



Adolescence

11 - 21 Years



ADOLESCENCE

Adolescence (ages 11 to 21), the transition between childhood and adulthood, is one of the most dynamic periods of human development. Adolescence is characterized by dramatic physical, cognitive, social, and emotional changes. These changes, along with adolescents' growing independence, search for identity, concern with appearance, need for peer acceptance, and active lifestyle, can significantly affect their eating behaviors and nutrition status.

Rapid physical growth creates an increased demand for energy and nutrients. Practicing healthy eating behaviors during adolescence is essential for

- Promoting optimal growth, development, and health.
- Preventing immediate health problems (e.g., iron-deficiency anemia, undernutrition, obesity, eating disorders, dental caries).
- Laying the foundation for lifelong health and reducing the risk of chronic diseases (e.g., cardiovascular disease, type 2 diabetes mellitus, hypertension, some forms of cancer, osteoporosis).

The period of adolescence is divided into three stages. Early adolescence, ages 11 to 14, includes pubertal and cognitive changes. Middle adolescence, ages 15 to 17, is a time of increased independence and experimentation. During late adolescence, ages 18 to 21, adolescents make important personal and vocational decisions. These stages provide a useful context for understanding the eating behaviors and body-image issues of adolescents, as well as a frame-

work for providing adolescents with the information they need to practice healthy eating behaviors and participate in regular physical activity.

Growth and Physical Development

The phenomenal growth that occurs during adolescence is second only to the growth that occurs during the first year of life, and it increases the body's demand for energy and nutrients. Nutrition needs are greater during adolescence than at any other time in the life cycle. During this period, adolescents achieve the final 15 to 20 percent of their adult height, gain 50 percent of their adult body weight, and accumulate up to 40 percent of their adult skeletal mass.¹ Nutrient needs parallel the rate of growth, with the greatest demands occurring during the peak period of growth (sexual maturity rating [SMR] 2 to 3 in females and 3 to 4 in males). For females, most physical growth is completed by about 2 years after menarche. (The mean age of menarche is 12^{1/2} years.) Males begin puberty about 2 years later than females, and they typically experience their major growth spurt and increase in muscle mass during middle adolescence.

Nutrition and physical activity are major determinants of adolescents' energy levels and influence growth and body composition. Inadequate nutrition can delay sexual maturation, slow or stop linear growth, and compromise peak bone mass. Practicing healthy eating behaviors and participating in regular physical activity can help adolescents achieve normal body weight and body composition, thereby reducing their risk of obesity.



The changes associated with puberty affect adolescents' satisfaction with their appearance. For males, the increased size and muscular development that come with physical maturation usually improve their body image. However, physical maturation among females may lead to dissatisfaction with their bodies, which may result in weight concerns and dieting.

Anticipatory guidance can help prepare adolescents and their parents for changes associated with puberty and help adolescents develop a positive body image. Because adolescents usually are inter-

ested in their growth and development, this period is a key opportunity for health professionals to discuss the importance of healthy eating behaviors, regular physical activity, and a positive body image.

Cognitive capacities increase dramatically during adolescence. During early adolescence, adolescents have a growing capacity for abstract thought, but their thinking still tends to be concrete and oriented toward the present. During middle adolescence, they become more capable of problem solving and abstract and future-oriented thinking. During late adolescence, they continue to refine their ability to reason logically and solve problems. The cognitive changes that occur during adolescence should facilitate nutrition supervision, because adolescents are beginning to reflect on their behavior and understand its consequences.

Undernutrition compromises cognitive development, which affects learning, concentration, and school performance. Conversely, eating breakfast improves cognitive performance and learning.²

Social and Emotional Development

Developing an identity and becoming an independent young adult are central to adolescence. Because foods can have symbolic meanings, adolescents may use them to establish individuality and express their identity.

Experimentation and idealism are common during middle adolescence. Adolescents may adopt certain eating behaviors (e.g., vegetarianism) to explore various lifestyles or to show concern for the environment. Adolescents are usually interested in new foods, including those from different cultures and ethnic groups.

Adolescents may try fad diets—and underestimate the health risks associated with them. The social pressure to be thin and the stigma of obesity can lead to unhealthy eating behaviors and a poor body image. Health professionals can help adolescents practice healthy eating behaviors, participate in regular physical activity, and develop a positive body image. (See Tool I: Tips for Fostering a Positive Body Image Among Children and Adolescents.)

Adolescents spend a lot of time with their friends, and peer influence and group conformity are important. They may eat certain foods to demonstrate loyalty to their friends.

As adolescents strive for independence, they begin to spend more time away from home and thus eat more meals and snacks away from home. Although parents cannot control what their adolescents eat when they are away from home, they can make sure that healthy foods are available at home.

Many adolescents walk or drive to neighborhood stores and fast-food restaurants and purchase foods with their own money. Snacks and fast foods can be high in fat and calories, and their consumption should be limited. Parents can be positive role models by practicing healthy eating behaviors themselves. In addition, parents need to provide guidance to help adolescents make healthy food choices away from home.

Healthy Lifestyles

Adolescents benefit from participating in regular physical activity, which can

- Promote a healthy weight.
- Give adolescents a feeling of accomplishment.
- Reduce the risk of certain diseases (e.g., coronary heart disease, hypertension, colon cancer,

diabetes mellitus) if adolescents continue to be active during adulthood.

As adolescents grow and develop, their motor skills increase, giving them more opportunities for participating in physical activity.

Parents are a major influence on an adolescent's level of physical activity. By participating in physical activity (e.g., biking, playing basketball or baseball) with their adolescents, parents emphasize the importance of regular physical activity—and show their adolescents that physical activity can be fun. Parents' encouragement to be physically active significantly increases an adolescent's activity level.

