

Dental Diseases

Dietary Guidance

General Public

Dietary factors of principal interest in dental diseases are sugars and fluoride. Frequent consumption of sugars, especially sucrose, promotes formation of dental plaque, the key predisposing cause of both caries and periodontal disease. In the United States, the daily intake of sugars ranges on average from 62 to 143 g, or 18 to 32 percent of total caloric intake. Evidence exists that sugars as they are consumed in the average American diet contribute to the development of dental caries, suggesting that the general public should reduce its sugar consumption.

The role of fluoride in prevention of tooth decay is also well established from animal studies and from human epidemiology and clinical trials. Although fluoride is present in foods, the most efficient source of this nutrient for the general public is community drinking water that naturally contains fluoride at an optimal level or to which fluoride is added to achieve the optimal level. Most, but not all, water supplies can be fluoridated, and current recommendations for optimum fluoride concentrations vary from 0.7 to 1.2 ppm depending on regional variation according to prevailing air temperature. Conclusive evidence shows that such levels of fluoride are safe.

Although other nutrients such as vitamin A, vitamin C, calcium, and phosphate may also be associated with prevention of dental diseases, evidence is insufficient at this time to recommend changes in dietary patterns on the basis of their relationship to these conditions for the general public.

Special Populations

Persons with diminished salivary flow are at special risk for caries and periodontal disease. They also may be unable to wear removable dental prostheses due to the lack of lubrication by saliva. Artificial saliva preparations containing fluoride and topical fluoride gels help to prevent tooth decay in such persons and can be recommended as an adjunct to sugar-restricted diets and appropriate dietary counseling. Children over the age of 6 months are at risk for nursing bottle caries, and their parents and caregivers should receive guidance in dietary and behavioral approaches to prevent this condition. Evidence related to the benefits of fluoride con-

sumption by pregnant women on subsequent tooth development of the fetus is insufficient to recommend fluoride supplementation during pregnancy. Individuals with diabetes are especially prone to periodontal infections and should take special care to use available dietary and therapeutic means to control disease.

Nutrition Programs and Services

Food Labels

The presence and relative amount of added sugars, especially sucrose, contained in processed foods, as indicated by ingredient lists on food labels, should continue to play an important role in identifying dietary factors associated with dental disease.

Food Services

Evidence related to the role of dietary factors in dental disease suggests that food service programs should provide optimally fluoridated drinking water and promote noncariogenic foods, especially in programs for populations at high risk for dental diseases.

Special Populations

Persons with an active history of dental caries or with reduced salivary flow and parents of young children should be provided with counseling and assistance in developing diets low in cariogenic foods and in accessing appropriate sources of fluoride. Persons with diabetes are especially prone to periodontal infections and should take special care to use available dietary and therapeutic means to control their disease (see chapter on diabetes).

Research and Surveillance

Research and surveillance issues of priority related to the role of diet in dental diseases should include investigations into:

- The definition of critical periods of development of dental tissues that may be sensitive to nutrient intake.
- The role of nutritional factors in the maintenance and repair of the periodontium and oral tissues.
- The relationship between nutritional imbalances during tooth development and the formation of tooth lesions or defects that may increase caries susceptibility in children.

- The role of nutrition and nutritional status in the etiology and pathogenesis of dental diseases in older persons and other high-risk populations.
- The relationship between nutrition and both the immune and the nonspecific defense mechanisms of oral tissues and fluids.
- The most effective means to educate the public on the role of water fluoridation, diet, and dental care in preventing dental diseases.
- The mechanisms of fluoride action in the prevention of dental disease or osteoporosis.
- The effect of dietary factors such as vitamin A, vitamin E, and alcohol on the initiation and progression of oral cancers.
- Epidemiologic methods to determine the correlation between malnutrition and dental caries and/or periodontal disease.
- The role of calcium in the etiology and/or prevention of residual ridge resorption and periodontal disease.
- Estimation of the levels of fluoride from all sources in the diets of children.
- Estimation of the extent of dental fluorosis in the population.

Kidney Diseases

Dietary Guidance

General Public

Nutrients of particular interest in the occurrence of renal disease are protein, phosphate, and certain fatty acids. Although there is evidence in animals and humans that protein restriction can retard the progression of end-stage renal disease, there is no evidence that current protein intakes by the American population adversely affect the prevalence of renal disease.

Dietary phosphate restrictions have been noted to retard the progression of renal disease, but there is not sufficient evidence to indicate a role in the prevention of this condition. Nor may any implications be drawn for the general public on the relationship of dietary fatty acids intake to renal disease. Suggestions that certain lipids may increase the progression of renal disease have yielded conflicting research results.

Special Populations

Protein restriction is a therapeutic measure prescribed for patients with advanced renal disease, and end-stage renal disease patients on dialysis must follow a protein-, potassium-, and phosphate-restricted maintenance diet. A qualified health professional should provide information to such patients on using these diets appropriately.

Nutrition Programs and Services

Food Labels

Evidence related to the role of dietary factors in renal disease currently holds no special implications for change in policy related to food labeling.

Food Services

Evidence related to the role of dietary factors in renal disease currently holds no special implications for policy changes in food service programs.

Special Populations

Patients with renal disease should receive counseling and assistance in developing diets low in protein and low in phosphate. Those with renal stones should receive advice on diets that reduce excretion of stone-promoting factors (purines and excessive calcium) and should receive recommendations for a high daily fluid intake in excess of two liters.

