Shaklee®
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Superwellness for Superkids—

A Parent's Guide

Hello, Parents and Grandparents!

I am incredibly pleased to bring to you a handbook full of information you can use to feel equipped to raise healthy and happy kids in today's fast-paced world! There is no more precious gift than a brand-new, beautiful baby—and the ongoing protection of that baby as he or she grows to the teen years and beyond is of utmost concern to you all. But the 21st century has brought new challenges and threats to our children's health—from fast food and inactivity leading to a growing epidemic of overweight children, to adult diseases such as hypertension and type 2 diabetes being diagnosed in children, to the emerging concerns about toxic chemicals in our environment being linked to the increased diagnoses of asthma. It is sometimes hard to know where to turn when you need answers to issues facing your children and your family. We hope this booklet will help.

We have included a chapter on each of the most pressing concerns that moms and dads have on their minds today: immune health, childhood obesity, brain development, environmental health concerns, and more. I think you will find this to be an easy-to-read reference for all the busy moms, dads, grandmothers, and grandfathers who want to ensure that their little ones stay healthy, grow to their tallest height, and perform their best in school, sports, dance, theater, and all the activities they pursue. The information we present here is supported by scientific research so that you can share this with complete confidence. After all, the well-being of our children is in our hands—an awesome responsibility, but also packed with fun times and happy memories along the way.

My two children are all grown-up now; my son and daughter-in-law have added to our family with the birth of my precious granddaughter, Gianna, last year, and my daughter is busy finishing up college. Yet, the many memories of their childhood—from our evening ritual of bedtime stories (which we continued into middle school!) to the many adventures we had on vacations to somehow making it to my son's soccer game that was occurring at the same time as my daughter's music recital—seem like they happened just yesterday! Life is precious—and health is its most important resource.

The information provided here can be the starting point to making a full commitment to the healthiest lifestyle and best diet possible for your children. Not only will they be healthier, but the entire family can benefit!

I wish you health and happiness,

Dr. Jamie McManus

Dr. Jamie McManus, M.D.

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Acknowledgement

The creation of this booklet would not have been possible without the hard work and dedication of the Shaklee Health Sciences staff. A special thanks to Pamela Manning, MS, RD, Senior Manager of Health Sciences, for taking the lead in this project; as well as Les Wong, VP of Health Sciences; Torrance Rogers, Health Sciences Product Specialist; and Nel Prentiss, Medical Affairs Coordinator, for their contributions and support. It is because of their efforts that this booklet provides a compilation of essential health information to help you raise children who are healthy, happy, and safe!

Nutrition and Fitness for a Lifetime of Health

Children grow at a much faster rate during their first few years than at any other time in their lives, stressing the need for parents to ensure optimal nutrition. Of special importance are macronutrients (carbohydrates, proteins, and fats) that provide calories and essential vitamins and minerals critical to proper growth, development, and immune function—including all eight B vitamins and vitamins C, A, and D, as well as calcium, iron, and zinc. In addition, growing children should achieve adequate intakes of omega-3 fatty acids such as DHA, which is essential for early brain and eye development.

Although specific nutrient needs vary throughout the different stages of life, there is probably not a more critical time for optimal nutrition than during childhood—especially early childhood. Good nutrition is absolutely essential for the development of healthy bodies that will thrive with abundant energy, healthy brain function, a responsive immune system, and strong bones and teeth. Healthful eating and exercise habits established during childhood also will help reduce the risk of obesity as well as many degenerative and lifestyle-related diseases of adulthood, including diabetes, heart disease, cancer, hypertension, osteoarthritis, and other conditions related to nutrition, weight, and lifestyle. In other words, acquiring beneficial lifestyle habits early in life—making nutritious and healthful food choices, being physically active, and filling in nutritional gaps with the appropriate dietary supplements—can provide a strong foundation for a lifetime of health and wellness.

Establishing Healthful Eating Habits

Establishing healthful eating habits early in life starts with parents and all caregivers of young children introducing and making available the most nutritious foods. We need to offer at all meals and snack times nutritious food choices that include a variety of age-appropriate foods, including fresh fruits and vegetables, whole-grain breads and cereals, legumes, low-fat or nonfat dairy products, poultry, lean meats, and fish that are rich in omega-3 fatty acids. This also means

Did You Know?

- During the past 25 years, consumption of milk—the largest dietary source of calcium—has decreased 36% among adolescent girls.[15]
- The American Academy of Pediatrics recently doubled its daily vitamin D intake recommendations for babies, children, and adolescents, and recommends supplementation because most children do not get enough from diet alone.[16]
- Children who consume fast food have higher intakes of fat, saturated fat, cholesterol, and sodium—and lower intakes of fiber, calcium, and iron—than those children who do not eat fast food.[17]
- Breakfast is an important meal for growing children, yet many children skip breakfast. Studies have documented a significant and positive relationship between eating breakfast and school performance.[18,19]
- The U.S. Food and Drug Administration and Environmental Protection Agency advise pregnant women, nursing mothers, and young children to avoid some types of fish because they are high in mercury, which makes getting adequate amounts of DHA through the diet alone more difficult.[1]

eliminating or at least minimizing the unhealthful choices. Fast food tends to be high in saturated fats, calories, sugar, and salt, and fairly absent in vitamins, minerals, and fiber. Children today are consuming sodas and sweetened juice drinks—which deliver excessive amounts of high-fructose corn syrup—far more frequently than milk and water, which is contributing to the rising incidence of childhood and teen obesity. Parents, let's be responsible not only for **what** our children eat, but **when and where** as well.

Fostering healthful eating habits means setting a good example. Practicing the same healthful eating habits you preach for your children is one of the strongest learning tools a parent can offer to a child. In addition, parents should strive to make more time to eat meals at home together as a family, engage children in meal planning and food preparation, introduce new foods or recipes on a regular basis, ensure the availability of nutritious snacks, and help children make intelligent food choices when eating out. These are good habits and choices that will benefit the entire family!

Filling the Nutritional Gaps with Dietary Supplements

Despite a parent's best efforts to provide their child with an overall healthy and well-balanced diet, the reality is that most children are NOT getting the complete nutrition they need. National nutrition surveys confirm over and over again that children are not consuming the recommended number of food group servings based on the Food Guide Pyramid, with 63% of 2- to 9-year-olds not consuming enough fruit, 78% not consuming enough vegetables, and only 12.7% consuming two or more servings of whole grains per day.[2,3] And poor eating habits appear to be starting earlier and earlier! In a recent study, 25%–30% of infants and toddlers ages 9 months to 24 months did not eat fruits or vegetables on a given day. In fact, French fries were the most commonly consumed vegetable for infants and toddlers 15–24 months of age, and an astounding 46% of 7- to 8-month-olds consumed some type of dessert, sweet, or sweetened beverage.[4] Studies also have found that children and adolescents may not be consuming the recommended amounts of vitamins A, C, D, and E, as well as the minerals calcium and magnesium.[5] In fact, based on the Healthy Eating Index, a tool used by the USDA to measure the diet quality of Americans, most diets of 2- to 9-year-olds were found to be "poor" or "need improvement."[6]

To make matters worse, trends in food consumption indicate children are eating larger portions; drinking less milk (but more fruit juice and soda); eating more calorie-rich, nutrient-poor meals away from home; and skipping breakfast.[7] These poor food choices and unhealthful eating trends are fueling the childhood obesity epidemic as well as increasing the prevalence of diseases that rarely were diagnosed in children until the past 15 years—including hypertension, elevated cholesterol, arthritis and other orthopedic problems, and a frightening increase in the diagnoses of type 2 diabetes.

