

Childhood

Childhood can be divided into the preschool period (2 to 5 years of age) and the schoolage period (6 to 11 years of age). The rapid growth rate that characterizes the first 12 months of life tapers off quickly during the preschool years and proceeds at a slow but steady rate until the end of childhood. If an average infant's growth rate did not slow down, he or she might weigh about 190 pounds and be about 57 tall by 3 years of age! However, the average 3-year-old weighs about 32 pounds and is about 3 feet in height. The preferred growth standard for children who are 2 to 20 years of age is the body mass index (BMI)-for-age. The BMI-for-age is a number calculated from the child's height and weight. BMI charts for children are both gender and age-specific. An overweight child has a BMI for age that is at or above the 85th percentile and lower than the 95th percentile for children of the same age and sex. An obese child has a BMI for age that is at or above the 95th percentile for children of the same age and sex.

As the growth rate slows after infancy, preschoolers' appetites decrease because they do not need as much food. Parents and other caregivers must recognize that a 3-year-old child should not be expected to eat as eagerly as he or she did as an infant. Furthermore, children do not have the stomach capacity to eat adult-size portions of foods. When planning meals and snacks for children who eat relatively little food, caregivers should emphasize nutrient-dense foods, such as lean meats, low-fat milk products whole-grain cereals, fruits, nuts, and vegetables. Although many ready-to-eat cereals are sweetened with sugar, it is not necessary to eliminate such foods. Caregivers, however, should read product labels and choose varieties with less added sugar. Additionally, it is important to monitor children's intake of sweets, because sugary items can crowd out more nutritious foods from their diets. are appropriate for children who are 2 to 5 years of age. Recall that fish and seafood are in the Meat & Beans group. Caregivers should include fish in children's meals regularly,

especially fish that are rich sources of omega-3 fatty acids, such as salmon. However, commercially fried fish, including fish sticks, should be avoided, because of their high fat content.

Nutritious Snacks

- Peanut butter spread on crackers
- Fruit smoothies
- Fruit salad (or cut-up fruit)
- Mini-pizzas (half an English muffin, topped with tomato sauce and Mozzarella cheese, and heated in toaster oven or microwave oven)
- Plain, low-fat yogurt topped with fresh fruit
- Pasta salad
- Peanuts, cashews, or sunflower seeds
- Fruit pops
- Quick breads, such as banana bread
- Cheese melted on whole-wheat crackers
- Dried fruit
- Ready-to-eat cereal
- Vegetable sticks dipped in hummus

Common Food-Related Concerns

1. Iron Deficiency.
2. Dental Caries.
- 3- Allergies.
- 4- Obesity.

Food & Nutrition tips

- Foods with bright colors, crisp textures, and sweet or mild flavors usually appeal to children. When planning meals, consider including foods with these attractive characteristics.
- To stimulate your child's appetite, try serving food on a small colorful plate that is designed to appeal to young children.
- Keep in mind that you are your children's role model for food choices and physical activity habits. If you eat a variety of nutrient-dense foods and are physically active, your children are likely to eat such foods and be active as well.

Adolescence

Adolescence is the life stage in which a child matures physically into an adult. During adolescence, the reproductive organs increase in size and begin functioning properly. Furthermore, individuals attain their full height by the end of adolescence. During this life stage, youth also develop emotionally, intellectually, and socially as they prepare for their adult roles. Healthy adolescents learn to function independently of their adult caregivers. Thus, youths face a variety of lifestyle choices, including decisions regarding eating and physical activity habits. Such decisions often set the stage for the quality of their health in adulthood. For many teens, however, pressure to conform to fads and be influenced by other adolescents ("peer pressure") negatively affects their diets and overall health. Puberty signals the end of childhood. In the United States, most boys begin puberty when they are between 10 and 12 years of age; most girls begin puberty between 8 and 10 years of age. Puberty is a period characterized by dramatic physical changes, including increases in height and weight, known as the "growth spurt." During growth spurts, adolescent girls tend to accumulate both lean and fat tissue, whereas adolescent boys

tend to gain mostly lean tissue. Most girls begin their growth spurt between 10 and 13 years of age. Boys begin their growth spurt later than girls generally when they are between 12 and 15 years of age. Girls usually begin menstruating during their growth spurt. A girl's skeletal growth is almost complete about 2 years after her first menstrual period, whereas boys typically continue to gain stature until they are in their early twenties. The timing of puberty and growth spurts can vary widely, primarily due to genetic, environmental, and nutritional factors.