Research and Surveillance

Research and surveillance issues of special priority related to the role of diet in renal disease should include investigations into:

- The ability of low-protein diets to retard the decline of renal function in normal aging.
- The mechanisms by which dietary protein affects renal function.
- The relationship of the role of dietary protein to that of phosphate in its effect on kidney function.
- The mechanisms by which other nutrients such as fatty acids or amino acids might affect renal function.
- The use of various diets—such as those low in protein or phosphate—to retard the rate of progression of renal failure.

- The relative merits of specialized formula diets, pharmacologic therapy, and traditional low-protein diets in treating progressive renal failure.
- The causes of wasting, malnutrition, and other nutritional disorders that occur in renal failure.
- The treatment—with calories, amino acids, or drugs—of wasting, malnutrition, and other nutritional disorders that occur in renal failure.
- The interplay of dietary factors (such as calcium, vitamin D, phosphate, protein, and oxalate) in the etiology of renal stones.
- The effect of omega-3 fatty acids in preventing the immune inflammatory response in chronic renal disease.
- The regulatory mechanisms in the utilization and metabolism of keto-acids in humans.
- The impact of reduced protein/amino acid intake on the quantitative dynamic status of protein and specific amino acid metabolism in organs and the entire body.
- Lipid metabolism as affected by reduced protein and amino acid intake.
- The role of lipids in the progression of chronic renal disease: lipid turnover by renal cells, effect on tubular growth and function, relationship of hyperlipidemia to renal injury, and effect of drugs in the treatment of hyperlipidemia.
- Control of renal growth and impact of nutrition on renal mass.
- Mechanisms that produce toxicity of uremia and consequences of uremic symptoms.
- Effect of protein restriction, as opposed to total calorie restriction, on renal injury.

Gastrointestinal Diseases

Dietary Guidance

General Public

Dietary fat, fiber, and alcohol are significant factors associated with gastrointestinal diseases, although the great variety of these conditions makes generalizations difficult. Because diets that contain a large proportion of calories from fat may be low in fiber, it is often difficult to separate the effects of these substances on gastrointestinal disease. Thus, current evidence on whether dietary fiber helps prevent diverticulosis is not con-

clusive. Similarly, whether dietary fiber helps prevent inflammatory or irritable bowel disease is uncertain. Nevertheless, evidence that dietary fiber helps treat and prevent constipation and manage chronic diverticular disease suggests the prudence of consuming diets higher in fiber and lower in fat.

The strong cause-and-effect association between excessive alcohol consumption and the development of chronic liver disease and cirrhosis (as reviewed in the chapter on alcohol) emphasizes that persons who consume alcoholic beverages should do so in moderation. Epidemiologic associations between diet and some types of gastrointestinal cancer (as reviewed in the chapter on cancer) suggest—but do not yet prove—that consuming less fat and alcohol and more fiber would help reduce the risk for these cancers.

Evidence on the role of dietary factors in the development of gastric or duodenal ulcers or reflux esophagitis is insufficient to make recommendations at this time.

Special Populations

Higher intakes of dietary fiber can prevent or relieve symptoms of constipation and chronic diverticular disease. Qualified health professionals should inform persons with these conditions about foods with relatively high fiber contents. Individuals with celiac disease should be provided with information on foods free of wheat gluten. Those with inflammatory bowel disease, irritable bowel syndrome, lactose intolerance, gallbladder disease, heartburn, and ulcers should be provided with guidance on diets appropriate to their conditions.

Nutrition Programs and Services

Food Labels

Evidence related to the role of dietary factors in gastrointestinal disease suggests that food manufacturers should include on package labels information about nutritional content of the food, especially for fat and carbohydrate components (and including fiber components to the extent permitted by analytical methods).

Food Services

Evidence related to the role of dietary factors in gastrointestinal diseases suggests that food services should include provisions for adequate intake of high-fiber and low-fat foods.

Food Products

Evidence related to the role of dietary factors in gastrointestinal diseases suggests that the public would benefit from additional products that are low in fat and calories and higher in fiber.

Special Populations

Persons with gastrointestinal diseases should receive counseling and assistance in developing appropriate diets for their particular condition. Qualified health professionals should provide appropriate training and enteral or parenteral nutritional support to persons with conditions that prevent food ingestion, cause malabsorption, or impair bowel function.

Research and Surveillance

Research and surveillance issues of special priority related to dietary factors affecting gastrointestinal function and diseases of the gastrointestinal tract should include investigations into:

- The prevalence of gastrointestinal diseases among the population.
- The influence of dietary factors such as specific dietary fibers, fat, and calories on development and function of the digestive tract.
- The influence of dietary factors on the development and release of enzymes and hormones that affect gastrointestinal function.
- The role of intestinal flora on nutrient bioavailability.
- The most effective nutrient-related interventions to improve the recovery of intestinal function following episodes of malnutrition or disease.
- The mechanisms by which dietary fiber may work in the prevention and treatment of bowel cancer, appendicitis, diverticular disease, gall-bladder disease, and other gastrointestinal conditions.
- The identification of specific dietary factors that might influence the causation, prevention, and treatment of celiac disease, inflammatory and irritable bowel syndromes, ulcers, and other gastrointestinal disorders.
- The most effective means to achieve dietary counseling to help alleviate gastrointestinal disorders.

