

## SECTION 5

### CHILD NUTRITION





## TABLE OF CONTENT

- 5.0 Child Nutrition
  - 5.0.1 Introduction
  - 5.0.2 Purpose
  - 5.0.3 Objectives
- 5.1 Developmental Nutrition
  - 5.1.1 The Toddler: 1 to 2 Years
  - 5.1.2 The Young Child: 3 to 5 Years
- 5.2 Nutrition Guidelines for Preschoolers
  - 5.2.1 Feeding Toddlers and Young Children
  - 5.2.2 Complementary Feeding
  - 5.2.3 Nutrition Guidelines for Age 2 and Up
  - 5.2.4 Juice Intake
  - 5.2.5 Vegetarian Diets
  - 5.2.6 Dietary Supplements
  - 5.2.7 Food Safety
- 5.3 Overweight and Physical Activity
  - 5.3.1 Overweight
  - 5.3.2 Physical Activity
- 5.4 Common Nutritional/Health Problems
  - 5.4.1 Oral Health
  - 5.4.2 Food Allergy
  - 5.4.3 Lead Poisoning
  - 5.4.4 Children with Special Health Care Needs
- 5.5 Self-Test Questions
- 5.6 References
- 5.7 Resources

## **5.0 CHILD NUTRITION**

### **5.0.1 Introduction**

Promoting optimal nutrition during childhood may be one of the more difficult tasks in WIC. To promote optimal nutrition, it is important to also understand:

- Developmental stages children pass through
- Developmental influences on food intake
- Family and mealtime environment influences on children's food behaviors and thus intake

The key is to be able to communicate this information to caregivers to prevent the occurrence of child nutrition problems.

### **5.0.2 Purpose**

The purpose of Section 5 is to provide information needed to promote optimal nutrient intakes and the development of good food habits among children. A secondary goal of this section is to introduce common childhood nutritional problems and their causes.

### **5.0.3 Objectives**

Upon completion of Section 5, you will be able to:

1. Identify childhood developmental stages that affect a child's food behaviors.
2. Identify groups of children at nutritional risk who may require a vitamin or mineral supplement.
3. Identify situations for referring picky eaters for further assessment and counseling.
4. Assess a child's diet and activity patterns to identify strategies to prevent overweight.
5. Counsel caregivers of overweight children on weight maintenance strategies.
6. Identify common causes of lead poisoning in children.
7. Identify ways that physical activity benefits overall health.

## **5.1 Developmental Nutrition**

During early childhood, a child's world expands to include friends, schoolmates, and others in the community. A child's physical, cognitive, social and emotional development are closely linked. Practicing healthy eating behaviors during early childhood is essential for promoting optimal growth, development and health. When offered developmentally appropriate food in a supportive environment, children can thrive.

Food habits are taught. An important goal of early childhood is to develop positive food patterns. Early food habits and attitudes can affect life-long food choices and, therefore, one's nutritional status throughout a lifetime. WIC staff should be sure to emphasize the benefits of establishing healthy eating habits for young children to parents and caregivers.

<b>Table 1. The Two Stages of Early Childhood</b>		
<b>Stage</b>	<b>Toddler</b>	<b>Young Child</b>
<b>Age</b>	<b>1 to 2 years</b>	<b>3 to 5 years</b>
<b>Characteristics</b>	Develop a sense of independence Struggle with parents over food	Become more interested in trying new foods Enjoy participating in family meals Become more competent at self-feeding

### 5.1.1 The Toddler: 1 to 2 Years

The toddler stage may frustrate caregivers since many toddlers have constantly changing food preferences and erratic appetites.

Common characteristics of toddler meal patterns and food behaviors:

- Toddlers tend to be leery of new foods and may refuse to eat them. They need to look at new foods and touch, smell, feel and taste them—perhaps as many as 15 to 20 times before accepting them.
- Toddlers are unpredictable. The foods they like one day may be different the next. They may eat a lot one day, and very little the next. Parents often become alarmed when toddlers' eating behaviors vary so much, and often so abruptly.
- Toddlers usually eat only one or two foods at a meal.



Parents should not become concerned that their toddler is not eating enough. Toddlers' growth rates slow down after infancy, thus decreasing their energy needs. Despite these changes, toddlers will consume a variety of foods if parents continue to serve developmentally appropriate, balanced meals and snacks. A young child gradually moves from the limited infant/toddler diet to daily multiple servings from each of the food groups as described in the 2005 US Dietary Guidelines and MyPyramid recommendations.

To encourage toddlers to establish healthy eating behaviors, parents and caregivers need to:

- Offer a variety of developmentally appropriate, nutritious foods.
- Reduce exposure to foods and beverages with high levels of salt and sugar.
- Prepare meals that are pleasing to the eye and include a variety of colors and textures.
- Offer only whole milk from age 1 to 2 years.
- Provide structure by scheduling regular meal and snack times.
- Allow the child to decide how much or whether to eat at meal and snack times.
- Allow the child to develop eating/self-feeding skills.
- Eat with the child in a pleasant mealtime environment without coercion.
- Set a good example by eating a variety of foods.

**Parents are responsible for what, when and where the toddler eats.  
Toddlers are responsible for whether to eat and how much.**

### **5.1.2 The Young Child: 3 to 5 Years**

Around age 3 or 4, young children become more curious about food. Young children should be encouraged to try new foods. The goal is for children to accept and learn to like a variety of healthy foods—not simply to get them to eat what is on their plates.

Young children may still be reluctant to try new foods, however this reluctance can be overcome if parents:

- Talk about new foods
- Allow children to help prepare food
- Allow children to help plant and grow their food

As young children grow, they become less impulsive and can follow instructions. They can stay calm when they are hungry, join in mealtime conversation, serve themselves and pass food to others. Young children are also more comfortable eating in unfamiliar places than they were as toddlers.

