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How to improve children's growth and development

Essential Components of Nutrition

The following essential components of nutrition are useful constructs for discussing nutrition from birth through young adulthood:

- **Nutrition for appropriate growth.** Provide adequate energy and essential nutrients to ensure appropriate growth and prevent overweight or obesity.
- **Nutrition and development of feeding and eating skills.** Choose foods that provide essential nutrients and support the development of age-appropriate feeding and eating skills.
- **Healthy feeding and eating habits.** Establish a positive, nurturing environment and healthy patterns of feeding and eating to promote eating habits that are built on variety, balance, and moderation.
- **Healthy eating relationships.** Promote healthy adult-child feeding relationships and social and emotional development.
- **Nutrition for children and youth with special health care needs.** Recognize specific nutrient demands or supplemental needs for vitamins or minerals related to a child's special health condition and provide these nutritional components.

Infancy Visits

Prenatal Through 11 Months

Diet and Physical Activity

Pregnant women need a balanced diet and should also take a prenatal vitamin containing folic acid, vitamin D, choline, and iron in amounts that will help protect the mother's and baby's health.

A pregnant woman's diet should include an average daily intake of 200 to 300 mg of the omega-3 long-chain polyunsaturated fatty acid (PUFA) docosahexaenoic acid (DHA) to guarantee a sufficient concentration of preformed DHA in the milk. Consumption of one to two 3-oz portions of seafood weekly will supply sufficient DHA. Women who are pregnant and breastfeeding should avoid the 4 types of fish that are high in mercury. These are tilefish, shark, swordfish, and king mackerel.

Additionally, a pregnant woman's diet should include 550 mg/day of choline because human milk is rich in choline and depletes the mother's tissue stores. Eggs, milk, chicken, beef, and pork are the biggest contributors of choline in the diet. For vegan mothers, who consume no animal products in the diet, a daily multivitamin including iron, zinc, vitamin B_{12}, omega-3 fatty acids, and 550 mg/day of choline is recommended.

Pregnant women also should be encouraged to engage in moderate-intensity physical activity for at least 30 minutes at least 5 days of the week to help ensure appropriate prenatal weight gain and to improve blood glucose levels. Pregnant women who habitually engage in vigorous-intensity aerobic activity or who are highly active can continue physical activity during pregnancy and the postpartum period, provided that they remain healthy and discuss with their health care professional how and when activity should be adjusted over time.

Anticipatory Guidance

- Eating a small serving of fish 1 to 2 times a week provides important nutrients to your baby. Canned light tuna, salmon, trout, and herring are the best choices to give your baby the neurobehavioral benefits of an adequate intake of an important fat called DHA.
- It is best to avoid 4 kinds of fish that are high in mercury. These fish are tilefish, shark, swordfish, and king mackerel.
- Consuming small amounts of milk, eggs, or meat every day is recommended.
- Talk with your own health care professional about how physically active you should be now and how to adjust your activity after the baby is born.

Infancy

Newborn Visit

General Guidance on Feeding

Parents find great enjoyment and satisfaction when their newborn feeds. It is a time the newborn is awake and alert, looking intently at her parent. Most parents gauge their early parenting ability with their success in feeding their baby. Therefore, providing guidance, assurance, and early assistance with any feeding concerns is a critical element of the Newborn Visit.

Many parents find early feeding a challenge because of difficulties in waking the newborn and the newborn's immature ability to organize sucking, swallowing, and breathing. Mothers of newborns with special health care needs may benefit from specialized assistance with feeding and nutrition. Consider including a lactation consultant in your medical home to support early and continued attempts at breastfeeding so that mothers can gain confidence.

Observing a feeding episode, whether at the breast or when bottle-feeding, often provides insight into the newborn's neuromotor abilities and the parent-newborn interaction. This examination is of value for all babies, but especially for babies who are at risk of feeding difficulties, or if there is concern about the parent-newborn interaction. The mother's comfort in feeding the newborn, eye contact between the mother and newborn, the mother's interaction with the newborn, the mother's and newborn's responses to distractions in the environment, and the newborn's ability to suck can be assessed with observation. Burping frequency varies for breastfed and formula-fed babies and is affected by technique.

Newborns typically lose 7% to 10% of their birth weight during the first 3 to 4 days of life. Birth weight is typically regained by 14 days of age. A newborn who is growing appropriately will gain on average 20 to 30 g per day after birth weight is regained. Newborns who have not passed urine by 24 hours of age or stool by 48 hours of age will require evaluation.

Anticipatory Guidance

- The baby's first stools are called meconium. The stools look greenish black and tarry. All babies should have their first stool by 2 days of age. You may notice that your baby is passing frequent meconium stools, especially each time she feeds. Most babies will pass urine by the time they are 1 day old.
- Your baby should have about 6 to 8 wet diapers in 24 hours when she reaches 3 to 4 days of age. She may have stools as frequently as every time she feeds. If you are breastfeeding, your baby's stools will be loose and yellowish. This is normal and is not diarrhea.

Breastfeeding Guidance

Cultural beliefs and family beliefs have an important effect on infant feeding practices. For example, in some cultures, people may believe that colostrum is harmful to the baby and that breastfeeding should not begin until the full milk has come in, or that the addition of formula offers health benefits. Explore what the family thinks about infant feeding and breastfeeding, and provide education that is tailored to their needs or concerns so that the parents can then make an informed decision that is best for them. It is important to get the breastfeeding mother off to a good start by assessing her plans, making sure she is eating healthy foods and taking vitamin and mineral supplements, and that there are no contraindications to breastfeeding. Very few contraindications to breastfeeding exist, and most need to be considered on a case-by-case basis. Breastfeeding is contraindicated for a baby with classic galactosemia. Additional contraindications include HIV-positive status (see the CDC Web site at **www.cdc.gov** for most current recommendations), substance use, tuberculosis (only until treatment is initiated and the mother is no longer infectious), herpetic lesions localized to the breast, and chemotherapy or other contraindicated drugs.

Before talking with the mother about how feedings are going, it is advisable to determine the weight difference from birth (percentage weight loss); the type, frequency, and duration of feedings; and number of wet diapers and stools. These details will give the mother specific information about the adequacy of feeding and to identify any possible concerns.

Mothers who breastfeed should ingest 500 µg of folate or folic acid daily by taking a daily prenatal vitamin or a multivitamin in addition to eating a nutritious diet. The mother's diet should include an average daily intake of 200 mg to 300 mg of the omega-3 long-chain PUFA DHA to guarantee a sufficient concentration of preformed DHA in the milk. This is obtained either through supplementation or consumption of 1 to 2 portions (3 oz each) of fish (eg, herring, canned light tuna, salmon) per week. The concern regarding the possible risk from intake of excessive mercury or other contaminants is offset by the neurobehavioral benefits of an adequate DHA intake and can be minimized by avoiding the intake of 4 types of fish that are high in mercury. These are tilefish, shark, swordfish, and king mackerel. Additionally, the mother's diet should include 550 mg/day of choline because human milk is rich in choline and depletes the mother's tissue stores. In the diets of women, eggs, milk, chicken, beef, and pork are the biggest contributors of choline.

For vegan mothers, who consume no animal products in their diet, a daily multivitamin including iron, zinc, vitamin B_{12}, omega-3 fatty acids, and 550 mg of choline is recommended.

Anticipatory Guidance

- Breastfeeding should not hurt, and pain is a warning sign that something is not right. You may experience nipple tenderness at first, but this should be mild. Anything other than mild tenderness should be checked. Speak with your nurse or lactation professional to make sure your baby is positioned and latching on correctly. She can also help you with treating your sore or cracked nipples.
- Breastfeeding exclusively for about the first 6 months of life provides ideal nutrition and supports the best possible growth and development. For mothers who have difficulties with breastfeeding their baby or who choose not to breastfeed, iron-fortified infant formula is the recommended substitute for breast milk for feeding the full-term infant during the first year of life.
- You should feed your baby when she is hungry. A baby's usual signs of hunger include putting her hand to her mouth, sucking, rooting, pre-cry facial grimaces, and fussing. Crying is a late sign of hunger. You can avoid crying by responding to the baby's subtler cues. Once a baby is crying, feeding may become more difficult, especially with breastfeeding, as crying interferes with latching on.
- In the first days after your delivery, encourage your baby to breastfeed between 8 to 12 times per day. This will ensure that she receives small, but frequent feedings of colostrum, the early milk that helps your baby's immune system and stimulates increased milk production.
- Around day 2 to 4 after delivery, your milk supply increases and you will notice that your breasts feel full and warm. You may notice milk leaking from your breasts. If you have not experienced this increase by day 5, let me know.
- At about 3 to 4 days after birth, babies will often increase the frequency and length of their feedings. They often want to breastfeed very frequently. This is when babies begin to gain weight. They should be back to their birth weight by about 2 weeks of age. As your baby breastfeeds more, you will see your milk supply increase to meet your baby's needs.

- At about 1 week of age, your baby should feed every 1 to 3 hours in the daytime, and every 3 hours at night with one longer 4- to 5-hour stretch between feedings. For the first few weeks, your baby should breastfeed between 8 to 12 times in 24 hours.
- Feed your baby until she seems full. Signs of fullness are gently releasing the nipple, closing the mouth, and relaxing the hands. If she is sleeping more than 4 hours at a time during the first 2 weeks, she should be awakened for feeding. Keeping her close by rooming-in while in the hospital and at home will make it easier for you to recognize her early feeding cues.
- A newborn is usually very alert for the first 3 to 4 hours after delivery, and then is typically sleepy for the rest of the first day. She may need gentle stimulation (such as rocking, patting, or stroking or undressing) and time to come to an alert state for feeding. These movements also are helpful for consoling your baby.
- Healthy babies do not require anything other than mother's milk. It is not necessary to give your baby anything other than your breast milk unless there is a medical reason.

Formula-Feeding Guidance

If a woman is unable or chooses not to breastfeed, a cow's milk–based, iron-fortified infant formula is the recommended substitute for feeding the full-term infant for the first year of life. Information regarding formula preparation and storage, formula safety, infant holding, and burping should be provided by the birthing hospital staff as part of the routine infant care to ensure safe and appropriate formula preparation and feeding.

Anticipatory Guidance

- Carefully read the instructions on the formula can. It will give you important information about how to prepare the formula and store it safely. The nurses will review how to safely prepare the baby's milk before you go home from the hospital. Talk with me or another health care professional if you have any questions about how to prepare formula or before switching to a different brand or kind of formula.
- Choose plastic bottles made from new, safer plastics or tempered glass baby bottles.
- Never heat a bottle in a microwave. If you wish to warm a bottle, a hot water bath is recommended.
- Formula-fed babies should be fed on cue, usually at least 8 times in 24 hours. The baby's stomach size increases after birth over the first few days. Newborns will typically take ½ to 1 oz per feeding in the first day or 2, and then gradually increase to 1 to 1½ oz by day 2 to 4. Take care not to overfeed your baby.
- Because formula is expensive, you may be hesitant to throw away any that is left in the bottle. For food safety reasons, if your baby has not taken all of the formula at one feeding, you may use it for the next feeding, but be sure to put it back in the refrigerator. Do not mix this formula with new formula. If the formula has been heated and has been out of the refrigerator for 1 hour or more, discard it.
- Do not cut bottle nipples or make the holes larger to increase the amount of formula the baby receives or to speed up feeding times.
- As your baby's appetite increases over time, you will need to prepare and offer larger quantities of formula.
- It is important for you to always hold your baby close when feeding, in a semi-upright position, so that you are able to sense her behavioral cues of hunger, being full, comfort, and distress. Hold your baby so you can look into her eyes during feeding.
- When you feed your baby with a bottle, do not prop the bottle in her mouth. Propping increases the risk that she may choke, get an ear infection, and develop early tooth decay. Holding your baby in your arms and holding the bottle for her gives you a wonderful opportunity for warm and loving interaction with her.

Infancy

First Week Visit (3 to 5 Days)

Anticipatory Guidance

- If you are bottle-feeding, do not prop the bottle, as this puts your baby at risk of choking, ear infections, and early childhood caries or tooth decay. Holding your baby close while you feed him gives you the opportunity for warm and loving interaction with him.
- Babies usually burp at natural breaks (eg, midway through or after a feeding). Help him burp by gently rubbing or patting his back while holding him against your shoulder and chest or supporting him in a sitting position on your lap.
- Your baby is getting enough milk if he has 6 to 8 wet cloth diapers (5 or 6 disposable diapers) and 3 or 4 stools per day and is gaining weight appropriately.
- Breastfed newborns usually have loose, frequent stools. After several weeks, the number of bowel movements may decrease. Breastfed babies who are 4 weeks and older may have stools as infrequently as every 3 days or more.
- Healthy babies do not require extra water, as breast milk and formula, when properly prepared, are adequate to meet the newborn's fluid needs.
- A baby's usual signs of hunger include putting his hand to his mouth, sucking, rooting, facial grimaces, and fussing. Crying is a late sign of hunger.
- You can tell he's full because he will gently release the nipple, close his mouth, or relax his arms and hands.

Breastfeeding Guidance

Mothers

Mothers who breastfeed should ingest 500 μg of folate or folic acid daily by taking a daily prenatal vitamin or a multivitamin in addition to eating a nutritious diet. The mother's diet should include an average daily intake of 200 mg to 300 mg of the omega-3 long-chain PUFA DHA to guarantee a sufficient concentration of preformed DHA in the milk. This is obtained either through supplementation or consumption of 1 to 2 portions (3 oz each) of fish (eg, herring, canned light tuna, salmon) per week. The concern regarding the possible risk from intake of excessive mercury or other contaminants is offset by the neurobehavioral benefits of an adequate DHA intake and can be minimized by avoiding the intake of 4 types of fish that are high in mercury. These are tilefish, shark, swordfish, and king mackerel. Additionally, the mother's diet should include 550 mg/day of choline because human milk is rich in choline and depletes the mother's tissue stores. In the diets of women, eggs, milk, chicken, beef, and pork are the biggest contributors of choline.

For vegan mothers, who consume no animal products in their diet, a daily multivitamin including iron, zinc, vitamin B_{12}, omega-3 fatty acids, and 550 mg of choline is recommended.

Infants

Vitamin D supplementation (400 IU per day) is recommended for breastfed babies beginning at hospital discharge.