Infections and Immunity

Dietary Guidance

General Public

Adequate nutrient and energy intake is critical to the maintenance of optimal immune function. However, evidence related to the role of specific dietary factors such as fatty acids, vitamin C, or zinc is insufficient to recommend changes in dietary guidance policy for the general public. Evidence related to the role of microbial and chemical contamination of food and water in human health suggests that the general public should receive information on appropriate food handling and storage methods to prevent outbreaks of food-borne disease.

Although the overall public health significance of breastfeeding in the United States is uncertain, studies in developing countries have shown the importance of breastfeeding in preventing diarrheal diseases and in reducing their severity. The immune protection conferred by breastfeeding also helps reduce the severity of certain infectious diseases among infants. Breastfeeding should continue to be recommended to pregnant women and to new mothers as the optimal method of infant feeding.

Although the relationship between malnutrition and changes in immune function observed with aging is not well understood, it is clear that adequate intake of nutrients is basic to the adequate immune protection in older Americans.

Special Populations

Infections produce well-documented adverse effects on nutritional status, and nutritional rehabilitation restores immune function and reduces the severity of infectious disease complications. Thus, the nutritional status of persons with infectious illnesses should be assessed regularly, and appropriate nutritional support measures should be instituted whenever necessary. Qualified health professionals should advise persons with food allergies and intolerances on the diagnosis of these conditions and on diets that exclude foods and food substances that induce symptoms.

Nutrition Programs and Services

Food Labels

Evidence related to diet-immune function interactions reinforces the need for food manufacturers to include explicit and complete ingredient state-

ments to protect individuals who may have severe adverse reactions to foods.

Food Services

Current evidence about the role of dietary factors in the maintenance of optimal immune function currently has no special implications for change in policy related to food service programs. Evidence related to the spread of infections suggests that food service personnel should receive adequate training in sanitary food handling and storage procedures.

Food Products

Evidence related to diet-immune function interactions suggests that food product manufacturers should take special precautions to use good manufacturing practices to avoid contamination with ingredients that may produce severe reactions and to reduce microbial and chemical contamination during production and storage. Manufacturers should continue to develop new products that are free of substances likely to induce allergic symptoms in susceptible individuals.

Special Populations

Patients with infectious diseases should be treated as rapidly and effectively as possible to minimize the depletion of body nutrients. Convalescing patients should be counseled and assisted in the development of diets that provide adequate intake of nutrients to regain an appropriate nutritional status. Patients with food intolerances should be counseled and assisted in the development of diets that omit foods and food factors that induce symptoms.

Research and Surveillance

Research and surveillance issues of special priority related to interactions between diet, infection, and immunity should include investigations into:

- The mechanisms by which generalized malnutrition depresses the function of specific components of the immune system.
- The effects of deficient or excess intake of single nutrients such as vitamin A, zinc, iron, or dietary fat on specific elements of the immune system and on immune function.
- The mechanisms by which deficient or excess intake of single nutrients might depress or improve immune system function.
- The factors in breast milk that protect infants from infectious disease.

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- The role of breast milk in transmitting allergens, infectious agents, or toxicants such as drugs.
- The role of nutrition in maintaining adequate immune function in older persons.
- The mechanisms by which infectious diseases alter nutrient metabolism and impair nutritional status.
- The most effective means of restoring nutritional status to malnourished individuals recovering from infectious illnesses.
- The identification of natural food products and chemical additives that induce adverse physiologic responses and the mechanisms by which they do so.
- The basic biochemistry of food antigens and biologically active components.
- The effects of processing and digestion of food substances with conversion to or inactivation of allergenic fractions.
- The value of therapeutic procedures designed to induce tolerance to food antigens.
- The prevalence of food-borne infections and intolerances and immunologic reactions to food in the population.
- The identification of behavioral determinants of unsanitary food handling and storage procedures and the development of effective educational methods to prevent transmission of food-borne illnesses.
- The effect of nutritional status on susceptibility to infectious diseases, including HIV infection, and on the complications of AIDS.

Anemia

Dietary Guidance

General Public

Prevention of nutrition-related anemia depends on adequate dietary intake of iron, vitamin B₁₂, and folate as well as the full complement of other essential nutrients. Except for younger children and women of reproductive age, who are at greater risk for iron deficiency, it appears that current iron consumption levels are sufficient for most of the population.

Special Populations

Routine health care for infants and pregnant women, the groups at highest risk for anemia, should include laboratory evaluation for anemia and

nutritional advice on methods to ensure adequate iron intake. Nonpregnant women in their childbearing years and adolescents are also at greater risk for iron deficiency anemia; these individuals should be monitored and should receive special counsel on preventing iron deficiency. Frequent blood donors, another high-risk group, should be advised by blood bank personnel about dietary methods to enhance iron intake and absorption. Groups who may need iron supplements, such as premature infants, pregnant women, women with excessive menstrual bleeding, frequent blood donors, strict vegetarians, and regular aspirin users, should also receive advice from health professionals on enhancing iron bioavailability from the diet. Specific education efforts directed toward these special groups, even though difficult, are needed.

Folate deficiency anemia usually occurs among women late in the course of pregnancy, among small and premature infants, and among alcoholics. These groups, especially from low-income families, should receive advice about dietary and supplemental sources of this vitamin.