Estimated Nutrient Intake for U.S. Children Compared with the Daily Value

Key Nutrients	Daily Value > 4 yr	NHANES 2003-04 Estimated Nutrient Intakes 2-5 yrs‡		CSFII 1994-96 Estimated Nutrient Intakes 9 yrs and under†	
Calcium	1,000 mg	1,003 mg	100% DV	870 mg	87% DV
Iron	18 mg	12.6 mg	70% DV	13.5 mg	75% DV
Vitamin D**	400 IU	n/a	n/a	236 IU**	59% DV
Vitamin K	80 mcg	38.3 mcg	48% DV	n/a	n/a
Vitamin E	30 IU	6.4 IU	21% DV	9 IU	30% DV
Thiamin	1.5 mg	1.39 mg	93% DV	1.39 mg	93% DV
Niacin	20 mg	16.7 mg	84% DV	16.6 mg	83% DV
Vitamin B6	2 mg	1.55 mg	78% DV	1.47 mg	74% DV
Folate	400 mcg	136 mcg	34% DV	247 mcg	62% DV
Vitamin B12	6 mcg	5 mcg	83% DV	3.65 mcg	61% DV
Magnesium	400 mg	203 mg	51% DV	205 mg	51% DV
Zinc	15 mg	9.4 mg	63% DV	9 mg	60% DV
Copper	2 mg	0.9 mg	45% DV	0.8 mg	40% DV
Fiber	~25-30 g	10.8 g	25%-36% DV	10.8 g	25%-36% DV

†Data from U.S. Department of Agriculture Continuing Survey of Food Intakes by Individuals (CSFII) 1994-96.
‡Data from *What We Eat in America*, NHANES 2003-04, U.S.D.A. 2007.
**Data from: *Journal of Nutrition* 2005;135:2478-85.

Given these unhealthful eating trends and suboptimal nutrient intakes—combined with the fact that many essential nutrients are not stored in the body and must be supplied in the diet on a regular basis—**parents should be encouraged to provide their infants, toddlers, and young children with a comprehensive multivitamin-multimineral supplement to fill in nutritional gaps caused by dietary shortfalls.**

Another nutritional challenge most children face today is getting adequate amounts of omega-3 fatty acids from the foods they eat. Omega-3 fatty acids play an important role in proper growth and development of the brain, eyes, and nervous system. Many organizations, including the Institute of Medicine's Food and Nutrition Board, the World Health Organization (WHO), the American Dietetics Association, and Dietitians of Canada, recommend increased consumption of omega-3 fatty acids in children.[8,9,10] Yet studies indicate most American and Canadian children aren't getting much at all from their diet.[1,11] DHA—or docosahexaenoic acid, one of the omega-3 fatty acids used most readily by the body—is found in fatty fish, yet children consume only 20–50 mg of DHA per day. And because of the growing concerns about environmental contaminants in our fish supply, the FDA and EPA advise young children to limit their fish intake.[12] **Supplementation with a high-quality dietary supplement that uses highly purified fish oil offers a means for safely providing DHA to our children** without worrying about the mercury and other environmental toxins present in the fatty fish that provide the food source of DHA.

Fostering Active Children

Regular physical activity in children and adolescents—as with adults—promotes health and fitness. Compared with those who are inactive, physically active children have higher levels of cardiovascular fitness and stronger muscles, perform better in school, and are less likely to suffer from anxiety and/or depression.

Physically active kids also are less likely to become overweight or obese, which is a major public health issue today. In fact, during the past 30 years, the childhood obesity rate for preschool children ages 2–5 has more than doubled—and has more than tripled for children ages 6–11.[13] Today, nearly 9 million children over 6 years of age are considered obese.

So how much physical activity do children need? Based on the 2008 Physical Activity Guidelines for Americans, children and adolescents should participate in at least 60 minutes or more of physical activity each day. This activity should include aerobic activity such as brisk walking, age-appropriate muscle strengthening activities such as gymnastics or push-ups, and bone-strengthening activities such as jumping rope or running.[14] It's also important for parents to take responsibility for raising fit children by helping them participate in a variety of age-appropriate activities, establishing a regular schedule for physical activity, incorporating activity into their daily routine, keeping activities fun so children stay engaged, and setting a good example by embracing a more physically active lifestyle themselves.

Tips for Raising Active and Fit Kids

- Restrict television, movies, videos, and computer games to less than two hours a day.
- If it's safe to walk or bike rather than drive, do so when you can. If your child is too young to bicycle to school on their own, bicycle with them if possible!
- Set the example for your children by using stairs instead of elevators and walking up escalators, rather than just standing on them.
- Plan family outings and vacations that involve activities such as hiking, bicycling, skiing, and swimming.
- Give your children some age-appropriate household chores that require physical exertion. Mowing lawns, raking leaves, scrubbing floors, and taking out the garbage not only teach responsibility but can be good exercise.
- Observe sports and activities your children like, and then find out about lessons and clubs. Some children thrive on team sports; others prefer individual activities.
- Choose fitness-oriented gifts—jump rope, mini trampoline, tennis racket, baseball bat, a youth membership at the local YMCA or YWCA—and minimize the "low activity" gifts such as video games.
- Take advantage of your city's recreation opportunities, from soccer leagues to fun runs.
- Strollers and playpens are high on convenience but low on activity potential. Try to free your infant from these mechanical restraints whenever and wherever he or she can safely move around.
- When your children are bored, suggest something that gets them moving, like playing catch or building a snowman in the yard.

10 Quick and Healthful Snack Ideas

1. Peel a banana and dip it in yogurt. Roll in crushed cereal and freeze.
2. Spread celery sticks with peanut butter or low-fat cream cheese. Top with raisins.
3. Make snack kabobs. Put cubes of low-fat cheese and grapes on pretzel sticks.
4. Blend low-fat milk, a scoop of protein powder, frozen strawberries, and a banana in a blender for a delicious smoothie.
5. Sprinkle grated Monterey jack cheese over a corn tortilla. Fold in half and microwave for 20 seconds. Top with mild salsa.
6. Toast a whole-grain waffle and top with low-fat vanilla yogurt and sliced peaches.
7. Make a mini pizza by drizzling tomato sauce on a toasted English muffin. Sprinkle with shredded part-skim mozzarella cheese.
8. Spread natural peanut butter on a fresh sliced apple.
9. Microwave a cup of tomato or vegetable soup and serve with whole-wheat crackers.
10. Mix together ready-to-eat cereal, raisins, and nuts and place in a sandwich bag for an on-the-go snack.

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Nutrition & Immune Function

A healthy immune system is a concern for all people, but especially for infants, toddlers, and young children. That's because, by nature, infants have immature immune systems, in part because you must first be exposed to pathogens to develop antibiodies that provide resistance to viruses and bacteria that cause illness. Infants are born with what is called "passive immunity"—this refers to the antibodies they have received from Mom via the umbilical cord while in utero. These antibodies last for up to six months, but "active immunity" occurs through their exposure to viruses, bacteria, and other allergens. So infants and toddlers are potentially quite vulnerable to infections as they develop this active immunity. Young children often are in close contact with one another at day care or school, and this certainly facilitates the spread of germs. According to the Centers for Disease Control and Prevention (CDC), children experience six to 10 colds a year on average, compared with two to four in adults. In families with school-aged children, the number of colds per child can be as high as 12 per year.[1] Although the common cold is usually mild with symptoms lasting one to two weeks, it is a leading cause of doctor visits and missed school days. The flu, on the other hand, can be a very serious illness in young children. In fact, children are two to three times more likely than adults to develop complications from influenza and are more likely to spread the virus to others.[2] The CDC estimates that 10%–20% of Americans come down with influenza each flu season and, on average, 20,000 children under age 5 are hospitalized because of complications associated with the flu.[3]

Immune System Primer

So before we talk about what we, as parents, can do to support our children having a healthy immune system, a brief understanding of the immune system may be helpful. The immune system is an exceedingly complex network of cells that activate and secrete an array of chemicals. Its mission is to protect the body against invading pathogens and other foreign substances. The cells in the immune system have the ability to recognize something as either "self" or "invader," and will try to get rid of anything that is an invader. Many different kinds of cells—and hundreds of different chemicals—must be coordinated for the immune system to function smoothly.