Because much of their physical activity occurs in group settings, adolescents' participation in physical activity may be influenced by peers. Teachers also influence an adolescent's level of physical activity. Physical education at school should be provided every day, and a variety of enjoyable activities should be offered.

Building Partnerships

Healthy eating behaviors and regular physical activity promote the nutrition status of adolescents. Partnerships among health professionals, families, and communities are integral to developing nutrition and physical activity programs.

Schools can play a significant role in promoting healthy eating behaviors among adolescents. Nutrition education should be integrated within a comprehensive school health-education program for adolescents.^{3,4} School cafeterias can reinforce what is taught in the classroom by providing healthy foods. Other foods sold at school (e.g., in vending machines, at sports events, for fund-raising) should be healthy. Federally funded food assis-

tance and nutrition programs can help schools provide adolescents with a substantial part of their daily nutrition requirements. (See Tool K: Federal Food Assistance and Nutrition Programs.) In addition, community groups, churches and other places of worship, and businesses can provide food and food vouchers to help hungry or homeless adolescents and families.

Common Nutrition Concerns

As a group, adolescents do not adhere to the Dietary Guidelines for Americans.⁵ Intake of certain vitamins (folate, vitamin A, vitamin B₆) and minerals (iron, calcium, zinc) is inadequate, particularly among adolescents from families with low incomes and among adolescent females. Excessive intake of fat, saturated fat, cholesterol, sodium, and sugar are common in adolescents and occur at all income levels, in all racial/ethnic groups, and in both sexes.

Over the past decade, obesity has become more prevalent among adolescents of both sexes.⁶ Even so, hunger may be of concern among adolescents from families with low incomes.

Other nutrition concerns for adolescents include low intake of fruits, vegetables, and calcium-rich foods; high soft-drink consumption; unsafe weight-loss methods; iron-deficiency anemia (in females); eating disorders; hyperlipidemia; and low levels of physical activity.³ Nutrition problems may also occur as a result of neglect, abuse, pregnancy, disabilities, chronic health conditions, or substance abuse.

Tool D: Key Indicators of Nutrition Risk for Children and Adolescents lists the risk factors that can lead to poor nutrition status. If there is evidence that an adolescent is at risk for poor nutrition, further assessment is needed, including a nutritional assessment and/or laboratory tests.

ADOLESCENCE NUTRITION SUPERVISION

An adolescent's nutrition status should be evaluated during nutrition supervision visits or as part of health supervision visits. (For more information on health supervision, see *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*, listed under Suggested Reading in this chapter.)

Health professionals begin nutrition supervision by gathering information about the adolescent's nutrition status. This can be accomplished by selectively asking key interview questions listed in this chapter or by reviewing a questionnaire filled out by the adolescent before the visit. (See Tool C: Nutrition Questionnaire for Adolescents.) These methods provide a useful starting point for identifying nutrition concerns.

Health professionals can then use this chapter's screening and assessment guidelines, and counseling guidelines, to provide families with anticipatory guidance. Interview questions, screening and assessment, and counseling should be used as appropriate and will vary from visit to visit and from adolescent to adolescent.

To assist health professionals in promoting optimal nutrition that will last a lifetime, desired outcomes for the adolescent and the role of the family are identified in Table 6.

Interview Questions

Eating Behaviors and Food Choices

For the Adolescent

Which meals do you usually eat each day? How many snacks? How many times a week do you skip breakfast? Lunch? Dinner?

How often does your family eat meals together?

What snacks do you usually eat?

What do you usually eat and drink in the morning? Around noon? In the afternoon? In the evening? Between meals?

Are there any foods you won't eat? If so, which ones?

How many servings of milk did you have yesterday? How many servings of other dairy foods?

How many fruits did you eat yesterday? How many vegetables?

How often do you drink soft drinks?

What changes would you like to make in the way you eat?

For the Parent

How often does your family eat meals together?

Do you have any concerns about Stephanie's eating behaviors (for example, getting her to drink enough milk)?

Do you think Stephanie eats healthy foods?

Food Resources

For the Adolescent or Parent

Who usually purchases the food you eat? Who prepares it?

Are there times when there is not enough food to eat or not enough money to buy food?

Weight and Body Image

For the Adolescent

How do you feel about the way you look?

Do you feel that you are underweight? Overweight? Just right? Why?

Are you trying to change your weight? If so, how?

How much would you like to weigh?

For the Parent

How do you feel about David's weight?

Physical Activity

For the Adolescent

How much physical activity do you usually get in a week? What type?

What physical activity would you like to do that you are not doing now? How can you make time for it?

How much time do you spend each day watching television and videotapes and playing computer games?

For the Parent

What type of physical activity does Lin participate in? How often?

Screening and Assessment

- Measure the adolescent's height and weight, and plot these on a standard growth chart. (See Tool M: CDC Growth Charts.) Deviation from the expected growth pattern, such as any major change in growth percentiles on the chart, should be evaluated. A change may be normal or may indicate a nutrition problem (e.g., difficulties with eating).
- Height and weight measurements provide reliable indicators of nutrition and growth status. Changes in weight reflect an adolescent's short-term nutrition intake and serve as general indicators of nutrition status and overall health. Low height-for-age may reflect long-term, cumulative nutrition or health problems.
- Body mass index (BMI) can be used as a screening tool to determine nutrition status and overall health. Calculate the adolescent's BMI by dividing weight by the square of height (kg/m^2) or by referring to a BMI chart. Compare the BMI to the norms listed for the adolescent's sex and age on the chart. (See Tool M: CDC Growth Charts.)
- Some adolescents have a high BMI because of a large, lean body mass resulting from physical activity, muscularity, or frame size. An elevated skinfold (i.e., above the 95th percentile on CDC growth charts) can confirm excess body fat in adolescents.
- Evaluate the appearance of the adolescent's skin, hair, teeth, gums, tongue, and eyes.
- Obtain the adolescent's blood pressure. (See the Hypertension chapter.)