Strict vegetarians who consume no foods of animal origin, especially women who are pregnant or nursing, should be advised to consume supplemental sources of vitamin B₁₂.

Nutrition Programs and Services

Food Programs

Because groups that benefit from food programs are those at highest risk for anemia, such programs should continue to be made available to high-risk groups and should encourage consumption of foods rich in iron and folate. Evidence suggests that current levels of iron fortification are safe and adequate, and no changes should be recommended at this time.

Food Labels

Evidence related to the role of iron and folate in anemia suggests that food labels should indicate the content of these nutrients.

Special Populations

Patients with anemia should receive counseling and assistance to develop diets that have adequate amounts of bioavailable iron, folate, or vitamin B₁₂ from dietary or supplemental sources.

Research and Surveillance

Research and surveillance issues of special priority related to the role of diet in anemia should include investigations into:

- Screening for earlier stages of iron deficiency using tests that identify iron depletion (e.g., erythrocyte protoporphyrin).
- Elucidation of the health consequences of conditions of iron depletion prior to development of anemia.
- Validation of methodologies for identification of the extent of deficiencies of iron, folate, and vitamin B₁₂ in the general population and in high-risk groups.
- Interactions between iron, folate, vitamin B₁₂, and other nutrients consumed in the diet.
- Improved methods for analysis of the folate content of food.
- Determination of iron requirements at various stages of the life cycle and under various physiologic conditions.
- Identification of appropriate levels and types of iron in the food supply for individuals with hereditary conditions of excess iron absorption.
- Identification of the level of iron intake that confers maximum protection against major infections.
- Determination of trends in iron fortification in the U.S. food supply.
- Development of effective methods to educate the general public and high-risk groups about consuming diets adequate in iron and folate.

Neurologic Disorders

Dietary Guidance

General Public

Nutrients of concern in stroke are those associated with its major diet-related risk factors—hypertension, diabetes, and obesity. Evidence suggests that diets low in sodium and alcohol, as well as caloric intake and physical activity to achieve and maintain desirable body weight, should be recommended as public health measures to prevent stroke and its related conditions. Excessive drinking has been associated with stroke; hence, this practice should be avoided. Although some evidence links very large exposures of major dietary components (e.g., amino acids, choline) to nervous system disorders other than stroke, this evidence is, for the most part, preliminary and remains to be confirmed by additional clinical evidence before implications can be drawn.

Over- or underconsumption of certain vitamins and minerals can damage the nervous system as in the occurrence in alcoholics of thiamin deficiency-related Wernicke-Korsakoff's syndrome.

Special Populations

Studies in patients with major diet-related risk factors for stroke indicate that similar dietary changes can reduce the level of the risk factor and help prevent cardiovascular disease (see chapters on high blood pressure, diabetes, and obesity). Qualified health professionals should provide patients with information on the means to achieve these changes. In addition to a focus on weight reduction and sodium restriction, this information should emphasize the importance of alcohol restriction in patients with high blood pressure and/or high glucose levels.

Suggestions that certain foods or food components might influence headache or epilepsy have yielded conflicting research results and are too preliminary to draw conclusions.

Nutrition Programs and Services

Food Labels

Evidence related to the role of dietary factors in stroke and other neurologic diseases supports the need for sodium labeling of packaged food products.

Food Services

Food service programs should emphasize diets low in sodium and calories to maintain ideal body weight and to control obesity and diabetes.

Special Populations

Patients at high risk for stroke and other neurologic conditions should be provided with counseling and assistance in the development of diets appropriate to their conditions.

Research and Surveillance

Research and surveillance issues of special priority related to the role of diet in neurologic disease should include investigations into:

- The role of specific dietary factors in the etiology and prevention of stroke.

Nutrition and Health

- The relationship, if any, between specific dietary factors and specific brain functions such as memory, alertness, and response time.
- The mechanisms by which food components, such as dietary precursors of neurotransmitters and certain additives and toxins, might affect nervous system function.
- The role, if any, of specific dietary factors in the etiology and prevention of Alzheimer's disease.
- The nutritional needs of the brain and nervous system in health and throughout life.
- The effects of excessive intake of nutrients and supplements (vitamins A, B₆, etc.) on nervous system function.
- The mechanism or mechanisms by which excessive alcohol intake increases the risk for stroke.
- The ability of diets low in calories, sodium, alcohol, and, perhaps, other dietary factors to prevent stroke.
- The most effective methods to educate the public about diet-related risk factors for stroke, and to assist the public in making recommended dietary changes.
- The comparative effects of dietary insufficiency on cognitive function and neurologic disease.
- The understanding of the blood-brain barrier nutrient transport processes and the mechanisms by which diet may influence brain function and health.
- The role of preexisting nutritional disease and nutritional status on the impact of neurotoxins.

Behavior

Dietary Guidance

General Public

Behavioral factors clearly influence food selection, dietary change, and chronic disease risk, but research in this area is still too preliminary to draw more than a few implications for the general public; exceptions generally apply to specific chronic disease conditions. Similarly, beyond the dietary guidance implications presented in the chapter on obesity, current evidence is insufficient to recommend specific dietary changes to prevent or treat the eating disorders—*anorexia nervosa*, *bulimia*, and *pica*. Sugar, certain food additives, and caffeine have been suggested as predisposing

dietary factors to the development of behavioral disorders in children and adults, but evidence is weak and contradictory, and there is no reason to expect that a reduced intake of these substances would affect the incidence or severity of behavioral disorders. In addition, current evidence does not support any implications at present about the effects of amino acid precursors of neurotransmitters on behavior.