Anticipatory Guidance

- Exclusive breastfeeding continues to be the ideal source of nutrition for about the first 6 months of life.
- At about 1 week of age, your baby should feed every 1 to 3 hours in the daytime, and every 3 hours at night, with one longer 4- to 5-hour stretch between feedings. For the first few weeks, your baby should breastfeed between 8 to 12 times in 24 hours.
- You can help your baby by paying attention to his sleep cycles in the day. When he comes to a drowsy state, change his diaper and wake him for a feeding about every 2 to 3 hours.
- Breastfeeding may be challenging for mothers, whether or not they have breastfed before. Every baby is different and catches on a little differently. That is why lactation consultants and breastfeeding support groups are valuable for consultation, education, and support as you and your baby are beginning to breastfeed. I can give you contact information for community groups and a lactation consultant.
- If you are breastfeeding your baby, be sure that you are giving him vitamin D drops.
- You may continue to take your prenatal vitamin with iron every day to ensure adequate intake of vitamins and minerals. If you do not consume any animal products in your diet and follow a vegan diet, your supplement should include vitamins D and B_{12}.
- Eating a small serving of fish 2 times a week provides important nutrients to your baby. Canned light tuna, salmon, trout, and herring are the best choices to give your baby the neurobehavioral benefits of an adequate intake of an important fat called DHA.
- It is best to avoid 4 kinds of fish that are high in mercury. These fish are tilefish, shark, swordfish, and king mackerel.
- Consuming small amounts of protein-containing foods, such as lean meat, poultry, dairy products, beans and peas, eggs, processed soy products, and nuts and seeds, every day is recommended.
- Because newborns feed so frequently, you should avoid alcohol in the first several months of your baby's life. Alcohol easily passes into breast milk and can remain in breast milk for 2 to 3 hours.

Formula-Feeding Guidance

A newborn who is growing appropriately will average 20 oz of formula per day, with a range of 16 to 24 oz per day. Formula preparation and formula safety information is needed for parents, especially the length of time over which formula from one feeding can be offered to the newborn. Parents also need to know why it is important to seek professional guidance before changing to a different formula.

Anticipatory Guidance

- Make sure to always use iron-fortified formula. At first, give your baby 2 oz of prepared formula every 2 to 3 hours. Give him more if he still seems hungry. As he grows and his appetite increases, you will need to prepare larger amounts.
- Because formula is expensive, you may be hesitant to throw away any that is left in the bottle. For food safety reasons, if your baby has not taken all of the formula at one feeding, you may use it for the next feeding, but be sure to put it back in the refrigerator. Do not mix this formula with new formula. If the formula has been heated and has been out of the refrigerator for 1 hour or more, discard it.
- Never heat a bottle in a microwave. If you wish to warm a bottle, a hot water bath is recommended.
- If you are thinking about switching brands of formula, talk to me first.

Infancy

1 Month Visit

Anticipatory Guidance

- Signs of fullness are turning the head away from the nipple, closing the mouth, and showing interest in things other than eating.
- Exclusive breastfeeding or formula meets all the nutritional needs of your baby for about 6 months. At that time, breastfed infants will need zinc- and iron-rich supplementary foods to meet their zinc and iron needs.
- Wait to introduce solid foods or liquids until about 6 months. Introducing solid foods earlier will not help your baby sleep through the night.
- If you are bottle-feeding your baby, always hold her in your arms in a partly upright position. This will allow you to look into her eyes during feedings and watch her cues for when she has had enough or needs to take break from feeding. Feeding is a wonderful opportunity for warm and loving interaction with your baby.

- It is very important to not prop a bottle in your baby's mouth or put her to bed with a bottle containing juice, milk, or other sugary liquids. Propping and putting her to bed with a bottle increases the risk of choking and developing early tooth decay.
- Burp your baby at natural breaks, such as midway through or after a feeding. Gently rub or pat her back while holding her against your shoulder and chest or supporting her in a sitting position on your lap.

Breastfeeding Guidance

Mothers

Mothers who breastfeed should ingest 500 µg of folate or folic acid daily by taking a daily prenatal vitamin or a multivitamin in addition to eating a nutritious diet. The mother's diet should include an average daily intake of 200 to 300 mg of the omega-3 long-chain PUFA DHA to guarantee a sufficient concentration of preformed DHA in the milk. This is obtained either through supplementation or consumption of 1 to 2 portions (3 oz each) of fish (eg, herring, canned light tuna, salmon) per week. The concern regarding the possible risk from intake of excessive mercury or other contaminants is offset by the neurobehavioral benefits of an adequate DHA intake and can be minimized by avoiding the intake of 4 types of fish that are high in mercury. These are tilefish, shark, swordfish, and king mackerel. Additionally, the mother's diet should include 550 mg/day of choline because human milk is rich in choline and depletes the mother's tissue stores. In the diets of women, eggs, milk, chicken, beef, and pork are the biggest contributors of choline.

For vegan mothers, who consume no animal products in their diet, a daily multivitamin including iron, zinc, vitamin B_{12}, omega-3 fatty acids, and 550 mg of choline is recommended.

Infants

Breastfed preterm or low birth weight infants will need multivitamin drops and iron supplementation by 2 to 6 weeks of age (2 weeks in very low birth weight infants) before solid foods are introduced.

Vitamin D supplementation (400 IU per day) is recommended for breastfed infants beginning at hospital discharge.

Anticipatory Guidance

- Exclusive breastfeeding continues to be the baby's best source of nutrition for about the first 6 months of life.
- You can be reassured about your baby's weight gain by reviewing the growth chart.
- If you are breastfeeding your baby, be sure that you are giving her vitamin D drops.
- Continue to take a daily prenatal vitamin or a multivitamin, in addition to eating a nutritious diet. If you do not consume any animal products in your diet and follow a vegan diet, your supplement should include vitamins D and B_{12} as well as iron and zinc.
- Avoid using any bottles and supplements, unless medically indicated, until breastfeeding is well established. For most infants, this occurs around 4 to 6 weeks of age.
- If you wish to introduce a bottle to your breastfeeding baby, pick a time when she is not overly hungry or full. Have someone other than you offer the bottle. Allow the baby to explore the bottle's nipple and take it in her mouth. Experiment with different bottle nipples and flow rates. Once you find a nipple that works well for your baby, it is important to stay with that type so that she can get used to a consistent flow of milk. Over time, as her suck becomes stronger, she may need a nipple with a slower flow rate.

Formula-Feeding Guidance

Proper preparation, heating, and storage of infant formula should be reinforced. If there is evidence of inadequate formula availability to meet the infant's needs, appropriate referrals to WIC and other community resources should be provided.

Infants will take an average of 24 to 27 oz of formula daily, with a range from 20 to 31 oz per day.

Anticipatory Guidance

- You will need to prepare and offer more infant formula as your baby's appetite increases and she goes through growth spurts.
- Never heat a bottle in a microwave. If you wish to warm a bottle, a hot water bath is recommended.

Infancy
2 Month Visit

General Guidance on Feeding and Delaying Solid Foods

By the second month of life, infant growth and the parent's comfort in feeding their infant should be well established. Infants who are struggling with maintaining a good growth pattern or parents who are struggling with feeding routines, extremely long feedings, or infrequent feedings should have additional support, guidance, and counseling to determine potential underlying infant developmental concerns or parenting knowledge issues.

Anticipatory Guidance

- Exclusive breastfeeding for about the first 6 months of life provides ideal nutrition and supports the best possible growth and development. If you are still breastfeeding, congratulations!
- If your baby is not breastfed, iron-fortified formula is the recommended substitute during the first year of life.
- Do not give your baby food other than breast milk or formula until he is developmentally ready, which is at about 6 months of age.
- Usually, healthy babies do not require extra water. On very hot days with no air conditioning, babies will benefit from some extra water. Breast milk and formula, when properly prepared, are adequate to meet the baby's fluid needs. Juice is not recommended.

Hunger and Satiety Cues

Parents begin to learn their infant's cues for hunger and satiety.

Anticipatory Guidance

- Breastfed and formula-fed infants have different needs for the frequency of feeding, although both breast milk and formula provide all the nutrition that infants need until about 6 months of age.
- To prevent overfeeding, which often leads to more frequent spit-ups, recognize your baby's individual signs of hunger and fullness. An infant's stomach is still small. Therefore, your baby still needs to eat every 2 to 4 hours, even during the night. Hopefully, your baby will have one longer stretch at night of 4 to 5 hours without feeding.
- Burp your baby at natural breaks, such as midway through or after a feeding, by gently rubbing or patting his back while holding him against your shoulder and chest or supporting him in a sitting position on your lap.

Breastfeeding Guidance

Explain that as infants grow, they are more easily distracted during feeding and may need gentle repetitive stimulation, such as rocking, patting, or stroking. The infant may need a quiet environment, perhaps with low lighting and without other people present. Feeding times offer a wonderful opportunity for social interaction between the infant and the mother.

Counsel mothers on safe storage of human milk.

Vitamin D supplementation (400 IU per day) is recommended for all full-term breastfed infants beginning at hospital discharge. Breastfed preterm or low birth weight infants will need multivitamin drops and iron supplementation at 2 mg/kg/day by 2 to 6 weeks of age until solid food introduction.

Anticipatory Guidance

- Breastfed infants continue to need about 8 to 12 feedings in 24 hours. They may feed more frequently when they go through growth spurts. By 3 months of age, breastfed infants generally will be feeding every 2 to 3 hours. If your baby is receiving frequent feedings during the day and continuing to receive between 8 and 12 feedings in 24 hours, he may have one longer stretch of 4 to 5 hours at night between feedings.
- Consider how to plan your activities and schedules to make things easier when you are home or out with your baby. Storing breast milk properly is very important. If you are interested, I can give you written guidelines to help you make sure your stored breast milk remains safe for your baby.
- I can help you with strategies to support breast milk production if you will be away from the baby for extended periods.
- If you are breastfeeding your baby, be sure that you are giving him vitamin D drops.
- You may continue to take your prenatal vitamin with iron every day to ensure adequate intake of vitamins or minerals. Discuss with your obstetric team how long you should continue to take it. If you do not consume any animal products in your diet and follow a vegan diet, your supplement should include vitamins D and B_{12} as well as iron and zinc.
- Eating a small serving of fish 2 times a week provides important nutrients for your baby. Canned light tuna, salmon, trout, and herring are the best choices to give your baby the neurobehavioral benefits of an adequate intake of an important fat called DHA.
- It is best to avoid 4 kinds of fish that are high in mercury. These fish are tilefish, shark, swordfish, and king mackerel.
- Consuming small amounts of protein-containing foods, like lean meat, poultry, dairy products, beans and peas, eggs, processed soy products, and nuts and seeds, every day is recommended.

Formula-Feeding Guidance

If parents feel that they do not have time to hold the bottle, review the importance of the feeding relationship and the benefits of holding the infant during feeding, as well as the risks of propping the bottle. Parents also may need to be reminded not to put the baby to bed with a bottle.

The usual amount of formula for a 2-month-old in 24 hours is about 26 to 28 oz, with a range of 21 to 32 oz.

Anticipatory Guidance

- Babies who receive formula usually will feed every 3 to 4 hours, with one longer stretch at night of up to 5 or 6 hours at night between feedings. Overall, a 2-month-old still needs about 6 to 8 feedings in 24 hours.
- When feeding your baby, always hold him in your arms in a partly upright position. This will prevent him from choking and will allow you to look into his eyes during feedings. Feeding is a wonderful opportunity for warm and loving interaction with your baby.
- Do not prop a bottle in your baby's mouth or put him to bed with a bottle containing juice, milk, or other sugary liquid. Propping and putting him to bed with a bottle increases the risk of choking and of developing early tooth decay.
- Never heat a bottle in a microwave. If you wish to warm a bottle, a hot water bath is recommended.

Infancy

4 Month Visit

General Guidance on Feeding

At age 4 months, feeding can be one of the most enjoyable experiences for parents, and both parents often share in this responsibility. Babies continue to gain about ½ pound a week, or 2 pounds a month. Their feedings may become less frequent, with 6 to 10 feedings in 24 hours. Only one parent might be present at this visit and a complete feeding history may not be available. This is particularly true if the infant is in child care. If there are concerns with feeding, irritability, or weight gain, it may be advisable to have the parents work together with the child care provider to complete a 24-hour or 3-day diet history that can be reviewed for nutritional adequacy. A referral can be made to a dietitian, if needed.

Anticipatory Guidance

- Exclusive breastfeeding provides the ideal source of nutrition for all infants for about the first 6 months of life. For those infants who are not breastfed, iron-fortified formula is the recommended substitute.
- Formula-fed infants do not need vitamin supplements if the formula is fortified with iron and the baby is consuming an adequate volume of formula for appropriate growth.

Feeding Choices (Avoid Grazing)

Parents continue to need reassurance that their infant is getting enough to eat when feeding patterns change because of a temporary increase in the frequency of feedings caused by growth spurts. Discuss the meaning of the growth chart and the relationship between the infant's birth weight and current weight and length.

As babies learn that they can put their hands in their mouth for chewing and sucking, they use this technique to calm themselves. Some parents think this means their baby is still hungry and they use it as a rationale for starting solid foods. Solid foods are not recommended until about 6 months of age.

Vitamin D (400 IU) supplements are recommended for all breastfed infants, but are not needed for formula-fed infants because vitamin D is present in the formula. Some preterm infants will require supplementation of additional vitamins.

Oral iron supplementation (1 mg/kg/day) should be provided to exclusively breastfed infants beginning at 4 months of age and should continue until iron- and zinc-rich complementary foods (baby meats and iron-fortified cereals) are introduced. It may take 1 to 2 months following introduction of these foods for infants to consume sufficient iron from complementary foods alone. Red meat is a better source of iron than iron-fortified cereals for older infants because a higher percentage of the iron in red meat is absorbed.

At 4 months, babies become very interested in their environment and it is not uncommon for them to vigorously begin a feeding and then become distracted by siblings or other activities in the environment and not complete a feeding. However, in an hour or so they begin to fuss because they are hungry again.

