

Nutrient Needs During Adolescence and Pregnancy

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Adolescence is a time of rapid physical growth with nutritional requirements increasing significantly to support growth and development. The additional energy and nutrient demands of pregnancy place adolescents at nutritional risk. This chapter reviews nutritional needs of adolescents and pregnancy.

FACTORS INFLUENCING NUTRITIONAL NEEDS OF NONPREGNANT ADOLESCENT FEMALES

- Onset of puberty—nutrient needs parallel the rate of growth, with the greatest needs occurring at the time of peak growth.¹
- Body composition and size—the increase in lean body mass associated with growth results in an increased need for protein, iron, zinc, calcium and folate.¹
- Menstruation—increases the need for iron (menstrual losses range from 15-28 mg iron per cycle).¹
- Physiological conditions—the following will further increase nutrient requirements:¹
 - Pregnancy/lactation
 - Physical activity and sports participation
 - Oral contraceptives

- Certain chronic illnesses (i.e., inflammatory bowel disease)
- Infections
- Socioeconomic conditions—because adolescent child-bearing is concentrated among teenagers who are poor,² and low income youth are at higher risk for nutrition problems, pregnant teenagers may enter pregnancy with reduced nutrient stores and increased risk of nutritional inadequacy.³

IMPLICATIONS FOR PREGNANCY

- The greater the amount of uncompleted growth at conception, the greater the energy and nutrient needs above those normally required during pregnancy.^{1, 3}
- Gynecologic Age (GA), the difference between chronological age and the age at menarche, can be used as an indirect measure of physiologic maturity and growth potential.¹ A pregnant adolescent with a GA of two years or less may still be in a period of growth and will have increased nutrient requirements compared to an adolescent who has finished her growth. Growth is generally completed four years after menarche.

- Research indicates that among young, growing pregnant adolescents, there may be competition for nutrients between the mother and fetus.³⁻⁷ This hypothesis was first put forth in 1981, by Naeye, who reported that fetuses grow more slowly in 10- to 16-year olds than in older women and speculated that there may be maternal-fetal competition for a limited supply of nutrients due to diminished placental blood flow.⁶ Frisanchio⁷ in a study of Peruvian adolescents also found that growing adolescents gave birth to smaller babies and speculated on maternal-fetal competition. The recent findings from Scholl, et al.^{8,9} suggest the possibility that, among young, still-growing pregnant adolescents, there may be competition for nutrients between mothers and their fetuses. The area of maternal growth and maternal-fetal competition remains controversial.¹⁰

PRECONCEPTION NUTRITIONAL STATUS

- Recently, attention has been placed on the importance of nutrition during preconception and the early months of pregnancy for healthy infant outcomes. For example, approximately 50% of cases of neural tube defects may be prevented with adequate intakes of folic acid from the time of conception and throughout the early months of pregnancy.¹¹
- Some dietary conditions that increase nutritional risk at the time of pregnancy are: adherence to a vegan diet; substantial under- or overweight; participation in highly competitive sports; and rigid dieting/eating disorders. Conditions such as these may require additional nutrients to replenish nutrient stores.
- Pregnant adolescents may enter pregnancy with inadequate nutrient reserves. However, pregnancy can motivate adolescents to improve their diets to have a healthy baby. Pregnancy provides a window of opportunity for practitioners to educate teens about the importance of healthy eating during pregnancy and to encourage healthy eating practices.
- A number of national reports have recommended that more emphasis be placed on preconception and early pregnancy care.¹² While preconception care should be standard for all women, it may not be the most effective approach for reaching adolescents, who often have unintended pregnancies, and have the lowest rates of health care utilization of any age group. A more effective approach may be primary prevention strategies aimed at improving the nutritional health of all adolescent females. Efforts to improve eating patterns and achieve healthy weights can be implemented, in part, through school-based nutrition programs and integration of nutrition and health-promotion counseling into primary care services.