Components of the Immune System

Key Components of the Immune System	Function
T lymphocytes, or "T cells"	Attack virus-infected cells by producing cytokines, which are proteins that regulate the body's response to potential infection.
Natural killer cells	Play a role in destroying cancer cells as well as virus-infected cells by releasing proteins that cause cell death.
Phagocytes (macrophages and neutrophils)	A first line of defense against infection. Cells that engulf and destroy "invaders."
B lymphocytes, or "B cells"	Manufacture and secrete antibodies.
Antibodies or immunoglobulins	Proteins made by B cells that can recognize and attach to specific sites on "invaders" to block their ability to infect.
Interferon	Protein produced by T cells and other cells in response to viral infection.
Lactoferrin	A protein found in human breast milk as well as cow's milk that supports the growth of *bifidobacteria*, lactoferrin plays a role in the activation of specific immune cells such as macrophages and neutrophils, and may inhibit the cellular attachment and replication of viruses.

Nutrients Needed for a Strong Immune System

Good nutrition is absolutely critical for a healthy immune response. Protein and essential amino acids are critical to every component of the immune system because the body cannot defend itself without producing new proteins. Vitamin A promotes the growth, differentiation, and activation of all cells, including immune cells, and vitamin C acts as a potent antioxidant that protects immune cells from free radical damage. Vitamin C also appears to have a direct effect on immune-cell function, and a deficiency of this essential nutrient has been linked to impaired immune response. Additionally, deficient intake of vitamin C decreases the ability of phagocytic cells to migrate to sites where an inflammatory process is occurring, which may allow the spread of an otherwise localized infection.[4] B vitamins also are important for immune function, with vitamins B_6, B_{12}, and folic acid being critical because of their role in DNA, RNA, and protein synthesis. Inadequate intake of any of these B vitamins can impair DNA, RNA, or protein synthesis, which can result in a decrease in the production, multiplication, and repair of immune cells. This can then lead to the body not being able to create the antibodies necessary to initiate a response to an infection.[4] Minerals such as iron, zinc, copper, and selenium also support immune function. During the immune response, the need for oxygen increases as immune cells proliferate and perform their functions, and iron is required for the production of hemoglobin, which helps transport oxygen in the blood. Zinc is needed by over 200 different enzymes, including many involved in protein and DNA synthesis. Like zinc, copper is needed by many enzymes to function and is specifically important for the functioning of antibody-forming cells—neutrophils, T lymphocytes, and macrophages. The trace mineral selenium is needed for the proper function of a number of different immune cells but—like vitamin C—supports immune function by its antioxidant action. If protected from free radical damage, the cells of the immune system are less easily destroyed during an immune response, thus increasing their number and effectiveness.[4]

The Immuno-Supportive Effects of Lactoferrin

There is new and interesting research related to the effects of a compound called lactoferrin, a unique and biologically active milk protein found naturally in breast milk, tears, and other body fluids. **Lactoferrin has been shown to activate multiple components of the immune system and is believed to be one of the components of breast milk responsible for the immuno-protective effects associated with breast-feeding.** The mechanisms by which lactoferrin may offer immuno-protection are numerous. Studies suggest that lactoferrin serves as a prebiotic, or food to fuel the growth of beneficial *bifidobacteria,* which in turn support a healthy digestive tract—and a healthy digestive system is one of the body's first lines of defense against pathogenic invaders.[5] Research also indicates that lactoferrin has anti-adhesion characteristics that can inhibit the cellular attachment and replication of viruses. In one recent study, lactoferrin inhibited the adhesion of adenovirus (the common cold virus) by 95%.[6] In addition, lactoferrin may activate specific immune cells such as macrophages and neutrophils. These cells are somewhat similar to little "Pac-Men," gobbling up foreign materials such as killed bacteria and viruses, and digesting them so they are no longer harmful to the body (a process called phagocytosis). In laboratory studies, lactoferrin was found to enhance the rate of phagocytosis in human neutrophils.[7]

Prebiotics and Probiotics for Digestive and Immune Health in Infancy

Newborns are first exposed to bacteria at the time of birth. Before that time, the infant's gastrointestinal tract is completely sterile. Bacteria rapidly colonize the small and large intestine, and the intestinal immune system learns to recognize these bacteria as desirable residents of the intestinal tract. A number of factors influence the process of colonization and the types of organisms that establish residency. These factors include the mother's diet, the mother's use of probiotics during pregnancy, the type of birth (vaginal vs. Cesarean), gestational age of the newborn, as well as the overall health of the newborn.

After delivery, environmental exposure and diet begin to play an important role in this colonization process. Depending on whether a baby is breast-fed or bottle-fed, the types of organisms that take up residency early in life may differ. Studies suggest that breast-fed babies have higher initial counts of *bifidobacteria* than formula-fed babies—and we know that *bifidobacteria* are beneficial to the function of the digestive system. However, once solid foods are introduced, the microflora readjust, and by the end of the first few months of life, *bifidobacteria* levels are similar in both the breast-fed and formula-fed babies.[8] By 1–2 years of age, the bacterial population in infants resembles that of an adult—both in terms of number and composition of microorganisms.

It has been proposed that the high oligosaccharide (carbohydrate) content of breast milk may be responsible for its bifidogenic effect. This has lead to **the addition of prebiotics—fibers such as inulin and fructo-oligosaccharides—to infant foods and formula with the purpose of selectively stimulating the growth and activity of beneficial *bifidobacteria* and *lactobacilli* in the large intestine.** In fact, prebiotics have been added to infant foods and formula in Japan for over 20 years, and in Europe since the early 2000s.[9]

The concept of adding prebiotics to infant foods and formula has grown in popularity and acceptance. This is due to an increasing understanding of the role intestinal microflora play in postnatal development of gastrointestinal function, including the development of the gut-associated immune system.[10] It is thought that the immaturity of the intestinal barrier in newborns facilitates antigen (foreign invader) transfer, causing intestinal inflammation. In turn, this inflammation is thought to lead to an increased permeability of the intestinal wall and impairment in the balance of microflora—factors thought to be involved in the initial development of food allergies in infants.[11] **A bifidus-dominated microflora is considered protective for infants as it may activate the immune system and inhibit invading pathogens, lessening their likelihood of getting infections and decreasing the development of food allergies.**

A number of studies have attempted to evaluate the effects of prebiotic consumption—specifically inulin and oligofructose—on both the digestive and the immune function in infants and toddlers. In one study, researchers evaluated the effects of a prebiotic (an inulin-enriched oligofructose) that was added to weaning foods and consumed by toddlers attending day care. Results indicated that toddlers who were fed up to three grams a day of prebiotic-enriched foods experienced softer stools; less vomiting, regurgitation, and perceived gastrointestinal discomfort; as well as fewer incidences of fever.[12] In a similar study, toddlers attending day care and taking two grams a day of prebiotics for three weeks experienced a protective effect against illness. Toddlers experienced fewer infectious episodes requiring antibiotics, fewer episodes of diarrhea and vomiting, and had less flatulence. Microbial analysis also confirmed a bifidogenic effect during the supplementation period.[13]

In addition to the health benefits associated with prebiotics for infants and toddlers, the use of probiotics (i.e. the direct supplementation with beneficial microflora—*bifidobacteria* and *lactobacillus*) also has been shown to produce beneficial health effects. Probiotics help support and maintain a healthy balance of intestinal microflora and are believed to do this by several mechanisms, such as increasing the production of compounds that inhibit or destroy pathogenic bacteria and competing for receptor-cell binding sites or for available nutrients needed by pathogenic organisms.