## **5.2 Nutrition Guidelines for Preschoolers**

### **5.2.1 Feeding Toddlers and Young Children**

Proper nutrition is one of the most important influences on a young child's well being. Children need a varied, balanced diet, containing adequate amounts of vitamins, minerals, protein, carbohydrates and fat to promote growth and overall good health.



Important considerations for feeding young children include:

- Food preferences are mostly developed during early and middle childhood.
- Encouraging healthful choices earlier is better.
- Most children watch for clues from others as to proper food choices.
- Many children will copy their parent's habits, likes and dislikes.
- As children spend many hours a day away from home, in school and with friends, a variety of social and other factors begin to influence what and when children eat.

Eating is only one activity in a child's busy day. A child may be so engaged in play when meal or snack time comes around that they do not want to stop to eat. They may throw a tantrum, ask to be excused from the table or refuse to eat. A child who is interrupted in the middle of active play may not be able to sit still.

To assist children in transitioning to meal or snack time, caregivers should:

- Provide a warning that mealtime will occur soon.
- Transition the child to a quiet activity for about 10 to 15 minutes before mealtime. Quiet play helps calm the child down for the meal.

The attention span of most toddlers is about 15 minutes, and 20 to 30 minutes for preschoolers. When a child reaches his/her limit, he/she should be allowed to leave the table if he/she asks or is playing at the table.

In general, it is the parents' role to decide what foods to offer at meals and snacks, while the child is in the best position to decide how much to eat of these foods. Normally, healthy and active children's bodies do a good job of "asking" for just the right amount of food. A child's stomach capacity is small. They can eat only small amounts of food at any meal or snack. However, they will quickly use up the energy from these foods to support their activity and growth needs. Children need to eat frequently.

Most toddlers and many preschoolers are at high risk of choking. They do not use their tongues to move food around in their mouths. They do not have the strength, ability or attention span required to grind foods completely, so they often swallow foods whole or partially chewed. Sixty-five percent of all food-related choking deaths occur in children under the age of 2. The skill of chewing may not be mastered until age 5. Children sometimes use their cheeks to store food they dislike or cannot chew and are afraid to swallow. They can hold food in their mouths this way for hours. A child can choke on any food, however, foods that are slippery, large, round, sticky, dry, or hard pose a greater risk. These types of foods may be swallowed whole and block the windpipe (trachea), causing the child to suffocate.

### **5.2.2 Complementary Feeding**

Complementary feeding is the gradual addition of foods and beverages to the diet of the infant and toddler. Complementary foods provided should be appropriate for a child's physical, intellectual and behavioral stages as well as meet their nutrient needs. Caregivers often do not recognize signs of developmental readiness and offer foods and/or beverages that may be inappropriate in type, amount, consistency or texture. A lack of nationally accepted feeding guidelines for children 1 to 2 years of age might lead caregivers to assume that all foods are suitable for this age range or that MyPyramid guidelines for ages 2 years and up can be applied to 1 year olds.

The Feeding Infants and Toddlers Study (FITS) found that WIC infants and toddlers consumed excess energy but inadequate amounts of fruits and vegetables. In addition, WIC toddlers consumed more sweets, desserts and sweetened beverages than non-WIC toddlers. Therefore it is important to emphasize appropriate complementary foods when working with WIC families. Iron, vitamin E, fiber and potassium are often inadequate in the diets of children 12 – 23 months, while zinc, vitamin A, sodium and energy are often consumed in excess. Discussion regarding complementary foods should encourage food sources of nutrients that are often lacking.

### **5.2.3 Nutrition Guidelines for Age 2 and Up**

The 2005 Dietary Guidelines for Americans (DGA) are established for healthy Americans 2 years and older. MyPyramid for Preschoolers, available at <http://www.mypyramid.gov/preschoolers/index.html>, is a graphic form of dietary guidance developed for and tested with children ages 2 to 5 years. To determine calorie needs for boys and girls of different ages and levels of physical activity, use the following estimates from the DGA, available at <http://www.health.gov/dietaryguidelines/>.

**Table 2. Estimated Calorie Requirements for WIC Gender and Age Groups at Three Levels of Physical Activity**

		Activity Level		
	Age (years)	Sedentary	Moderately Active	Active
Child	2-3	1,000	1,000-1,400	1,000-1,400
Female	4-8	1,200	1,400-1,600	1,400-1,800
Male	4-8	1,400	1,400-1,600	1,600-2,000

Then determine suggested amounts of food to consume from the basic food groups, subgroups and oils to meet recommended nutrient intakes at different calorie levels. The following table also shows the discretionary calorie allowance within each calorie level, in addition to the suggested amounts of nutrient-dense forms of foods in each group.

**Table 3. Daily Amount of Food From Each Group (vegetable subgroup amounts are per week)**

Calorie Level	1,000	1,200	1,400	1,600	1,800	2,000
Food Group—food group amounts shown in cup (c) or ounce-equivalents (oz-eq), with number of servings (srv) in parentheses when it differs from the other units. DGA on the web shows quantity equivalents for foods in each group. Oils are shown in grams (g).						
Fruits	1 c	1 c	1.5 c	1.5 c	1.5 c	2 c
Vegetables	1 c	1.5 c	1.5 c	2 c	2.5 c	2.5 c
Dark Green veg	1 c/wk	1.5 c/wk	1.5 c/wk	2 c/wk	3 c/wk	3 c/wk
Orange veg	.5 c/wk	1 c/wk	1 c/wk	1.5 c/wk	2 c/wk	2 c/wk
Legumes	.5 c/wk	1 c/wk	1 c/wk	2.5 c/wk	3 c/wk	3 c/wk
Starchy veg	1.5 c/wk	2.5 c/wk	2.5 c/wk	2.5 c/wk	3 c/wk	3 c/wk
Other veg	3.5 c/wk	4.5 c/wk	4.5 c/wk	5.5 c/wk	6.5 c/wk	6.5 c/wk
Grains	3 oz-eq	4 oz-eq	4 oz-eq	5 oz-eq	6 oz-eq	6 oz-eq
Whole grains	1.5	2	2.5	3	3	3
Other grains	1.5	2	2.5	2	3	3
Lean meat/beans	2 oz-eq	3 oz-eq	4 oz-eq	5 oz-eq	5 oz-eq	5.5 oz-eq
Milk	2 c	2 c	2 c	3 c	3 c	3 c
Oils	15 g	17 g	17 g	22 g	24 g	27 g
Discretionary calorie allowance	165	171	171	132	195	267

The 2005 Dietary Guidelines promote increased intake of “shortfall nutrients” for children, including vitamin E, calcium, magnesium, potassium and fiber. Additionally, diets of WIC participants, especially toddlers, are often low in iron.