DIETARY SURVEY FINDINGS

- Poor dietary habits are common among U.S. adolescent girls. National surveys have documented inadequate intakes of certain vitamins (folate, vitamins A, E, B₆), minerals (calcium, iron, zinc) and fiber, as well as excessive intakes of total fat, saturated fat, sodium, and cholesterol.^{13, 14}
- National data show that discretionary fat and added sugar make up 40% of total energy intake for adolescent females 12-19 years of age.¹⁵ Eighteen percent of adolescent females do not meet any of the national recommendations for food pyramid groups and only 0.6% meet all food group recommendations.¹⁵
- A review of published studies of pregnant adolescents found the nutrients consumed consistently in amounts substantially less than the RDA were: vitamins B₆, D, E, and folate and the minerals iron, zinc, and magnesium.¹⁶ These same nutrients were also found to be low among more mature pregnant women.¹⁶

NUTRIENT NEEDS

Limited information is available regarding the nutrient needs of pregnant adolescents. Dietary Reference Intakes (DRIs) represent the new approach adopted by the Food and Nutrition Board to provide quantitative estimates of nutrient needs to help individuals optimize their health and prevent disease. The DRIs replace and expand upon the Recommended Dietary Allowances (RDAs) which focused on reducing classic deficiency diseases. The DRIs contain four categories of recommendations for nutrient reference values: RDAs, Adequate Intakes (AIs), Estimated Average Requirements (EARs) and Tolerable Upper Intake Levels (ULs) (see Table 1).

TABLE 1
Dietary Reference Intakes

Dietary Reference Intakes (DRIs) – The new standards for nutrient recommendations that can be used to plan and evaluate diets for healthy people. Think of DRIs as the umbrella term that includes the following values:

Estimate Average Requirement (EAR) –

A nutrient intake value that is estimated to meet the requirement of half the healthy individuals in a group. It is used to assess adequacy of intakes of population groups. EARs are also used to develop RDAs.

Recommended Dietary Allowance (RDA) –

The average daily dietary intake level that is sufficient to meet the nutrient requirement of nearly all (97% or less) healthy individuals in a group. It is based upon the EAR. If an EAR cannot be determined, an RDA value cannot be proposed.

Adequate Intake (AI) – A recommended daily intake level based on observed or experimentally determined approximations of nutrient intake by a group (or groups) of healthy people. It is used when sufficient scientific evidence is not available to determine an RDA.

Tolerable Upper Intake Level (UL) – The highest level of daily nutrient intake that is likely to pose no risks of adverse health effects to almost all individuals in the general population. As intake increases above the UL, the risk of adverse effects increases.

Adapted from: Yates A, Schlicker S, and Suitor C. Dietary reference intakes: the new basis for recommendations for calcium and related nutrients, B vitamins, and choline. *J Am Diet Assoc* 1998;98:699-706; and Nutrient requirements get a makeover, *Food Insight* (ISSN 1065-1497), IFIC Foundation. Sept/Oct 1998:1:4-5.

To date, two DRI reports have been issued on the following nutrients: calcium, vitamin D, phosphorus, magnesium, fluoride, thiamin, riboflavin, niacin, vitamin B₆, folate, vitamin B₁₂, pantothenic acid, biotin, and choline. Future reports will be issued over the next three to four years.¹⁷

Table 2 shows the DRIs for young women and for pregnancy and lactation. Table 3 shows the 1989 RDAs for nutrients that still remain to be revised.

Energy

- Energy needs are difficult to determine because they vary greatly among adolescents. The following factors influence total energy needs:¹
 - Growth status
 - Physical activity
 - Body composition
 - Pregravid weight
 - Stage of pregnancy
- Sufficient energy is a primary dietary requirement of pregnancy. If energy needs are not met, available protein, vitamins and minerals cannot be used effectively for various metabolic functions.
- Energy requirements are greater for pregnant adolescents than for their nonpregnant peers. Current recommendations suggest pregnant women should increase their average energy intake by 300 calories per day during the second and third trimesters of pregnancy.¹⁶
- Younger adolescents may require higher energy intakes during pregnancy than older women. In general, pregnant adolescents should not consume less than 2000 calories/day, and in many cases, higher intakes are needed.
- Because caloric needs are so variable (38-50 Kcal/kg/day), the best assurance of adequate energy intake is a satisfactory weight gain.
- Adolescents who begin pregnancy underweight, are still growing, or who are physically active may need additional energy intake during pregnancy.