One of the primary areas of probiotic research in children has been in the treatment or prevention of diarrhea, especially diarrhea associated with antibiotic use. Several studies indicate that supplemental *lactobacilli* and *bifidobacteria* species during antibiotic therapy reduce the incidence of diarrhea and loose stools.[14,15] In addition to digestive health benefits, research also indicates that probiotics may play a role decreasing food-related allergies. Preliminary research suggests that probiotic supplementation may reduce markers of intestinal inflammation and decrease intestinal permeability[16,17], two benefits that may prove to be beneficial in reducing symptoms related to food allergy.

Filling in Nutritional Gaps with Immune-Supporting Supplements

Proper nutrition plays a critical role in the development and maintenance of a strong and healthy immune system—from infants to children of all ages. Therefore, it is a parent's responsibility to provide children with healthful, age-appropriate food choices that provide an array of immune-supporting nutrients. But despite a parent's best intention, ensuring their child gets all the nutrition they need from diet alone is a challenge. The toddler years, in particular, can be quite challenging. Children ages 1–2 years can become picky eaters as they transition to eating table food and accepting new tastes and textures, which may potentially limit the variety of foods they eat. Nutrition surveys confirm over and over that young children—even infants and toddlers—are

NOT getting the nutrition they need. In fact, researchers found in a recent study that poor eating habits start early—on any given day, 25%–30% of infants and toddlers ages 9–24 months did not eat any fruit, and 20%–25% did not eat any vegetables.[18] And because most vitamins and minerals are not stored in the body and need to be supplied on a regular basis, **supplementation with a comprehensive multivitamin-multimineral supplement to fill those nutritional gaps just makes good sense. Also, look for products that include ingredients such as lactoferrin, prebiotics, and probiotics—all of which can provide additional immune support for your child!**

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Building Strong Bones Starts Early—And the Latest News About Vitamin D!!

When it comes to concerns about your child's health, helping them to have strong bones may not be at the top of your list! But there is much that parents should know about bone health—even when your children are very young. Building strong bones by adopting healthy nutritional and lifestyle habits in early childhood is critically important in helping to prevent osteoporosis later in life. Osteoporosis, a condition of thinned bones that are prone to fractures, has been called "a pediatric disease with geriatric consequences" because the bone mass attained during childhood and adolescence is the most important determinant of long-term skeletal health. In other words, the eating habits, activity levels, and supplement usage in your kids today may very well make or break their bones as they age.

Childhood and Adolescence: Building the Bone Bank

Bone is living tissue that changes throughout life. There is a continuous remodeling occurring, with a balance between bone formation and bone resorption.[1] This critical balance between the breakdown and formation of bone changes as we age. During childhood there is a higher amount of bone formation than bone breakdown and, thus, it is during this critical time that your child's bones increase in both size and density. In fact, by the time girls reach age 18 and boys reach age 20, up to 90% of peak bone mass has been acquired.[2] Once we reach about age 30, the rate of bone breakdown and formation are relatively equal—although there is still an ongoing remodeling of bone that requires the support of all the bone nutrients. At the time of menopause for women and beginning in the 60s for most men, bone breakdown exceeds bone formation, which can result in loss of bone mass. For women, the first five years after menopause are the most critical for potential loss of bone density and the development of osteopenia and osteoporosis. But back to kids!! Because your child is going to achieve most if not all of their peak bone mass by age 20, what they do in childhood, adolescence, and the teen years is critically important for their long-term bone health.

What Are the Essential Nutrients for Strong Bones?

Many nutrients play a role in proper bone development. For example, the minerals calcium, phosphorous, and magnesium all are incorporated into and form the matrix of bone; the nutrients zinc, copper, and manganese are trace minerals that serve as catalysts for metabolic reactions involved in building bone; vitamin D assists with the intestinal absorption of calcium; and vitamin K assists in the creation and proper function of a protein produced by bone-forming cells during bone matrix formation. Although all are essential to developing strong bones, the two nutrients of particular concern for growing infants and children are **calcium** and **vitamin D**.

Calcium

Calcium is the most abundant mineral in the body with more than 99% occurring in bones and teeth, where it is the central "support structure." Therefore, it's critically important that children of all ages optimize their calcium intake every day to

ensure proper development of bones and teeth. Calcium is found in many foods, but the most common source is milk and other dairy products. One 8-ounce glass of milk provides 300 mg of calcium, which is 33% of the recommended daily intake for younger children and about 25% of the recommended intake for teens. Based on the USDA Food Guide Pyramid, individuals ages 2 and older should consume two to three servings of dairy products per day, with a serving size being equivalent to 1 cup (8 ounces) of milk, 8 ounces of yogurt, or 1.5 ounces of natural cheese. Calcium also can be found in fortified foods such as tofu, soy milk, and some juices—as well as in dark, leafy green vegetables such as kale, broccoli, and spinach. However, to get the same amount of calcium in one 8-ounce glass of milk, a child would have to consume $2^1/_4$ cups of cooked broccoli or 8 cups of spinach!

The recommended daily intake of calcium for infants and children ranges between 210 mg and 1,300 mg a day, depending on the age of the infant or child (refer to Table 1). However, national nutrition surveys have shown downward trends in the consumption of milk, and increased consumption of sugar-rich juices and sodas[3] among adolescents and teens. Other studies confirm that many children aren't getting enough calcium from diet alone. **In one such study, 44% of boys and 58% of girls ages 6–11, and 64% of boys and 87% of girls ages 12–19, did not meet their recommended intake for calcium.**[4] Inadequate calcium intake, during such a critical time, can prevent children from achieving optimal peak bone mass, ultimately increasing their risk for osteoporosis and bone fractures later in life. So the take-home message is to assess your child's dietary intake of calcium and vitamin D (see below) and be sure to provide a supplement that delivers adequate amounts of both calcium and vitamin D to fill any gaps that may exist in their diets.

Table 1. Recommended Calcium Intake for Infants, Children, and Young Adults*

Age	Amount of Calcium
Infants	
Birth to 6 months	210 mg
6 months to 1 year	270 mg
Children/Young Adults	
1–3 years	500 mg
4–8 years	800 mg
9–18 years	1,300 mg

*Source: National Academy of Sciences' Institute of Medicine (Food and Nutrition Board), 1997

Vitamin D

Vitamin D is a fat-soluble vitamin needed by the body to help maintain normal blood levels of calcium and phosphorus. By assisting the body with calcium absorption, vitamin D helps to create and maintain strong bones. Without adequate levels of vitamin D, bones can become thin, brittle, and misshapen. Vitamin D can be obtained through the skin after exposure to sunlight or from our diets, but very few foods provide vitamin D naturally—with the exception of fatty fish such as salmon.[5] In fact, fortified foods provide most of the vitamin D in the American diet.[6] For example, almost all of the U.S. milk supply is fortified with 100 IU of vitamin D per cup. But again, we know that milk consumption in children is down and juice and soda consumption is up!!