## IRON

It’s crucial that children consume several sources of iron each day in order to avoid iron deficiency anemia (discussed in Section 6). Children between 9 and 18 months of age have the highest rate of iron deficiency of any age group. Iron from animal sources, such as meats, is better absorbed than iron found in plant sources. However, some preschool children may not eat much meat, so parents need to offer other sources of iron. Section 6 of this manual provides more information about iron-rich foods and preventing iron deficiency.

## **VITAMINS A AND C**

Preschoolers also need to get their daily requirements of vitamins A and C, which are generally found in fruits and vegetables. Children need a combination of dark green and orange vegetables, legumes, starchy vegetables and other vegetables. Caregivers should offer at least one fruit or vegetable every day that is a good source of vitamin A and one that is a good source of vitamin C.

## **CALCIUM**



Calcium is another key nutrient that preschoolers need each day. Children get most of their calcium from milk and milk products. Children 2 to 8 years of age should consume 2 cups per day of fat-free or low-fat milk or equivalent milk products. If a preschooler does not drink milk, parents should try serving milk-based soups, yogurt, cheese, custard, cereal with milk, tofu (processed with calcium sulfate) or cottage cheese (Note: cottage cheese has only moderate amounts of calcium compared to many other dairy products). Adding powdered milk to meat loaf, casseroles, oatmeal, etc. can boost a child's calcium intake. Calcium may also be obtained from calcium-fortified juice and other fortified food products.

## **FLUID REQUIREMENTS**

Preschoolers need about 6 to 8 cups of fluids each day, depending on their weight. Milk and juice do contribute to a preschooler's fluid intake, though parents should offer plenty of water to help meet fluid requirements.

Children may need more fluids if they:

- Eat more fiber
- Are more physically active
- Are experiencing diarrhea or vomiting
- Live in an environment with high temperatures and/or high humidity

## **FAT**

Before age 2, fat is crucial for brain growth and development. Fat is also needed to ensure adequate calories for overall growth. Parents should not restrict their toddler's fat intake. Whole milk and full-fat milk products are appropriate for toddlers between age 1 and 2. At age 2, children's diets should begin to reflect the dietary guidelines, which call for a lower fat diet. For children 2 to 3 years of age, keep total fat intake between 30%-35% of calories, decreasing this to 25%-35% after 3 years of age. Polyunsaturated and monounsaturated fats are preferred fat sources. The majority of a child's calories should come from grain products; fruits; vegetables; low fat dairy products; and beans, lean meat and poultry. Adopting a lower fat diet early on will assist children with developing low fat eating habits that will last through adulthood. Adults who consume low fat diets have been found to have lower blood cholesterol levels and a reduced risk of heart disease.

Note: Children participating in WIC may have been advised by their pediatrician to drink reduced fat milk before the age of 2 years. In July 2008, the American Academy of Pediatrics (AAP) updated its policy statement on cholesterol in childhood. The updated

guidelines advise use of reduced-fat milk for children between 12 months and 2 years of age for whom overweight or obesity is a concern or who have a family history of obesity, dyslipidemia or cardiovascular disease. However, USDA does not allow reduced fat milk for children 12 – 23 months of age.

## **FIBER**

Fiber is needed to promote normal bowel movements and to prevent diseases of the bowel. Too much fiber, however, can decrease children's caloric intake as well as the absorption of some important nutrients. Therefore, excessive fiber intake would put children at risk for inadequate growth and development. According to the Dietary Reference Intakes children ages 1 to 3 need 19 g of fiber each day, while children ages 4 to 8 should aim for 25 g per day.



Good fiber sources include fruits, vegetables, whole grain cereals and breads and dried beans and peas.

### **5.2.4 Juice Intake**

Dental caries is a major health problem in U.S. preschool children. The practices most often implicated in this rampant disease process is prolonged use of baby bottles containing fermentable sugars (e.g., fruit juice, soda, and other sweetened drinks) during the day or night, use of pacifiers dipped in sweet agents such as sugar, honey or syrups, or other high frequency sugar exposures.

The AAP recommends that children not be put to bed with a bottle. Bottle use while sleeping decreases a child's swallowing and salivary flow, creating a pooling of liquid around the teeth. Many problems can result, including:

- Dental carries
- Ear infections
- Choking from liquid flowing into the lungs

Parents should be encouraged to teach infants to drink from a cup as they approach their first birthday. Children should be weaned from the bottle by 12-14 months of age. Juice intake should be limited to 4-6 oz of 100% juice each day.

### **5.2.5 Vegetarian Diets**

It is the position of the American Dietetic Association (ADA) that well-planned vegan and other types of vegetarian diets are appropriate for all stages of the life cycle, including pregnancy, lactation, infancy, childhood and adolescence. Children consuming vegetarian diets have lower intakes of cholesterol, saturated fat and total fat, and higher intakes of fruits, vegetables and fiber than non-vegetarians. These children are also reported to be leaner and to have lower serum cholesterol levels.