Nutrition-Related Concerns of Adolescents

Obesity

Physical inactivity contributes to overweight among adolescents. Teenagers need to perform at least 60 minutes of moderate-intensity physical activity every day, or 5 or more days of the week. According to results of the 2007 National Youth Risk Behavior Survey, about 65% of the participants in the survey did not obtain recommended amounts of physical activity during 5 or more days of the week. Recommended physical activities increase breathing and heart rates, and are performed for a total of at least 60 minutes/day.

Overweight and Atherosclerosis

Although it is unusual for young adults to have heart attacks or strokes, the process of atherosclerosis begins in childhood and continues during adolescence. High blood glucose, cholesterol, and blood pressure levels are major risk factors for atherosclerosis. The prevalence of type 2 diabetes and hypertension is increasing among obese American adolescents. Thus, medical experts are concerned that many over fat teenagers with type 2 diabetes, elevated blood cholesterol, or hypertension will develop atherosclerosis prematurely.

Weight Loss for Adolescents

In many cases, overweight teenagers who are experiencing their growth spurt do not need to lose weight, because their lengthening skeletons eventually add inches to their height. However, these youth may need to slow their rate of weight gain, so they are less likely to be over fat when their skeletal growth stops. Before embarking on a weight-loss program, over fat teens should be evaluated by a physician to determine how much weight they should lose. After the assessment, the physician can refer the overweight or obese adolescent to a registered dietitian for specific help in planning a calorie-reduced diet.

Nutrition for Older Adults

The Aging Process

The aging process begins at conception and is characterized by numerous predictable physical changes. By the time you are 65 years of age, you will have reached the final life stage, older adulthood. What causes people to age is unclear. Scientists who study the aging process have learned that cell structure and function inevitably decline with time, leading to many of the physiological changes. Eventually, most cells lose the ability to regenerate their internal parts, and they die. As more and more cells in an organ die, the organ loses its functional capacity, and as a result, other organs fail and body systems are adversely affected. When this happens, the person soon dies. **Senescence** refers to declining organ functioning and increased vulnerability to disease that occurs after a person reaches physical maturity.

Older Adults: Common Nutrition-Related Concerns

Compared to younger persons, older adults have greater risk of nutritional deficiencies because of physiological changes associated with the normal aging process. Other factors that can influence an older person's nutritional status include

illnesses, medications, low income, and lack of social support. Diets of older adults, particularly older women, often provide inadequate amounts of vitamins D, A, C, and B-12 and minerals such as calcium, iron, and zinc. Results of a survey of over 1700 older adults indicated that subjects often failed to consume recommended amounts of grain and milk products, vegetables, and fruits. Furthermore, most subjects were over fat, with BMIs equal to or greater than 25.

Reduced Food Intake Among Older Adults: Contributing Factors

- Reduced ability to taste and smell food
- Difficulty swallowing
- Loss of teeth
- Loss of normal cognitive function
- Lack of income
- Depression
- Reduced mobility and flexibility

Nutrition & Diseases

Diabetes mellitus

Diabetes mellitus (diabetes) is actually a group of serious chronic diseases characterized by abnormal glucose, fat, and protein metabolism.

Classification

The American Diabetes Association classifies diabetes into a four categories:

1. Type 1 diabetes (T1DM): formerly called insulin dependent diabetes mellitus, is **characterized** by sudden, severe insulin deficiency requiring insulin therapy to prevent ketoacidosis, coma, and death. T1DM generally appears during childhood or adolescence and accounts for 5% to 10% of the cases of diabetes. However, T1DM can occur at any age,

2. Type 2 diabetes (T2DM): formerly called non-insulin dependent diabetes mellitus, is associated with insulin resistance and obesity combined with inadequate insulin produced in the pancreatic beta cells to compensate for the insulin resistance or an insulin secretory defect with insulin resistance. T2DM accounts for 90% to 95% of all cases of diabetes, and **symptoms** may include poor wound healing, blurred vision, or recurrent gum or bladder infections.

3. Gestational diabetes mellitus (GDM): is defined as carbohydrate intolerance of variable severity with onset or first recognition during pregnancy. GDM develops in 2% to 5% of all pregnancies, and 30% to 40% of women with GDM are likely to develop T2DM.

4. Other specific types: include genetic defects of the beta cell, genetic defects in insulin action, disease of the exocrine pancreas, endocrinopathies, and other uncommon forms of immune-mediated diabetes.

Symptoms of T1DM

- Increased thirst (polydipsia)
- Increased urination (polyuria)
- Increased hunger (polyphagia)
- Weight loss (more common with T1DM)
- Fruity smell to breath (symptom of ketoacidosis)
- Fatigue or weakness

Symptoms of T2DM

- Poor wound healing or recurrent infections
- Blurred vision (result of effects of hyperglycemia on shape of the cornea, which is returned to normal after glucose levels are stabilized)
- Skin irritation or infection
- Recurrent gum or bladder infections

Can Diabetes Be Prevented?