Carbohydrates

- The majority of calories eaten during pregnancy (at least 50%) should come from carbohydrate-containing foods, such as grain products, fruits, and vegetables. One study found that excessive sugar intake may increase the risk of delivering a small-for-gestational age infant.¹⁸
- Fiber can help alleviate constipation and hemorrhoids, which often occur during pregnancy. Whether pregnant or not, 25-35 g of fiber are needed

TABLE 2
**Dietary Reference Intakes:
 Recommended Intakes for Young Women, Pregnancy and Lactation**

Category	Calcium (mg/d)	Phosphorus (mg/d)	Magnesium (mg/d)	Vit. D (µg/d)	Fluoride (mg/d)	Thiamin (mg/d)	Riboflavin (mg/d)	Niacin (mg/d)	Vit. B ₆ (mg/d)	Folate (µg/d)	Vit. B ₁₂ (µg/d)	Pantothenic Acid (mg/d)	Biotin (µg/d)	Choline (mg/d)
Females														
9-13 yr	1,300*	1,250	240	5*	2*	0.9	0.9	12	1.0	300	1.8	4*	20*	375*
14-18 yr	1,300*	1,250	360	5*	3*	1.0	1.0	14	1.2	400	2.4	5*	25*	400*
19-30 yr	1,000*	700	310	5*	3*	1.1	1.1	14	1.3	400	2.4	5*	30*	425*
Pregnancy														
≤18 yr	1,300*	1,250	400	5*	3*	1.4	1.4	18	1.9	600	2.6	6*	30*	450*
19-30 yr	1,000*	700	350	5*	3*	1.4	1.4	18	1.9	600	2.6	6*	30*	450*
Lactation														
≤18 yr	1,300*	1,250	360	5*	3*	1.5	1.6	17	2.0	500	2.8	7*	35*	550*
19-30 yr	1,000*	700	310	5*	3*	1.5	1.6	17	2.0	500	2.8	7*	35*	550*

Note: This table presents Recommended Dietary Allowances in bold type and Adequate Intake in ordinary type followed by an asterisk(*).
 Source: Food and Nutrition Board, National Academy of Sciences – Institute of Medicine, 1997 and 1998.

every day. Fiber is found in whole grain foods, fruits, vegetables, legumes, nuts and seeds (see Appendix A). Increased fiber intake should be accompanied by increased fluid intake.

Protein

- Protein needs increase during pregnancy. Adequate protein intake is required to support continued growth and development in both the fetus and the young pregnant adolescent.
- The RDA for protein for adolescent females is approximately 45 g per day. An additional allowance of 10 g per day is recommended throughout pregnancy.¹⁹
- High-protein powders and specially formulated high-protein supplements or beverages may be potentially harmful (increasing risk of preterm birth) and should be avoided during pregnancy.¹⁶
- Diets of American adolescent females, both pregnant and nonpregnant, show that the majority meet the RDAs for protein intake.
- Factors that may increase the risk for inadequate protein intake include:
 - Low socioeconomic status (protein foods tend to be expensive)
 - Low energy intake (when energy needs are not met, protein is catabolized for energy)
 - Exclusion of all animal products, such as eggs, dairy products, and meats (most commonly occurs in vegan or macrobiotic vegetarians or adolescents with eating disorders)
- A careful dietary assessment can determine the protein intake of a pregnant adolescent. The quality of the protein, as well as adequacy of energy intake should be considered. About two-thirds of total protein should be of high biologic quality, such as eggs, milk, meat, or other animal sources. An overview of good quality protein sources for vegetarian pregnant adolescents can be found in Chapter 14.