Table 5. Indicators of Height and Weight Status for Adolescents

Indicator	Anthropometric Variable	Cut-Off Values
Stunting	Height-for-age	< 3rd percentile
Thinness	BMI-for-age	< 5th percentile
At risk for overweight	BMI-for-age	≥ 85th percentile, but < 95th percentile
Overweight	BMI-for-age	≥ 95th percentile

Sources: Compiled from World Health Organization⁷ and Himes and Dietz.⁸

- Assess the adolescent’s risk for familial hyperlipidemia. (See the Hyperlipidemia chapter.)
- Assess fluoride levels in all sources of water used by the family (including municipal, well, commercially bottled, and home system–processed) to determine whether the adolescent needs to drink fluoridated water or take fluoride supplements. If the adolescent is not getting enough fluoride, refer the adolescent to a dentist or primary care health professional.
- Ask whether the adolescent has regular dental checkups. (See the Oral Health chapter.)

Stunting

Adolescents whose height-for-age is below the third percentile should be evaluated by a health professional.⁷ Stunting reflects a failure to reach optimum height as a result of poor nutrition or health. Stunting has been reported in adolescents with inadequate food resources, those on highly restrictive diets (e.g., diets extremely low in fat), and those with eating disorders or chronic illnesses. The aim is to identify adolescents whose growth is stunted and

who may benefit from improved nutrition or treatment of other underlying problems. Most adolescents with low height-for-age are short as a result of genetics, not because their growth is stunted.

Thinness

Adolescents with a BMI below the fifth percentile should be evaluated for organic disease and eating disorders. A BMI below the fifth percentile is consistent with the BMI seen in adolescents with anorexia nervosa. Other illnesses associated with weight loss that need to be ruled out include cancer, diabetes mellitus, thyroid disease, infections (e.g., tuberculosis [TB], human immunodeficiency virus [HIV]), gastrointestinal disease or malabsorption, and renal disease.

Overweight

Adolescents with a BMI between the 85th and 95th percentiles are at risk for overweight and need further screening. Adolescents with a BMI at or above the 95th percentile for their age and sex are overweight and need an in-depth medical assessment.⁸ (See the Obesity chapter.)

Iron-Deficiency Anemia

All menstruating, nonpregnant adolescent females should be screened for iron-deficiency anemia every 5 to 10 years throughout their child-bearing years during routine health examinations. Adolescent females who have risk factors for iron deficiency (e.g., extensive menstrual or other blood loss, low iron intake, previous diagnosis of iron-deficiency anemia) should be screened annually. Adolescent males ages 12 to 18 with a history of iron-deficiency anemia, special health care needs, or low iron intake should also be screened.⁹ Adolescents 18 years and older should be screened only if risk factors are present. (See the Iron-Deficiency Anemia chapter.)

Physical Activity

Assess the adolescent's level of physical fitness by

- Determining how much physical activity the adolescent participates in on a weekly basis.
- Evaluating how the adolescent's physical fitness compares with national standards (e.g., by reviewing the results of the adolescent's President's Council on Physical Fitness and Sports test).

For physical-activity characteristics associated with an increased likelihood of poor nutrition, see Tool D: Key Indicators of Nutrition Risk for Children and Adolescents. If there is evidence of nutrition risk, further assessment is needed, including a nutritional assessment and/or laboratory tests.

Counseling

Health professionals can use the following information to provide anticipatory guidance to adolescents and their parents. Anticipatory guidance provides information on the adolescent's current nutrition status and on what to expect as the adolescent enters the next developmental period, and promotes a positive attitude about food and healthy eating behaviors. (For additional information on counseling, see Tool F: Stages of Change—A Model for Nutrition Counseling, and Tool G: Strategies for Promoting Healthy Eating Behaviors.)

Early Adolescence: 11 to 14 Years

Physical Development

- Explain the standard growth chart to adolescents and their parents, and show them how they compare to other adolescents their age. Discuss their upcoming physical changes and specific concerns. Emphasize that a healthy body weight is based on a genetically determined size and shape rather than on an ideal, socially defined weight. (See Tool I: Tips for Fostering a Positive Body Image Among Children and Adolescents.)
- Help adolescents understand and accept normal physical changes (e.g., weight changes; the widening of females' hips and fat accumulation in their bodies; the large variation in height, weight, and growth rates among adolescents).
- Adolescent females' physical growth and development may lead to dissatisfaction with their appearance. Reassure them that fat accumulation in the hips, thighs, and buttocks is normal during adolescence (from 15 to 18 percent of body

weight before puberty to 20 to 25 percent at the end of puberty).

- Adolescent males have a mild weight gain before their growth spurt (i.e., increase in height), which occurs at 9 to 13 years of age. In addition, their percentage of body fat decreases during their growth spurt (sexual maturity rating 3 to 4). After puberty, their percentage of body fat increases, and by age 18, it is about 15 to 18 percent of their body weight. Reassure adolescent males and their parents that fat gain is normal and will probably level off during the upcoming growth spurt.



