shown to reduce these risks.<sup>17–20</sup> The average person is likely to benefit from dietary practices and physical activity (see Chapter 55) that keep caloric intake commensurate with daily energy expenditures.

In addition to the overall objective of caloric balance, modified intake of specific dietary factors may also help prevent certain diseases.

Reduced intake of dietary fat, especially saturated fats (and, possibly, partially hydrogenated vegetable fats), appears to reduce the risk of developing coronary heart disease. A large body of epidemiologic evidence links serum cholesterol levels to the development of coronary atherosclerosis.<sup>21-23</sup> Serum cholesterol levels can in turn be modified by dietary measures. Clinical trials incorporating reduced total or saturated fat intake, either as a sole intervention or as part of a multifactorial intervention, have reported mixed results in reducing serum cholesterol levels and in decreasing the incidence of cardiac events, such as myocardial infarction and sudden death.<sup>24-32</sup> Intake of saturated fat correlates more closely with serum cholesterol levels than does total fat intake. Clinical trials have also found that serum cholesterol-lowering drugs can reduce the incidence of coronary heart disease in asymptomatic middle-aged men with hyperlipidemia.<sup>33-38</sup> These studies found that the incidence of cardiac events in such men is decreased by an average of 2% for every 1% reduction in serum cholesterol (see Chapter 2). (Evidence regarding benefits in persons with preexisting coronary heart disease is reviewed in Chapter 2.)

Modeling studies based on these data suggest that coronary heart disease mortality rates in the U.S. could be lowered by 5–20% if all Americans restricted their fat intake to less than 30% of total calories but that increases in life expectancy among low-risk persons might be modest.<sup>39-41</sup> Two randomized controlled trials reported that a low-fat diet does not increase high-density lipoprotein (HDL) cholesterol levels unless coupled with physical activity,<sup>42,43</sup> and one meta-analysis of 27 trials suggested that substantial reductions in dietary fat intake might lower HDL cholesterol levels.<sup>44</sup> Some observational studies also suggest a possible association between intake of *trans*-isomers of fatty acids (formed in the partial hydrogenation of vegetable oils) and unfavorable changes in low-density lipoprotein (LDL) and HDL cholesterol<sup>45,46</sup> and in the risk of coronary heart disease;<sup>47-49</sup> others suggest an association between fatty acids found primarily in fish oils and reduced risk of cardiovascular disease.<sup>50-52</sup> Dietary cholesterol intake may also influence serum cholesterol levels, especially LDL cholesterol levels, but the association appears to be weaker and more variable than that of dietary saturated fat intake.<sup>1</sup> Finally, prospective cohort data suggest that a diet with increased intake of fruits and vegetables is associated with decreased risk of stroke, but further study is needed.<sup>53</sup>

The association between foods high in dietary fat and certain forms of cancer is currently under investigation. An effect of dietary fat on carcinogenesis has been demonstrated in animal research. Furthermore, international comparisons of cancer incidence and most case-control studies have

revealed an epidemiologic correlation between dietary fat consumption and the incidence of cancer of the breast, colon, prostate, and lung.<sup>54-63</sup> Within more homogenous populations, however, cohort studies to date have been unable to provide consistent evidence of a causal relationship between increased dietary fat consumption and the incidence of breast, prostate, colon, or other cancers.<sup>64-74</sup> Similarly, inconsistent results have been reported in epidemiologic studies of the link between low blood cholesterol and cancer.<sup>75,76</sup> Clinical trials are now in progress to examine further the relationship between dietary fat and cancer.<sup>77</sup> These and other studies may help elucidate whether low-fat diets reduce cancer risk because of decreased fat intake or because of increased intake of fruits, vegetables, or fiber (see below).