Anticipatory Guidance

- It is important for you to help your baby avoid getting into the habit of grazing or snacking and then crying to be fed again soon. For breastfed babies, this may not be uncommon, however, when they are going through a growth spurt. The difference is that a growth spurt does not usually last more than a week.
- Be sure to continue your baby's vitamin D supplement. An iron supplement is now also necessary and we will begin it today.
- To help your baby finish a feeding, it may help to find a quiet and less distractible environment.
- In addition, because your baby loves to see your face, watch your expressions, and hear your voice, you can be the most interesting thing to watch while feeding. Position your baby so that she can see your face, and talk with her about her feeding, what is going on around her, and what will happen during the day. You can use touch, changes in your voice, and even slight changes in her position to help her refocus on feeding.

Delaying Solid Foods

At 4 months of age, human milk or formula remains the best food for babies. Solid feeding is discouraged until about 6 months of age.

Anticipatory Guidance

- Exclusive breastfeeding for about the first 6 months of life provides ideal nutrition and supports the best possible growth and development.
- If your baby is not breastfed, iron-fortified formula is the recommended substitute during the first year of life.
- Do not give your baby food other than breast milk or formula until she is developmentally ready, which is at about 6 months of age.
- Usually, healthy babies do not require extra water. On very hot days with no air conditioning, she will benefit from some extra water. Breast milk and formula, when properly prepared, are adequate to meet your baby's fluid needs. Juice is not recommended.

Breastfeeding Guidance

Commend mothers who are still breastfeeding. Reinforce that exclusive breastfeeding is the ideal source of nutrition for about the first 6 months of age, followed, as solid foods are introduced, by continued breastfeeding for 1 year or longer as mutually desired by the mother and child.

Discuss how demand for more frequent breastfeeding is usually related to an infant's growth spurt and is nature's way of increasing human milk supply. If an increased demand continues for a few days, is not affected by increased breastfeeding, and is unrelated to illness, teething, or changes in routine, it may be a sign that the breastfed infant is ready for solid foods.

Counsel mothers on safe storage of human milk.

Anticipatory Guidance

- Congratulations for continuing to breastfeed your baby! It is not unusual for babies to go through growth spurts during the first year of life and, whenever this occurs, your baby will begin to breastfeed more frequently, and often at night. This is nature's way of increasing your milk supply. This is a temporary situation and it does not indicate that your baby is not getting enough to eat.
- Storing breast milk properly is very important. If you are interested, I can give you written guidelines to help you make sure your stored breast milk remains safe for your baby.
- As your baby gets closer to 6 months of age, you may begin to see signs that she is ready for solid foods.

Supplements and Over-the-counter Medications

Medications and supplements often pass through the human milk to the baby. It is important to know what supplements and over-the-counter medications mothers are taking. Assess their safety for the infant.

Anticipatory Guidance

- It is important to tell me about any medications, supplements, herbs, or vitamins you may be taking. This information will help me give you the best care and advice since you are breastfeeding. However, some medications may decrease your milk supply. Knowing what you are taking helps me determine whether they are safe with medications or treatments your baby might receive.
- Most medications are compatible with breastfeeding, but should be checked on an individual basis.

Formula-Feeding Guidance

Discuss with parents that as the infant's appetite increases and she grows, they will need to continue to prepare and offer a little more infant formula. Instruct parents to feed the infant when she is hungry (usually 8–12 times in 24 hours).

Discuss with parents that iron-fortified formula is the most important nutrition for the infant at this time. Other foods or drinks are not advised unless recommended by the health care professional.

The usual amount of formula for a 4-month-old in 24 hours is about 30 to 32 oz of formula per day, with a range of 26 to 36 oz.

Anticipatory Guidance

- Your baby is now able to clearly show when she is hungry or full. It also is not unusual for her to want different amounts of formula at different times of the day. She may take more at a morning feeding than at a noon feeding. It is important to respond to your baby's behaviors for feeding to avoid underfeeding or overfeeding. Overfeeding can lead to spitting up. Holding your baby during feeding also helps you understand the meaning of her behaviors. This will help you meet her needs and reduce fussiness. It will even help with her learning as she watches you and listens to your voice.
- It is important to hold your baby for all bottle-feedings to reduce the risks of choking and to ensure that your baby gets enough of the formula. To reduce the risk of your baby developing tooth decay, do not prop the bottle.
- If you have concerns about the cost of formula now that your baby is drinking larger amounts, you may want to contact community resources, like WIC, that can provide formula for your baby.
- Never heat a bottle in a microwave. If you wish to warm a bottle, a hot water bath is recommended.

Infancy
6 Month Visit

General Guidance on Feeding

By reviewing the growth chart with parents at each visit, parents become aware of the importance of growth and nutrition and become partners in providing appropriate nutrition for their child. This review also will determine the need for more in-depth assessment of nutritional adequacy and anticipatory guidance about the use of nutritional supplements (eg, vitamins, herbs, alternative formulas, and foods). Infants who take longer than 35 to 45 minutes to feed should be evaluated carefully for developmental and nutritional concerns.

Significant transitions in feeding occur during the next 3 months, and parents need clear guidance about what to expect. Managing this transition includes a discussion about cultural or extended family beliefs about introduction of solid foods and types and textures of foods. The concept of the division of responsibility between parent and infant with feeding is especially helpful. In this division, the parent is responsible for providing appropriate foods and the infant is responsible for how much to eat.

Anticipatory Guidance

- In the next 6 months, it is typical for your baby's growth to slow down a little, as you can see on the growth chart.
- Breastfeeding exclusively for about 6 months of life and then combining breast milk with solid foods from about 6 to 12 months of age provides the best nutrition and supports the best possible growth and development. You can continue breastfeeding for as long as you and your baby want.
- For infants who are not breastfed, iron-fortified infant formula, with the addition of solid foods after 6 months of age, is the recommended alternative through the first year of life.
- As you begin solid foods, it is important to feed your baby in a bouncy seat or high chair that is adjusted to support your baby's head, trunk, and feet, so you can look at each other. Your baby's arms also should be free, as this is his way of communicating with you. Of course, when offering the bottle, it is still very important to continue to hold your baby so that you can see each other and communicate with each other. Your baby then will be able to let you know when he is still hungry and when he is full.

- Responding appropriately to your baby's behaviors during feedings lets him know that you understand his needs so you can provide the appropriate amount of food at a feeding. Remember, you are responsible for providing a variety of nutritious foods, but he is responsible for deciding how much to eat.

Solid Foods

Parents need specific verbal or written guidance on the introduction of solid foods. The order in which they are introduced is not critical as long as essential nutrients are provided. For the breastfed infant, emphasize the need to include a good dietary source of iron to prevent iron deficiency and an oral vitamin D supplement (400 IU/day). Some breastfed infants may need an iron supplement.

Parents can offer store-bought and home-prepared baby food as well as soft table foods. As the infant progresses from purees to foods with more consistency, encourage parents to offer finger foods, such as soft bananas and cereal. Advise parents that infants do not need salt or sugar added to their food.

After the introduction of solid foods, the next few months are a sensitive period for learning to chew. A gradual exposure to solid textures during this time may decrease the risk of feeding problems, such as rejecting certain textures, refusing to chew, or vomiting.

The WIC can provide information and guidance on introducing solid foods.

Anticipatory Guidance

- Adding solid foods to your baby's diet is very individualized. Transitioning from breast milk or formula at about 6 months of age to table foods at 12 months of age involves a number of steps.
- A key step is to determine when your baby is ready for solid foods.
  - One of the signs that a baby is ready to eat solid foods is the fading of the baby's tongue-thrust reflex. This is when the baby pushes food out of his mouth.
  - Another sign is that the baby can elevate his tongue to move pureed food to the back of his mouth and, as he sees a spoon approach, he opens his mouth in anticipation of the next bite. At this stage, your baby sits with arm support and has good head and neck control, so he can indicate a desire for food by opening his mouth and leaning forward.
  - He can tell you he's full or doesn't want food by leaning back and turning away.
- Introduce single-ingredient new foods, one at a time, and watch for adverse reactions over several days.
- Good sources of zinc- and iron-rich foods include zinc- and iron-fortified infant cereal and pureed meats, especially red meats. One ounce (30 g) of infant cereal provides the daily iron requirement, particularly if you give it to him along with vitamin C–rich foods, such as fruit, which enhance iron absorption from the cereal. Some breastfed infants may need to continue oral iron drops.

- Gradually introduce other pureed or soft fruits and vegetables after your baby has accepted zinc- and iron-fortified, single-grain infant cereal and/or pureed or soft meats. Offer solid food 2 to 3 times per day and let him decide how much to eat.
- As with all feeding interactions, watch your baby's verbal and nonverbal cues and respond appropriately. If a food is rejected, move on and try it again later. Don't force him to eat or finish foods.
- Give your baby an initial taste of one of these foods *at home* rather than at day care or a restaurant. Most reactions occur in response to what is believed to be the initial try.
- Repeated exposure to foods enhances acceptance of new foods by both breastfed and formula-fed infants. It may take up to 10 to 15 experiences before a new food is accepted, because of the transition to textures as well as tastes.
- The only foods to be avoided are raw honey or large chunks of food that could cause choking. Newer data suggest that the early introduction of all foods may actually *prevent* individual food allergies.
- If your baby has no apparent reaction, introduce the food in gradually increasing amounts. Continue introducing other new foods in the same manner if no adverse reactions occur.
- Giving your baby foods of varying textures, such as pureed, blended, mashed, finely chopped, and soft lumps, will help him successfully go through the change from gumming to chewing foods. Slowly introducing solid textures during this time may decrease the risk of feeding problems, refusing to chew, or vomiting. Gradually increase table foods. Avoid mixed textures, like broth with vegetables, because they are the most difficult for infants to eat.

Fluids and Juice

Parents can begin offering sips of human milk, formula, or water from a small cup held by the feeder, but an infant this age is unlikely or unable to take adequate amounts of fluids and energy needs in a cup. Caution parents to limit juice to 2 to 4 oz of 100% juice in any one day and to avoid the use of sweetened drinks, such as sodas and artificially flavored "fruit" drinks that provide calories without other nutrients.

Anticipatory Guidance

- Give your baby only 2 to 4 oz of 100% juice in any one day, as it is not considered a snack or food. Avoid the use of sweetened drinks, such as sodas and artificially flavored fruit drinks that provide calories without other nutrients.

Breastfeeding Guidance

Congratulate the mother for continuing to breastfeed.

Weaning ages vary considerably from child to child. Although breastfeeding is recommended for at least 12 months, or longer as mutually desired by the mother and infant, some infants are ready to wean earlier. Refer mothers to breastfeeding support groups or a lactation consultant as needed for questions or concerns.

Vitamin D supplementation (400 IU per day) is recommended for all breastfed infants, but is not needed for formula-fed infants, as vitamin D is present in the formula. Some preterm infants will require supplementation of additional vitamins.

Oral iron supplementation (1 mg/kg/day) for exclusively breastfed infants should continue until iron- and zinc-rich complementary foods (baby meats and iron-fortified cereals) are introduced. It may take a month or two following the introduction of these foods for infants to consume sufficient iron from complementary foods alone. Red meat is a better source of iron than iron-fortified cereals for older infants because a higher percentage of the iron in red meat is absorbed.

Anticipatory Guidance

- At 6 months of age, breast milk with solid foods continue to be your baby's best source of nutrition. You should try to continue to breastfeed for the first year of your baby's life and for as long thereafter as you and your baby want to continue.
- Be sure to continue your baby's vitamin D until your baby is taking at least 16 oz of vitamin D–fortified milk each day.
- Continue your baby's iron supplement until he is eating red meat or iron-fortified cereal every day.

Formula-Feeding Guidance

Older infants generally consume 24 to 32 oz of formula per day with solid food, but larger infants (6 months old, 90th percentile for weight) may take as much as 42 oz of formula per day without solid foods. Often, at this age, parents may consider using a less expensive formula and may need guidance based on the individual needs of the infant.

Anticipatory Guidance

- Continue to feed your baby when he shows hunger cues, usually 5 to 6 times in 24 hours.
- Supplements are not needed if the formula is iron fortified and your baby is consuming an adequate volume of formula for appropriate growth.
- During the first year of life, babies continue to need iron-fortified formula. If the cost of the formula is a concern, programs such as WIC or other community services may be able to help you.
- Never heat a bottle in a microwave. If you wish to warm a bottle, a hot water bath is recommended.

Infancy
9 Month Visit

Self-feeding, Mealtime Routines, Transition to Solid Foods (Table Food Introduction), Cup Drinking

During the next 3 months, infants demonstrate a growing ability to feed themselves. As infants begin to want independence with self-feeding, it is increasingly important for parents to understand the division of responsibility between parent and child with regard to feeding—the parent is responsible for providing a sufficient amount and variety of nutritious foods, and the child is responsible for deciding how much to eat.

The time between the introduction of solid foods and age 9 months is a sensitive period for learning to chew. A gradual exposure to solid textures during this time may decrease the risk of feeding problems, such as rejecting certain textures, refusing to chew, or vomiting.

Anticipatory Guidance

- Try to be patient and understanding as your baby tries new foods and learns to feed herself. Removing distractions, like TV, will help her stay focused on eating. Remember, it may take 10 to 15 tries before your baby will accept a new food.
- As your baby becomes more independent in feeding herself, remember that you are responsible for providing a variety of sufficient nutritious foods, but she is responsible for deciding how much to eat.
- Most 9-month-olds can be on the same eating schedule as the family. This usually means breakfast, lunch, and dinner. The baby also should have a mid-morning, afternoon, and bedtime snack. The amount of food taken at a single feeding may vary and may not be a large amount, but the 3 meals and 2 to 3 snacks help ensure that your baby is exposed to a variety of foods and receives adequate nutrition. Snacks can be an opportunity to try new foods.
- Giving your baby foods of varying textures, including pureed, blended, mashed, finely chopped, and soft lumps, will help her successfully go through the change from gumming to chewing foods. Slowly introducing solid textures during this time may decrease the risk of feeding problems, refusing to chew, or vomiting. Gradually increase table foods. Avoid mixed textures, like broth with vegetables, because they are the most difficult for infants to eat.

- Encourage your baby to drink from a cup with help. One hundred percent juice may be served as part of a snack, but should be limited to 4 oz per day. Avoid the use of sweetened drinks, such as sodas and artificially flavored “fruit” drinks. These drinks provide calories, but no nutrients.
- No foods need to be withheld except raw honey and chunks that could cause choking.