Growing Concerns About Vitamin D Deficiency

Rickets, an extreme form of vitamin D deficiency that affects infants and small children and is characterized by soft and deformed bones, was nearly eliminated in the United States when vitamin D fortification of milk was introduced in the 1930s.[6] However, **concerns about vitamin D status in the United States recently have resurfaced because of an increasing number of reports of insufficient dietary intake and signs of deficiency**—both in children and in adults. Based on findings from the National Health and Nutrition Examination Survey (NHANES), children living in the United States consume about 300 IU of vitamin D per day, on average, from both food sources and dietary supplements.[7] In a fairly recent study published in the *American Journal of Clinical Nutrition*, researchers analyzed blood levels of vitamin D in 382 healthy children and adolescents.[8] They found that 55% of the children had lower-than-recommended serum concentrations of vitamin D. They also noted that vitamin D blood concentrations dropped during the winter months as a result of reduced sun exposure. Overall, 68% of children had inadequate levels of the vitamin in their blood during the colder months when they spent more time indoors. In another study involving 380 healthy infants and toddlers, the prevalence of actual vitamin D deficiency was found to be 12%—**but 40% of infants and toddlers had blood levels of vitamin D considered to be suboptimal.**[9]

Risk factors for vitamin D deficiency in children include inadequate dietary intake of vitamin D; spending more time indoors, thus reducing their sun exposure; use of sunscreens, which block the synthesis of vitamin D; and other risk factors such as having a dark complexion or having been exclusively breast-fed during infancy.[10]

Recommended Intakes of Vitamin D in Infants and Children

In 1997, the National Academy of Sciences' Panel for Vitamin D—along with the Institute of Medicine—recommended a daily intake of 200 IU of vitamin D to prevent deficiency in healthy infants, children, and adolescents. At the time, this recommendation was endorsed by the American Academy of Pediatrics (AAP). However, nutrition experts, researchers, and pediatricians are faced with an emerging mass of scientific studies linking insufficient levels of vitamin D in the blood not only to bone demineralization and reduced calcium absorption, but to a wide variety of other health issues, including insulin resistance, impaired immune response, and other metabolic consequences—including a higher risk of certain cancers. In fact, based on evidence from more recent clinical trials and a long history of safe use of vitamin D supplements, the AAP recently issued its own recommended daily intake for vitamin D that exceeds the National Academy of Sciences' recommendation.[11] **The AAP now recommends that infants and children of all ages get 400 IU of vitamin D per day, doubling previous recommendations.** As part of these recommendations, the AAP also acknowledges that, given the dietary practices of many children and adolescents today, getting 400 IU of vitamin D from diet alone is difficult to achieve. So to help infants and children meet their need for this important bone-health nutrient, the AAP recommends daily use of a vitamin D-containing multivitamin supplement. The group also acknowledges that there is an ongoing debate among health experts as to what constitutes vitamin D "sufficiency," "insufficiency," and "deficiency" in infants and children. It is also recognized that children at significant risk for vitamin D deficiency may require even higher amounts to achieve and maintain optimal vitamin D status. How much higher? Well, more research is needed, but studies conducted in adults have found that supplemental intakes of 400 IU a day have only a modest effect on blood concentrations of vitamin D and, in people with suboptimal blood levels of vitamin D, as much as 2,000 IU a day is needed to raise blood concentrations to an optimal level.[12] Until more children's data are available, we believe that 400 IU of vitamin D per day for infants and children under age 4 and 600 IU per day for older children are reasonable and well within safe levels of consumption.

Physical Activity and Bone Strength

Building strong bones during childhood and optimizing bone health throughout life involves not only getting one's daily requirement for all bone health nutrients, but it also entails getting regular exercise. Exercise, specifically "weight-bearing" activities such as jumping rope, walking, dancing, and playing organized sports (e.g. gymnastics, basketball, soccer, and hockey) stimulate bone-building cells, which ultimately will help increase bone size and mass. Therefore, **one of the most important things you can do as a parent is to encourage your children to participate in weight-bearing activity for at least 30 minutes a day most days of the week.** And while they are out there playing—go join them!! It will be good for your bones as well!

Optimizing Bone Health with Supplementation

Helping children build strong bones and teeth starts early. Parents should begin by offering and making available a variety of healthful food choices rich in essential bone-health nutrients, paying special attention to calcium, magnesium, zinc, copper, and manganese, as well as vitamins D and K. Dairy products provide the best source of calcium, and many of the other bone-health nutrients can be found in whole grains, nuts, seeds, dark-green vegetables, lean meats, poultry, and seafood. However, because national surveys consistently show that **most children fail to achieve the recommended intake of calcium or vitamin D, parents are making a wise decision by providing their children with a comprehensive multivitamin that contains at least 400 IU to 600 IU of vitamin D, 200 mg of calcium, as well as the other nutrients** listed above to add to the nutrients already being provided in their diets.

Give your child the best chance to achieve optimal bone mass during one of the most critical periods in life by investing now in your child's bone health. Not only will you be helping them to keep their bones strong, but you'll be helping them to reduce their risk of developing osteoporosis later in life.

Important Food Sources of Bone-Health Nutrients

Calcium: milk, cheese, yogurt

Magnesium: dark, leafy greens; nuts; seeds

Vitamin D: fortified milk, salmon, eggs

Vitamin K: kale, spinach, broccoli

Manganese: whole grains, nuts, peas

Zinc: beef, chicken, pork, fortified cereal

Copper: seafood, nuts, seeds

Factors Affecting Peak Bone Mass

Gender: Bone mass or density generally is higher in men than in women. Before puberty, boys and girls develop bone mass at similar rates, but after puberty, boys tend to acquire greater bone mass than girls.

Race: For reasons not well understood, African-American girls tend to achieve higher peak bone mass than Caucasian girls. And girls of Asian descent tend to have the lowest bone mass. However, because all women—regardless of race—are at significantly higher risk for osteoporosis, girls of all races need to build as much bone mass as possible to help protect against this disease.

Hormones: Sex hormones, including estrogen and testosterone, are essential for the development of bone mass. Girls who start to menstruate at an earlier age typically have greater bone density. Girls who have been diagnosed with anorexia as well as female athletes who have very low body-fat levels and abnormal menses are at greater risk of not achieving optimal bone density.

Nutrition: Calcium in particular is essential for bone health. In fact, calcium deficiencies in young people can account for 5%–10% lower peak bone mass and may increase the risk of bone fractures later in life. A well-balanced diet including adequate amounts of vitamins D and K, as well as the minerals calcium, magnesium, zinc, copper, and manganese, also are essential to bone health.

Physical Activity: Important for building healthy bones, weight-bearing activities that stimulate bone growth—such as running and jumping rope—are especially important.

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Omega-3 Fatty Acids and Children's Health

Omega-3 fatty acids, also known as polyunsaturated fatty acids, are essential to human health but cannot be made by the body. For this reason, they must be obtained from the foods we eat. Good sources of omega-3s include fatty fish and certain plant foods, including olive oil, flaxseed, and walnuts.

There are three major types of omega-3 fatty acids consumed in foods and used by the body: alpha-linolenic acid (ALA), eicosapentaenoic acid (EPA), and docosahexaenoic acid (DHA). The body converts ALA to EPA and DHA, which are the two omega-3 fatty acids used most readily by humans. However, because this conversion is fairly inefficient (less than 5%), dietary consumption of both DHA and EPA is highly recommended—especially in young children in order for them to meet their significant need for these important omega-3 fatty acids. Research continues to validate the important role these omega-3 fatty acids play in normal growth as well as in the early development of a child's brain and eyes.

Early Brain and Visual Development

DHA and EPA are best known for their beneficial role in protecting adults' cardiovascular health and in lessening inflammatory conditions. However, emerging science suggests that **DHA in particular plays an important role in early brain and visual development in growing infants and children.** In fact, DHA is the most abundant omega-3 long-chain fatty acid in the brain and, during the last trimester of pregnancy and continuing throughout the first few years of life, it is rapidly incorporated into nervous tissue of the retina and brain.[1] Supplementation of infant formula with DHA has been shown to aid growth, development, and vision in premature infants, and prenatal and infant deficiencies of DHA have been shown to lead to brain abnormalities.[1]

Cognitive and Behavioral Function

Beyond early development and throughout life, DHA is believed to continue to influence brain function by playing an important role in brain-cell membrane structure, brain-cell receptor activity, and the production of neurotransmitters and other brain chemicals.[2] This has lead to considerable interest in the potential role DHA may have on cognitive development and behavioral function during childhood. A number of research studies have examined the relationship between the levels of omega-3 fatty acids in the body and a variety of childhood disorders, including autism and attention deficit hyperactivity disorder (ADHD).