Extremely restrictive diets such as fruitarian and raw food diets have been associated with impaired growth and are not recommended for infants and children. Frequent meals and snacks and the use of some refined foods (such as fortified breakfast cereals, breads and pasta) and foods higher in unsaturated fat can help vegetarian

children meet energy and nutrient needs. Vegan children may have protein needs that are slightly higher than those of nonvegan children because of differences in protein digestibility and amino acid composition of plant food proteins. These protein needs are generally met when diets contain adequate energy and a variety of plant foods.

When introducing complementary foods, cubes of tofu, cheese or soy cheese, and bite-



size pieces of soy burger can be started. Commercial, full-fat, fortified soymilk, or cow's milk can be used as a primary beverage starting at age 1 year for a child who is growing normally and eating a variety of foods. Energy and nutrient dense foods such as legume spreads (e.g., hummus), tofu and mashed avocado should be used when the infant is being weaned.

Good sources of calcium, iron and zinc should be emphasized for children consuming vegetarian diets along with dietary practices that enhance absorption of zinc and iron from plant foods. A reliable source of vitamin B<sub>12</sub> is important for vegan children. Vitamin D supplements or fortified foods may be necessary if the child gets limited sunlight exposure (especially during the fall and winter seasons), is dark skinned or uses sunscreen.

### **5.2.6 Dietary Supplements**

According to the Dietary Guidelines for Americans, nutrient needs should be met primarily through consuming foods. Dietary supplements, while recommended in some cases, cannot replace a healthful diet. A daily multivitamin may help some children meet their nutritional needs.

Children who may benefit from supplement use include:

- Children who are ill
- Children who are undernourished or malnourished
- Children on extremely restrictive diets, for example due to severe food allergies
- Children with poor appetites or limited variety in the diet

Supplements should be kept out of a child's reach. Supplements may look like candy and consuming too many at once may be harmful.

### **5.2.7 Food Safety**

#### **MERCURY IN FISH**

Fish and shellfish are an important part of a healthy diet. Fish and shellfish contain high-quality protein and other essential nutrients, are low in saturated fat and contain omega-3 fatty acids. A well-balanced diet that includes a variety of fish and shellfish can contribute to heart health and children's proper growth and development. So young children in particular, should include fish or shellfish in their diets due to the many nutritional benefits.

Mercury is a heavy metal naturally present in rocks and soil. Once mercury reaches the oceans and rivers, it accumulates in long-lived fish, including tuna. However, nearly all fish and shellfish contain traces of mercury. For most people, the risk of mercury

poisoning from eating fish and shellfish is not a health concern. Yet, some fish and shellfish contain higher levels of mercury that may harm an unborn baby or young child's developing nervous system. Mercury exposure in children is linked to impairments in eye-hand coordination and learning ability.

The risks from consuming mercury in fish and shellfish depend on the amount eaten and the levels of mercury in the fish and shellfish. Therefore, the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) are advising young children to avoid certain types of fish and eat fish and shellfish that are lower in mercury. Children under 45 pounds can safely eat 3 to 6 oz of chunk-light tuna per week. Albacore “white” tuna has higher mercury levels than canned light tuna. Some fish, including salmon, shrimp, clams and tilapia, have consistently lower mercury levels so that children can safely eat them every day. Children should avoid tilefish, shark, swordfish and king mackerel. Check local advisories or the EPA Web site, [www.epa.gov/ost/fish](http://www.epa.gov/ost/fish), to learn about the safety of fish caught by family and friends in local lakes and rivers. The brochure “What You Need to Know about Mercury in Fish and Shellfish” can be downloaded or ordered at <http://www.cfsan.fda.gov/~dms/admehg3b.html>. The brochure is available in several languages.

### **FOOD-BORNE ILLNESS**

According to the AAP, to prevent food-borne illness, the foods listed below should not be fed to young children.

All of these foods have been implicated in outbreaks of food-borne illness:

- Unpasteurized juices and dairy products.
- Soft cheeses such as feta, Brie, Camembert, blue-veined and Mexican-style cheese. These dairy products could contain harmful bacteria, including listeria. Hard cheeses, processed cheeses, cream cheese, cottage cheese, and yogurt are safe for children.
- Raw or undercooked meat, fish, poultry or eggs.
- Raw vegetable sprouts (alfalfa, clover, bean, and radish). Sprouts grown under clean conditions in the home also present a risk because bacteria may be present in the seeds. Cook sprouts to reduce the risk of illness.
- Undercooked or raw tofu. Bacteria found in tofu are sensitive to heat and destroyed by adequate cooking.
- Deli meats, hot dogs and processed meats may be contaminated with Listeria. Avoid unless heated until steaming hot.

## **5.3 Overweight & Physical Activity**



### **5.3.1 Overweight**

Overweight and obesity are both labels for ranges of weight that are greater than what is generally considered healthy for a given height. The terms also identify ranges of weight that have been shown to increase the likelihood of certain diseases and health problems. Body mass index (BMI) is used as a screening tool for overweight and obesity. For children and teens, BMI ranges take into account normal

differences in body fat between genders and differences in body fat at various ages. BMI is a reliable indicator of body fatness for most children. The Centers for Disease Control and Prevention (CDC) and the AAP recommend the use of BMI to screen for weight issues in children beginning at age 2.

After calculating BMI, it should be plotted on the CDC BMI-for-age and gender growth chart to obtain a percentile ranking. The percentile indicates the relative position of the child's BMI among children of the same sex and age.