Eating Behaviors

- Energy requirements increase greatly during adolescence and are influenced by growth status, physical activity level, and body composition. Adolescent males need about 2,500 to 3,000 calories per day, and females need about 2,000 calories per day. An additional 600 to 1,000 calories per day are needed if the adolescent is involved in vigorous physical activity. Reassure adolescents and their parents that it is normal for adolescents to eat more during growth spurts.
 - Discuss healthy eating behaviors, ways to achieve them, and the importance of not skipping meals. Encourage healthy food choices that are based on the Dietary Guidelines for Americans and the Food Guide Pyramid. (See the Healthy Eating and Physical Activity chapter.)
- The quality of the diet often decreases from childhood through adolescence because adolescents are more independent and make their own food choices. Encourage adolescents to practice healthy eating behaviors. Encourage parents to provide a variety of healthy foods at home and to make family mealtimes a priority.
 - Encourage adolescents to choose healthy foods when eating away from home.
 - Many adolescent females begin to diet after the onset of puberty. Early-maturing females are more likely to diet shortly after puberty than those who mature later. Overweight adolescent females are also more likely to diet and use unhealthy weight-loss practices. Discuss safe and healthy ways to achieve and maintain a healthy body weight. Promote a positive body image and encourage regular physical activity.

- Explain that community water fluoridation is a safe and effective way to significantly reduce the risk of dental caries in adolescents. It is best for families to drink fluoridated water; for families that prefer bottled water, a brand in which fluoride is added at a concentration of approximately 0.8 to 1.0 mg/L (ppm) is recommended. Adolescents up to 16 years require fluoride supplementation if their water is severely deficient in fluoride (less than 0.6 ppm).¹⁰

Weight and Body Image

- Help the adolescent build a positive body image by explaining that people come in unique sizes and shapes, within a range of healthy body weights. Adolescents need to know that they are

loved and accepted as they are, regardless of their size and shape. (See Tool I: Tips for Fostering a Positive Body Image Among Children and Adolescents.)

- Discuss healthy and safe ways for adolescents to achieve and maintain a healthy weight (e.g., by practicing healthy eating behaviors and participating in regular physical activity). Emphasize that weight reduction through dieting or other means is not advisable for adolescents, who are still growing.

Physical Activity

- Physical activity is recommended on most, if not all, days of the week. Explain that the adolescent can achieve this goal through moderate physical



activities (e.g., brisk walking for 30 minutes) or through shorter, more intense activities (e.g., jogging or playing basketball for 15 to 20 minutes).

- Participation in physical activity declines dramatically during early adolescence, especially in females. Help adolescents incorporate regular physical activity into their daily lives (e.g., through physical education at school and activities with family and friends).
- Encourage adolescents to drink plenty of fluids when they are physically active.
- Emphasize the appropriate use of safety equipment (e.g., helmets, pads, mouth guards, goggles) when the adolescent participates in physical activity.
- Encourage adolescents, especially those who are overweight, to reduce sedentary behaviors (e.g., watching television and videotapes, playing computer games).
- If the safety of the environment or neighborhood is a concern, help adolescents find other settings for physical activity.

Substance Use

- Warn adolescents about the dangers of using alcohol, tobacco, and other drugs.
- Warn adolescents about the dangers of using performance-enhancing products (e.g., protein supplements, anabolic steroids).

Middle Adolescence: 15 to 17 Years

Physical Development

- Explain the standard growth chart to adolescents, and show them how they compare to other adolescents their age. Discuss their upcoming physical changes and specific concerns. Emphasize that a healthy body weight is based on a genetically determined size and shape rather than on an ideal, socially defined weight. (See Tool I: Tips for Fostering a Positive Body Image Among Children and Adolescents.)
- Help adolescents understand and accept normal physical changes (e.g., weight changes; the widening of females' hips and fat accumulation in their bodies; the large variation in height, weight, and growth rates among adolescents).
- Reassure late-maturing adolescent males that they are normal. Use charts that plot height velocity by age and sexual maturity rating to ease their concerns.

Eating Behaviors

- Energy requirements increase greatly during adolescence and are influenced by growth status, physical activity level, and body composition. Adolescent males need about 2,500 to 3,000 calories per day, and females need about 2,000 calories per day. An additional 600 to 1,000 calories per day are needed if the adolescent is involved in vigorous physical activity. Reassure adolescents and their parents that it is normal for adolescents to eat more during growth spurts.
- Discuss healthy eating behaviors, ways to achieve them, and the importance of not skipping meals. Encourage healthy food choices that are based on



the Dietary Guidelines for Americans and the Food Guide Pyramid. (See the Healthy Eating and Physical Activity chapter.)

- The quality of the diet often decreases from childhood through adolescence because adolescents are more independent and make their own food choices. Encourage adolescents to practice healthy eating behaviors. Encourage parents to provide a variety of healthy foods at home and to make family mealtimes a priority.
- Encourage adolescents to choose healthy foods when eating away from home.
- Explain that community water fluoridation is a safe and effective way to significantly reduce the risk of dental caries in adolescents. It is best for families to drink fluoridated water; for families that prefer bottled water, a brand in which fluoride is added at a concentration of approximately 0.8 to 1.0 mg/L (ppm) is recommended. Adolescents up to 16 years require fluoride supplementation if their water is severely deficient in fluoride (less than 0.6 ppm).¹⁰

Weight and Body Image

- Help the adolescent build a positive body image by explaining that people come in unique sizes and shapes, within a range of healthy body weights. Adolescents need to know that they are loved and accepted as they are, regardless of their size and shape. (See Tool I: Tips for Fostering a Positive Body Image Among Children and Adolescents.)
- Discuss healthy and safe ways for adolescents to achieve and maintain a healthy weight (e.g., by practicing healthy eating behaviors and participating in regular physical activity). Emphasize that weight reduction through dieting or other means is not advisable for adolescents, who are still growing.

Physical Activity

- Physical activity is recommended on most, if not all, days of the week. Explain that the adolescent can achieve this goal through moderate physical activities (e.g., brisk walking for 30 minutes) or through shorter, more intense activities (e.g., jogging or playing basketball for 15 to 20 minutes).
- Encourage adolescents to drink plenty of fluids when they are physically active.
- Emphasize the appropriate use of safety equipment (e.g., helmets, pads, mouth guards, goggles) when the adolescent participates in physical activity.
- Encourage adolescents, especially those who are overweight, to reduce sedentary behaviors (e.g., watching television and videotapes, playing computer games).