Plans for Weaning

The transition from a complete milk diet to a diet of solids and milk continues. Discuss plans for weaning or transitioning from formula to whole milk and from breast or bottle to cup. For babies receiving formula or human milk from a bottle, weaning can be done gradually, substituting 1 bottle with a cup of the liquid. As the infant approaches 12 months of age, most, if not all, bottles can be eliminated.

Because breastfeeding is recommended for the entire first year, weaning is usually delayed to after 12 months. However, some mothers report that their babies appear to be less interested in breastfeeding at around age 9 months. This is often remedied by breastfeeding in a quiet environment free of distraction. Alternatively, pumped human milk or infant formula (NOT cow's milk) may be served from a cup, not a bottle.

Anticipatory Guidance

- Weaning ages vary considerably from child to child. Some are ready to wean earlier than others and will show this by decreasing their interest in breastfeeding as they increase their interest in the foods they see their parents eating.
- Your baby's best source of nutrition at 9 months of age continues to be breast milk with solid food. Try to continue breastfeeding through the first year of the baby's life, or for as long as both you and your baby want.
- If your baby is taking formula, it is recommended that it be your baby's major milk source until her first birthday. Whole milk can be introduced after age 1 year.
- As you begin to wean your baby, consider starting with the least interesting bottle time (perhaps the naptime bottle). Gradually substitute the cup for other bottles.
- If your baby is used to being held during feeding, hold her while feeding with a cup.

Vitamin and Mineral Supplements

A major concern in infancy is the adverse effect of early iron deficiency on psychomotor development. Iron deficiency can result in cognitive and motor deficits,[20] some of which may be prevented with iron supplementation.[21] A Cochrane Review on the subject concluded there is no clear evidence that treating young children with anemia secondary to iron deficiency will improve psychomotor development within 30 days of therapy, but the effects of longer-term iron supplementation are not yet known.[22] Thus, prevention is extraordinarily important. During the first year of life, infants at highest risk of iron deficiency are those born prematurely, those fed infant formula that is not iron fortified, and those who are exclusively breastfed for more than 4 months without iron supplements. Term, healthy infants have enough iron stores for at least 4 months of life. Because human milk contains little iron, infants who receive only human milk are at an increasing risk for iron deficiency after 4 months of age.[15] Therefore, the AAP Committee on Nutrition recommends that oral iron drops (1 mg/kg/day) begin at 4 months of age and continue until iron- and zinc-rich complementary foods (baby meats and iron-fortified cereals) are introduced.[23]

It may take a month or two following introduction of these foods for infants to consume sufficient iron from complementary foods alone. Red meat is a better source of iron than are iron-fortified cereals for older infants because a higher percentage of the iron in red meat is absorbed. Infants who receive at least 500 mL (17 oz) of iron-fortified infant formula per day do not need additional iron supplementation.

Vitamin D deficiency or insufficiency is now more prevalent in infants because of the decreased exposure to sunlight secondary to changes in lifestyle and use of topical sunscreens. The AAP recommends that all breastfed infants receive vitamin D supplementation (400 IU per day) beginning in the 2 months after birth.[24] Breastfed infants whose mothers are vegans or vitamin B_{12} deficient need supplements of vitamin B_{12}. Calcium intake is sufficient in infants who receive enough human milk or infant formula.

Fluoride supplementation is not indicated until after the eruption of teeth, which usually occurs at approximately 6 months of age. Beginning at 6 months, fluoride supplementation is recommended for infants and children who do not drink flurordated water.[25] *(For more information on this topic, see the Promoting Oral Health theme.)*

Dietary Reference Intakes for Calcium and Vitamin D[45]

Birth at Term Until 1 Year

- 200 mg calcium per day, birth–6 months
- 260 mg calcium per day, 7–12 months
- 400 IU vitamin D per day

Children Aged 1–3

- 500 mg calcium per day
- 400 IU of vitamin D per day

Children Aged 4–8

- 800 mg calcium per day
- 600 IU vitamin D per day

Children, Adolescents, and Young Adults Aged 9–18

- 1,300 mg calcium per day
- 600 IU vitamin D per day

Data derived from Ross AC, Taylor CL, Yaktine AL, Del Valle HB; Institute of Medicine Committee to Review Dietary Reference Intakes for Vitamin D, Calcium, Food and Nutrition Board. *Dietary Reference Intakes for Calcium and Vitamin D*. Washington DC: National Academies Press; 2011.

Childhood

Early Childhood Visits
1 Through 4 Years

Self-feeding

The child should be developing toddler eating skills—biting off small pieces of food, feeding herself, and holding and drinking from a cup. Toddlers learn to like foods by touching, smelling, and mouthing them repeatedly.

Sample Question

How is your child doing with feeding herself during meals and snacks?

Anticipatory Guidance

- Give your toddler a spoon for eating and a cup for drinking. Be sure that they are easy for her small hands to hold.
- Cover your floor and don't worry about messes. Young children learn from experimenting.
- Avoid small, hard foods like peanuts or popcorn, on which your child can choke. Cut any firm, round food, such as hot dogs, raw carrots, grape or cherry tomatoes, or grapes, into thin slices.

Continued Breastfeeding and Transition to Family Meals

Meals can be relaxed, safe, and enjoyable family times. Encourage fine motor skills, such as using a cup or spoon and eating finger foods. Continue to support breastfeeding as long as mutually desired by mother and child. Mothers who breastfeed continue to need support when nursing their child at 12 months of age and beyond. It is now appropriate to switch the child from formula to whole cow's milk. Limit fruit juice (even 100%) to 4 oz total for the day and rely instead on water for hydration. Develop plans to stop bottle-feeding. Bottle-feeding should be used only to provide the toddler with water.

Anticipatory Guidance

- Include your toddler in family meals by providing a high chair or booster seat at table height placed at a safe distance from the table. Make mealtimes pleasant and companionable. Encourage conversation.
- Whole cow's milk may be introduced by cup, providing up to 16 oz per day. The amount of whole cow's milk intake will increase as breastfeeding diminishes.
- Avoid using raw milk or any milk substitutes that are not equivalent to cow's milk and that do not meet US Department of Agriculture (USDA) standards for milk substitutes. These include beverages such as rice milk, almond milk, or coconut milk.

Nutritious Foods

Now is a good time for parents to establish positive eating patterns for their child by providing healthy foods at regular intervals 5 to 6 times throughout the day, giving appropriate amounts, and emphasizing nutritious foods. Discuss the importance of providing healthy snacks and of minimizing foods and beverages that are high in added sugars and saturated fat and low in nutrients. Remind parents that they are responsible for providing a variety of nutritious foods and that their child is responsible for how much to eat.

Many families wonder whether they should choose organic fruits and vegetables over conventional fruits and vegetables to reduce pesticide exposure in their child's diet. Eating a diet rich in a variety of fruits and vegetables, either conventional or organic, has well-established health benefits. Choosing organic fruits and vegetables can reduce exposures to pesticides in the diet. Mercury in bodies of water like lakes and streams—some of it discharged from industrial plants—can be converted by bacteria into mercury compounds such as methyl mercury. As a result, certain fish, specifically tilefish, shark, swordfish, and king mackerel, can contain high quantities of mercury, which, when consumed, can have a serious negative effect on a young child's developing nervous system.

Anticipatory Guidance

- By this time, a toddler will have transitioned from a primarily liquid diet to the family meal. Introducing a wide variety of flavors and textures helps her adjust to this change.
- Your toddler's rate of weight gain will be slower than in the first year. Overall, she may eat less now than when she was an infant. Toddlers also tend to graze. Her appetite will vary; she will eat a lot one time, and not much the next time.
- Include 2- to 3-oz servings of protein, such as eggs, lean meat, chicken, or fish (making sure to remove any bones).
- Let your toddler decide what and how much to eat from an assortment of healthy foods you offer. Trust your child's ability to know when she is hungry and full. If she asks for more, provide a small additional portion. If she stops eating, accept her decision.

- Feed your toddler 5 to 6 times throughout the day (3 meals and 2 or 3 planned snacks). Be sure that your toddler's caregiver or child care center also provides nutritious foods.
- Have healthy snacks on hand, such as
  - Fresh fruit or vegetables, such as apples, oranges, bananas, cucumber, zucchini, and radishes, that are cut in small pieces or thin strips
  - Applesauce, cheese, or small pieces of whole-grain bread or crackers
  - Unflavored yogurt, sweetened with bits of mashed fruit
- Wash fruits and vegetables and eat a variety of fruits and vegetables. Include fish because it has many nutritional benefits, but avoid the 4 kinds that are high in mercury. These are tilefish, shark, swordfish, and king mackerel.

Nutritious Foods

Meals should be relaxed, safe, and enjoyable family times. Remind parents that they are responsible for providing a variety of nutritious foods and that their child is responsible for how much to eat. Parents can establish positive eating patterns for their child by providing healthy foods at regular intervals throughout the day, giving appropriate amounts, and emphasizing vegetables and fruit and other nutritious foods.

A reduced appetite appropriately accompanies the slower rate of growth of early childhood in contrast with infancy. Parents are often distressed when children eat less than they expected, but food refusal often means their child is not hungry. Parents may fail to realize that by encouraging a child to eat when he is not hungry gives him calories he did not ask for and likely doesn't need. Also, preparing substitute foods only encourages picky eating. Discuss the importance of providing healthy snacks and of minimizing foods and beverages that are high in added sugars and saturated fat and low in nutrients.

Anticipatory Guidance

- Offer a variety of healthy foods to your child, especially vegetables and fruits, and include higher protein foods like meat and deboned fish at least 2 times per week.
- Help your child explore new flavors and textures in his food.
- Remember that children this age seldom eat "3 square meals a day," but more likely 1 good meal and multiple smaller meals and snacks.
- When your child refuses something you've prepared, it usually means he is not hungry. It doesn't mean he doesn't like it and wouldn't have it later for a snack.
- Trust your child to determine when he is hungry or full and never encourage him to eat food he did not ask for.
- Your kitchen is not a fast-food restaurant and you don't need to fix another meal if your child refuses what you have already prepared. This only encourages him to be a picky eater.

- Have healthy snacks on hand, such as
  - Fresh fruit or vegetables, such as apples, oranges, bananas, cucumber, zucchini, or radishes, that are cut in small pieces or thin strips
  - Applesauce, cheese, or small pieces of whole-grain bread or crackers
  - Unflavored yogurt, sweetened with bits of mashed fruit

Water, Milk, and Juice

Fluid intake is an important element of nutrition. Water should be provided ad lib at all times and should be regularly offered to children of all ages, with increased attention to water intake in warm or dry environments.

Families may fail to recognize the importance and effect of other fluids to their child's nutrition and it may be useful to remind parents that what we drink contributes protein, fat, and sugar to our daily intake. Milk is an important fluid and protein source and the most accessible source of calcium and vitamin D for children. The fat provided in milk is believed to be of importance until age 2 years, so the introduction of low-fat and fat-free milk should be delayed until the second birthday. Breastfeeding should continue to be supported as long as mutually desired by mother and child. The child will continue to receive benefits, including host defense, through at least 24 months of age. Discuss possible pressure to wean by family or friends. If weaning is desired, discuss appropriate weaning techniques.

Juices demand special attention. The sugar content of all juices demands that juice intake be limited, to reduce the risk of dental caries and limit the intake of sugar calories. Soda or soft drinks, sports drinks, and punches provide many calories of scant nutrient value and should be avoided.

Anticipatory Guidance

- Be sure you always have cool water available to your child, especially on warm days and when your child is physically active.
- Young children should drink 16 to 24 oz of milk each day to help meet their calcium and vitamin D needs. Milk is also an important source of protein for growth.
- Juice is not a necessary drink. If you choose to give juice, limit it to 4 oz daily and always serve it with a meal.
- To protect your child's teeth, don't dilute juice with water and don't allow your child to carry around a bottle, sippy cup, or juice box for drinking over a long period of time.

Expressing Independence Through Food Likes and Dislikes

Food is an area in which toddlers frequently express their newly independent views, especially their likes and dislikes. This is NORMAL.

Anticipatory Guidance

- Your toddler may become more aware and suspicious of new or strange foods, but do not limit the menu to foods she likes. Continue to offer new foods and allow the child to explore at her own pace. Do not force her to eat the food.
- You may have to offer your toddler a new food many times before she accepts it. It often takes repeated exposure to foods before a toddler will enjoy it. Do not give up after a few tries. Parents should not be short-order cooks.
- Let your toddler experiment with a variety of foods from each food group by touching and mouthing them. She can feed herself.
- Allow your child to determine how much of the healthy foods you serve she will eat. Do not continue to feed her if she is not interested.
- A toddler may eat 6 small meals every day or 3 meals with nutritious snacks in between.

Middle Childhood Visits

5 Through 10 Years

Nutrition (Healthy Weight; Increased Vegetable, Fruit, Whole-Grain Consumption; Adequate Calcium and Vitamin D Intake; Healthy Foods at School)

Discuss healthy weight by using a BMI chart to show the child and her family how her height and weight compare with those of other children of the same sex and age. If the child's BMI is greater than the 85th percentile, it is appropriate to begin more in-depth counseling on nutritious food choices and physical activity. Note that some children between the 85th and 94th percentiles are healthy and do not have chronic disease risk factors.

As children aged 5 and 6 years begin to broaden their experiences beyond home, they are increasingly expected to make their own choices about what to eat (eg, school lunch, snacks at a friend's house). This is a time when the overall quality of many children's eating patterns begins to decline. It is, therefore, a good time to counsel families about appropriate food choices that promote nutritional adequacy and to reinforce the positive nutrition habits established earlier. Ensuring sufficient calcium and vitamin D intake can be a particular concern, especially if the child does not consume dairy products. Supplementation with these nutrients can be considered. Fortified orange juice typically has calcium and vitamin D. Soy milk generally has both, but that is not always true for other products marketed as "milks" (eg, almond, rice, coconut, hemp). Families should be encouraged to check the package label to be sure. Not all yogurt has vitamin D.