Attention Deficit Hyperactivity Disorder

Attention deficit hyperactivity disorder is one of the most common childhood disorders and it affects 5%–10% of school-age children, or 4.4 million youths ages 4–17. Symptoms include difficulty staying focused and paying attention, difficulty controlling behavior, and a general inability to sit still or tendency to be hyperactive. The Centers for Disease Control (CDC) estimate that 2.5 million of these children receive some type of medication to treat this disorder and, to make matters worse, this condition can continue throughout life, with as many as 70% of children diagnosed with ADHD suffering from the disorder into adolescence and adulthood.[3]

Studies suggest that children with ADHD may have low levels of certain essential fatty acids (including DHA) in their bodies. In a clinical study of nearly 100 boys, those with lower levels of omega-3 fatty acids demonstrated more learning and behavioral problems—such as temper tantrums and sleep disturbances—than boys with normal omega-3 fatty acid levels.[4] In animal studies, low levels of omega-3 fatty acids have been shown to lower the concentration of certain brain chemicals—such as dopamine and serotonin—related to attention and motivation.[5]

Randomized clinical trials assessing the effects of omega-3 supplementation on symptoms of ADHD have been published. Some studies indicate supplementing a child's diet with a combination of long-chain fatty acids including DHA and EPA may be beneficial for reducing symptoms of inattention and hyperactivity when compared with a placebo[6,7], while other studies have found no benefit.[8]

Because of the diversity of findings, more research is needed and, as of today, firm conclusions are difficult to draw. However, researchers have proposed that future studies be designed to: 1) better understand the mechanism of action of omega-3 fatty acids in ADHD, 2) identify which children with ADHD might benefit from omega-3 supplementation, 3) determine which fatty acids—and how much—to supplement with, and 4) pinpoint the optimal time for intervention (e.g. prenatal, infancy, or at time of diagnosis).[9] However, until then, consumption of foods and supplements high in omega-3 fatty acids is a reasonable approach for someone with ADHD.

Autism

Autism is one of a group of disorders known as autism spectrum disorders (ASDs). Autism usually is diagnosed by age 3 and lasts throughout a person's life. Children with autism or other ASDs can suffer a wide array of developmental disabilities that can cause substantial impairments in social interaction and communication, as well as unusual behaviors and interests. Many children with ASDs also have unusual ways of learning, paying attention, and reacting to different sensations, and there is significant variability in severity—some children are high functioning while others can be quite severely affected. Recent data from the CDC's Autism and Developmental Disabilities Monitoring Network indicate that about 1 in 150 8-year-olds living in the United States has an ASD. Scientists think there may be many causes that can lead to the development of an ASD—and both genes and the environment appear to play a role.[10]

There is some evidence that alterations in fatty acid metabolism may play a role in the pathophysiology of autism. In one study, researchers compared the levels of fatty acids in the blood of a group of autistic children with those in a group of mentally challenged control subjects. Results indicated a 23% reduction in levels of DHA in the children with autism, resulting in significantly lower levels of total omega-3 fatty acids—without a reduction in total omega-6 fatty acids.[11] The reasons for the lower concentrations of DHA are not well understood, but several hypotheses have been proposed. It may be that children with autism have insufficient dietary intakes of DHA, may have less ability to convert ALA to DHA, and/or have an enhanced breakdown of DHA in cell membranes.[11]

Dietary Intake of Omega-3s—Are Children Getting Enough?

The growing evidence in support of a positive relationship between omega-3 fatty acids and many health outcomes in children (and adults as well, for that matter!) have fueled the realization that relatively recent changes in the diet of Americans has dramatically changed the type of fat consumed, resulting in a significant shift in the ratio of omega-6 fatty acids to omega-3 fatty acids, thereby potentially changing the fatty acid composition of the brain. Omega-6 fatty acids such as linoleic acid (LA) are abundant in our diet, with a major source coming from vegetable oils, which tend to be much higher in omega-6 than omega-3 fatty acids. In the days of hunters and gatherers, the dietary ratio of omega-6 to omega-3 fatty acids was believed to be in the range of 1:1 to 2:1. However, over the past 50–100 years, intakes of omega-3 fatty acids such as DHA and EPA have declined while the intake of omega-6 fatty acids has increased, such that the ratio of omega-6s to omega-3s is now estimated in the range of 15:1 to 25:1.[12] This ratio is important because the omega-6 fatty acid LA and the omega-3 fatty acid ALA compete for the same enzymes that convert ALA to DHA and EPA. Therefore, it is believed that both excessive intakes of omega-6 fatty acids and lesser amounts of omega-3s may actually diminish DHA availability in the brain. In addition, the decreased overall intake of omega-3s means less DHA and EPA are available for incorporation into brain-cell membranes.

Both the American Dietetics Association and Dietitans of Canada recommend an increase in dietary intakes of omega-3 fatty acids[13], and recommended intakes for omega-3 fatty acids to support optimal neuronal functioning and overall health of children have been established by various internationally recognized organizations.[14] Although specific dietary requirements for DHA and EPA in children have not been established, the National Academy of Sciences' Institute of Medicine has established a recommended intake for total omega-3 fatty acids as ALA (see Table 1, Page 18)[15], with DHA and EPA contributing 10% toward the recommended intake. For example, the recommended intake of total omega-3 fatty acids for children ages 4–8 is 900 mg a day, of which 90 mg may come from DHA and EPA.

Table 1: Recommended Adequate Intakes (AI) for Omega-3 Fatty Acids in Infants and Children*

Life Stages	Age	(Mg/Day)
Infants	0–12 mos	500 mg
Children	1–3 yrs	700 mg
Children	4–8 yrs	900 mg
Children	9–13 yrs	1,200 mg

Note: 10% of the above amounts (AI values) may be in the form of DHA and EPA.

*Source: Food and Nutrition Board, USA, 2005

Given these recommendations, the question remains as to whether children are consuming adequate amounts of omega-3s, especially DHA and EPA. Based on the most current national nutrition survey findings, most infants and children are not. **Data collected from the 1999–2000 National Health Examination Survey estimated that intakes of DHA among children 11 years old and younger to be only 20–40 mg a day[16],** and in a recent study published in the *Journal of Nutrition*, researchers quantified the omega-3 fatty acid intake in a group of Canadian children ages 4–8. The mean dietary intake of DHA in these children, according to this study, was only 54 mg per day.[17]

Because of the ever-growing and emerging body of literature demonstrating the importance of omega-3 fatty acids in proper growth and development, early brain and visual development, and possibly in childhood conditions such as ADHD and autism, this dietary gap should be readily filled with an increased consumption of foods rich in DHA such as fish and seafood. However, increased fish consumption poses additional concerns. Nearly all fish and shellfish contain traces of mercury—and some may contain other environmental pollutants that may pose harm to an unborn baby or to a young child's developing nervous system. In fact, the Food and Drug Administration (FDA) and the Environmental Protection Agency (EPA) advise women who may become pregnant, pregnant women, nursing mothers, and young children to avoid some types of fish and eat only fish and shellfish that are lower in mercury.[18] Concerns about the safety of fish consumption coupled with inadequate dietary intakes suggest that **most children would benefit from taking a high-quality dietary supplement that uses a pharmaceutical-grade, highly purified fish oil to deliver omega-3 fatty acids, including plenty of DHA to support the proper development and function of the brain and eyes.**

2004 EPA and FDA Advice For: Women Who Might Become Pregnant

Women who are pregnant, nursing mothers, and young children

1. Do not eat shark, swordfish, king mackerel, or tilefish because they contain high levels of mercury.
2. Eat up to 12 ounces (two average meals) a week of a variety of fish and shellfish that are lower in mercury.
   a. Five of the most commonly eaten fish that are low in mercury include shrimp, canned light tuna, salmon, pollock, and catfish.
   b. Another commonly eaten fish, albacore ("white") tuna, has more mercury than canned light tuna. So when choosing your two meals of fish and shellfish, you may eat up to 6 ounces (one average meal) of albacore tuna per week.
3. Check local advisories about the safety of fish caught by family and friends in your local lakes, rivers, and coastal areas. If no advice is available, eat up to 6 ounces (one average meal) per week of fish you catch from local waters, but don't consume any other fish during that week.
4. Follow these same recommendations when feeding fish and shellfish to your young child, but serve smaller portions.