- If the safety of the environment or neighborhood is a concern, help adolescents find other settings for physical activity.

Substance Use

- Warn adolescents about the dangers of using alcohol, tobacco, and other drugs.
- Adolescent males, especially those who mature late, may be interested in using protein supplements or anabolic steroids to try to build muscle mass. Discourage the use of these products.



Late Adolescence: 18 to 21 Years

Physical Development

- Explain the standard growth chart to adolescents, and show them how they compare to other adolescents their age. Discuss any specific concerns. Emphasize that a healthy body weight is based on a genetically determined size and shape rather than on an ideal, socially defined weight. (See Tool I: Tips for Fostering a Positive Body Image Among Children and Adolescents.)

Eating Behaviors

- Energy requirements increase greatly during adolescence and are influenced by growth status, physical activity level, and body composition. Adolescent males need about 2,500 to 3,000 calories per day, and females need about 2,000 calories per day. An additional 600 to 1,000 calories

per day are needed if the adolescent is involved in vigorous physical activity.

- Discuss healthy eating behaviors, ways to achieve them, and the importance of not skipping meals. Encourage healthy food choices that are based on the Dietary Guidelines for Americans and the Food Guide Pyramid. (See the Healthy Eating and Physical Activity chapter.)
- Encourage parents to provide a variety of healthy foods at home and to make family mealtimes a priority.
- As older adolescents prepare to leave home for college or to join the workforce or military, they become responsible for making their own food choices. Discuss how the adolescent can make healthy food choices and participate in regular physical activity when living away from home. Parents should be aware of changes in their adolescent's eating behaviors and weight.

- Explain that community water fluoridation is a safe and effective way to significantly reduce the risk of dental caries in adolescents. It is best for families to drink fluoridated water; for families that prefer bottled water, a brand in which fluoride is added at a concentration of approximately 0.8 to 1.0 mg/L (ppm) is recommended.¹⁰

Weight and Body Image

- Help the adolescent build a positive body image by explaining that people come in unique sizes and shapes, within a range of healthy body weights. Adolescents need to know that they are loved and accepted as they are, regardless of their size and shape. (See Tool I: Tips for Fostering a Positive Body Image Among Children and Adolescents.)
- Discuss healthy and safe ways for adolescents to achieve and maintain a healthy weight (e.g., by practicing healthy eating behaviors and participating in regular physical activity).
- Because pubertal development is complete at this stage, help adolescents accept their body size and shape. (See Tool I: Tips for Fostering a Positive Body Image Among Children and Adolescents.)

Physical Activity

- Physical activity is recommended on most, if not all, days of the week. Explain that the adolescent can achieve this goal through moderate physical activities (e.g., brisk walking for 30 minutes) or through shorter, more intense activities (e.g., jogging or playing basketball for 15 to 20 minutes).

- Many adolescents become less active as they approach adulthood. Discuss how adolescents can incorporate physical activity into their daily lives (e.g., by using the stairs instead of taking the elevator or escalator) and participating in physical activities with friends and family (e.g., walking, running, hiking, biking).
- Encourage adolescents to drink plenty of fluids when they are physically active.
- Emphasize the appropriate use of safety equipment (e.g., helmets, pads, mouth guards, goggles) when the adolescent participates in physical activity.
- Encourage adolescents, especially those who are overweight, to reduce sedentary behaviors (e.g., watching television and videotapes, playing computer games).
- If the safety of the environment or neighborhood is a concern, help adolescents find other settings for physical activity.

Substance Use

- Warn adolescents about the dangers of using alcohol, tobacco, and other drugs.
- Adolescent males may be interested in using protein supplements or anabolic steroids to try to build muscle mass. Discourage the use of these products.

Table 6. Desired Outcomes for the Adolescent, and the Role of the Family

Adolescent

Educational/Attitudinal	Behavioral	Health
<ul style="list-style-type: none"> ■ Understands that healthy eating behaviors and regular physical activity are crucial to growth, development, and health ■ Understands the importance of eating a variety of healthy foods and how to increase food variety ■ Understands the importance of a healthy diet consisting of 3 meals per day and snacks as needed ■ Understands the physical, emotional, and social benefits of regular physical activity and how to increase physical activity level ■ Understands that people come in unique body sizes and shapes, within a range of healthy body weights ■ Understands safe ways to achieve and maintain a healthy body weight, and recognizes the dangers of unsafe weight-loss and weight-gain methods 	<ul style="list-style-type: none"> ■ Consumes a variety of healthy foods ■ Makes healthy food choices at and away from home ■ Seldom skips meals and does not practice restrictive eating or eating disorder behaviors ■ Participates in physical activity on most, if not all, days of the week 	<ul style="list-style-type: none"> ■ Maintains optimal nutrition to promote growth and development ■ Achieves nutritional and physical well-being, without signs of iron-deficiency anemia, undernutrition, obesity, eating disorders, dental caries, or other nutrition-related problems ■ Achieves and maintains a healthy body weight and positive body image

(continued)

Table 6. Desired Outcomes for the Adolescent, and the Role of the Family (continued)