Special Populations

Studies in patients with eating disorders and other chronic disease conditions (reviewed in other chapters of this Report) emphasize the importance of modification of diet-related behavior in these conditions. Such patients should receive advice from qualified health professionals on the application of dietary principles appropriate for their conditions. Although evidence linking dietary caffeine, refined sugars, and food additives to behavioral disorders is uncertain, their elimination from the diet will not impair nutritional status and can be recommended to patients on an individual trial basis.

Nutrition Programs and Services

Food Labels

Evidence related to the role of dietary factors in behavioral disorders holds no special implications for food labeling policies.

Food Services

Evidence related to the role of dietary factors in behavioral disorders currently holds no special implications for change in policies related to food programs beyond those suggested by the *Dietary Guidelines for Americans*.

Food Products

Evidence related to the role of dietary factors in behavioral disorders holds no special implications for change in policies related to food products at this time.

Special Populations

Patients with eating disorders should be provided with ready access to counseling and assistance in the development of diets that provide safe and adequate levels of energy and nutrients.

Research and Surveillance

Research and surveillance issues of special priority related to the role of behavior in the prevention of diet-related chronic disease and to the role of diet in behavioral disorders include investigations into:

- Behavioral factors that influence food selection patterns and dietary change.
- The most effective behavioral methods to encourage appropriate dietary changes.
- Behavioral factors that increase the risk for diet-related chronic disease.
- Behavioral factors that increase the risk for obesity, anorexia nervosa, bulimia, and pica.
- The prevalence of these eating disorders among different groups.
- Behavioral techniques effective in treatment of these disorders.
- Effects of foods and nutrients on etiology and treatment of behavioral disorders.
- Behavioral interventions that increase the long-term effectiveness of health promotion and chronic disease treatment programs.

Maternal and Child Nutrition

Dietary Guidance

General Public (Including Children and Pregnant Women)

Assessment of nutritional status is an integral part of maternity care at the beginning of pregnancy and periodically throughout pregnancy and lactation to provide continuing monitoring and recommend appropriate intervention.

Evidence related to the role of diet in maternal and child health indicates that well-nourished mothers produce healthier children. Intake of sufficient energy and nutrients to attain optimal nutritional status, including appropriate weight before pregnancy and adequate weight gain during pregnancy, improves infant birth weight and reduces infant mortality and morbidity. Avoiding potentially toxic substances such as alcohol or drugs during pregnancy seems to improve infant birth weight and health, but the evidence regarding low exposures to these agents is not conclusive. Information on appropriate dietary intake, with consideration of ethnic and

cultural food habits, should be provided as early as possible to pregnant women and to women expecting to become pregnant.

Evidence related to the role of diet in infancy indicates that breast milk is the optimal food for infants. Whenever possible and as early as possible, health professionals should provide guidance and support to pregnant women and new mothers on the importance of breastfeeding and on methods for its initiation and maintenance. Mothers who cannot or choose not to breastfeed should receive information about appropriate formulas.

Consuming the appropriate amount and form of energy and nutrients for developmental age is important for good health, as is early education about lifelong dietary patterns that help prevent disease. Parents should guide their children in developing positive eating behaviors and on age-appropriate food patterns that meet nutritional requirements but avoid excessive intake of fat, sodium, and sugar. Parents should also help adolescents develop healthy eating habits and should emphasize the importance of including sufficient quantities of low-fat, nutritious foods in meals and snacks.

Special Populations

Some factors present at the onset of pregnancy place women at increased nutritional risk. These include: adolescence, short interconceptional period, poor reproductive performance, economic deprivation, food faddism, substance use, chronic systemic disease, and inadequate or excessive prepregnant weight (below 85 percent or above 120 percent of standard weight for height). Other nutritional risk factors such as anemia and inadequate or excessive weight gain may develop during pregnancy.

Attaining appropriate prepregnancy body weight and nutritional status, gaining adequate body weight, and avoiding alcohol during pregnancy are important for all women. Qualified health professionals should provide close nutritional monitoring and individualized counseling to women appropriate to their educational level and cultural food habits before and throughout pregnancy.

Specialized professional counseling on feeding should be provided to parents of low birth weight (LBW) infants, other infants at high risk, and infants who require special formulas. Parents of children who are at high risk because of developmental disorders, inborn errors of metabolism, physical disabilities, or chronic disease should also receive ongoing professional advice on appropriate diets and feeding methods. Because children

from families with a history of diet-related chronic disease have a high risk for such conditions, they should be evaluated for these conditions. Children of families whose blood cholesterol, blood sugar, or blood pressure exceed appropriate levels should be advised on dietary and other means to reduce these risk factors.

Physicians, nurses, and other health professionals caring for children and women of childbearing age should receive education and training in nutrition assessment, nutrition intervention for prevention of disease, and promotion of maternal and child health.

Nutrition Programs and Services

Nutrition Services

Evidence related to the role of nutrition in maternal, infant, and child health suggests that all health care programs for these groups should provide nutrition services, especially to those people at special health or economic risk. Such services include nutrition assessment, dietary counseling, nutrition education, and referral.