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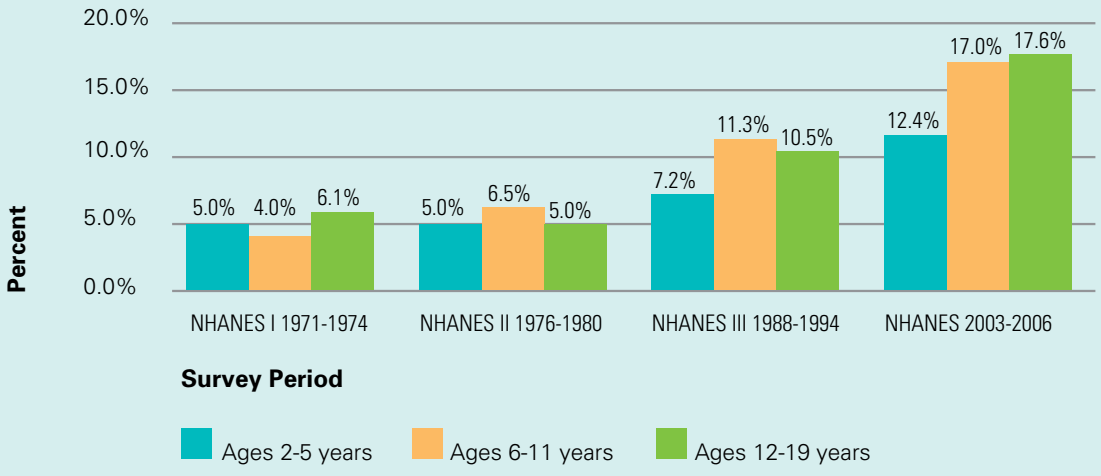
Obesity and Overweight: A Preventable Public Health Crisis

Childhood obesity is a serious public health epidemic. During the past several decades, obesity rates have soared among all age groups, increasing 400% among children ages 6–11 since the 1970s.[1] Today, nearly one-third of children and adolescents are overweight or obese—that's more than 23 million kids and teenagers! Preventing obesity during childhood is absolutely critical because habits learned in childhood are carried into adulthood. **Research shows that obese adolescents have up to an 80% chance of becoming obese adults.**[2] This is particularly alarming given the knowledge that being overweight to obese increases one's risk for many diseases, including cardiovascular disease, cancer, hypertension, and diabetes—all of which are causes of premature death. If these trends are not reversed soon, we will be in danger of raising the first generation of American children who will have more health challenges AND die younger than the generation before them.

Parents play an essential role in fostering healthful eating habits and physical-activity routines among children and adolescents. In many ways, parents shape their children's dietary practices, physical activity, sedentary behaviors, and, ultimately, their weight. A parent's knowledge and understanding of nutrition; influence over food selection, meal structure, and eating patterns; and control over time spent watching TV, playing video games, or sitting at the computer all influence a child's development of lifelong habits that contribute to either a healthy weight or to overweight and obesity.

Prevalence of Obesity* Among U.S. Children and Adolescents† (Ages 2-19 Years)



*Sex- and age-specific BMI > 95th percentile based on the CDC growth charts.
†Source: National Health and Nutrition Examination Survey

Consequences of Obesity

Being overweight or obese as a child can lead to a variety of health consequences. **Overweight and obese children are at higher risk for a host of serious health issues, including heart disease, stroke, asthma, and certain types of cancer.**[3] And many overweight to obese children already are being diagnosed with health problems that previously were considered "adult" illnesses such as type 2 diabetes and high blood pressure. In one study, 60% of obese children ages 5–10 already had at least one risk factor for cardiovascular disease—such as elevated cholesterol and/or triglycerides, hypertension, or insulin resistance—and 25% already had two or more of these risk factors.[4] The latest statistics show that boys born in the United States in the year 2000 have a 30% lifetime risk of being diagnosed with type 2 diabetes, and girls have a 40% lifetime risk.[5] Many overweight and obese children also suffer emotional consequences. Emotional stress from social stigmatization resulting in low self-esteem can hinder both academic and social functioning, which can lead to underperformance and underachievement as they move into adulthood.[6]

The Culprits: Poor Eating Habits and Physical Inactivity

Childhood obesity is the result of an imbalance between the calories a child consumes and the calories he or she uses to support normal growth and development, metabolism, and physical activity. In other words, if your child consumes more calories than they use each day, they will gain excessive weight in the form of body fat. Left unchecked, continual excessive weight gain will lead to overweight or obesity. The causes of childhood overweight and obesity are multifactorial. **Although genetic and socioeconomic factors can contribute, children become overweight because they eat too much food, they eat the wrong types of foods, and they generally are not active enough.** Let's explore each of these issues.

Poor Eating Habits

Over the past several decades, it has become increasingly evident that the eating patterns of just about everyone in North America have changed—leading to an obesity epidemic that knows no geographical or socioeconomic barriers. **Today, children eat more meals away from home, drink more sugar-sweetened beverages, and snack more often than they used to.**[7] **Portion sizes also have increased—contributing to excessive calorie consumption**[8]**—and children often skip breakfast, an eating pattern also linked to obesity.**[9]

Frequent consumption of food away from home, especially fast food, can increase a child's risk of becoming overweight or obese. Studies show that children who consume fast food two or more times a week consume larger portions, more calories, and, overall, consume lower-quality foods (i.e. more fat, added sugars, and soda, and less milk, fiber, and fruits and vegetables). Fast food presents a "double whammy" by providing excessive amounts of what you don't need—saturated fat, salt, sugar, and preservatives—while also being deficient in vitamins, minerals, fiber, and antioxidants. Children who regularly consume fast food also are more likely to have a higher body mass index (BMI)—a measure of overweight in children.[10] Sweetened-beverage consumption has increased steadily among children, and studies suggest that children who consume two servings of sweetened beverages per day are three times more likely to become overweight compared with children who don't drink sweetened beverages.[11] Although not all snacks are unhealthful, many children snack on foods that are high in fat and calories but low in essential nutrients. In a recent study, 88% of children surveyed regularly consumed high-calorie, low-nutrient foods such as muffins, cakes, cookies, candy, French fries, chips, and buttered popcorn.[12]

Skipping breakfast has been shown to negatively impact weight in both adults and children. In a study conducted by researchers at the University of Minnesota School of Public Health, children who ate breakfast on a regular basis were less likely to be overweight. The study examined the relation between the frequency of breakfast consumption and the five-year change in body weight in more than 2,200 adolescents, and the results indicate that daily breakfast eaters consumed a healthier diet and were more physically active than breakfast skippers. Five years later, the daily breakfast eaters also tended to gain less weight and have a lower BMI than those who had skipped breakfast as adolescents.[13]