Family

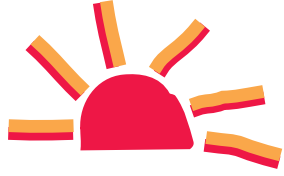
Educational/Attitudinal	Behavioral	Health
<ul style="list-style-type: none"> ■ Understands the nutrition needs of the growing adolescent ■ Understands physical changes that occur with growth and development ■ Understands the relationship between nutrition and short- and long-term health ■ Understands the importance of a healthy diet consisting of 3 meals per day and snacks as needed ■ Understands that people come in unique body sizes and shapes, within a range of healthy body weights ■ Understands the dangers of unsafe weight-loss methods, and knows safe ways to achieve and maintain a healthy weight 	<ul style="list-style-type: none"> ■ Provides a positive role model: practices healthy eating behaviors, participates in regular physical activity, and promotes a positive body image ■ Provides a variety of healthy foods at home, limiting the availability of high-fat and high-sugar foods ■ Eats meals together regularly to ensure optimal nutrition and to facilitate family communication ■ Provides opportunities for the adolescent to participate in meal planning and food preparation ■ Uses community nutrition programs and food resources if needed ■ Participates in regular physical activity with the adolescent 	<ul style="list-style-type: none"> ■ Provides developmentally appropriate, healthy foods and modifies them if necessary ■ Helps the adolescent achieve and maintain a healthy weight ■ Provides opportunities and safe places for the adolescent to participate in physical activity

References

1. Story M. 1992. Nutritional requirements during adolescence. In McAnarney ER, Kreipe RE, Orr DE, Comerci GD, eds., *Textbook of Adolescent Medicine*, pp. 75–84. Philadelphia, PA: WB Saunders.
2. Pollitt E, Mathews R. 1998. Breakfast and cognition: An integrative summary. *American Journal of Clinical Nutrition* 67(4):804S–813S.
3. Centers for Disease Control and Prevention. 1996. Guidelines for school health programs to promote lifelong healthy eating. *Morbidity and Mortality Weekly Report* 45(RR-9):1–41.
4. Centers for Disease Control and Prevention. 1997. Guidelines for school and community programs to promote lifelong physical activity among young people. *Morbidity and Mortality Weekly Report* 46(RR-6):1–36.
5. Munoz KA, Krebs-Smith SM, Ballard-Barbash R, Cleveland LE. 1997. Food intakes of US children and adolescents compared with recommendations. *Pediatrics* 100(3):323–329.
6. Troiano RP, Flegal KM. 1998. Overweight children and adolescents: Description, epidemiology, and demographics. *Pediatrics* 101(Suppl. 1):497–504.
7. World Health Organization. 1995. Physical status: The use and interpretation of anthropometry. Report of a WHO expert committee. *World Health Organization Technical Report Series* 854:1–452.
8. Himes JH, Dietz WH. 1994. Guidelines for overweight in adolescent preventive services: Recommendations from an expert committee. *American Journal of Clinical Nutrition* 59(2):307–316.
9. Centers for Disease Control and Prevention, Epidemiology Program Office. 1998. *Recommendations to Prevent and Control Iron Deficiency in the United States*. Atlanta, GA: Centers for Disease Control and Prevention, Epidemiology Program Office.
10. American Dental Association. 2000. *ADA Guide to Dental Therapeutics* (2nd ed.). Chicago, IL: ADA Publishing Company.

Suggested Reading

- Casamassimo P, ed. 1996. *Bright Futures in Practice: Oral Health*. Arlington, VA: National Center for Education in Maternal and Child Health.
- Green M, Palfrey JS, eds. 2002. *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents* (2nd ed., rev.). Arlington, VA: National Center for Education in Maternal and Child Health.
- Patrick K, Spear B, Holt K, Sofka D, eds. 2001. *Bright Futures in Practice: Physical Activity*. Arlington, VA: National Center for Education in Maternal and Child Health.
- Rickert VI, ed. 1996. *Adolescent Nutrition: Assessment and Management*. New York, NY: Chapman and Hall.
- Tamborlane WV, Weiswasser JZ, Held NA, Fung T. 1997. *The Yale Guide to Children's Nutrition*. New Haven, CT: Yale University Press.



A Dancer's Dream

Katherine's mother is concerned that Katherine appears to be "chunky" and thinks that she will probably need to slim down if she is going to have a chance of making the team.

Katherine Gomez is a seventh-grade student attending middle school. She loves to dance and has been taking lessons since she was 5 years old. Katherine has dreamed of being on her school's dance team, and now, as a seventh-grader, she can try out for the team. Katherine's mother is concerned that Katherine appears to be "chunky" and thinks that she will probably need to slim down if she is going to have a chance of making the team. Mrs. Gomez asks their physician, Dr. Meyer, for a diet for Katherine.

Dr. Meyer measures Katherine's weight and height, and determines her body mass index (BMI). He assures Katherine and Mrs. Gomez that Katherine's weight and height are well proportioned and within the normal range for her age. Dr. Meyer explains that Katherine's body is preparing for the adolescent growth spurt by laying down

extra fat and that it could be harmful to Katherine's health to restrict her calorie intake. He also asks Katherine about her eating behaviors and determines that they are appropriate for her age. Dr. Meyer advises Katherine to eat three meals a day and to eat nutritious snacks when she is hungry. He suggests that she try to eat a wide variety of foods and to choose fruits, vegetables, and low-fat dairy foods as snacks rather than chips, candy, and soft drinks.

Dr. Meyer realizes that Katherine and her mother need additional information and guidance on anticipated physical changes and nutrition needs during adolescence. The physician refers Mrs. Gomez and her daughter to a dietitian for follow-up. He also makes a note in Katherine's chart to evaluate her height, weight, and food intake during her next visit.



Helping an Active Adolescent Manage Diabetes

Charlie Davis is an active 14-year-old who loves to play basketball. One afternoon, he rushes home from school to tell his parents that he wants to try out for the basketball team. The coach has seen Charlie play basketball with his classmates and thinks that he could become a good player. Mr. and Mrs. Davis are happy for their son, but also concerned. Charlie was diagnosed with diabetes 6 months ago. It took the family almost 2 months to learn how to balance his food intake and insulin dose to keep his blood glucose in a healthy range. If Charlie decides to play basketball, it could mean that the family would have to change its routine again.