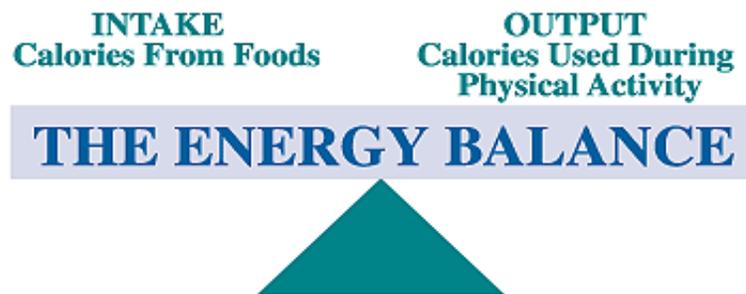
New recommendations from the Expert Committee for Recommendations on the Assessment, Prevention and Treatment of Child and Adolescent Overweight and Obesity in June 2007 called for using the terms overweight and obese in reference to children. You may see these terms used interchangeably.

	Children 2-18 years with a BMI $\geq$ 95 <sup>th</sup> percentile for age.	Children 2-18 years with a BMI $\geq$ 85 <sup>th</sup> percentile but $<$ 95 <sup>th</sup> percentile for age.
WIC and CDC terms	Overweight	At-risk for overweight
2007 Expert Committee recommendations	Obese	Overweight

Overweight and obesity are major public health problems. Studies over the past two decades have shown a dramatic increase in the prevalence of overweight among children (including those younger than 5 years of age) and adolescents. A survey of low-income children aged 2 to 5 called the Pediatric Nutrition Surveillance Survey (PedNSS) found that 14.8 percent of these children are obese and 16.4 percent are overweight. In Missouri, the number of children who are overweight has more than doubled among 2 to 5 year old children in the past three decades. Overweight children are more likely than normal weight children to become obese adults, particularly if overweight is present in adolescence.

Although the underlying causes are not fully understood, obesity is a complex chronic disease involving genetics, metabolism, and physiology, as well as environmental and psychosocial factors. Inappropriate eating behaviors and low levels of physical activity contribute to the continuing increase in prevalence of overweight among children.

Evidence-based guidelines offer actions to reverse the trend of increasing overweight and obesity. Because obesity is difficult to treat, efforts should focus on prevention. Fit WIC is a national program that offers evidence-based interventions for preventing childhood overweight. When evidence-based recommendations are not available, best practices are encouraged. The Missouri WIC Program provides



guidance for implementing Fit WIC locally at <http://www.dhss.mo.gov/WICLWP/FitWIC-MO.html>.

The most important strategies for preventing overweight are:

- Practice healthy eating behaviors
  - Decrease sugar-sweetened beverage intake
  - Increase fruit and vegetable intake
  - Promote breastfeeding
  - Reduce intake of energy-dense foods
- Increase regular physical activity
- Reduce sedentary activity (e.g., watching television and playing computer games)

These preventive strategies are part of a healthy lifestyle that should be developed during early childhood.

### **5.3.2 Physical Activity**

For the first time ever, the 2005 Dietary Guidelines for Americans included specific guidelines for physical activity. Children should aim for at least 60 minutes of physical activity each day. The AAP further recommends no TV viewing for children under 2 years of age, and less than 2 hours of TV time per day for children 2-5 years of age. Physical activity results in physical fitness.

Being fit:

- Increases energy levels for daily tasks
- Increases activity
- Builds a positive self-image

During early childhood, physical changes take place that enhance the child's ability to move and participate in physical activity. Physical changes include:

- Muscles continue to grow and develop
- The nervous system continues to develop
- Vision and visual perception improve (children's vision does not fully mature before age 6 or 7). Imprecise eye movements limit their ability to track and judge the speed of moving objects)
- Kinesthesia—the sense that detects body position, weight, and movement of the muscles, tendons, and joints—improves
- Sense of balance improves
- Cognition improves

Regular physical activity is key to maintaining a healthy body weight for children as well as adults. Children do not have to spend hours in a gym to be physically active. Early childhood is an ideal time for promoting the development of motor skills and physical activity behaviors. Most children are active but may not have the opportunity to play and explore because of space or safety concerns or because their parents do not encourage them to be physically active.



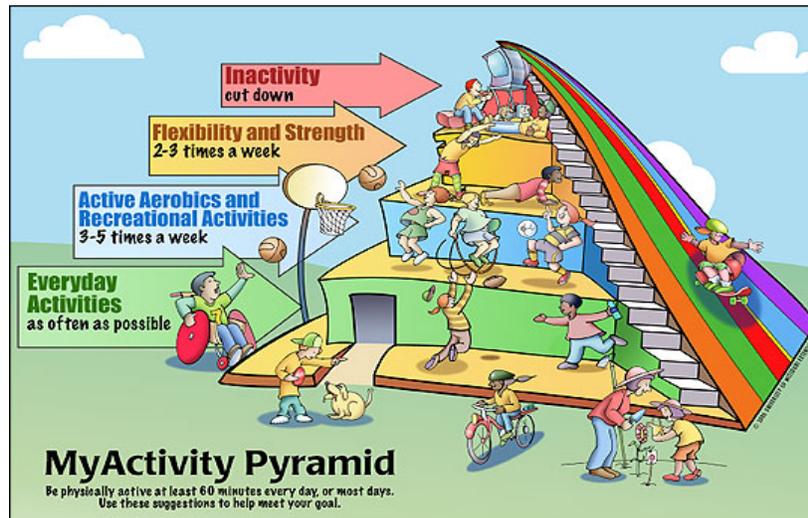
Children in early childhood should be encouraged to participate in physical activity, including:

- Simple games such as "Simon Says," chase and tag
- Unorganized free play
- Family chores such as walking the dog and raking leaves
- Structured recreational activities
- Outdoor play

Parents should be encouraged to plan at least one age-appropriate, special physical activity a week, such as a hike, bike ride or outing to the park. Parents should also play games with their children, such as ball and hopscotch.

Physical activities (e.g., tumbling, gymnastics, dancing) tailored to the developmental needs of children are also appropriate. Because most young children need to develop motor skills, they are not ready for organized sports, which require visual acuity, control and balance. Team sports are not appropriate until about 6 years of age.