TABLE 3
Recommended Dietary Allowances, 1989, for Young Women, Pregnancy and Lactation

Category	Age (years) or condition	Protein (g)	Vitamin A ($\mu\text{g RE}$)	Vitamin E (cg -TE)	Vitamin K (μg)	Vitamin C (mg)	Iron (mg)	Zinc (mg)	Iodine (μg)	Selenium (μg)
Females	11-14 yr	46	800	8	45	50	15	12	150	45
	15-18 yr	44	800	8	55	60	15	12	150	50
	19-24 yr	46	800	8	60	60	15	12	150	55
Pregnancy		60	800	10	65	70	30	15	175	65
Lactating	1st 6 mo	65	1300	12	65	95	15	19	200	75
	2nd 6 mo	62	1200	11	65	90	15	16	200	75

Source: Food and Nutrition Board, National Academy of Sciences – Institute of Medicine, 1989 Recommended Dietary Allowance.

Fat

- Fat is an essential nutrient which provides essential fatty acids necessary for the development of fetal brain and central nervous tissues. Fat also plays a role in transporting the fat-soluble vitamins and is a concentrated source of calories, helping to meet the energy needs of pregnancy.
- One study found that infants born prematurely or of low birth weight were more likely to have had mothers who were inadequately nourished and had dietary deficits of essential fatty acids.²⁰
- The U.S. Dietary Guidelines recommend that Americans limit their fat intake to no more than 30% of calories. These recommendations are generally accepted during pregnancy, although meeting calorie needs is the primary concern. With caloric needs of 2000 per day, 30% of calories from fat would equal 66 g of fat per day.
- Monounsaturated and polyunsaturated fatty acids should be the predominant types of fat consumed during pregnancy. Sources of these fats include olive, canola, safflower and sunflower oils, tub margarine, peanuts, peanut butter, walnuts, and fish (such as salmon, tuna, and bluefish). Vegan and macrobiotic vegetarians need to pay close attention to the types of fats that they consume to assure adequate essential fatty acid intake for fetal development (see Chapter 14).

Fluids

- Water helps the body maintain proper temperature, transports nutrients and waste products, moistens the digestive tract and tissues, and cushions and protects the developing fetus.
- Fluid needs increase during pregnancy, primarily because of increased blood volume. At least 8 cups of non-caffeinated fluids should be consumed each day. Water is the best choice, as it is rapidly absorbed by the body. Milk, juice and noncaffeinated beverages such as herbal teas contribute to fluid needs. Caffeinated beverages increase urinary output and should be consumed in limited amounts.

Iron

- Iron deficiency is one of the most common nutritional problems among both pregnant and nonpregnant adolescent females and occurs in all socioeconomic groups.
- Iron deficiency anemia during the first two trimesters is associated with a twofold increased risk for preterm delivery and a threefold increase risk for delivering a low birth weight baby.²¹
- The need for iron increases during adolescence due to increases in lean body mass, red blood cell mass and onset of menses. Iron requirements are further

increased during pregnancy due to expansion of maternal plasma volume and growth of the fetus and placenta.

- The need for iron increases as pregnancy progresses. Iron needs increase throughout the second trimester reaching a peak requirement in the third trimester when fetal demands are greatest.
- The pregnancy RDA for iron is 30 mg per day, a level twice that for nonpregnant adolescents. Despite improved absorption of iron during pregnancy, this level is not likely to be achieved through diet.
- National data suggest that only one fourth of adolescent girls meet the RDA for iron. Data from NHANES III indicate that 9% of nonpregnant 12-15 year old females and 11% of 16-19 year old females had iron deficiency anemia.²² The prevalence of anemia in low-income pregnant adolescents enrolled in the WIC program in 1990 was 11%, 16% and 37% in the first, second and third trimesters, respectively.²³
- To meet the iron requirements of pregnancy and prevent iron deficiency anemia, the CDC recommends low dose (30 mg/day) supplements of iron at the first prenatal visit.²² Low-dose iron can be given alone or as part of a multivitamin, mineral supplement of appropriate composition for pregnancy. Liquid and chewable forms of iron are available if teenagers have trouble swallowing tablets or capsules. To ensure adequate iron absorption, iron supplements should be taken at bedtime or between meals with water or juice, not with milk, tea, or coffee. (See Chapter 10 on prevention and management of iron deficiency anemia.)
- Pregnant adolescents should be encouraged to eat iron-rich foods and foods that enhance iron absorption.²²
- Food sources: The best sources of iron are meats, dried beans and peas, dark green leafy vegetables, whole grain or enriched breads and fortified cereals. (See Appendix A.) Iron from animal sources is well absorbed. Iron from plant sources is poorly absorbed, although its absorption is enhanced by vitamin C, meat, fish, and poultry.