A diet emphasizing the consumption of foods high in complex carbohydrates and fiber (e.g., whole grain foods and cereal products, vegetables [including dried beans and peas], and fruits) is an important means of lowering dietary fat consumption by replacing caloric intake from fat. Foods high in complex carbohydrates and fiber and low in fat content also have lower average caloric density, and they are therefore preferred for maintaining caloric balance and healthful body weight.<sup>1,78,79</sup> There are other health benefits associated with the replacement of foods high in simple carbohydrates (e.g., table sugar, honey, corn sweeteners) with those containing starch and fiber. In addition to improving caloric balance, reduced intake and less frequent consumption of refined sugars may lower the risk of developing dental caries (see also Chapter 61),<sup>80-85</sup> and the avoidance of highly refined grain products reduces the contribution of “empty calories” to the diet.<sup>86</sup>

Increased intake of dietary fiber improves gastrointestinal function.<sup>87</sup> Certain types of dietary fiber may also be helpful in the treatment of glucose intolerance, weight reduction, and the control of lipid disorders.<sup>87,88</sup> The consumption of foods containing large amounts of soluble fiber (e.g., dried beans, oat products) appears to lower levels of LDL cholesterol (independent of their replacement of foods high in saturated fat and cholesterol).<sup>89,90</sup> An insoluble high-fiber diet (most plant foods) may be effective in reducing intracolonic pressure and preventing diverticular disease.<sup>91</sup> The risk of developing colorectal cancer may also be influenced by dietary fiber intake. At least 15 cross-cultural studies have shown an inverse relationship between dietary fiber consumption and the incidence of colon cancer.<sup>92,93</sup> Such studies do not, however, provide direct evidence that high dietary fiber intake, rather than other population dietary characteristics (e.g., low fat intake), is directly responsible for the lower cancer incidence rate. Case-control studies have produced inconsistent results regarding the association between dietary fiber and colon cancer.<sup>94-97</sup> Meta-analyses of these studies, however, suggest an overall benefit from dietary fiber.<sup>98,99</sup> Ob-

servational studies also suggest an association between intake of vegetables and fruits and lower risk of cancer.<sup>86</sup> Cohort studies to date that have examined the relationship between dietary fiber and cancer have produced inconsistent results and suffer from methodologic limitations, including the difficulty of determining whether observed benefits were due to fiber itself or to its substitution of foods high in saturated fats.<sup>73,100–103</sup>

Reduced intake of dietary sodium may be of clinical benefit to persons who either have sodium-dependent hypertension or are likely to develop it in the future.<sup>104</sup> A number of clinical trials and recent meta-analyses have demonstrated the ability of dietary sodium restriction to lower blood pressure by at least several millimeters of mercury in some hypertensive and normotensive individuals.<sup>105–118</sup> In addition, cross-cultural studies have shown a correlation between the sodium intake of different populations and the incidence of hypertension.<sup>119–121</sup> A multinational study involving 52 sites also demonstrated an association between sodium excretion and the rate of change of blood pressure with age.<sup>122</sup> However, controlled prospective studies will ultimately be necessary to provide definitive evidence that normotensive persons who practice dietary sodium restriction are at lower risk of developing hypertension over time than are those with more typical sodium consumption.

Many American women and adolescent girls consume less dietary calcium than is recommended by major groups (men: 1,000 mg/day; adolescents and young adults, 1,200–1,500 mg/day; women 25–50 years of age, 1,000 mg/day; postmenopausal women, 1,000–1,500 mg/day; pregnant and nursing women, 1,200–1,500 mg/day).<sup>123</sup> Population and cross-sectional studies suggest that reduced calcium intake among women, especially young women, may be an important risk factor for bone mineral loss and postmenopausal osteoporosis,<sup>124,125</sup> and studies suggest that calcium supplementation in adolescence and early adulthood may increase bone mineral density.<sup>126,127</sup> Prospective studies of asymptomatic postmenopausal women have produced inconsistent results about the efficacy of increasing dietary calcium intake as a means of slowing bone loss. Although some studies have reported that a daily intake of 750–1,700 mg/day can reduce significantly the rate of bone loss in asymptomatic postmenopausal women,<sup>128–130</sup> other controlled studies have shown either no effect or an effect only on compact bone with doses as high as 1,800–2,000 mg/day.<sup>131–134</sup> A meta-analysis of intervention and observational studies concluded that 1,000 mg of calcium daily would prevent about 1% of bone loss per year.<sup>135</sup> Clinical trials suggest that calcium supplementation may reduce the risk of fractures in postmenopausal women.<sup>135a,135b</sup> In such women, however, estrogen replacement therapy may be a more effective form of chemoprophylaxis than calcium supplementation (see Chapter 68). (See also the discussion of the relationship between exercise and bone density

in Chapter 55.) There appears to be little significant risk for women who moderately increase their consumption of dietary calcium. Gross and prolonged use of calcium supplements may, under unusual circumstances, result in milk alkali syndrome or an increased occurrence of kidney stones, although direct evidence of the latter is lacking.<sup>136</sup>