Anticipatory Guidance

- Choose healthy eating behaviors.
  - Every day, give your child a healthy breakfast. Research shows that eating breakfast helps children learn and behave better at school.
  - Help your child recognize and respond to hunger and fullness cues.
  - Eat together as a family. Make mealtimes pleasant and companionable; encourage conversation and turn off the TV.
  - Be a role model for your child with your own healthy eating behaviors.
- Make nutritious foods and drinks the usual options at home for meals and snacks. These include vegetables; fruits; whole grains; lean protein, such as meat, fish, poultry, eggs, beans and peas, legumes, nuts and seeds; and low-fat and nonfat dairy.
- Limit foods and drinks that are high in calories, saturated fat, salt, added sugars, and refined grains, and low in nutrients. These include ice cream, baked goods, salty snacks, fast foods, pizza, and soda and other sweetened beverages.
- Limit juice to 4 to 6 oz of 100% fruit juice each day.
- Make sure your child gets dairy foods and calcium- and vitamin D–containing foods and beverages each day. Children aged 4 to 8 years need 12 to 16 oz of low-fat or fat-free milk each day plus an additional serving of low-fat yogurt and cheese. If your child doesn't drink milk or consume other dairy products, then let's talk about alternatives. These can include foods and beverages that are fortified with calcium and vitamin D (like some orange juices and cereals).

For the Child

- Eating breakfast helps you learn better and feel better at school, so always eat something healthy for breakfast.
- Pay attention to what your body tells you. Eat when you feel hungry and stop eating when you feel satisfied.
- Vegetables and fruits are an important part of healthy eating. Ask your parents to let you help choose vegetables and fruits at the store and to help prepare them for meals and snacks.
- Be sure to drink fat-free or low-fat milk at least 2 times a day. Three times a day is better. You can eat cheese or yogurt, too.
- Try not to have drinks that have lots of sugar, such as sodas, fruit drinks, and sports drinks. The healthiest drinks are milk and water; try to drink only them.

Physical Activity (60 Minutes of Physical Activity a Day)

Encourage parents to support their children in being physically active and to be physically active together as a family. Current recommendations state that children should be physically active for at least 60 minutes each day. Encourage the parents of children with special health care needs to allow their children to participate in regular physical activity or cardiovascular fitness within the limits of their medical conditions. Adaptive physical education can be part of a child's IEP.

Emphasize the importance of safety equipment when the child participates in physical activity. Help families identify appropriate community activities for their child (eg, Boys & Girls Clubs, 4-H, community centers, parks, and faith-based programs).

The time a child is using media or the Internet is time she is not being physically active. Counsel regarding media time expenditure and Internet safety.

Anticipatory Guidance

- Encourage your child to be physically active for at least 60 minutes total every day. It doesn't have to happen all at once, but can be split up into several periods of activity over the course of the day.
- Be a role model by being physically active yourself. Find physical activities your family can enjoy together and incorporate them into your daily lives.
- Identify activities your child can do indoors to be physically active.
- Children this age can learn reading, science, and math skills from computers, and may be using computers and other Internet-connected media in school. However, they need other experiences such as unstructured play alone and with peers, time outdoors, physical activity, and hands-on learning. These kinds of activities help them develop all parts of their brain, including more complicated skills such as executive functioning and social skills.
- Do not allow your child to sleep with any electronic device in her bedroom, including phones or tablets.
- In order to balance your child's needs for physical activity, sleep, school activities, and unplugged time, consider making a family media use plan to balance these important health behaviors and media use time in your child's day. The family media use plan is an online tool that you and your child can fill out together. The tool prompts you and your child to enter daily health priorities such as an hour for physical activity, 8 to 11 hours of sleep, time for homework and school activities, and unplugged time each day for time with family and independently. You and your child can then view the time left over and decide on rules around daily screen time for your child. The AAP has information on making a plan at **www.HealthyChildren.org/MediaUsePlan.**

- Take into account not only the quantity but the quality and location of media use. Consider TVs, phones, tablets, and computers. Rules should be followed by parents as well as children. Construct it so that it suits your families' media needs, but also helps you preserve face-to-face time during family routines such as meals, playtime, and bedtime. Times or locations in the house can be designated as media-free.
- Children learn more from educational media when you watch a show or use an app with them and talk about it afterwards.
- Supervise your child's Internet use so that you can teach her how to use it safely and how to avoid inappropriate content.
- If your child is using media excessively, find out why. Is she having trouble with friends or social skills? Some children seek solitary activities if they are struggling with friendships. Encourage your child to find activities that interest her, or seek help through the school.
- Most children this age need an average of 10 to 11 hours of sleep each night. Create a regular and consistent sleep schedule and bedtime routine.
- Help your child get to sleep each night by making her bedroom dark, cool, and quiet and avoiding caffeinated drinks. Reading a book in bed is a better option than using media. Media use before bedtime actually leads to worse sleep habits, less sleep, and school problems.

For the Child

- It's a good idea to be active often during the day.
- Turn off your TV and video games. Get up and play instead.

Middle Childhood

7 and 8 Year Visits

Nutrition (Healthy Weight, Adequate Calcium and Vitamin D Intake, Limiting Added Sugars Intake)

Discuss healthy weight by using the BMI chart to show a child and his parents how his height and weight compare to those of other children of the same sex and age. If the child's BMI is greater than the 85th percentile, it is appropriate to begin more in-depth counseling on nutritious food choices and physical activity.

Counsel all families about appropriate food choices to promote nutritional adequacy and reinforce positive nutrition habits. Ensuring sufficient calcium and vitamin D intake can be a particular concern, especially if the child does not consume dairy products. Supplementation with these nutrients can be considered. Fortified orange juice typically has calcium and vitamin D. Soy milk generally has both, but that is not always true for other products marketed as "milks" (eg, almond, rice, coconut, hemp). Families should be encouraged to check the package label to be sure. Not all yogurt has vitamin D.

Guidance or a referral is appropriate if the family needs nutrition help because of cultural, religious, or financial reasons. For children with special health care needs, ensure that nutrition and physical activity are incorporated into the IEP.

Anticipatory Guidance

- Choose healthy eating behaviors.
  - Every day, give your child a healthy breakfast. Research shows that eating breakfast helps children learn and behave better at school.
  - Help your child recognize and respond to hunger and fullness cues.
  - Eat together as a family. Make mealtimes pleasant and companionable; encourage conversation and turn off the TV.
  - Be a role model for your child with your own healthy eating behaviors.
- Make nutritious foods and drinks the usual options at home for meals and snacks. These include vegetables; fruits; whole grains; lean protein, such as meat, fish, poultry, eggs, legumes, nuts and seeds; and low-fat and nonfat dairy products.
- Limit foods and drinks that are high in calories, saturated fat, salt, added sugars, and refined grains, and low in nutrients. These include ice cream, baked goods, salty snacks, fast foods, pizzas, and soda and other sweetened beverages.
- Limit juice to 4 to 6 oz of 100% fruit juice each day.

- Make sure your child gets dairy foods and calcium- and vitamin D–containing foods and beverages each day. Children aged 4 to 8 years need 12 to 16 oz of low-fat or fat-free milk each day plus an additional serving of low-fat yogurt and cheese. If your child doesn't drink milk or consume other dairy products, then let's talk about alternatives. These can include foods and beverages that are fortified with calcium and vitamin D (like some orange juices and cereals).

For the Child

- Eating healthy foods is important to helping you do well in school and being physically active.
- Pay attention to what your body tells you. Eat when you feel hungry and stop eating when you feel satisfied.
- Dairy foods are important for strong bones and teeth. Be sure to drink at least 3 glasses of milk each day. You can also eat yogurt instead of drinking milk.

Middle Childhood

9 and 10 Year Visits

Nutrition (Healthy Weight, Disordered Eating Behaviors, Importance of Breakfast, Limits on Saturated Fat and Added Sugars, Healthy Snacks)

Children this age may be at increased risk of overweight or obesity. Carefully assess BMI and discuss results with parents. During this age, children begin skipping breakfast. Eating breakfast has been shown to improve academic performance and children who eat breakfast tend to have lower BMIs. Often, a child will eat snacks and not be hungry at mealtimes. This habit may lead to unhealthy eating practices.

Ensuring sufficient calcium and vitamin D intake can be a particular concern, especially if the child does not consume dairy products. Supplementation with these nutrients can be considered. Fortified orange juice typically has calcium and vitamin D. Soy milk generally has both, but that is not always true for other products marketed as “milk” (eg, almond, rice, coconut, hemp). Families should be encouraged to check the package label to be sure. Not all yogurt has vitamin D.

In addition, at this age, girls begin to think of dieting and weight loss. Evaluate the child’s risk of severe dieting or tendencies toward disordered eating.

Anticipatory Guidance

- Choose healthy eating behaviors.
  - Every day, give your child a healthy breakfast. Research shows that eating breakfast helps children learn and behave better at school.
  - Help your child recognize and respond to hunger and fullness cues.
  - Eat together as a family. Make mealtimes pleasant and companionable; encourage conversation, turn off the TV, and discourage use of portable electronics, such as smartphones or handheld devices, at the dinner table.
  - Be a role model for your child by your own healthy eating behaviors.

- Make nutritious foods and drinks the usual options at home for meals and snacks. These include vegetables, fruits, whole grains, lean protein, such as meat, fish, poultry, eggs, beans and peas, legumes, nuts and seeds, and low-fat and nonfat dairy.
- Limit foods and drinks that are high in calories, saturated fat, salt, added sugars, and refined grains, and low in nutrients. These include ice cream, baked goods, salty snacks, fast foods, pizza, and soda and other sweetened beverages.
- Sports drinks are high in sugar and should only be used after vigorous exercise lasting more than 1 hour, but even after an hour of exercise, a sports drink or juice may give your child more calories than she just burned off with exercise. Energy drinks are potentially dangerous and should not be consumed by children of any age.
- Limit juice to 4 to 6 oz of 100% fruit juice each day.
- Make sure your child gets dairy foods and calcium- and vitamin D–containing foods and beverages each day. Children aged 9 and 10 years need 20 to 24 oz of low-fat or fat-free milk each day plus an additional serving of low-fat yogurt and cheese. If your child doesn't drink milk or consume other dairy products, then let's talk about alternatives. These can include foods and beverages that are fortified with calcium and vitamin D (like some orange juices and cereals).
- Beware of dangers of dieting for weight loss.
- If you are considering offering dietary or sports supplements to your child, please discuss these plans with me to make sure they are safe and really will help her.

For the Child

- I am happy to answer your questions and explain your weight and height measurements. The key to good health is a balance between the calories you take in from foods and the calories your body burns in carrying out its normal activities and in physical activity.
- Pay attention to what your body tells you. Eat when you feel hungry and stop eating when you feel satisfied.
- Eating a healthy breakfast every day is especially important and helps you do better in school.
- Every day, try to eat vegetables, fruit, whole-grain breads and cereals, low-fat or fat-free dairy products, and lean meats. Drink low-fat or fat-free milk or water instead of soda and sugared drinks. If you choose foods that are high in fat or sugar, have a small portion instead of a large one, or share your portion with someone else.
- Weight loss is almost never a good idea while your body is rapidly growing in puberty. If you are considering going on a diet to lose weight, let's talk about it first.
- If you are considering taking dietary or sports supplements, please discuss these plans with me to make sure they are safe and really will help you reach your goals.

Calcium and Vitamin D

Calcium and vitamin D intake is a concern during middle childhood. These nutrients are critical for bone health, and a higher incidence of fractures is reported in children who do not get adequate amounts. Studies indicate that few children consume enough of either nutrient. Consumption of juice, soft drinks, or sports drinks often leads to reduced milk intake. Decreased outdoor activity, along with sunscreen use, also has resulted in reduced vitamin D absorption.

Nutrition recommendations for calcium change during middle childhood from 800 mg per day for children aged 4 to 8 years to 1,300 mg per day for children, adolescents, and young adults aged 9 to 18.[45] Health care professionals should encourage parents to provide several servings of low-fat or fat-free milk daily. One 8-oz glass of milk provides approximately 300 mg of calcium and 120 IU of vitamin D. For children who are unable to consume milk or dairy products, health care professionals can recommend the consumption of other calcium-rich foods, calcium-fortified products (eg, some orange juices and breads), and soy milk foods and beverages that are similar to milk and dairy products in their content of calcium and vitamin D. Parents should be alert to the nutritional content of other products sold as "milk" (eg, almond milk, hemp milk) that may not provide equivalent calcium, vitamin D, or protein. A dietary supplement containing calcium and vitamin D may be recommended for children who do not consume enough of either through their diets.

Current Recommendations for Selected Nutrients[33]

Folate

The IOM recommends that, to reduce the risk of giving birth to an infant with neural tube defects, female adolescents who are capable of becoming pregnant should take 400 µg of synthetic folic acid per day from fortified foods, a supplement, or both in addition to consuming foods rich in folate.[1,46]

Iron

The body's need for iron increases dramatically during adolescence, primarily because of rapid growth. Adolescent boys require increased amounts of iron to manufacture myoglobin for expanding muscle mass and hemoglobin for expansion of blood volume. Although adolescent girls generally have less muscular development than adolescent boys, they have a greater risk for iron-deficiency anemia because of blood lost through menstruation. Iron-deficiency anemia in adolescents may be caused by inadequate dietary intake of iron, which results from low-calorie and extremely restrictive diets, periods of accelerated iron demand, and increased iron losses. The DRIs for iron are[2]

- Girls and boys 9–13 years of age: 8 mg iron per day
- Females 14–18 years: 15 mg iron per day
- Women 19–21 years: 18 mg iron per day
- Males 14–18 years: 11 mg iron per day
- Men 19 and 21 years: 8 mg iron per day

Calcium

Adequate calcium intake is essential for peak bone mass development during adolescence, a period when 45% of the total permanent adult skeleton is formed. Calcium requirements increase with the growth of lean body mass and the skeleton. Therefore, requirements are greater during puberty and adolescence than in childhood or adulthood. The current calcium DRIs for children and adolescents are[1]

- Children, adolescents, and young adults 9–18 years of age: 1,300 mg calcium per day
- Young adults 19–21 years: 1,000 mg calcium per day

Abbreviations: DRI, Dietary Reference Intake; IOM, Institute of Medicine.