Mr. and Mrs. Davis call their physician, Dr. Yamaguchi, for advice. They ask how risky it would be for Charlie to play on a basketball team and how it could affect his insulin levels. Dr. Yamaguchi assures Mr. and Mrs. Davis that many adolescents with diabetes are physically active. Dr. Yamaguchi suggests that Charlie and his parents come in for a

visit if he makes the basketball team.

Charlie makes the team, and his parents reluctantly agree to let him play if he learns how to adjust his food intake and insulin dose. At the diabetes clinic, members of the health care team show Charlie and his parents how to monitor his blood glucose level to learn how physical activity will affect it, and how to treat a low-blood-glucose reaction (hypoglycemia). Charlie is taught to carry fast-acting carbohydrate snacks and glucose to consume if he becomes hypoglycemic. His eating schedule is altered to include a snack before and after each practice and game. Charlie also learns how to choose appropriate foods from fast-food and other restaurants when his team travels, and he is advised that post-exercise hypoglycemia may occur 4 to 10 hours after unusually intense or long workouts. The health care team suggests that Charlie and his parents talk with the coach about his special health needs, and that the coach be taught how to identify and

treat hypoglycemia. The health care team asks Charlie to schedule a follow-up visit.

During the follow-up visit, Charlie reports that he is doing well. It took a couple of weeks for him to learn what types of pregame snacks he needs to keep his blood glucose levels from dropping too low, but he has not had a low-blood-glucose reaction since the second week of practice. He is excited to share that he has been picked as a starting player for the team.

FREQUENTLY ASKED QUESTIONS ABOUT NUTRITION IN ADOLESCENCE

■ How can I encourage my teenager to eat healthy foods?

- Serve new foods and regional and ethnic foods.
- Involve the family in shopping, cooking, and trying new foods.
- Be a positive role model—practice healthy eating behaviors yourself.
- Don't fight over food with your teenager.
- Keep a variety of healthy foods in the house.
- Limit the availability of high-fat and high-sugar foods.

■ How can our family eat healthy meals together when we are so busy?

- Make food preparation and cooking a family activity.
- Eat different meals together. For example, eat breakfast together one day and lunch or dinner the next.
- Buy healthy ready-to-eat foods from the store or healthy take-out foods from a restaurant.
- When your family eats together, use the time to socialize. Avoid distractions. Turn the television off, and don't answer the telephone.

■ How can I get my teenager to eat breakfast?

- Provide foods that are fast and convenient, such as bagels, low-fat granola bars, fruits, 100 percent fruit juice, and yogurt.

Serve foods other than the usual breakfast foods (for example, sandwiches, baked potatoes, and leftovers such as chicken or pasta).

Help your teenager get organized so that he has time to eat in the morning.

Make breakfast the night before.

If your teenager is in a hurry, offer him foods, such as fruits or trail mix, to eat at school.

■ How can I get my teenager to eat more fruits and vegetables?

Keep a variety of fruits and vegetables at home.

Keep 100 percent fruit juice in the refrigerator.

Wash and cut up fruits and vegetables and keep them in the refrigerator, along with low-fat dip or salsa. Use a clear container so that the fruits and vegetables can be seen easily.

Serve two or more vegetables with dinner, including at least one your child likes. Serve a salad with a choice of low-fat dressing.

Pack fruits and vegetables (including juice) in your child's bag to eat at school.

Be a good role model—eat more fruits and vegetables yourself.

Use plenty of vegetables in soups, sauces, and casseroles.

Plant a garden.

Offer a variety of fruits and vegetables at meals and snacks, but don't force your teenager to eat them.

■ How can I help my teenager get enough calcium?

Serve foods that are rich in calcium, such as reduced-fat (2 percent), low-fat (1 percent), or fat-free (skim) milk, cheese, yogurt, tofu processed with calcium sulfate, broccoli, and collard and turnip greens.

Serve reduced-fat, low-fat, or fat-free flavored milk, such as chocolate or strawberry.

Use low-fat dairy products in recipes, such as in puddings, milkshakes, soups, and casseroles.

Serve unusual dairy products, such as new flavors of low-fat yogurt.

If your teenager's digestive system cannot handle milk and other dairy products (she is lactose intolerant), try these suggestions:

- Serve small portions of these foods throughout the day.
- Serve these foods along with nondairy foods.
- Serve lactose-free dairy products, yogurt, and aged hard cheeses, such as Cheddar, Colby, Swiss, and Parmesan, that are low in lactose.
- Give your teenager lactase tablets before she eats dairy products containing lactose.

Serve foods, such as orange juice and cereal products, with added calcium (calcium-fortified).

If these ideas do not work, talk to a health professional about giving your teenager a calcium supplement.

■ How can I teach my teenager to make healthy food choices away from home?

Encourage your teenager to buy healthy foods at school, stores, and restaurants, and from vending machines.

Look at school and restaurant menus with your teenager, and discuss healthy food choices and appropriate portions. Find foods that are low in fat, sugar, and calories.

Encourage your teenager to eat salads with low-calorie dressings and broiled or baked meats.

Encourage your teenager to avoid eating fried foods or to reduce serving sizes. For example, suggest that she split an order of French fries with a friend.

Teach your teenager to ask for changes to make foods healthier, such as asking the server to "hold the mayonnaise."

■ My teenager snacks on chips and candy. What should I do?

Limit foods that are high in fat, such as potato chips that are fried, and foods that are high in sugar, such as candy and soft drinks.

Serve healthy foods, such as pretzels, baked potato chips, low-fat granola bars, popcorn, 100 percent fruit juice, fruits, apple sauce, vegetables, and yogurt.

Keep a bowl of fruit on the kitchen table or counter.

■ How can I help my teenager like her body?

Teenagers are very sensitive about how they look. Do not criticize your teenager about his size or shape.