Adequate dietary iron intake may be important for menstruating women and for young children to maintain iron stores and prevent iron deficiency anemia. This topic is discussed in detail in Chapter 22. Although infants and young children may benefit from iron supplementation (see below), there is little evidence from prospective studies of older children and menstruating women that mild anemia in the absence of symptoms is a direct cause of increased morbidity or mortality. It may be clinically prudent, however, to recommend diets including iron-rich foods (e.g., lean meats, certain beans, iron-enriched and whole grain products) for persons at increased risk of iron deficiency.

Current research is exploring the potential health benefits of other minerals and vitamins. For example, evidence suggests that women of childbearing age who take folic acid supplements may be less likely to give birth to children with neural tube defects (see Chapter 42).<sup>137</sup> The role of beta-carotene, vitamins (e.g., vitamin A, vitamin C, vitamin E), and other antioxidants in reducing the risk of cancer, atherosclerosis, and other chronic diseases is currently being studied.<sup>138-143</sup>

### Special Populations

*Infants and Children.* Infants require breast milk or appropriate alternatives (e.g., infant formulas) to provide adequate nutrition. Nutritional status remains important throughout childhood to facilitate normal growth and development.<sup>144</sup> Epidemiologic evidence and randomized prospective studies suggest that infant consumption of breast milk for at least 6 months may reduce the risk of otitis media, lower respiratory tract illness, meningitis, allergic illness, diarrhea, hospital admissions, and abnormal cognitive development in the child.<sup>145-147</sup> Breast-fed infants often have higher blood cholesterol levels than formula-fed infants, but current evidence, with the exception of one cohort study,<sup>148</sup> suggests that these elevations resolve with weaning<sup>149</sup> and are not linked to adult blood cholesterol levels or increased risk of heart disease. Iron deficiency anemia during infancy may also be associated with impaired infant neurologic and cognitive development,<sup>150</sup> and infants may therefore benefit from iron-fortified formula and foods to replace depleted iron stores.

The benefits of reduced dietary fat intake during childhood are uncertain. There is some epidemiologic evidence of tracking (persistence of childhood elevations of blood cholesterol into adulthood) and autopsy ev-

idence of atherosclerotic disease among children and young adults with elevated cholesterol levels,<sup>151,152</sup> but evidence of improved health outcomes from lowering blood cholesterol during childhood is lacking. Observational studies provide evidence that children can achieve statistically significant reductions in total and LDL cholesterol levels through dietary fat reduction.<sup>153,154</sup> A potential risk of such interventions is that excessive low-fat diets may not provide children with sufficient nutrients for healthy growth and development,<sup>155</sup> but direct evidence of this adverse effect is limited to extreme cases of dietary restriction. A cross-sectional study found that 10-year-old children with low fat intake had no significant differences in anthropometric measurements, but they were more likely to be deficient in the Recommended Dietary Allowances for calcium, phosphorus, magnesium, iron, and certain vitamins.<sup>156</sup> A recent randomized controlled trial involving children aged 8–10 reported that a diet providing 28% of energy from total fat achieved statistically significant reductions in LDL cholesterol levels with no significant effects on height, ferritin levels, or selected psychometric indices.<sup>157</sup>