- Weight typically increases an average of 1.6 to 3.9 kg per year with only slight differences between each sex.
- Girls generally increase their rate of gain between 10 and 11 years, with boys starting between 11 and 12 years of age, signaling the approach of puberty. Height increase increments average 5 to 9 cm (2 to 3½ inches) per year with lower increases in late childhood until the individual growth spurt seen in puberty

- While growth is generally steady during the preschool and school age years, it can be erratic in individual children, with periods of no growth followed by growth spurts. These patterns usually parallel similar changes in appetite and food intake. For parents, these periods of slower (but normal) growth and decreased appetite can cause anxiety, potentially leading to mealtime struggles.

The body composition of preschool and school age children remains relatively constant.

- Fat gradually decreases during the early childhood years, reaching a minimum between 4 and 6 years of age. Children then experience the adiposity rebound, or increase in body fatness in preparation for the pubertal growth spurt. Earlier adiposity rebound (before 5 ½ years of age) has been associated with increased adult body mass index (BMI)

Sex differences in body composition

- Sex differences in body composition become increasingly apparent:

boys have more lean body mass per centimeter of height than girls.

Girls have a higher percentage of weight as fat than boys, even in the preschool years, but these differences in lean body mass and fat do not become significant until adolescence

Nutrient requirements

Because children are growing and developing bones, teeth, muscles, and blood, they need more nutritious food in proportion to their size than do adults. They may be at risk for malnutrition when they have a poor appetite for a long period, eat a limited number of foods, or dilute their diets significantly with nutrient-poor foods.

Also

Minerals and vitamins are necessary for normal growth and development. Insufficient intake can cause impaired growth and result in deficiency diseases.

Energy

- The energy needs of healthy children are determined by basal metabolism, rate of growth, and energy expenditure of activity. Dietary energy must be sufficient to ensure growth and spare protein from being used for energy, while not allowing excess weight gain. The acceptable macronutrient distribution ranges (AMDRs) are 45% to 65% as carbohydrate, 30% to 40% as fat, and 5% to 20% as protein for 1- to 3-year-olds, with carbohydrates the same for 4- to 18-year-olds, 25% to 35% as fat, and 10% to 30% as protein

Protein Dietary Reference Intakes (DRIs) for Children

Age	Grams/Day	Grams/Kilogram/Day
1-3 yr	13 g/day	1.05 g/kg/day
4-8 yr	19 g/day	0.95 g/kg/day
9-13 yr	34 g/day	0.95 g/kg/day

Iron

- Young children are at risk for iron deficiency and iron deficiency anemia, which can affect development and behavior. **National Health and Nutrition Examination Survey (NHANES) data indicate that children with prolonged bottle feeding and those of Mexican American descent are at highest risk for iron deficiency**
- Recommended intakes must factor in the absorption rate and quantity of iron in foods, especially those of plant origin. The prevalence of iron deficiency among 1- to 5-year-olds in the United State is 7.1%, and the prevalence of iron deficiency anemia is 1.1%, with higher rates among children 1 to 2 years of age

Calcium

- Calcium is needed for adequate mineralization and maintenance of growing bone in children. The RDA for calcium for children 1 to 3 years old is 700 mg/day, for children 4 to 8 years it is 1000 mg/day, and for those 9 to 18 years it is 1300 mg per day.
- **Actual need depends on individual absorption rates and dietary factors** such as:

quantities of protein, vitamin D, and phosphorus. Because milk and other dairy products are primary sources of calcium, children who consume limited amounts of these foods are often at risk for poor bone mineralization. Other calcium-fortified foods such as soy, rice, and nut milks and fruit juices are also good sources

Zinc

- Zinc is essential for growth; a deficiency results in growth failure, poor appetite, decreased taste acuity, and poor wound healing. Because the best sources of zinc are meat and seafood, some children may regularly have low intakes
- Diagnosis of zinc deficiency, especially marginal deficiency, may be difficult because laboratory parameters, including plasma, serum erythrocyte, hair, and urine, are of limited value in determining zinc deficiency.
- **There is a positive influence of zinc supplementation on growth and serum zinc concentrations.**

Vitamin D

- Vitamin D is needed for calcium absorption and deposition of calcium in the bones; other functions within the body, including prevention of chronic diseases such as cancer, cardiovascular disease, and diabetes, are important areas of current investigation. Because this nutrient also is formed from sunlight exposure on the skin, the amount required from dietary sources depends on factors such as geographic location and time spent outside

Vitamin D

- The DRI for vitamin D for infants is 400 IU (10 mcg) per day and for children is 600 IU (15 mcg) per day. Vitamin D-fortified milk is the primary dietary source of this nutrient, and breakfast cereals and nondairy milks often are fortified with vitamin D. Dairy products such as cheese and yogurt, however, are not always made from fortified milk. Milks other than cow milk (e.g., goat, soy, almond, or rice) may not be fortified with vitamin D. For young children the current DRI for vitamin D is higher than what may be consumed from a typical diet. Supplementation may be needed after a careful assessment or measurement of vitamin D status. It is becoming more common to measure serum 25(OH) vitamin D in children; however, there is some controversy regarding what constitutes optimal levels

Vitamin-mineral supplements

- Children who routinely take a multiple vitamin or a vitamin-mineral supplement usually do not experience negative effects if the supplement contains nutrients in amounts that do not exceed the DRIs, especially the tolerable upper intake level. However, some nutrients can be "missed" by general multiple vitamin supplements. Although many children consume less than the recommended amount of calcium, children's vitamin-mineral supplements typically do not contain significant amounts of calcium. For example, among children ages 2 to 18 years who took supplements, one third did not meet recommendations for calcium and vitamin D intakes even with supplements

Vitamin-mineral supplements

- Supplement use was associated with increased prevalence of excessive intakes of iron, zinc, vitamin A, and folic acid
- Children should not take megadoses, particularly of the fat-soluble vitamins and minerals, especially liquid and gummy vitamins, because large amounts can result in toxicity. Careful evaluation of each pediatric supplement is suggested because many types are available but incomplete. Because many vitamin-mineral supplements look and taste like candy, parents should keep them out of reach of children to avoid excessive intake of nutrients such as iron

The American Academy of Pediatrics (AAP) does not support giving healthy children routine supplements of any vitamins or minerals other than fluoride

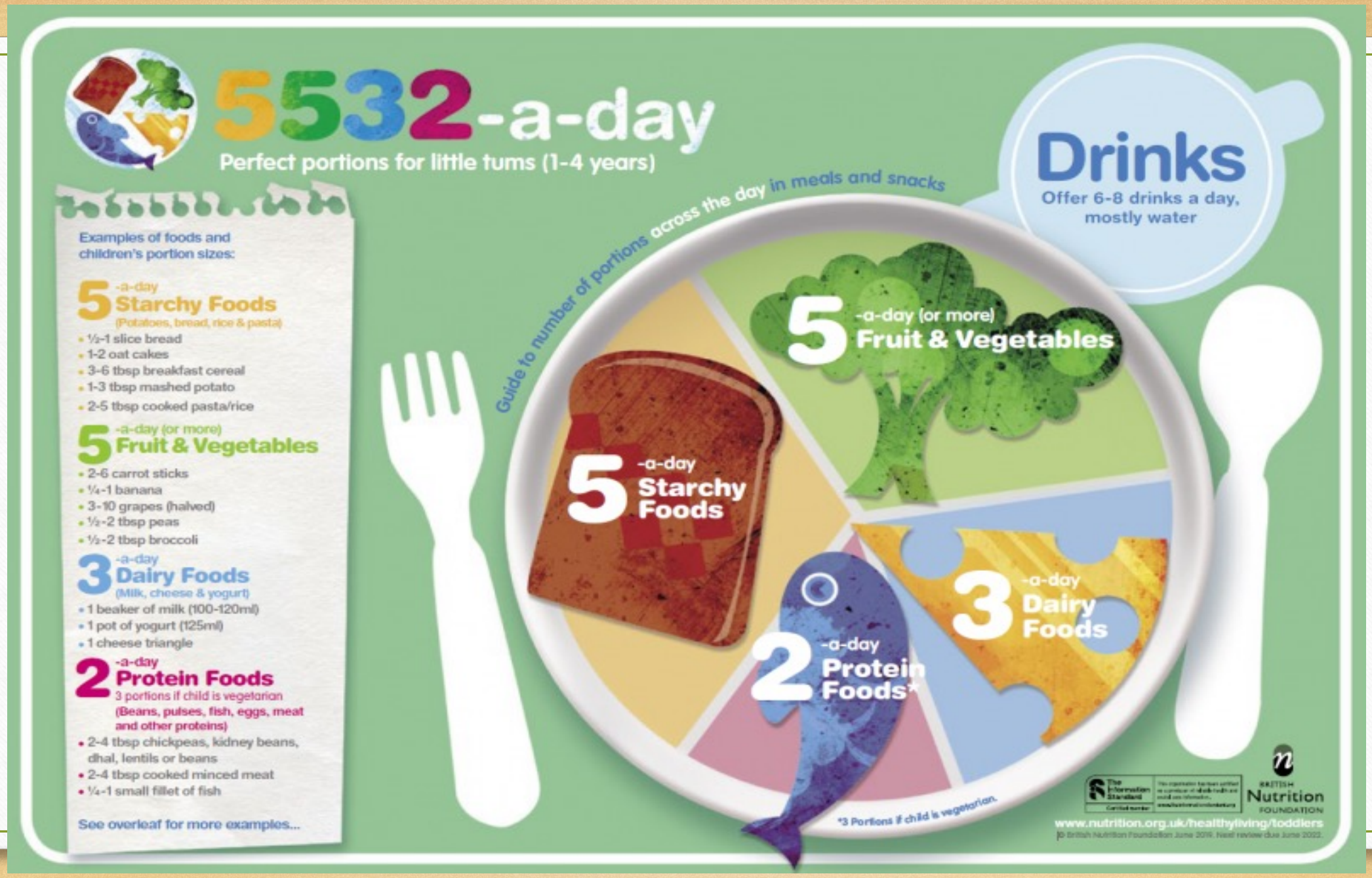
However, children at risk for inadequate nutrition who may benefit include those

1. with anorexia, inadequate appetite, or who consume fad diets
2. with chronic disease (e.g., cystic fibrosis, inflammatory bowel disease, hepatic disease)
3. from food-insecure families or who suffer parental neglect or abuse
4. who participate in a dietary program for managing obesity;
5. who consume a vegetarian or vegan diet without adequate calcium intake and/or dairy products and vitamin B12
6. with faltering growth (failure to thrive)
7. with developmental disabilities.

Factors influencing food intake

- Numerous influences, some obvious and others subtle, determine the food intake and habits of children. Habits, likes, and dislikes are established in the early years and carried through to adulthood.
- **The major influences on food intake in the developing years include family environment, societal trends, the media, peer pressure, and illness or disease**.

Food Group	Servings per Day	Portion Size for Ages 1 to 3	Portion Size for Ages 4 to 6	Portion Size for Ages 7 to 10
Fruits	2–3 servings	¼ cup cooked, frozen, or canned ½ piece fresh ¼ cup 100% juice	¼ cup cooked, frozen, or canned ½ piece fresh ⅓ cup 100% juice	⅓ cup cooked, frozen, or canned 1 piece fresh ½ cup 100% juice
Vegetables	2–3 servings	¼ cup cooked	¼ cup cooked ½ cup salad	½ cup cooked 1 cup salad
Grains	6–11 servings	½ slice bread ¼ cup cooked cereal, rice, or pasta ⅓ cup dry cereal 2–3 crackers	½ slice bread ⅓ cup cooked cereal, rice, or pasta ½ cup dry cereal 3–4 crackers	1 slice bread ½ cup cooked cereal, rice, or pasta ¾–1 cup dry cereal 4–5 crackers
Meats and other proteins	2 servings	1 ounce meat, fish, chicken, or tofu ¼ cup cooked beans ½ egg	1 ounce meat, fish, chicken, or tofu ⅓ cup cooked beans 1 egg	2–3 ounces meat, fish, chicken, or tofu ½ cup cooked beans 1 or 2 eggs
Dairy	2–3 servings	½ cup milk ½ ounce cheese ⅓ cup yogurt	½ cup milk 1 ounce cheese ½ cup yogurt	1 cup milk 1 ounce cheese ¾–1 cup yogurt


5532-a-day
Perfect portions for little tums (1-4 years)
Examples of foods and children's portion sizes:
5 -a-day Starchy Foods
(Potatoes, bread, rice & pasta)
• ½-1 slice bread
• 1-2 oat cakes
• 3-6 tbsp breakfast cereal
• 1-3 tbsp mashed potato
• 2-5 tbsp cooked pasta/rice
5 -a-day (or more) Fruit & Vegetables
• 2-6 carrot sticks
• ¼-1 banana
• 3-10 grapes (halved)
• ½-2 tbsp peas
• ½-2 tbsp broccoli
3 -a-day Dairy Foods
(Milk, cheese & yogurt)
• 1 beaker of milk (100-120ml)
• 1 pot of yogurt (125ml)
• 1 cheese triangle
2 -a-day Protein Foods
3 portions if child is vegetarian
(Beans, pulses, fish, eggs, meat and other proteins)
• 2-4 tbsp chickpeas, kidney beans, dhal, lentils or beans
• 2-4 tbsp cooked minced meat
• ¼-1 small fillet of fish
See overleaf for more examples...
Guide to number of portions across the day in meals and snacks
5 -a-day Starchy Foods
5 -a-day (or more) Fruit & Vegetables
3 -a-day Dairy Foods
2 -a-day Protein Foods*
*3 Portions if child is vegetarian.
Drinks
Offer 6-8 drinks a day, mostly water
www.nutrition.org.uk/healthyliving/toddlers
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BRITISH Nutrition FOUNDATION

Adolescence

- Adolescence is one of the most exciting yet challenging periods in human development. Generally thought of as the period of life that occurs between 11 and 21 years of age.

Late Adolescence
18 Through 21 Year Visits

Healthy Eating

Many young adults aged 18 through 21 years are making most food decisions on their own. They may be living on their own, eating college cafeteria food, and eating out often. Even if they are still living at home, their schedules often do not foster participation in family meals. Vegetarian or vegan diets require careful attention to ensure adequate intakes of protein and nutrients.