### **MyActivity Pyramid (developed for children 6-11 years)**



<http://extension.missouri.edu/explorepdf/hesguide/foodnut/n00386.pdf>

To prevent injury, teach children to exercise safely.

- Stretching, both before and after exercising, increases flexibility and helps prevent injuries from muscle strain.
- Proper equipment also safeguards against injury—make sure children (and adults) always wear the appropriate equipment for the activity such as goggles or other protective eye wear, helmets and elbow and knee pads.

## **5.4 Common Nutritional/Health Problems**

### **5.4.1 Oral Health**

Oral health can be defined as a functionally sound mouth and jaw, free of disease and supported by healthy behaviors. Because oral health requires a healthy body and healthy habits, nutrition is relevant to both the development and maintenance of oral health.

- Nutrition is important in the development of oral tissues that are functional, durable and resistant to disease.
- Nutrition plays a role in two oral infections that account for most tooth loss: dental caries and periodontal disease.
- Nutrition also contributes to the healing and ecology of the mouth, including the salivary function.

Dental caries affect 6% of US children aged 1 year, 22% aged 2 years, 35% aged 3 years, and 48% aged 4 years. It is the most common chronic condition of childhood. Affected children are generally from low-income and minority families. Certain foods high in sugars and starches promote tooth decay. Decay starts with bacteria found naturally in the mouth. When mixed with sugar, the bacteria produce an acid that attacks the tooth surface and can create a hole or cavity. This process is called demineralization.



Each time a child eats sugary or starchy foods; the bacteria on the teeth have a chance to form acid. If a child frequently snacks on sugary foods, their teeth are continually bathed in acid, making tooth decay more likely to occur. Caregivers play a crucial role in caring for young children's teeth, through both routine dental care and good nutrition.

To help prevent tooth decay:

- Wean from the bottle to a cup by 12 to 14 months of age.
- Plan regular meals and snacks.
- Do not allow free access to food or sweetened beverages between meals.
- Offer healthy snacks, including cheese and fresh fruits and vegetables.
- Limit snack choices that promote tooth decay, including cakes, candy, crackers, chips and soft drinks.
- Parents should brush their children's teeth twice a day and floss them once a day.

Fluoridation of water is one of the 10 most important public health measures of the 20th century. Although fluoride isn't an essential nutrient, fluoridated drinking water is extremely beneficial in reducing dental caries.

The level of fluoride in a community's drinking water can be determined by:

- Contacting the local health department or local water supplier
- Consulting a local dentist or pediatrician

Optimal fluoride levels recommended by the US Public Health Service and the CDC for drinking water range from 0.7 parts per million (ppm) for warmer climates to 1.2 ppm for cooler climates. The variation accounts for the tendency for people to drink more water in warmer climates. Private water sources, such as well water, vary greatly in fluoride content and should be tested yearly. Bottled water also varies greatly in fluoride content from brand to brand.

Toothpaste with fluoride should not be used until age 18 to 24 months or until the child will spit it out after use. Use only a pea-sized amount of toothpaste per day. Caregiver supervision is essential.

The CDC recommends that fluoride supplementation be used only for children at high risk of caries, beginning at 6 months of age and ending by 12 years. The supplement dose is determined by the fluoride content of the drinking water as well as by the fluoride found in food, beverages and toothpaste. The dentist or pediatrician will prescribe the appropriate dose.

### 5.4.2 Food Allergy

Only about 5 percent of all adverse reactions to foods and food additives in the general population are true food allergies.

There are two broad categories of adverse reactions to foods:

- Food allergy/hypersensitivity
- Food intolerance



Food allergy/hypersensitivity refers to a condition in which a person's immune system responds to the ingestion of a particular food protein. Trace amounts of the allergenic food may be sufficient to trigger an adverse reaction. Symptoms can occur within seconds or as long as 72 hours after exposure. Symptoms include itching, hives, rash (eczema), vomiting, diarrhea, abdominal pain, or swelling of the lips, tongue, and face.

The terms "food sensitivity" and "adverse reaction to food" are synonymous and may be used to describe either immune-mediated or non-immune mediated responses to food. Food allergies are particularly prevalent in infants and children because their digestive and immune systems are still immature. As children mature, food allergies are often outgrown. Food allergies diagnosed in young children are more likely to be outgrown than those diagnosed in older children. The more severe the initial allergic reaction, the longer it usually takes for the child to become tolerant of the trigger food. Some food allergies are lifelong conditions.

Wait to introduce these common food allergens until after 1 year of age:

- Eggs
- Milk
- Wheat
- Soy
- Peanuts
- Tree Nuts
- Fish
- Shellfish

Nutrition counseling for children with food allergies and their families should address:

- Selecting food to meet nutrient needs
- Avoiding the allergenic foods (a priority of early counseling)
- The feeding relationship (i.e., all interactions between the parents and child involving food)
- Providing a framework for healthy eating behaviors

Depending on the family's coping skills, having a child with a food allergy can be quite stressful, demanding considerable time and emotional energy. The WIC Nutritionist can help families feel competent to handle special diet needs and eating problems.

### 5.4.3 Lead Poisoning

Lead is an environmental contaminant that can be toxic to children. Lead, a shiny silver colored metal found naturally in the earth's crust, has been used in our society in a variety of ways including in paints, gasoline and some vinyl products, such as mini-blinds. Fine particles of processed or recycled lead and/or lead dust become a health hazard when they are taken into the body through inhalation (breathing) and/or ingestion (swallowing).



Lead poisoning affects one out of every 50 children in rural areas and 1 in 10 inner city children. According to 2004 Missouri blood lead testing data, about 4 percent of children under the age of six had elevated blood lead levels. Any child may be at risk for lead poisoning. Lead poisoning can occur regardless of financial, socio-economical or cultural status. Young children are at greatest risk due to their frequent hand-to-mouth behavior and rapid development.