*Pregnant Women.* Nutritional status is especially important during pregnancy. Studies have shown that low birth weight and neonatal mortality are more common in pregnant women with very poor nutritional status<sup>158,159</sup> and in those who fail to gain adequate weight during pregnancy,<sup>160–163</sup> although factors other than nutrient intake may account for these outcomes. Prenatal programs providing nutritional support for pregnant women have been associated with improved perinatal outcomes.<sup>164</sup> Pregnancy brings increased requirements for energy and specific nutrients, such as protein, calcium, folic acid, and iron.<sup>162,165,166</sup> Oral iron supplements may be beneficial in preventing iron deficiency anemia in pregnancy, and they are often prescribed routinely as part of prenatal health care. Although an association between moderate to severe iron deficiency anemia and adverse obstetric outcomes has been demonstrated in some observational studies, there is little direct evidence that routine iron supplementation during pregnancy (in the absence of documented anemia or iron deficiency) results in improved clinical outcome for the mother or fetus.<sup>167</sup>

*Older Adults.* The elderly can also have special nutritional requirements. Depending on the patient's nutritional status, underlying medical disorders, functional status, dentition, and therapeutic drug regimens, it can be important to modify recommended daily intake levels of calories, sodium, calcium, water, dietary fat, fiber, protein, and other nutrients to reduce the risk of complications.<sup>168</sup> Observational data suggest that older adults benefit to some extent by reducing elevated blood cholesterol levels.<sup>169</sup> It is unclear from current evidence whether women who have already developed clinical evidence of postmenopausal osteoporosis benefit from cal-

cium supplementation.<sup>170-173</sup> Clinical recognition of protein-calorie malnutrition, especially when manifested by clinically subtle findings, is often delayed among older adults. This has prompted the introduction of nutritional screening initiatives in this population,<sup>174</sup> but direct evidence of clinical benefit from screening is currently lacking.

### Effectiveness of Counseling

The effectiveness of nutritional counseling in changing the dietary habits of patients has been demonstrated in a number of clinical trials.<sup>175</sup> For example, randomized controlled trials have shown that dietary counseling of patients with high blood cholesterol can lower serum lipids in both patients and their families<sup>176</sup> and that regular reinforcement can enhance compliance with dietary recommendations.<sup>177</sup> Tailored printed materials distributed in primary care settings have also been effective in lowering dietary fat consumption.<sup>178</sup> Other measures that may enhance compliance with low-fat diets include setting strict limits on fat intake, frequent (e.g., monthly) monitoring, involvement of family in nutritional counseling sessions, and group sessions.<sup>179</sup> Studies have confirmed the effectiveness of nutritional counseling among pregnant women<sup>180</sup> and the important role of parental guidance in modifying the diets of children.<sup>181</sup>

In most studies of nutritional counseling, however, the counselor was not a physician, but rather a nurse, nutritionist, registered dietitian, health educator, or psychologist. Many of the interventions tested in these studies were part of highly specialized or community-wide programs. Such interventions are not easily reproduced in the typical physician-patient clinical encounter. Although physicians can often provide general guidelines on proper nutrition, many lack the time and skills to obtain a thorough dietary history, to address potential barriers to changes in eating habits, and to offer specific guidance on food selection.<sup>182</sup> Patients may also have difficulty with long-term compliance,<sup>183</sup> especially if food selection and preparation for recommended diets are perceived as unappealing or inconvenient. Fat-containing foods, in particular, are a popular component of the American diet.<sup>184</sup> It is possible, however, that physicians can overcome many of these limitations by expanding the content of the nutritional information they provide to patients, by emphasizing to the patient the health benefits of good nutrition, and by referring those requiring help with dietary changes to qualified registered dietitians, nutritionists, health educators, nurses, or other providers with greater nutrition expertise.

### Recommendations of Other Groups

Dietary guidelines for the general population have been issued by the Department of Agriculture and the Department of Health and Human Ser-