There is no way to prevent type 1 diabetes. However, you may reduce your risk of type 2 diabetes by avoiding excess body fat, exercising daily, and changing your diet. Certain eating habits may help prevent type 2 diabetes. A recent analysis of the eating practices of over 40,000 American men identified two major dietary patterns: Western and prudent diets. The Western diet contains high amounts of red meat, processed meats, French fries, high-fat dairy foods, and refined sugars and starches. The prudent diet contains more poultry, fish, and fiber-rich whole grains, fruits, and vegetables than the Western diet. The results of this study indicated that men who ate Western diets had almost twice the risk of developing type 2 diabetes that those who followed prudent diets had. Results of another study indicated that high red meat intake may increase the risk of type 2 diabetes in women. On the other hand, high-fiber diets, particularly those containing cereal fiber, may protect against

diabetes. Some medical experts are concerned that diets that contain excess sugar, particularly fructose, may increase the risk for type 2 diabetes and other serious chronic diseases.

Hypertension

A condition characterized by persistently elevated blood pressure, It is a major factor in the development of stroke, heart attack, heart failure, and kidney disease. Blood pressure **classify to** normal, Prehypertension, Stage 1 hypertension (medium severity), and Stage 2 hypertension (severe), as explained in table (1).

Systolic pressure

Maximum blood pressure within an artery that occurs when the ventricles contract.

Diastolic pressure

Pressure in an artery that occurs when the ventricles relax between contractions.

Table (1). Classification of blood pressure

BLOOD PRESSURE (BP) CLASSIFICATION	SYSTOLIC (in mm Hg)*	DIASTOLIC (in mm Hg)
Normal [‡]	<120	and <80
Prehypertension	120-139	or 80-89
Stage 1 hypertension [¶]	140-159	or 90-99
Stage 2 hypertension [¶]	>160	or >100

Nutritional Management of Hypertension

Taste for a given amount of salt with food is an acquired one, not a physiologic necessity. Sufficient sodium for the body's need is provided as a natural mineral in

foods consumed. Some persons salt their foods heavily and thus form high salt taste levels. Others form lighter tastes by using smaller amounts. Common daily adult intakes of sodium range widely from about 2 – 4 g, with lighter tastes to as high as 10 – 12 g with heavier use. Also avoid pickles, salty dairy products, canned foods and alcoholic beverages.

Lactose Intolerance

Lactose intolerance is a digestive problem related to the inability to digest lactose. Lactose intolerance is estimated to affect as many as 70% of the world's population. Individuals with lactose intolerance vary in their ability to digest lactose. They may have symptoms after taking in as little as 6 g or as much as 12 to 18 g of lactose (1 cup of milk contains 12 g of lactose). The problem stems from a deficiency of lactase, the digestive enzyme in the microvilli of the small intestine that breaks lactose into the simple sugars glucose and galactose. When undigested lactose remains in the small intestine and colon, it absorbs large amounts of water and is fermented by resident bacteria, producing diarrhea, bloating, and gas. Most people who have problems digesting lactose do not need to follow a lactose-free diet. Maldigestion of lactose does not mean that an individual is allergic to milk or dairy foods, although both conditions are sometimes present in the same person. A true milk allergy is caused by the protein in milk, not the lactose. **To increase their intakes of calcium and vitamin D, people with lactose maldigestion might begin to include dairy foods in their diet in the following ways:**

- Add dairy foods gradually: Begin with a small amount of one dairy food each day, one-quarter cup of milk or one half ounce of cheese; include only one lactose-containing food per meal.
- Include lactose-containing foods with a meal or snack: This combination slows the movement of lactose into the intestine and may reduce discomfort.

- Choose dairy foods low in lactose: Use lactose-free or lactose-reduced milk. (Acidophilus milk is not lactose free.)
- Add lactase enzyme drops (Lactaid or Dairy Ease) to milk to break down some of the lactose.
- Lactase tablets taken right before eating can reduce discomfort.
- Aged cheeses such as cheddar or Swiss are lower in lactose than cheese spreads or other processed cheese.