Food Products

Evidence related to the role of dietary factors in maternal and child health suggests that food manufacturers should develop nutritious, low-fat, low-salt, low-sugar snack food products for children and adolescents. Quality and safety of infant formulas and other infant foods require continued monitoring to prevent untoward health consequences.

Special Populations

Pregnant women, infants, and children with diet-related disease conditions and physical disabilities that impair food intake should receive counseling and assistance in dietary management. Low-income families should have access to an adequate diet. Those with poor education, limited understanding of English, and different cultural patterns require nutrition education approaches appropriate to their needs.

Research and Surveillance

Research and surveillance issues of special priority related to the role of diet in maternal, infant, and child health should include investigations into:

- The amounts of energy and essential nutrients pregnant women must consume to achieve optimal birth outcome and promote long-term maternal health.

- The optimal weight gain during pregnancy.
- The diet during pregnancy that best prevents complications of chronic disease conditions in the mother.
- The effects of potentially toxic dietary factors such as alcohol on fetal health.
- The optimal feeding methods and diet for improving growth and development of LBW infants.
- The diet in childhood that will best prevent later development of chronic disease conditions.
- The influence of nutritional status on teratogenic outcomes, particularly neural tube defects.
- Nutritional care for optimal development of infants and children with special health care needs due to chronic illness or developmental disorders.
- Effective educational methods to teach parents how to develop good dietary practices for themselves and their children.
- Effective educational methods for teaching good nutritional practices to children and adolescents.
- Effective strategies to integrate nutrition screening, education, and intervention services into health care programs.
- The impact of social changes on nutritional status, including those related to meal sources and eating patterns.

Aging

Dietary Guidance

General Public

Aging is accompanied by a variety of physiologic, psychologic, economic, and social changes that may compromise nutritional status. However, ways in which the aging process affects energy balance, specific nutrient requirements, and nutrient status remain to be fully elucidated. Older adults may not necessarily have the same nutritional requirements as younger adults, yet current estimates of the nutrient requirements of older persons are based almost entirely on values extrapolated from data from studies of younger adults. The ways in which nutritional status might influence changes in tissue and organ function change with age and may influence the relationships between dietary components and the occurrence of chronic diseases of old age. Until more appropriate age-specific RDA's are estab-

lished, the current RDA's should continue to be used as standards for nutrient intake of healthy older persons.

Until more is known, older Americans should consume sufficient nutrients and energy and maintain levels of physical activity that maintain desirable body weight and may prevent or delay the onset of chronic disease. Because it is often difficult to maintain adequate nutrient intake on low-calorie diets, older people should be advised to maintain at least moderate levels of physical activity so as to increase caloric needs. Recommendations to the general population about calcium intake (see chapter on skeletal diseases) are true for older Americans. Because many of the chronic diseases common to older persons may originate earlier in life (see chapter on maternal and child nutrition), dietary guidance to prevent them should be provided throughout life (as discussed in other chapters).

Health promotion messages from the public and private sectors should utilize advanced communication techniques, recognizing different lifestyles, decrements in vision and hearing, different cultural experiences, and different learning styles that may be common to older people. Federal and State agencies should provide information about successful public-private sector models for nutrition, health promotion, and education for older adults—for example, Healthy Older People, Age Well, and OASIS (Older Adult Service Information System).

Special Populations

Sedentary older individuals should be counseled on appropriate methods to increase caloric expenditure. Older persons who do not (or cannot) consume adequate levels of nutrients from food sources and those with dietary, biochemical, or clinical evidence of inadequate intake should receive advice on the proper type and dosage of nutrient supplements. Such supplements may be appropriate for some older persons, but self-prescribed supplementation, especially in large doses, may be harmful and should be discouraged. Older people who suffer from diet-related chronic diseases should receive dietary counseling from credentialed health professionals, and those who take medications should be given professional advice on diets that minimize food-drug interactions.

Nutrition Programs and Services

Food Labels

Evidence related to the role of diet in the aged currently holds no special implications for change in policy related to food labeling, although the size

of the type on the label is a factor for most older consumers. Information provided on food labels should be scientifically sound, understandable, and nonmisleading.

Food Services

Food services, especially those receiving Government funds, should be required to pay special attention to meeting the caloric and nutrient needs of older clients. Nutritional assessment and guidance should be done at hospital admission or enrollment in or discharge from institutional or community-based services for older adults (e.g., acute and long-term care inpatient services, hospital-based outpatient services, alcohol and drug treatment programs, community health services, and home-delivered meals programs).

Food Products

Evidence suggests that older people would benefit from food products that provide a high proportion of available nutrients to calories, that have taste appeal, and that are easy to prepare.

Special Populations

Older people who are homebound, who live in isolation, or who suffer from chronic disease have special needs for nutrition services that are tailored to their particular conditions. Considerable evidence supports the nutritional and health benefits of dietary, economic, and social support programs for the older population.

Research and Surveillance

Research on nutrition and aging currently focuses on two general areas—the nutritional requirements and status of aging people and the influence of diet on aging processes and related pathologies. Psychosocial interactions with nutrition cut across both areas.

Research and surveillance issues of special priority related to the role of nutrition in the aged should include investigations into:

- The nutrient and energy requirements of older adults, currently extrapolated from younger age groups.
- The effects of dietary restriction and overconsumption on longevity and age-related pathology.
- The interactions among nutritional status, lifestyle and behavior, and the environment in older Americans.