WIC children will be assessed to determine if they have received a blood lead-screening test. If a child has not had a lead-screening test, the agency must refer the family to a screening program for testing, based on the rules issued by the Missouri Department of Health and Senior Services.

Other facts about lead include:

- Lead from automobile exhaust and air and water pollution enters the soil, contaminating the food supply.
- Children may directly consume lead by eating soil containing lead or eating lead-based paint chips and peeling lead-based paint off window sills or walls.
- Within the past 20 years many steps have been taken to decrease lead exposure in children. The introduction of unleaded gasoline and the removal of leaded paint from the market are two examples.
- Particularly important to infants and children was

the change in the way many infant foods and drinks were packaged (i.e. glass jars versus cans).

Lead has no useful purpose in the body. Lead can damage the brain and nerves, cause learning and behavioral problems and interfere with growth and hearing. Lead impacts the body systems by interfering with heme molecule synthesis, primarily by not allowing iron to be incorporated into heme. Children with lead toxicity will often develop an anemia that is similar to iron deficiency anemia.

Symptoms of lead toxicity include:

- Anorexia or loss of appetite
- Drowsiness, stupor and coma
- Abnormal kidney function
- Constipation
- Irritability
- Jaundice

Many of these symptoms have multiple causes. Lead toxicity cannot be diagnosed through symptoms alone.

Good nutrition practices can reduce the body's absorption of lead. More lead is absorbed on an empty stomach so regular meals and snacks should be encouraged. In addition, foods high in calcium, vitamin C and iron can reduce lead absorption.

#### **5.4.4 Children with Special Health Care Needs**

Children with developmental disabilities and special health care needs often have nutrition problems including:

- Growth alterations (such as failure to thrive, obesity or growth retardation)
- Metabolic disorders
- Poor feeding skills
- Medication-nutrient interactions
- Partial or total dependence on enteral or parenteral nutrition

A survey of children in early intervention programs found that 79%-90% of children birth to age 3 years with developmental delays had one or more nutrition risks. The CDC reports that 17% of children under 18 years of age have some type of developmental disability. Infants being born too small or too soon are at increased risk for developmental delays.



Health issues for children with developmental disabilities or special health care needs are similar to the health issues for the general population. These include physical activity, nutrition, oral care, mental health, family care giving and access to health care and clinical preventive services. Addressing nutrition issues in the treatment plan of children with special health care needs is critical to improving the quality of life.

**Table 4. Frequently Reported Nutrition Problems and Factors Contributing to Nutritional Risk for Selected Syndromes and Developmental Disabilities**

<b>Syndrome/Disability</b>	<b>Growth Concerns</b>	<b>Altered Energy Need</b>	<b>Constipation/ Diarrhea</b>	<b>Feeding Problems</b>	<b>Other</b>
<p><b>Cerebral Palsy</b> A disorder of muscle control or coordination resulting from injury to the brain during its early (fetal, perinatal and early childhood) development. May have problems with intellectual, visual or other functions.</p>	Growth problems	Failure to thrive	Constipation	Oral/motor problems	<ul style="list-style-type: none"> <li>▪ Central nervous system involvement</li> <li>▪ Orthopedic problems</li> <li>▪ Medication/ nutrient interaction related to seizure disorder medications</li> </ul>
<p><b>Down Syndrome</b> A genetic disorder that results from an extra #21 chromosome, causing development problems such as congenital heart disease, mental retardation, short stature and decreased muscle tone.</p>	Risk for obesity	Related to short stature and limited activity	Constipation	Poor suck in infancy	<ul style="list-style-type: none"> <li>▪ Gum disease common</li> <li>▪ Increased risk of heart disease, osteoporosis and Alzheimer's Disease</li> </ul>
<p><b>Prader-Willi Syndrome</b> A genetic disorder marked by hypotonia, short stature, hyperphagia and cognitive impairment; when not carefully managed, characterized by obesity.</p>	Risk for obesity	Failure to thrive in infancy	N/A	<ul style="list-style-type: none"> <li>▪ Poor suck in infancy</li> <li>▪ Food-related problems</li> </ul>	Risk of diabetes mellitus

<b>Syndrome/Disability</b>	<b>Growth Concerns</b>	<b>Altered Energy Need</b>	<b>Constipation/ Diarrhea</b>	<b>Feeding Problems</b>	<b>Other</b>
<b>Autism</b> Classified as a type of pervasive developmental disorder; diagnostic criteria include communication problems, ritualistic behaviors and inappropriate social interaction.	N/A	N/A	N/A	Limited food selection Strong food dislikes	<ul style="list-style-type: none"> <li>▪ Pica</li> <li>▪ Medication/ nutrient interactions</li> </ul>
<b>Cystic Fibrosis (CF)</b> An inherited disorder of the exocrine glands, primarily the pancreas, pulmonary system and sweat glands, characterized by abnormally thick luminal secretions.	N/A	<ul style="list-style-type: none"> <li>▪ Increased nutrient needs</li> <li>▪ Decreased food intake</li> <li>▪ Decrease of nutrients related to pancreatic insufficiency and chronic pulmonary infection</li> </ul>	N/A	N/A	<ul style="list-style-type: none"> <li>▪ Increase in secondary illnesses:</li> <li>▪ Diabetes</li> <li>▪ Liver disease</li> <li>▪ Osteoporosis</li> </ul>
<b>Spina Bifida (Myelomeningocele)</b> Results from a midline defect of the skin, spinal column and spinal cord. Characterized by hydrocephalus, mental retardation and lack of muscular control.	Risk for obesity	Altered energy needs based on short stature and limited mobility	Constipation	Swallowing problems caused by the Arnold Chiari malformation of the brain	Urinary tract infections

*Position of the American Dietetic Association: Providing Nutrition Services for Infants, Children, and Adults with Developmental Disabilities and Special Health Care Needs, January 2004 Volume 104 Number 1 pg 100, [http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy\\_1737\\_ENU\\_HTML.htm](http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy_1737_ENU_HTML.htm)*

Special growth charts exist for some syndromes and conditions. Their use in nutrition assessment is limited and controversial however because they were developed using very small populations, do not include all growth parameters and some use very old data. Appropriate CDC growth charts for girls and boys must be used for risk assignment for all WIC participants.