Calcium

Calcium Needs and Concerns

- During pregnancy, approximately 25-30 g of calcium is transferred to the fetus.²⁴ Most of this is acquired during the third trimester, when calcium is deposited into the fetal skeleton at a rate of about 330 mg per day.¹⁶ In an adult woman this represents about 2.5% of typical maternal bone calcium stores (no data is available for pregnant adolescents). The DRIs for calcium during pregnancy are not increased above non-pregnancy levels, as calcium absorption increases during pregnancy.¹⁷ The pregnant adolescent, theoretically, could have an increased need for calcium because of her need to support her own bone consolidation as well as that of the fetus.²⁴
- Adequate calcium intake is especially important for pregnant adolescents who are still increasing their bone mass. A higher peak bone mass during adolescent years is protective against postmenopausal osteoporosis. Approximately 40% of peak bone mass in girls is accumulated during the adolescent years.²⁵
- For pregnant and lactating women, the DRI is 1300 mg calcium per day for those age 18 or younger, and 1000 mg calcium for those older than 18.
- A few studies indicate that pregnant adolescents may benefit from a high calcium intake.²⁴ A lower incidence of preterm delivery and low birth weight was observed in pregnant adolescents randomized to receive 2000 mg per day supplemental calcium.²⁶
- Low calcium intakes are well-documented in adolescent females. Only 18% of females 9-19 years of age meet dietary recommendations for calcium (DRIs are 1300 mg calcium/day for adolescents 9-18 years). In NHANES III, the mean calcium intake of adolescent girls 12-15 years old was 796 mg per day and 822 mg per day among 16-19 year old girls.
- Soft drinks appear to displace milk in the diets of adolescents. Adolescents who consume soft drinks daily have lower calcium intakes.²⁷

Sources

- Food sources: Approximately three fourths of the calcium in the American diet comes from dairy products. One 8 oz glass of milk provides 300 mg calcium.

To achieve the recommendation of 1300 mg calcium per day, the pregnant adolescent requires at least four glasses of milk each day or the equivalent, such as one cup of yogurt or 1.5 oz of cheese.²⁵ Additional food sources of calcium are in Appendix A.

- **Fortified foods:** There are several calcium fortified foods on the market, including orange juice, bottled water, cereal, breakfast bars and bread. Some are fortified to the same level of calcium as milk (300 mg/serving). The amount of calcium is listed on the label.
- **Supplements:** Supplemental calcium is indicated when adolescents are unable (e.g., because of lactose intolerance) or unwilling to achieve the recommended dietary calcium intake from food sources. The IOM¹⁶ recommends a supplement providing 600 mg of elemental calcium per day (e.g., 1.5 g calcium carbonate). Multi-nutrient supplements do not provide this much calcium so a separate calcium supplement is needed. Unlike iron, calcium absorption is enhanced when the supplement is taken with meals rather than between meals.
- **Most chemical forms of calcium—carbonate, citrate, lactate, or phosphate—have the same absorption rate.** On average, 35% of the calcium in calcium citrate malate is absorbed compared to about 30% of the calcium in calcium carbonate and other supplements. Of the calcium supplements commercially available, calcium carbonate contains the highest proportion (40%) of elemental calcium by weight and is the least expensive.
- **Certain calcium preparations, such as bone meal calcium, dolomite and calcium carbonate from oyster shells, have been found to contain lead and other heavy metal contaminants.** Calcium supplements should be labeled “lead-free.”²⁸

Lactose Intolerance

- About 25% of US adults have lactose intolerance and develop symptoms of diarrhea and bloating after ingestion of a large dose of lactose, such as is contained in a quart of milk. Primary lactose deficiency begins in childhood and may become clinically apparent in adolescence.²⁴ Many lactose intolerant individuals can tolerate a glass of milk or its lactose equivalent, especially when consumed with meals.