ances<sup>185</sup> and reaffirmed by the Surgeon General,<sup>1</sup> in the Year 2000 Objectives for the Nation,<sup>186</sup> and in the “Food Guide Pyramid” released in 1992 by the Department of Agriculture.<sup>187</sup> The Food and Nutrition Board of the National Research Council has published Recommended Dietary Allowances (RDAs) for specific nutrients,<sup>165</sup> and it has released an extensive report on diet and chronic disease risk.<sup>16</sup> Recommendations for nutritional counseling of patients have been issued by the American Medical Association,<sup>188</sup> the American College of Physicians,<sup>189</sup> the Canadian Task Force,<sup>203</sup> and the American Heart Association.<sup>144,190</sup> Guidelines for dietary practices to reduce the risk of cancer have been issued by the National Research Council,<sup>191</sup> the American Cancer Society,<sup>192</sup> and the National Cancer Institute.<sup>193</sup> Recommendations on nutritional counseling to reduce cardiac risk factors have been issued by panels convened by the National Heart, Lung, and Blood Institute<sup>194</sup> and by the National High Blood Pressure Education Program<sup>195</sup> and National Cholesterol Education Program,<sup>196,197</sup> which are endorsed by over 40 organizations and government agencies. Dietary recommendations for children have been issued by the American Academy of Pediatrics<sup>198,199</sup> and National Cholesterol Education Program.<sup>200</sup> Dietary guidelines for pregnant women have been issued by the American College of Obstetricians and Gynecologists<sup>201</sup> and the Institute of Medicine.<sup>162</sup> Recommendations on the use of folic acid supplementation by women have been issued by the U.S. Public Health Service.<sup>202</sup> Dietary guidelines for Americans were updated in 1995.<sup>204</sup>

#### CLINICAL INTERVENTION

Adults and children over age 2 should limit dietary intake of fat (especially saturated fat) (“A” recommendation) and cholesterol (“B” recommendation), maintain caloric balance in their diet (“B” recommendation), and emphasize fruits, vegetables, and grain products containing fiber (“B” recommendation). Both diet and exercise should be designed to achieve and maintain a desirable weight by keeping caloric intake balanced with energy expenditures. Adolescents and adults, in particular, should reduce total fat intake to less than 30% of total calories and dietary cholesterol to less than 300 mg/day. Saturated fat consumption should be reduced to less than 10% of total calories. To achieve these goals, patients should emphasize consumption of fish, poultry prepared without skin, lean meats, and low-fat dairy products. They should be encouraged to eat a variety of foods, with emphasis on the consumption of whole grain products and cereals, legumes, vegetables, and fruits. Current recommendations from the U.S. Department of Health and Human Services are for at least five servings of fruits and vegetables and at least six servings of breads, cereals, or legumes each day. Detailed food selection guidelines for healthy eating are published elsewhere.<sup>185</sup>

There is insufficient evidence that, for the general population, reducing dietary sodium intake or increasing dietary intake of iron, beta-carotene, or other antioxidants results in improved health outcomes (“C” recommendation); recommendations to reduce sodium intake may be made on other grounds, including the potential beneficial effects on blood pressure in salt-sensitive persons. See Chapter 61 for information regarding intake of refined sugars and dental health. Women should be encouraged to consume recommended quantities of calcium (adolescents and young adults, 1,200–1,500 mg/day; adults aged 25–50, 1,000 mg/day; postmenopausal women, 1,000–1,500 mg/day; pregnant and nursing women, 1,200–1,500 mg/day<sup>123</sup>) (“B” recommendation). Parents should be encouraged to offer breastfeeding to their infants (“A” recommendation). Pregnant women should receive specific nutritional guidelines to enhance fetal and maternal health. See Chapter 22 regarding the role of iron during pregnancy and in the diets of newborns and young children, and see Chapter 42 regarding the use of folic acid by women of childbearing age. There is insufficient evidence to recommend for or against the special assessment of dietary needs and habits of older adults (“C” recommendation), but recommendations to do so can be made on other grounds, such as the increased prevalence of nutrition-related disorders in this age group. Counseling regarding alcohol consumption is discussed in Chapter 52.

There is insufficient evidence that nutritional counseling by physicians, as opposed to counseling by dietitians or community interventions, is effective in changing the dietary habits of patients (“C” recommendation). Clinicians who lack the time or skills to perform a complete dietary history, to address potential barriers to changes in eating habits, and to offer specific guidance on meal planning and food selection and preparation, should either have patients seen by other trained providers in the office or clinic or should refer patients to a registered dietitian or qualified nutritionist for further counseling.

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