Anticipatory Guidance

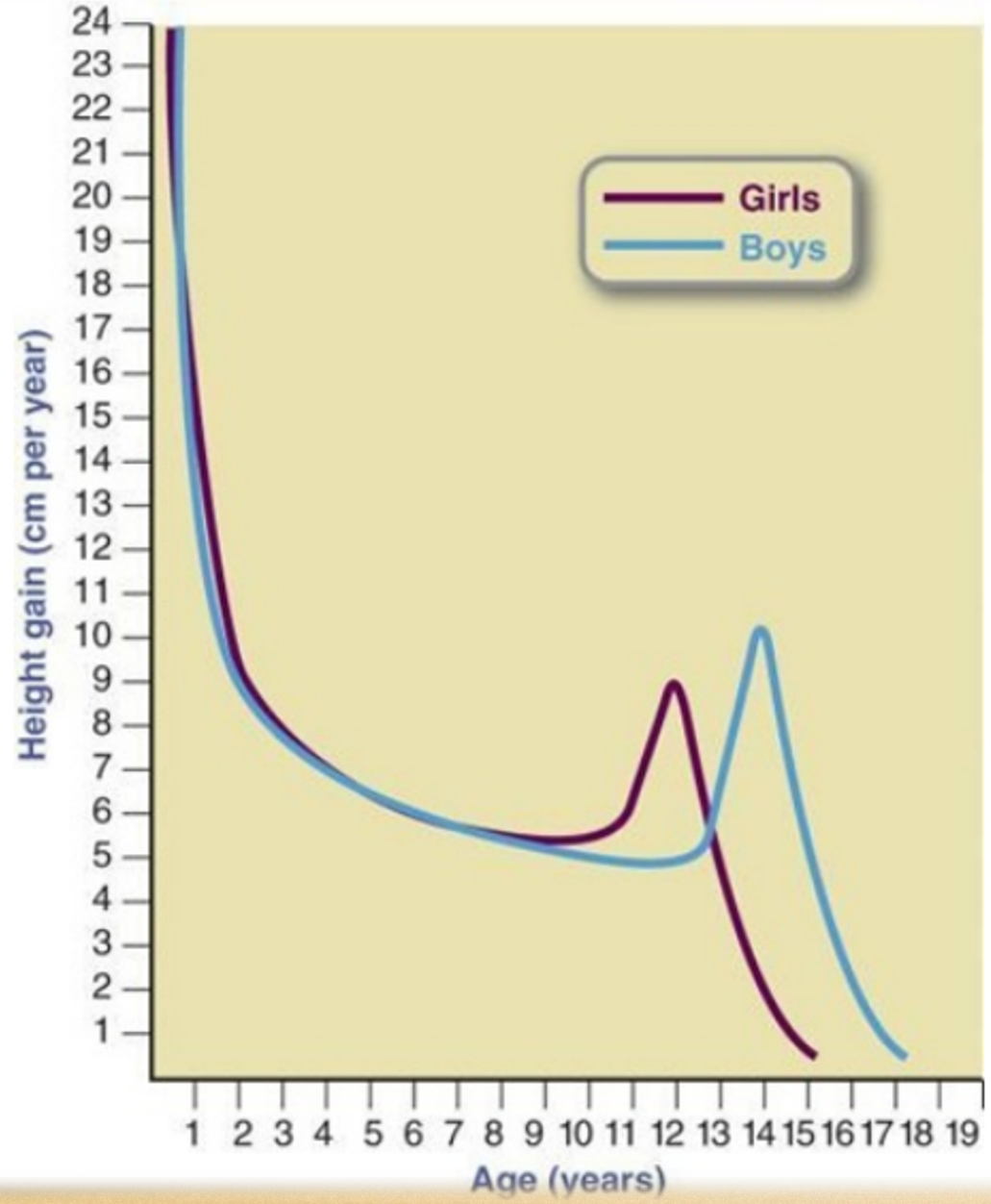
- Eat in ways that help your body be as healthy as possible.
  - Respond to your body's signals. Eat when you are hungry. Stop eating when you feel satisfied.
  - Eat 3 healthy meals a day. Breakfast is an especially important meal.
  - Pick a healthy lunch from the school or work cafeteria or other food venues, or pack a healthy lunch.
- Choose healthy, nutrient-dense food and drinks for meals and snacks.
  - Eat a lot of vegetables and fruits.
  - Choose whole grains, like whole-wheat bread, brown rice, and oats, not refined grains, like white bread.
  - Get enough protein from foods like chicken, fish, lean meat, eggs, legumes, nuts, and seeds.
  - Keep your bones strong by having 20 to 24 oz of low-fat or fat-free milk every day, plus an additional serving of yogurt, or cheese. If you don't drink milk or eat cheese or yogurt, have other foods that contain calcium as well as foods and drinks that are fortified with calcium and vitamin D, like some orange juices and cereals.
- Limit foods and drinks that are high in calories, saturated fat, salt, added sugars, and refined grains, but low in nutrients, like chips, pizza, ice cream, and cupcakes.
- Drink water throughout the day. Choose water or low-fat or fat-free milk instead of juice, fruit drinks, soda, vitamin waters, sports or energy drinks, and caffeine drinks.
- If you're concerned about having enough money to buy healthy foods for your family, please talk with me. I can tell you about food and nutrition assistance programs and local community resources that can help you.

Adolescence

- adolescence is a period of tremendous physiologic, psychological, and cognitive transformation during which a child becomes a young adult.
- The gradual growth pattern that characterizes early childhood changes to one of rapid growth and development, affecting physical and psychosocial aspects of health.
- Changes in cognitive and emotional functioning allow teens to become more independent as they mature. Peer influence and acceptance may become more important than family values, creating periods of conflict between teens and parents.

Adolescence

- Because all of these changes have a **direct effect on the nutrient needs** and dietary behaviors of adolescents, it is important that health care providers develop a full understanding of how these developmental changes of adolescence can affect nutritional status.



Typical individual velocity curves for supine length or height in males and females.

Early Adolescence
11 Through 14 Year Visits

Healthy Eating

As the early adolescent begins to take responsibility for what he eats, his parents can support this decision-making by providing healthy foods at home and opportunities for him to participate in food shopping and meal preparation. This can help the young person learn how to make healthy food choices (eg, foods lower in saturated fat and added sugars) in other situations, such as in school and restaurants. Eating family meals together provides parents with an opportunity to model healthy eating behaviors and promote communication. Advocating for offering healthy food choices in school cafeterias, vending machines, snack bars, school stores, and other venues that offer food and beverages to students also can be an important strategy.

Adequate calcium and vitamin D intake is an important concern for early adolescents, who are experiencing their growth spurts and need calcium to support optimal bone growth. Educate parents and youth on ways to ensure sufficient calcium and vitamin D intake through daily choices of low-fat or fat-free milk and milk products, such as yogurt and cheese. Supplementation can be considered for youth who cannot consume calcium-containing foods. Fortified orange juice typically has calcium and vitamin D. Soy milk generally has both, but families should be encouraged to check the package label. Not all yogurt has vitamin D.

Middle Adolescence
15 Through 17 Year Visits

Healthy Eating

Adolescents spend a good deal of time away from home, and many consume foods that are convenient, but often high in calories, saturated fat, and added sugars. It is common for adolescents to skip meals and snack frequently. As the middle adolescent takes increasing responsibility for what she eats, parents can support this decision by providing healthy foods at home and opportunities for the adolescent to learn about selecting, purchasing, and preparing foods. This can help the adolescent choose healthy foods (eg, vegetables, fruits, whole grains, and foods lower in saturated fat and added sugars). Advocating for healthy food in school cafeterias, vending machines, snack bars, school stores, and other venues that offer food and beverages to students also can be an important strategy.

Adequate calcium intake continues to be an important concern during middle adolescence. Educate adolescents and parents on ways to ensure adolescents receive sufficient calcium intake through daily choices of milk and milk products, such as low-fat or fat-free milk, yogurt, and cheese. Supplementation can be considered for youth who cannot consume calcium-containing foods. Fortified orange juice typically has calcium and vitamin D. Soy milk generally has both, but families should be encouraged to check the package label. Not all yogurt has vitamin D. Vegetarian or vegan diets require careful attention to ensure adequate intakes of protein and nutrients.

Anticipatory Guidance

For the Youth

- Eat in ways that help your body be as healthy as possible.
  - Respond to your body's signals. Eat when you are hungry. Stop eating when you feel satisfied.
  - Eat 3 healthy meals a day. Breakfast is an especially important meal.
  - Eat meals with your family as often as you can.
- Choose healthy, nutrient-dense food and drinks for meals and snacks.
  - Eat a lot of vegetables and fruits.
  - Choose whole grains, like whole-wheatbread, brown rice, and oats, not refined grains, like white bread.
  - Get enough protein from foods like chicken, fish, lean meat, eggs, legumes, nuts, and seeds.
  - Keep your bones strong by having 20 to 24 oz of low-fat or fat-free milk every day, plus an additional serving of yogurt, or cheese. If you don't drink milk or eat cheese or yogurt, choose other foods that contain calcium and foods and drinks that are fortified with calcium and vitamin D, like some orange juices and cereals.
- Limit foods and drinks that are high in calories, saturated fat, salt, added sugars, and refined grains, but low in nutrients, like chips, pizza, ice cream, and cupcakes.
- Drink water throughout the day. Choose water or low-fat or fat-free milk instead of juice, fruit drinks, soda, vitamin waters, sports and energy drinks, and caffeine drinks.

For the Parent

- Support positive nutrition habits by keeping a variety of healthy foods at home and encouraging your child to make healthy food choices.
- Be a role model by making healthy nutrition choices yourself.
- Make family meals a priority. Eat together as a family as often as possible and make mealtimes pleasant and encourage conversation. Avoid having the television (TV) on or using phones during meals. Make sure your child has breakfast before going off to school.
- Support your child's choices by providing healthy food and drink options at home, such as vegetables, fruits, whole grains, lean protein, and low-fat or fat-free dairy products. Limit the availability of high-calorie, low-nutrient foods and drinks.
- Calcium and vitamin D are important for healthy bones, so help your child get 20 to 24 oz of low-fat or fat-free milk each day, plus an additional serving of low-fat yogurt and cheese. If your child doesn't drink milk or consume other dairy products, then let's talk about alternatives. These can include foods that naturally contain calcium as well as foods and beverages that are fortified with calcium and vitamin D, like some orange juices and cereals.
- When your child is hungry between meals, offer healthy snacks, like vegetables, fruits, yogurt, and cheese and whole-grain crackers.

Anticipatory Guidance

For the Adolescent

- Eat in ways that help your body be as healthy as possible.
  - Respond to your body's signals. Eat when you are hungry. Stop eating when you feel satisfied.
  - Eat 3 healthy meals a day. Breakfast is an especially important meal.
  - Eat meals with your family as often as you can.
  - Pick a healthy lunch from the school cafeteria or other food venues, or pack a healthy lunch.
- Choose healthy, nutrient-dense food and drinks for meals and snacks.
  - Eat a lot of vegetables and fruits.
  - Choose whole grains, like whole-wheat bread, brown rice, and oats, not refined grains, like white bread.
  - Get enough protein from foods like chicken, fish, lean meat, eggs, legumes, nuts, and seeds.
  - Keep your bones strong by having 20 to 24 oz of low-fat or fat-free milk every day, plus an additional serving of yogurt or cheese. If you don't drink milk or eat cheese or yogurt, choose other foods that contain calcium and foods and drinks that are fortified with calcium and vitamin D, like some orange juices and cereals.
- Limit foods and drinks that are high in calories, saturated fat, salt, added sugars, and refined grains, but low in nutrients, like chips, pizza, ice cream, and cupcakes.
  - Drink water throughout the day. Choose water or low-fat or fat-free milk instead of juice, fruit drinks, soda, vitamin waters, sports and energy drinks, and caffeine drinks.
  - Don't drink too many caffeinated beverages, such as soda, coffee, and sports and energy drinks.

For the Parent

- Support positive nutrition habits by keeping a variety of healthy foods at home and encouraging your adolescent to make healthy food choices.
- Be a role model by making healthy nutrition choices yourself.
- Make family meals a priority. Eat together as a family as often as possible and make mealtimes pleasant and encourage conversation. Avoid having the TV on during meals. Make sure your adolescent has breakfast before going off to school.
- Support your adolescent's choices by providing healthy food and drink options at home, such as vegetables, fruits, whole grains, lean protein, and low-fat or fat-free dairy products. Limit the availability of high-calorie, low-nutrient foods and drinks.
- Calcium and vitamin D are important for healthy bones, so help your adolescent get 20 to 24 oz of low-fat or fat-free milk each day, plus an additional serving of low-fat yogurt and cheese. If your adolescent doesn't drink milk or eat yogurt or cheese, have her consider other foods that contain calcium as well as foods and beverages that are fortified with calcium and vitamin D, like some orange juices and cereals.
- When your adolescent is hungry in between meals, offer healthy snacks, like vegetables, fruits, yogurt, and cheese and whole-grain crackers.

Nutrient requirements

Nutrient requirements

- Although the DRIs provide an estimate of the energy and nutrient needs for an individual adolescent, actual need varies greatly between teens as a result of differences in body composition, degree of physical maturation, and level of physical activity. Therefore health professionals should use the DRIs as a guideline during nutritional assessment but should rely on clinical judgment and indicators of growth and physical maturation to make a final determination of an individual's nutrient and energy requirements.

Energy

- To determine adequate energy intake, physical activity assessment is required. The energy requirements allow for four levels of activity (sedentary, low active, active, and very active), which reflect the energy expended in activities other than the activities of daily living.