- **Suggestions for improving calcium intake among adolescents with symptoms of lactose intolerance include:**²⁸

- Try smaller amounts of milk with meals.
- Eat aged cheeses, such as cheddar and swiss. They contain only small amounts of lactose.
- Eat yogurt with active cultures. The bacterial cultures “autodigest” lactose within the intestinal tract.
- Use lactose-reduced or lactose-free milk and milk products available in the supermarket.
- Use lactase enzyme preparations to treat the milk purchased at the grocery or swallow an enzyme tablet before consuming dairy foods.

Zinc

- Zinc affects protein synthesis and is essential for growth. The recommended intake during pregnancy is 15 mg of zinc per day. Young pregnant teenagers who are still growing may have higher needs.
- In one recent study, low intakes of zinc were associated with an increased risk of low birth weight and preterm delivery in adolescents.²⁹
- Zinc requirements are highest in the third trimester when the fetus acquires two-thirds of its zinc stores.
- Zinc intake has been shown to be below two-thirds of the RDA for both pregnant and nonpregnant adolescents.
- Diets that are very high in fiber or phytate such as vegan diets may decrease zinc absorption. Routine iron and folate supplementation may also impair zinc absorption. Therefore, good dietary sources of zinc should be emphasized.
- **Food sources:** The best sources are seafood, meat, and eggs. Less rich sources are legumes and whole grains.

Folate

- Folate, essential for nucleic acid synthesis, is required in greater amounts during pregnancy as a result of maternal and fetal tissue growth and red blood cell formation. Folate deficiency during pregnancy may result in intrauterine growth retardation, congenital anomalies, or spontaneous abortion.³⁰ The DRI for folate during pregnancy is 600 mcg per day.

- Supplementation with folic acid during early gestation has been related to a 50% protective effect against first occurrence and a 72% protective effect against recurrent neural tube defects (i.e., spina bifida, anencephaly, encephalocele). Because these birth defects occur early in gestation, before pregnancy is apparent, and because many pregnancies, especially those of adolescents, are unplanned, it is advised that all women of childbearing age who are capable of becoming pregnant consume 400 mcg of folic acid daily.³⁰
- The diets of adolescents are often limited in folate. Teens who skip breakfast or who have limited amounts of fruits and vegetables in their diets are at greater risk for inadequate folate intakes.
- Although the United States began fortification of grain products with folic acid in 1998, there is still the possibility that females will not consume adequate amounts of folate. Pregnant adolescents need to be counseled on foods that are good sources of folate, as well as on the role of folic acid in preventing neural tube defects.
- Food sources: Folic acid, the synthetic form of folate, is found in enriched bread, pasta, crackers, breakfast cereal, and rice. Good sources of folate include: dry beans, lentils, chickpeas, peanuts, orange juice, oranges, strawberries, pineapple juice, kiwi fruit, leafy greens, okra, sweet corn, beets, and broccoli (see Appendix A).

Vitamin D

- Vitamin D facilitates the absorption of dietary calcium and helps deposit calcium into bones. Maternal vitamin D deficiency can lead to neonatal hypocalcemia and delayed growth, as well as maternal osteomalacia. The recommended intake of vitamin D for women of childbearing age is 200 IU (5 mcg), whether pregnant or not.
- The major source of vitamin D for humans is the exposure of the skin to sunlight.²⁴
- Very few foods naturally contain vitamin D. In the US almost all of the intake of vitamin D comes from fortified milk products and other fortified foods such as breakfast cereals.²⁴