## **5.5 Self Test Questions**

1. When introducing new food(s):
  - a. Offer one new food at a time.
  - b. Give the child a large serving so he or she can taste it several times during the meal.
  - c. Serve the food with another well-liked food.
  - d. Instruct the child to eat all of it.
2. When a child occasionally refuses to eat:
  - a. Tell the child there will be no dessert unless her plate is clean.
  - b. Remove the food and let the child wait until the next meal.
  - c. Prepare something else you know your child will eat.
3. List four foods that are likely to cause choking in young children.
  - a.
  - b.
  - c.
  - d.
4. Why do preschoolers need snacks?
5. List two situations in which a child may need a multivitamin and mineral supplement.
  - a.
  - b.
6. Children should not eat or drink which of the following foods to avoid the risk of food-borne illness:
  - a. Uncooked bologna
  - b. Hard boiled eggs
  - c. Raw milk
  - d. Cookie dough with raw eggs
7. BMI is a reliable indicator of body fatness for children one year of age and older.
  - a. True
  - b. False
8. The most important strategies for preventing obesity are:
  - a. Healthy eating habits
  - b. Being more active
  - c. Both
9. The most common chronic condition of childhood is:
  - a. Overweight
  - b. Food allergy
  - c. Dental caries
  - d. Cystic fibrosis
10. Identify symptoms of an allergic reaction to foods.

## **5.6 REFERENCES**

Department of Health and Human Services, President's Council on Physical Fitness and Sports, <http://www.fitness.gov/>, July 30, 2008.

Active Start: A Statement of Physical Activity Guidelines for Children Birth to Five Years by National Association for Sport and Physical Education, [http://www.aahperd.org/naspe/template.cfm?template=ns\\_active.html](http://www.aahperd.org/naspe/template.cfm?template=ns_active.html), July 30, 2008

Dietary Guidelines for Americans 2005.  
<http://www.health.gov/dietaryguidelines/dga2005/document/>, July 28, 2008

Satter, E, Child of Mine: Feeding with Love and Good Sense, Bull Publishing Co.: Boulder, CO; 2000.

University of Missouri-Columbia, University Extension. Children's Activity Pyramid.  
<http://extension.missouri.edu/explore/hesguide/foodnut/n00386.htm>, July 28, 2008

U. S. Environmental Protection Agency. The National Lead Information Center.  
[www.epa.gov/lead](http://www.epa.gov/lead), July 28, 2008

U.S. Food and Drug Administration, Backgrounder for the 2004 FDA/EPA Consumer Advisory: What You Need to Know About Mercury in Fish and Shellfish,  
<http://www.fda.gov/oc/opacom/hottopics/mercury/backgrounder.html>, July 15, 2008

Daniels SR and Greer FR, Committee on Nutrition. Lipid Screening and Cardiovascular Health in Childhood. Pediatrics. 122(1):198-208, July 2008.  
<http://pediatrics.aappublications.org/cgi/content/full/122/1/198>, July 28, 2008

Centers for Disease Control and Prevention, <http://apps.nccd.cdc.gov/MWF/Index.asp>, July 28, 2008

Position of the American Dietetic Association and Dietitians of Canada: Vegetarian diets, June 2003 Volume 103 Number 6 pages 748-765,  
[http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy\\_933\\_ENU\\_HTML.htm](http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy_933_ENU_HTML.htm), July 29, 2008

Position of the American Dietetic Association: The Impact of Fluoride on Health, October 2005 Volume 105 Number 10 pages 1620-1624,  
[http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy\\_adap1000\\_ENU\\_HTML.htm](http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy_adap1000_ENU_HTML.htm), July 29, 2008

Position of the American Dietetic Association: Nutrition Guidance for Healthy Children Ages 2 to 11 Years, June 2008 Volume 108 Number 6 pages 1038-1047, [http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy\\_adap0199\\_ENU\\_HTML.htm](http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy_adap0199_ENU_HTML.htm), July 29, 2008

Position of the American Dietetic Association: Providing Nutrition Services for Infants, Children, and Adults with Developmental Disabilities and Special Health Care Needs, January 2004 Volume 104 Number 1 pg 100, [http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy\\_1737\\_ENU\\_HTML.htm](http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/advocacy_1737_ENU_HTML.htm) July 30, 2008

Excerpt from USDA WIC Policy Memorandum 98-9, Revision 8 Nutrition Risk Criteria, Missouri WIC Spring 2007 Program Update Training

## **5.7 RESOURCES**

Missouri Department of Health and Senior Services WIC Program  
<http://www.dhss.mo.gov/wic/index.html>

Fit WIC Childhood Obesity Prevention Initiative  
[http://www.nal.usda.gov/wicworks/Sharing\\_Center/statedev\\_FIT.html](http://www.nal.usda.gov/wicworks/Sharing_Center/statedev_FIT.html).

Dietary Guidelines for Americans 2005  
<http://www.health.gov/dietaryguidelines/dga2005/document/>

United States Department of Agriculture MyPyramid  
<http://www.mypyramid.gov/>

American Dietetic Association  
<http://www.eatright.org/cps/rde/xchg/ada/hs.xsl/index.html>.

American Academy of Pediatrics  
<http://www.aap.org/>

Centers for Disease Control and Prevention  
<http://www.cdc.gov/>

Maternal and Child Health Library, Nutrition in Children and Adolescents Knowledge Path  
[http://mchlibrary.info/KnowledgePaths/kp\\_childnutr.html](http://mchlibrary.info/KnowledgePaths/kp_childnutr.html)