Focus on traits other than appearance when talking to your teenager.

Talk to your teenager about how the media affects his body image.

Be a good role model—don't criticize your own size or shape or that of others.

■ **My teenager has become a vegetarian. Should I be concerned?**

With careful planning, a vegetarian lifestyle can be healthy and meet the needs of a growing teenager.

A vegetarian diet that includes dairy foods and eggs usually provides adequate nutrients; however, your teenager may need to take an iron supplement.

Vegans are strict vegetarians who don't eat any animal products, including dairy foods, eggs, and fish. They may need additional calcium, vitamin B₁₂, and vitamin D, which can be provided by fortified foods and supplements.

Instead of always preparing separate vegetarian meals for your teenager, occasionally fix vegetarian meals for the whole family.

Ask a dietitian or nutritionist to help you plan healthy meals.

■ **How can I help my teenager maintain a healthy weight?**

If your child is growing, eats healthy foods, and is physically active, you do not need to worry about her weight.

Serve healthy meals and snacks at scheduled times, but allow for flexibility.

Limit foods that are high in fat, such as potato chips that are fried, and foods that are high in sugar, such as candy and soft drinks.

Do not forbid sweets and desserts. Serve them in moderation.

Focus on gradually changing the entire family's eating and physical activity behaviors.

Plan family activities that everyone enjoys, such as hiking, biking, or swimming.

Limit to 1 to 2 hours per day the amount of time your teenager watches TV and videotapes and plays computer games.

Be a good role model—practice healthy eating behaviors and participate in regular physical activity yourself.

Encourage your teenager to avoid dieting to lose weight, unless a health professional recommends a diet for medical reasons and supervises it.

■ **How can I help my teenager be more active?**

Limit the time your teenager spends watching TV and videotapes and playing computer games to 1 or 2 hours per day.

Encourage your teenager to take a 10-minute physical activity break for every hour she watches TV and videotapes, or plays computer games.

For every hour your teenager reads, watches television and videotapes, or plays computer games, encourage her to take a 10-minute physical activity break.

Make physical activity a part of your teenager's daily life. For example, use the stairs instead of taking an elevator or escalator, and walk or ride a bike instead of riding in a car.

Encourage your teenager to enroll in planned physical activities, such as swimming, martial arts, or dancing.

Participate in physical activity together, such as going biking, dancing, or skating. It is a great way to spend time with your teenager.

Be a good role model—participate in regular physical activity yourself.

■ **How can I help my underweight teenager gain weight?**

Limit the quantity of beverages your teenager drinks between meals if his appetite is being affected.

Encourage your teenager to eat a midmorning snack at school, if possible, and an after-school snack. Limit snacks close to mealtimes if snacking is affecting his appetite.

Have your teenager help with meal planning and food preparation.

Continue to offer foods even if your teenager has refused to eat them before. Your teenager is more likely to accept these foods after they have been offered several times.

■ **If you notice any of these symptoms, talk to a health professional about your concerns:**

Anorexia Nervosa

- Excessive weight loss in a short period of time
- Continuation of dieting although thin
- Dissatisfaction with appearance; belief that body is fat, even though severely thin
- Loss of menstrual period
- Unusual interest in certain foods and development of unusual eating rituals
- Eating in secret
- Obsession with exercise
- Depression

Bulimia Nervosa

- Loss of menstrual period
- Unusual interest in certain foods and development of unusual eating rituals
- Eating in secret
- Obsession with exercise
- Depression
- Binge-eating
- Binge-eating with no noticeable weight gain
- Vomiting or laxative use
- Disappearance into bathroom for long periods of time (e.g., to induce vomiting)
- Alcohol or drug abuse

Resources for Families

- Behan E. 2001. *Fit Kids: Raising Physically and Emotionally Strong Kids with Real Food*. Riverside, NJ: Pocket Books.
- Clark N. 1996. *Nancy Clark's Sports Nutrition Guidebook* (2nd ed.). Champaign, IL: Human Kinetics.
- Dietz WH, Stern L, eds. 1999. *American Academy of Pediatrics Guide to Your Child's Nutrition: Making Peace at the Table and Building Healthy Eating Habits for Life*. New York, NY: Villard Books.
- Jennings DS, Steen SN. 1995. *Play Hard, Eat Right: A Parent's Guide to Sports Nutrition for Children*. Minneapolis, MN: Chronimed Publishing.
- Kaehler K, Church C. 2001 *Teenage Fitness: Get Fit, Look Good and Feel Great*. New York, NY: Harper Press.
- National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases. 1997. *Helping Your Overweight Child*. Bethesda, MD: National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases.
- Nissenberg SK, Bogle ML, Wright AC. 1995. *Quick Meals for Healthy Kids and Busy Parents: Wholesome Family Meals in 30 Minutes or Less*. New York, NY: John Wiley and Sons.
- Sears W, Sears M. 1999. *The Family Nutrition Book: Everything You Need to Know About Feeding Your Children from Birth Through Adolescence*. Boston, MA: Little, Brown and Company.
- Shanley E, Thompson C. 2001. *Fueling the Teen Machine*. Boulder, CO: Bull Publishing Company.
- Storlie J. 1997. *Snacking Habits for Healthy Living*. New York, NY: John Wiley and Sons.
- U.S. Department of Agriculture, Food and Nutrition Service. 1997. *Fun Tips: Using the Dietary Guidelines at Home*. Alexandria, VA: U.S. Department of Agriculture, Food and Nutrition Service. In USDA's Team Nutrition [Web site]. Cited September 1, 2001; available at <http://www.fns.usda.gov/tn/resources/funtips.html>.
- Wood C. 1999. *How to Get Kids to Eat Great and Love It!* Torrance, CA: Griffin Publishing Group.