Vitamin A

- A maternal deficiency of vitamin A can impair fetal growth. The daily requirement, whether pregnant or not, is 5000 International Units (IU). Vitamin A deficiency is rare in American women of childbearing years. However, if adolescents have low consumption of fruits, vegetables, dairy products and fortified cereals, there is the potential for having an inadequate intake of vitamin A.
- Vitamin A at high levels is a documented teratogen. Pregnant adolescents should avoid unprescribed supplements that contain vitamin A, especially at dosages exceeding 800 RE (~4,000 IU).³¹
- Congenital malformations have been documented in mothers using either isotretinoin or etretinate, vitamin A analogues for treatment of cystic acne, during pregnancy. Topical applications of retinoids do not appear to be harmful.
- Food sources: The richest sources of preformed vitamin A are liver, egg yolks, dairy products, margarine, butter and fortified cereals. (See Appendix A). Sources of beta carotene, which are converted to vitamin A include carrots, broccoli, winter squash, greens (spinach, kale, mustard, turnip), tomatoes, apricots, sweet potatoes, red peppers, peaches, pumpkin, mango, and cantaloupe.

Vitamin C

- The RDA for vitamin C during pregnancy is 70 mg per day. It is recommended that regular cigarette smokers consume at least 100 mg of vitamin C per day since smoking increases metabolic turnover of the vitamin, leading to lower concentrations in the blood.¹⁹
- Vitamin C can have a beneficial effect on iron status. Usual daily dietary intakes of vitamin C of 25-75 mg can enhance the intestinal absorption of dietary non-heme iron by two to four fold when the two nutrients are contained together.
- Food sources: oranges and other citrus fruit, green and red peppers, collard greens, broccoli, spinach, tomatoes, potatoes, strawberries, fortified juices (See Appendix A).

Vitamin B₆

- The recommended level of vitamin B₆ is 1.9 mg for pregnant adolescents. It is not uncommon for adolescent females to have intakes below this level.
- Food sources: The richest sources are chicken, fish, liver, pork and eggs. Other good sources include whole wheat grains, oats, peanuts, and walnuts. (See Appendix A.)

Vitamin B₁₂

- To help prevent megaloblastic anemia, pregnant vegetarians, especially vegans, should be sure their diets are adequate in vitamin B₁₂, which is primarily found in animal foods. (See Chapter 14.)
- Food sources: beef, ham, pork, turkey, chicken, herring, salmon, trout, tuna, clams, oysters, lobster, shrimp, milk, cheese, yogurt and egg yolk. Fortified breakfast cereals, fortified soy milk, and nutritional yeast (not brewer's yeast) also provide vitamin B₁₂. (See Appendix A.)

Prenatal Supplement Use

- Obtaining nutrients from food reduces the likelihood of nutrient imbalances, nutrient interactions and toxicities.
- A low-dose vitamin-mineral supplement is recommended for pregnant adolescents who do not regularly consume a diet that meets the nutrient needs of pregnancy, are strict vegetarians, have a multiple gestation, who smoke more than 20 cigarettes per day, or abuse alcohol or drugs.¹⁶
- A calcium supplement (600 mg/day) is recommended for adolescents who do not drink milk or do not eat calcium-rich foods daily.¹⁶
- To prevent iron deficiency anemia, iron supplementation at a low dose, about 30 mg of elemental iron per day for nonanemic pregnant adolescents is recommended.²²
- A study by Scholl et al.³² found that the use of prenatal supplements by low income, urban women in the Camden Study reduced the risk of preterm delivery and low birth weight.

- Since prenatal supplements are often large, adolescents may be more likely to comply with a standard or chewable multivitamin supplement.

Dietary Guidelines to Meet Nutritional Needs During Pregnancy

Table 4 presents criteria for a healthy prenatal diet. The Dietary Guidelines for Americans and the Food Guide Pyramid (See Appendix B) provide a framework and foundation for a healthful diet during pregnancy. A self-evaluation form for pregnant teens is shown in Appendix C4. Sample menus for pregnant adolescents are found in Appendix D.

TABLE 4
Criteria for a Healthy Prenatal Diet

- Provides enough calories for adequate weight gain
- Is well-balanced and follows the Food Guide Pyramid
- Tastes good and is enjoyable to eat
- Spaces eating in intervals throughout the day
- Provides adequate amounts of high fiber foods
- Includes 8 cups of fluid daily
- Limits beverages that contain caffeine (2-3 servings or fewer daily)
- Is moderate in fat, saturated fat, cholesterol, sugar and sodium
- Stable and continuous food supply
- Excludes alcohol

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