- The effects of nutrition on age-related impairment of the cardiovascular, gastrointestinal/oral, immune, musculoskeletal, and nervous system functions and on prevention and treatment of disorders of those systems.
- The effects of marginal nutrient and energy deficiencies on the mental and physical health of older persons.
- Interactions among nutrients and between nutrients and drugs in older adults.
- Development of data bases for use by pharmacists and dietitians in counseling older persons on drug-nutrient interactions.
- Age-specific methods and standards to assess the nutritional status and body composition of older adults.
- The educational methods and program strategies that best promote adequate food consumption by older persons.
- Improved methods to monitor the nutritional status of older populations and individuals, including institutionalized older adults, over time.
- The educational and public health strategies that can be used to eliminate nutrition-related health fraud directed toward older citizens.

Alcohol

Dietary Guidance

General Public

Alcohol has been identified as a dietary factor that increases the risk for diseases of the liver, nervous system, and heart. It also contributes to the development of certain cancers. Although consumption of up to one to two drinks per day has not been associated with disease among healthy male and nonpregnant female adults, evidence that 9 percent of the total population consumes two or more alcoholic drinks per day suggests that the risk for alcohol-related conditions could be reduced by an overall decrease in alcohol consumption among some segments of the general public.

Special Populations

Because studies in pregnant women have been unable to identify a threshold level of safety for alcohol intake during pregnancy, and because the risk for fetal abnormalities increases with increased alcohol intake during pregnancy, pregnant women—and women planning to become pregnant—should be advised to avoid drinking alcohol.

Persons with alcohol-related liver, nervous system, and cardiovascular conditions (e.g., elevated blood cholesterol and blood pressure levels) should receive advice from health professionals to reduce or eliminate alcohol intake to reverse or to prevent progression of these conditions. Persons with diabetes should also receive counseling on the effects of alcohol on caloric intake and blood glucose control.

Adolescents and young adults should be counseled in schools and through the media on the relationship between alcohol intake and motor vehicle and other accidents, suicides, and homicides. Older individuals should be counseled on the relationship between alcohol intake, nutritional deficiencies, and drug interactions.

Nutrition Programs and Services

Food Labels

Evidence related to the role of alcohol in health suggests that if alcoholic beverage containers are required to bear health warning labels, these labels should carry information warning of hazards to the developing fetus as well as of other health hazards associated with alcohol consumption abuse.

Food Services

Aside from the special populations noted below, evidence related to the role of alcohol currently holds no special implications for change in policies related to food service programs.

Food Products

There are no special implications for change in policy related to formulation of food products.

Special Populations

Pregnant women, including those served by the Special Supplemental Food Program for Women, Infants, and Children (WIC) and other maternal and child health programs, should be provided with counseling on avoidance of alcoholic beverages. Persons with alcohol-related conditions should be provided with counseling and referrals on the benefits of abstinence.

Research and Surveillance

Research and surveillance issues of special priority related to the role of alcohol and health include investigations into:

- The levels at which alcohol intake increases risk for chronic diseases and birth defects.
- The mechanisms by which alcohol induces fatty changes in the liver.
- The mechanisms by which alcohol increases blood pressure, blood cholesterol, blood glucose levels, and other risk factors for chronic disease.
- The mechanisms by which low levels of alcohol may reduce risk for coronary heart disease.
- The mechanisms by which alcohol increases cancer risk.
- The mechanisms by which alcohol damages the nervous system.
- The mechanisms by which alcohol intake interferes with nutritional status.
- Definition of the physiologic energy value of alcoholic beverages.
- The interaction of alcohol intake, nutritional status, socioeconomic status, and health.

Drug-Nutrient Interactions

Dietary Guidance

General Public

Although drugs interact with dietary factors in many ways that impair nutrient availability, evidence about the public health significance of such interactions is insufficient to recommend general shifts in the pattern of use of any particular drug on the basis of its adverse effects on nutritional status. Nor may any implications be drawn at this time for the general public on intake of specific nutrients with relation to nonprescription drug interactions.

Special Populations

Studies of patients consuming multiple drugs for prolonged time periods, especially those patients who are older, suggest that dietary intakes may need to be adjusted to compensate for adverse interactions of specific nutrients with medications and that information should be provided to such patients by qualified health professionals on appropriate use of such diets.

Patients taking drugs that induce acute reactions in the presence of dietary factors such as tyramines or alcohol should be instructed on appropriate means to avoid those factors.

Persons with inborn metabolic errors that respond to pharmacologic doses of nutrients or to special products designed to minimize toxic symptoms should be advised on the safe and effective use of such therapies. Health professionals should receive instruction about drug-nutrient interactions to understand how best to maximize drug efficacy and minimize adverse reactions.

Nutrition Programs and Services

Food Labels

Evidence related to the role of diet in drug interactions currently holds no special implications for change in policy related to food labeling.

Drug Labels

Evidence related to the role of diet in drug interactions suggests that drug manufacturers should provide information in the package insert on the potential effects of the medication on nutritional status, and vice versa.

Food Services

Evidence related to the role of diet in drug interactions currently holds no special implications for change in policy related to food service programs.