Protein Deficiency

Kwashiorkor and Marasmus

At one time, nutrition experts thought there were only two types of **(PEM) protein-energy malnutrition** condition that results from chronic lack of food or poor food choices, which are **kwashiorkor**: form of PEM that results from consuming adequate energy and incomplete protein, and **marasmus** which mean starvation. The distinctions between these conditions, however, are often blurred, because protein deficiency is unlikely when a person's energy intake is adequate. Nevertheless, dietitians generally consider kwashiorkor, and marasmus as forms of PEM. **Children affected by kwashiorkor** have stunted growth; unnaturally blond, sparse, and brittle hair; and patches of skin that have lost their normal coloration. Children with kwashiorkor have some subcutaneous (under the skin) fat and swollen cheeks, arms, legs, and bellies that make them look well fed, but their appearance is misleading. **Obvious signs of marasmus** are weakness and wasting. The body of a starving person loses most of its subcutaneous fat and deeper fat stores. The marasmic person is so thin that his or her ribs, hips, and spinal bones are visible through the skin. People suffering from marasmus avoid physical activity to conserve energy, and they are often irritable.

Overweight and Obesity

At one time, people referred to height/weight tables to determine whether their body weights were “ideal” or “desirable.” Today, medical experts use the body mass index (BMI) to judge whether an adult’s weight is healthy. BMI is a numerical value based on the relationship between body weight and risk of chronic health problems associated with excess body fat. **Body Mass Index (BMI)** is a ratio of weight to height and has been correlated with overall mortality and nutritional risk. It does not estimate body composition (lean body mass or adiposity); however, it is a reliable indicator of total body fat

Calculating BMI

$$\text{BMI} = \frac{\text{Weight (kg)}}{\text{Height}^2 \text{ (m)}} \text{ or } \text{BMI} = \frac{\text{Weight (lb)}}{\text{Height}^2 \text{ (in)}} \times 704.5$$

Example: An individual weighs 65 kg (143 lb) and is 1.7 m (5 feet 7 inches) tall. $\text{BMI} = 65 / (1.7)^2 = 22.5 \text{ kg/m}^2$

Classification of BMI

Underweight: <18.5

Normal: 18.5-24.9

Overweight: 25.0-29.9

Obese: ≥30.0

Extreme obesity: ≥40.0

Water intoxication

Can occur when an excessive amount of water is consumed in a short time period or the kidneys have difficulty filtering water from blood. The excess water dilutes the sodium concentration of blood, disrupting water balance. As a result of the imbalance, too much water moves into cells, including brain cells. **Signs and symptoms of water intoxication may include** dizziness, headache, confusion, inability to coordinate muscular movements, bizarre behavior, and if the condition is not detected early and treated effectively, coma and death can result.

Vitamins Deficiency

Vitamin	Major Functions in the Body	Major Dietary Sources	Major Deficiency Signs & Symptoms
Vitamin A	Normal vision and reproduction, cellular growth, immune system function	liver, milk, fortified cereals Provitamin: yellow orange and dark green fruits and vegetables	Night blindness, xerophthalmia, poor growth, dry skin, reduced immune system functioning
Vitamin D	Absorption of calcium and phosphorus, Maintenance of normal blood calcium, calcification of bone, maintenance of immune function	Vitamin D-fortified milk, fortified cereals, fish oils, fatty fish	Rickets in children, osteomalacia in adults: soft bones, depressed growth, and reduced immune system functioning
Vitamin E	Antioxidant	Vegetable oils and products made from these oils, certain fruits and vegetables, nuts and seeds, fortified cereals	Loss of muscular coordination, hemolysis of red blood cells resulting in anemia
Vitamin K	Production of active blood-clotting factors	Green leafy vegetables, canola and soybean oils, and products made from these oils	Excessive bleeding
Thiamin	Part of coenzyme needed for carbohydrate metabolism and the metabolism of certain amino acids; may help produce neurotransmitters	wheat germ, enriched breads and cereals, brewer's yeast	Beriberi and WernickeKorsakoff syndrome: Weakness, abnormal nervous system functioning
Riboflavin	Part of coenzymes needed for carbohydrate, amino acid, and lipid metabolism	Milk, yogurt, and other milk products; enriched breads and cereals; liver	Inflammation of the mouth and tongue, eye disorders
Niacin	Part of coenzymes needed for energy metabolism	Enriched breads and cereals, beef, liver, tuna, salmon, poultry, mushrooms	Pellagra: Diarrhea, Dermatitis, Dementia
Folate	Part of coenzyme needed for DNA synthesis and conversion of cysteine to methionine	Dark green, leafy vegetables, liver, legumes, asparagus, broccoli, orange juice, enriched breads and cereals (folic acid)	Megaloblastic anemia, diarrhea, neural tube defects in embryos
Ascorbic acid	Connective tissue synthesis and maintenance; antioxidant; synthesis of neurotransmitters and certain hormones; immune system functioning	Peppers, citrus fruits, papaya, broccoli, cabbage, berries	Scurvy: Poor wound healing, pinpoint hemorrhages, bleeding gums, bruises, depression