Estimated Energy Requirements for Adolescent Males

			ESTIMATED ENERGY REQUIREMENTS (KCAL/DAY)			
Age	**Reference Weight (kg [lb])**	**Reference Height (m [in])**	**Sedentary PAL***	**Low Active PAL***	**Active PAL***	**Very Active PAL***
9	28.6 (63.0)	1.34 (52.8)	1505	1762	2018	2334
10	31.9 (70.3)	1.39 (54.7)	1601	1875	2149	2486
11	35.9 (79.1)	1.44 (56.7)	1691	1985	2279	2640
12	40.5 (89.2)	1.49 (58.7)	1798	2113	2428	2817
13	45.6 (100.4)	1.56 (61.4)	1935	2276	2618	3038
14	51.0 (112.3)	1.64 (64.6)	2090	2459	2829	3283
15	56.3 (124)	1.70 (66.9)	2223	2618	3013	3499
16	60.9 (134.1)	1.74 (68.5)	2320	2736	3152	3663
17	64.6 (142.3)	1.75 (68.9)	2366	2796	3226	3754
18	67.2 (148)	1.76 (69.3)	2383	2823	3263	3804

Estimated Energy Requirements for Adolescent Females

			ESTIMATED ENERGY REQUIREMENTS (KCAL/DAY)			
Age	**Reference Weight (kg [lb])**	**Reference Height (m [in])**	**Sedentary PAL***	**Low Active PAL***	**Active PAL***	**Very Active PAL***
9	29.0 (63.9)	1.33 (52.4)	1390	1635	1865	2248
10	32.9 (72.5)	1.38 (54.3)	1470	1729	1972	2376
11	37.2 (81.9)	1.44 (56.7)	1538	1813	2071	2500
12	40.5 (89.2)	1.49 (58.7)	1798	2113	2428	2817
13	44.6 (91.6)	1.51 (59.4)	1617	1909	2183	3640
14	49.4 (108.8)	1.60 (63)	1718	2036	2334	3831
15	52.0 (114.5)	1.62 (63.8)	1731	2057	2362	2870
16	53.9 (118.7)	1.63 (64.2)	1729	2059	2368	2883
17	55.1 (121.4)	1.63 (64.2)	1710	2042	2353	2871
18	56.2 (123.8)	1.63 (64.2)	1690	2024	2336	2858

Protein

- During adolescence protein requirements vary with degree of physical maturation. The DRIs for protein intake are estimated to allow for adequate pubertal growth and positive nitrogen balance
- When protein intake is inadequate, alterations in growth and development are seen. In the still-growing adolescent, insufficient protein intake results in delayed or stunted increases in height and weight. In the physically mature teen, inadequate protein intake can result in weight loss, loss of lean body mass, and alterations in body composition. Impaired immune response and susceptibility to infection also may be seen.

Carbohydrates

- Carbohydrate requirements of adolescents are estimated to be about 130 g/day
- The requirements for carbohydrates, as for most nutrients, are extrapolated from adult needs and should be used as a starting point for the determination of an individual adolescent's actual need.
- Adolescents who are very active or actively growing need additional carbohydrates to maintain adequate energy intake, whereas those who are inactive or have a chronic condition that limits mobility may require fewer carbohydrates. Whole grains are the preferred source of carbohydrates because these foods provide vitamins, minerals, and fiber

Carbohydrates

- Intake of carbohydrate is adequate in most teens; data from the 2013–2014 What We Eat in America survey, a component of the NHANES, suggest that average daily intakes of carbohydrate are 298 g for teenage males and 220 g for females

Fiber

- Fiber intakes of youth are low because of poor intake of whole grains, fruits, and vegetables. The adequate intake (AI) values for fiber intake among adolescents are 31 g/day for males 9 to 13 years old, 38 g/day for males 14 to 18 years old, and 26 g/day for 9- to 18-year-old females. These values are derived from calculations that suggest that an intake of 14 g/1000 kcal provides optimal protection against cardiovascular disease (CVD) and cancer

Fat

- DRI values for total fat intake have not been established for adolescents. Instead it is recommended that total fat intakes not exceed 30% to 35% of overall energy intake, with no more than 10% of calories coming from saturated fatty acids. Specific recommendations for intakes of omega-6 and omega-3 fatty acids have been set in an attempt to ensure that teens consume adequate essential fatty acids to support growth and development, as well as to reduce chronic disease risk later in life.

Minerals and vitamins

- Micronutrient needs of youth are elevated during adolescence to support physical growth and development.
- In general, adolescent males require greater amounts of most micronutrients during puberty, with the exception of iron

Minerals and vitamins

- The micronutrients involved in the synthesis of lean body mass, bone, and red blood cells are especially important during adolescence. Vitamins and minerals involved in protein, ribonucleic acid, and deoxyribonucleic acid synthesis are needed in the greatest amounts during the growth spurt. Needs decline after physical maturation is complete; however, the requirements for vitamins and minerals involved in bone formation are elevated throughout adolescence and into adulthood, because bone density acquisition is not completed by the end of puberty

Mean Intakes of Select Nutrients Compared with DRIs: Adolescent Males

	Mean Intake	9- to 13-year-old RDA/AI	14- to 18-year-old RDA/AI
Vitamin A (mcg RAE)	648	600	700
Vitamin D (µg)	6.0	15	15
Vitamin E (mg)	9.3	11	15
Thiamin (mg)	1.99	0.9	1.2
Riboflavin (mg)	2.53	0.9	1.3
Niacin (mg)	31.5	12	16
Vitamin B_6 (mg)	2.53	1	1.3
Folate (µg DFE)	620	300	400
Vitamin B_{12} (µg)	6.50	1.8	2.4
Vitamin C (mg)	75.9	45	75
Phosphorus (mg)	1604	1250	1250
Magnesium (mg)	296	240	410
Iron (mg)	17.4	8	11
Zinc (mg)	13.7	8	11
Calcium (mg)	1186	1300	1300
Sodium (mg)	3960	1500	1500
Fiber (g)	16.4	31	38

Mean Intakes of Select Nutrients Compared with DRIs: Adolescent Females

	Mean Intake	9- to 13-year-old RDA/AI	14- to 18-year-old RDA/AI
Vitamin A (mcg RAE)	507	600	700
Vitamin D (µg)	3.7	15	15
Vitamin E (mg)	6.7	11	15
Thiamin (mg)	1.35	0.9	1
Riboflavin (mg)	1.70	0.9	1
Niacin (mg)	20.5	12	14
Vitamin B_6 (mg)	1.60	1	1.2
Folate (µg DFE)	467	300	400
Vitamin B_{12} (µg)	3.90	1.8	2.4
Vitamin C (mg)	62.7	45	65
Phosphorus (mg)	1095	1250	1250
Magnesium (mg)	210	240	360
Iron (mg)	12.1	8	15
Zinc (mg)	8.6	8	9
Calcium (mg)	842	1300	1300
Sodium (mg)	2844	1500	1500
Fiber (g)	12.5	26	26

Calcium

- Because of accelerated muscular, skeletal, and endocrine development, calcium needs are greater during puberty and adolescence than during childhood or the adult years. Bone mass is acquired at much higher rates during puberty than any other time of life. **In fact, females accrue approximately 37% of their total skeletal mass from ages 11 to 15 years, making adolescence a crucial time for osteoporosis prevention**

Calcium

- **The recommended dietary allowance (RDA) for calcium is 1300 mg for all adolescents with an upper level intake of 3000 mg/day**
- Calcium intake declines with age during adolescence, especially among females. Research suggests that high soft drink consumption in the adolescent population contributes to low calcium intake by displacing milk consumption conversely, adolescents who report more often having milk served at dinner tend to have lower intakes of sugar-sweetened beverages

Iron

- Iron requirements are increased during adolescence to support the deposition of lean body mass, increase in red blood cell volume, and need to replace iron lost during menses among females. Iron needs are highest during periods of active growth among all teens and are especially elevated after the onset of menses in adolescent females. The DRI for iron among females increases from 8 mg/day before age 13 (or before the onset of menses) to 15 mg/day after the onset of menses

Iron

- Among adolescent males recommended intakes **increase from 8 to 11 mg/day,** with higher levels required during the growth spurt. Iron needs remain elevated for women after age 18 but fall back to prepubescent levels in men once growth and development are completed

Folate

- The DRI for folate intake among adolescents is 300 mcg/day for 9- to 13-year-old males and females, increasing to 400 mcg/day for 14- to 18-year-olds.
- The need for folate increases during later adolescence to support accretion of lean body mass and to prevent neural tube defects among females of reproductive age**. Food sources of folate should include naturally occurring folate, found in dark green leafy vegetables and citrus fruit, and folic acid found in fortified grain products**

Vitamin D

- Vitamin D plays an important role in facilitating calcium and phosphorus absorption and metabolism, which has important implications for bone development during adolescence.
- There is also some evidence that suggests vitamin D may play a role in cardiometabolic health, immunity, preventing chronic disease, and protecting against certain types of cancer; however, given the state of this evidence the current RDA is based solely on benefits for bone health
- The RDA for vitamin D requirements among adolescents is 600 IU/day

Vitamin D

- Several factors may contribute to the recent increases and prevalence of vitamin D deficiency Increased use of topical sunblock lotions has been advocated to prevent premature aging of the skin and some skin cancers, but its use also decreases vitamin D synthesis. Some evidence suggests that individuals with a higher BMI more readily sequester cutaneous vitamin D in adipose tissue, making it less bioavailable

Vitamin D

- **Further, overweight youth may be less likely to engage in regular physical activity outdoors and thus have less exposure to sunlight**. Other risk factors for vitamin D deficiency include malabsorption syndromes such as cystic fibrosis, long-term use of medications that increase its catabolism (e.g., corticosteroids), lactose intolerance or milk allergy, darkly pigmented skin, and residence at northern geographic latitudes where youth may spend little time outdoors during colder months. Low vitamin D intake is an important health risk for adolescents and deserves attention during nutrition assessment, education, and intervention.

Supplement use by adolescents

- The consumption of moderate portions of a wide variety of foods is preferred to nutrient supplementation as a method for obtaining adequate nutrient intake. Despite this recommendation, studies show that adolescents do not consume nutrient-dense foods and usually have inadequate intakes of many vitamins and minerals; thus supplements such as a multivitamin may be beneficial for many adolescents

Food habits and eating behaviors

- Food habits of concern that are seen more frequently among adolescents than other age groups include irregular consumption of meals, excessive snacking, eating away from home (especially at fast-food restaurants), dieting, and meal skipping.
- Many factors contribute to these behaviors, including decreasing influence of family, increasing influence of peers, exposure to various forms of media, employment outside the home, greater discretionary spending capacity, and increasing responsibilities that leave less time for adolescents to eat meals with their families.

Food habits and eating behaviors

- Most adolescents are aware of the importance of nutrition and the components of a healthy diet; however, they may have many barriers to overcome. Among the most challenging barriers are household food insecurity, discrimination against some ethnic/racial groups, and weight-related concerns
- Teens perceive taste preferences, hectic schedules, the cost and accessibility of different foods, and social support from family and friends to be key factors that affect their food and beverage choices

Food habits and eating behaviors

- Developmentally, many teens lack the ability to associate current eating habits with future disease risk. Teens often are more focused on "fitting in" with their peers. They adopt health behaviors that demonstrate their quest for autonomy and make them feel more like adults such as drinking alcohol, smoking, and engaging in sexual activity.

Food habits and eating behaviors

Food habits and eating behaviors

- Nutrition education and counseling should focus on short-term benefits that many adolescents care about, such as improving school and sports performance and having more energy.
- Although appearance is also important to many adolescents, this topic needs to be discussed carefully so as to not reinforce negative biases. Messages should be positive, developmentally appropriate, and concrete.
- Specific skills such as choosing water, unsweetened tea, or milk over sugar-sweetened drinks; ordering broiled rather than fried meats; and choosing baked rather than fried snack foods are key concepts to discuss.

Recommended Number of Servings for Adolescents Ages 13 and 16 Years Based on Activity Level

	Grains (oz-eq/day)	Whole Grains (oz-eq/day)[†]	Vegetables (cups/day)	Fruit (cups/day)	Dairy (cups/day)	Seafood (oz/week)	Meat, poultry, eggs (oz/week)	Nuts, seeds, soy products (oz/week)	Oils (g/day)
Males									
13 Years									
Sedentary	6	3	2.5	2	3	8	26	5	27
Moderately Active	7	3.5	3	2	3	9	28	5	29
Active	9	4.5	3.5	2	3	10	31	5	34
16 Years									
Sedentary	8	4	3	2	3	10	31	5	31
Moderately Active	10	5	3.5	2.5	3	10	33	6	36
Active	10	5	4	2.5	3	10	33	6	51
Females									
13 Years									
Sedentary	5	3	2	1.5	3	8	23	4	22
Moderately Active	6	3	2.5	2	3	8	26	5	27
Active	7	3.5	3	2	3	9	28	5	29
16 Years									
Sedentary	6	3	2.5	1.5	3	8	23	4	24
Moderately Active	6	3	2.5	2	3	8	26	5	27
Active	8	4	3	2	3	10	31	5	31

Vegetarian dietary patterns

- As adolescents mature, they begin to develop autonomous social, moral, and ethical values. These values may lead to vegetarian eating practices because of concerns about animal welfare, the environment, or personal health. Concerns about body weight also motivate some adolescents to adopt a vegetarian diet because it is a socially acceptable way to reduce dietary fat.

Vegetarian dietary patterns

- **Some research has suggested that adolescents who consume vegetarian diets are less likely to be overweight or obese than their omnivorous peers**

Vegetarian dietary patterns

- Well-planned vegetarian diets that include a variety of legumes, nuts, seeds, fruits and vegetables, and whole grains can provide adequate nutrients for adolescents
- Vegetarian adolescents often have optimal intakes of iron, vitamin A, and fiber and low intakes of dietary cholesterol.

Recommended Number of Servings for Vegetarian Adolescents Ages 13 and 16 Years Based on Activity Level

	Grains (oz-eq/day)	Vegetables (cups/day)	Fruit (cups/day)	Dairy (cups/day)	Eggs (oz-eq/week)	Beans and peas (oz-eq/week)	Nuts and seeds (oz-eq/week)	Soy products (oz-eq/week)	Oils (g/day)
Males									
13 Years									
Sedentary	6.5	2.5	2	3	3	6	7	8	27
Moderately Active	7.5	3	2	3	3	6	7	8	29
Active	9.5	3.5	2	3	3	9	9	10	34
16 Years									
Sedentary	8.5	3	2	3	3	8	8	9	31
Moderately Active	10.5	3.5	2.5	3	4	10	10	11	36
Active	10.5	4	2.5	3	4	10	13	13	51
Females									
13 Years									
Sedentary	5.5	2	1.5	3	3	4	5	6	22
Moderately Active	6.5	2.5	2	3	3	6	7	8	27
Active	7.5	3	2	3	3	6	7	8	29
16 Years									
Sedentary	6.5	2.5	1.5	3	3	6	6	6	24
Moderately Active	6.5	2.5	2	3	3	6	7	8	27
Active	8.5	3	2	3	3	8	8	9	31


Thank you
for
listening


ANY
QUESTIONS
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