Food Products

Evidence related to the role of diet in drug interactions currently holds no special implications for change in policy related to packaged food products. Preliminary evidence relating human infections to antibiotic-resistant micro-organisms derived from animals treated with subtherapeutic doses of antibiotics suggests the need for close scrutiny of this practice.

Special Populations

Persons—especially older persons—who consume drugs should be provided with counseling and assistance on dietary methods to avoid adverse drug-nutrient interactions. Persons with inborn metabolic errors requiring therapy with pharmacologic doses of nutrients should be provided with counseling and assistance on appropriate and safe use of such supplements.

Research and Surveillance

Research and surveillance issues of special priority related to the role of diet in drug interactions should include investigations into:

- The extent of drug taking (prescription, over the counter, and illegal) among the population.
- The extent of adverse drug-nutrient interactions in the population.
- Age-related changes in nutrient metabolism with special implications for pharmaceutical use.
- Effects of medications on the nutritional status of older persons.
- Drug effects on nutrient intake, absorption, metabolism, and excretion.
- Effects of diet, including alcohol, on drug absorption, metabolism, and excretion.
- The effects of antibiotics, hormones, or other drugs in animal feeds on human health.
- The levels of intake of essential nutrients that induce toxic symptoms.
- The most effective means to educate health professionals and the general public about drug-nutrient interactions.

Dietary Fads and Frauds

Dietary Guidance

General Public

Running counter to—and sometimes capitalizing on—legitimate gains in scientific understanding of the relationships between diet and health, food faddism and nutrition fraud are increasingly prevalent in the United States. Although most of the adverse consequences of this trend are economic, fraud can cause significant health consequences to individuals as a result of direct toxicity and as a result of failure to seek appropriate medical care or to engage in genuinely healthful dietary practices. Cooperative educational efforts by Government, health professionals, and the private sector, including the news media, are needed to expose emerging fads and frauds before they are widely accepted. One approach to this end is general public education to reinforce the basic principles of sound nutrition as stated in the *Dietary Guidelines for Americans*. Another approach is to direct the public to responsible sources of nutrition information.

Special Populations

Special efforts should be directed toward older persons, who are the target of much nutrition fraud. Cooperative educational efforts by Government and the private sector, such as current collaborations of the FDA with the Pharmaceutical Advertising Council and the Council of Better Business Bureaus, can provide effective support for Government enforcement programs. People with chronic debilitating illnesses—such as cancer, coronary heart disease, arthritis, or Alzheimer's disease—may be especially susceptible to fads and frauds, and health providers should be informed about the most common schemes in each area and should be involved in the effort to forewarn patients.

Nutrition Programs and Services

Food Labels

Food labels should contain information about nutrient content that is provided in a straightforward, effective, and efficient way. Should a health-claims-approved program be implemented, claims for a particular product should be presented in a manner that is most informative, scientifically sound, and not misleading to consumers.

Food Services

Education provided in the context of food services should emphasize general principles of sound nutrition for the general public and inform people about the nature of and problems associated with common nutritional frauds and fads.

Food Products

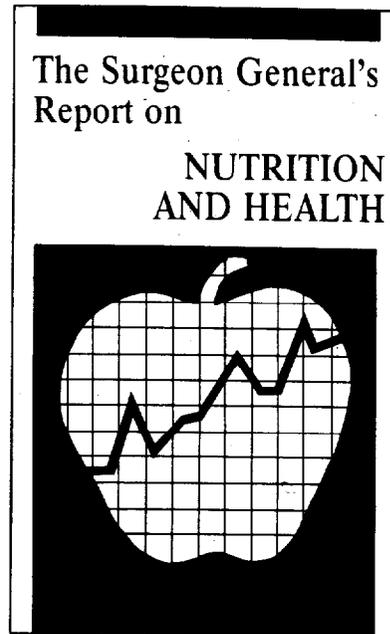
The FDA is charged with ensuring that misleading claims about foods are not presented to the public and that specific foods are not promoted as therapeutic or preventive agents unless there is adequate documentation to support such claims. Continued support for, and vigilance by, the FDA is important in this regard. A cornerstone of this effort is close coordination of regulation and enforcement activities of the various agencies at the Federal, State, and local levels through coalitions developed against nutrition fraud.

Research and Surveillance

Research and surveillance issues of special priority related to the issue of food fads and frauds should include investigations into:

- Frequency and type of fraudulent claims and harmful effects.
- Establishment of safe levels of essential nutrients as well as other components in food.
- The personal and behavioral factors that enhance response to certain unscientific claims and ways to counter them.
- The level of use of vitamin, mineral, and food components that may induce nutrient toxicities or deficiencies by the general public.

The Surgeon General's Report on NUTRITION AND HEALTH



This authoritative 750 page report from the Surgeon General on the relationship between nutrition and health presents:

- Nineteen chapters that document the scientific evidence for associations between diet and disease;
- The historical context in which these associations are examined;
- The public health impact of the diseases covered;
- The public policy implications of the evidence;
- Tables and charts that support these associations; and
- Extensive reference lists for each chapter.

The 78 page *Summary and Recommendations* presents highlights of the full report, including the sections on policy implications and tables that illustrate key issues.

Take this opportunity to obtain copies of these landmark publications on how diet affects health. Use the order form on the reverse side of this page to order *The Surgeon General's Report on Nutrition and Health* (available October 1988) and/or the report's *Summary and Recommendations* (available now). Reproduction of the order form is encouraged.

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