Tips for Promoting Healthful Eating

- Start the day right by ensuring your child eats a healthful breakfast
- Eat meals together as a family as often as possible
- Carefully cut down on the amount of bad fats and empty calories in your family's diet
- Don't place your child on a restrictive diet—instead focus on a healthful breakfast, limiting snacking, and stocking your home with fruits, vegetables, protein bars, and other healthful choices
- Avoid using food as a reward or withholding food as punishment
- Encourage your children to drink water and to limit the intake of beverages with added sugars, such as soft drinks and fruit-juice drinks
- Stock the refrigerator with fat-free or low-fat milk, and fresh fruits and vegetables instead of soft drinks or snacks that are high in fat, calories, and added sugars, and low in essential nutrients
- Aim to have your child eat at least five servings of fruits and vegetables each day
- Discourage eating meals or snacks while watching television

Lack of Physical Activity

Regular physical activity, fitness, and exercise are critically important for the health and well-being of people of all ages, including children and teens. Compared with children who are inactive, physically active children and teens have higher levels of cardiorespiratory fitness and stronger muscles. They also can have lower body fat, stronger bones, and less anxiety and depression. However, despite the well-known benefits of physical activity, many children lead sedentary lifestyles. Today, children and teenagers spend far too much time watching television, using the computer, and playing video games. **It is estimated that children in the United States spend 25% of their waking hours watching television, and children who watch television most have the highest incidence of obesity.**[14] Watching television, using the computer, and playing video games increases the likelihood of obesity in children, not only because these activities require little energy output but because they displace the amount of time children could spend participating in physical activity. Watching television—which can lead to increased snacking—also has been found to promote increased calorie consumption because exposure to ads promoting junk food can influence children to make unhealthful food choices; **TV exposure has even been shown to lower a child's metabolic rate.**[15,16]

Unfortunately, children also may be spending less time engaged in physical activity at school. Daily participation in school P.E. among adolescents dropped from 41% in 1991 to 28% in 2003.[17] And the situation appears to be worse as children get older. Less than one-third of high school students meet current recommended levels of physical activity.[18]

In 2008 the federal government issued new Dietary Guidelines for Americans, and within those guidelines they made physical activity recommendations for both adults and children. Based on their recommendation, children ages 6 and older should get 60 minutes or more physical activity every day. Activities should include a combination of aerobic activities (e.g. running and brisk walking), muscle-strengthening activities (e.g. gymnastics and push-ups), and bone-strengthening activities (e.g. jumping rope and running). They also stress the importance of encouraging children to participate in a variety of activities that are age-appropriate and enjoyable.

Tips for Promoting Physical Activity

- Embrace a healthier lifestyle; be a role model by being physically active yourself
- Plan family activities that provide everyone with exercise and enjoyment
- Help your child participate in a variety of activities that are age appropriate
- Provide a safe environment for your children and their friends to play actively; encourage swimming, biking, skating, ball sports, and other fun activities
- Advocate for more physical-activity programs in schools and in your community
- Reduce the amount of time you and your family spend performing sedentary activities such as watching television or playing video games; limit TV time to less than two hours a day

Taking Action to Prevent Childhood Obesity

As a parent, you can make a huge difference in your child's life by helping to prevent overweight or obesity at every stage of their development. Even before an infant is born, certain aspects of a mother's pregnancy can put the child at risk of overweight in childhood or later in life. Poor nutritional habits during pregnancy can lead to an unfavorable intrauterine environment, and can increase a growing fetus' risk of developing obesity, high blood pressure, and type 2 diabetes in the future.[19] Children of mothers with diabetes, gestational diabetes, undernutrition, and overnutrition during pregnancy are at particular risk for obesity later in life.[20]

During infancy, when a child is first beginning to establish a lifetime foundation of nutritional habits, **choosing to breast-feed your baby can have a protective effect against obesity.**[21] Researchers believe that breast-feeding may help infants better regulate their food intake than bottle-feeding. In fact, encouraging bottle-fed babies to empty their bottles may make it more difficult for a baby to recognize and attend to his or her own feelings of satiety.

As toddlers and preschoolers develop their eating and exercise habits, parents can shape their early environments in ways that encourage healthful lifestyle practices. **Offering young children a variety of healthful food choices and exposing them early to nutritious foods such as fresh fruits and vegetables, whole grains, low-fat or nonfat dairy products, lean meats, poultry, fish, legumes, nuts, and seeds can help a child establish food preferences for healthful foods.** Parents also should be mindful of the effect strict control of unhealthful food choices can have on their child. Being too controlling can often backfire on a parent, increasing a child's desire for high-fat, calorie-rich foods and contributing to an inability of the child to innately self-regulate hunger and satiety.

Being a positive role model by leading an active lifestyle can influence your child's activity level. Studies have shown that adolescents whose parents watch television more than two hours a day are more than twice as likely to be physically inactive as those children whose parents watch less.[22] In the Framingham Children's Study, when both parents were active, children were almost six times more likely to be active than children with two sedentary parents.[23] And as children transition from childhood to adolescence and into the teen years, parents can continue to encourage their children to be active. Participating in team sports, joining a gym, or participating in structured exercise programs can help older children maintain a healthy body weight and active lifestyle.

Parents absolutely play a crucial role at home in preventing childhood obesity—with their role changing as the child grows up to be a healthy adult. By better understanding your own role in influencing your child's dietary habits, physical-activity tendencies, sedentary behaviors, and, ultimately, their weight, you as a parent can learn to create a healthful environment, provide opportunities for physical activity, and discourage or place reasonable limits on sedentary behaviors such as watching television. Preventing childhood obesity starts with you!

Did You Know?

- Children eat nearly twice as many calories (770) at restaurants as they do during a meal at home (420).
- According to a national study, 92% of elementary schools do not provide daily physical education classes for all students throughout the entire school year.
- The typical American child spends about 44.5 hours per week using media outside of school.
- At least 30 minutes of moderate physical activity on most days of the week is the recommended minimum. However, nearly 23 percent of children and nearly 40 percent of adults get no free-time physical activity at all.
- Studies have shown that, between 1977 and 1996, portion sizes and corresponding calories per serving grew markedly in the United States. One study of portion sizes for typical items showed that:
  - Salty snacks increased from 132 calories to 225 calories.
  - Soft drinks increased from 144 calories to 193 calories.
  - French fries increased from 188 calories to 256 calories.
  - Hamburgers increased from 389 calories to 486 calories.

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Environmental Health Hazards

Children are particularly susceptible to environmental hazards that are surfacing in everyday environments. Potentially toxic chemicals show up in our food, as contaminants in air and water, in common household and personal care products, in packaging, and in furniture. It has been estimated that the average home may contain 1,500 compounds that may be eroding our vitality and increasing our health costs. Although children should be the first to be protected from environmental hazards, the truth is they are at the greatest risk for chemical exposures. As parents and caregivers, we need to do a better job of screening and choosing household and personal care products to reduce our children's exposures.

Infants and Children are at Greater Risk for Chemical Exposures

It's no secret that infants and children are highly vulnerable to chemical toxins. Infants and young children spend a lot of time putting things in their mouths, raising their risk of ingesting chemical residues. Pound for pound, children drink more water, eat more food, and breathe more air than adults.[1] So children are likely to have substantially greater exposures than adults to potential toxins in the water we drink, the food we eat, and the air we breathe. **And yet, so many of the popular and most trusted brands of household cleaners, personal care products, and even baby care products continue to include harsh chemicals.**

An immature immune system and metabolic pathways affect a baby's ability to metabolize, detoxify, and excrete chemicals and counteract toxic challenges. In an adult, a blood-brain barrier insulates the brain from many of the potentially harmful chemicals circulating through the body. But in an infant, that barrier isn't fully developed, so early exposures may be especially risky.

Children also have more time to develop chronic diseases triggered by early chemical exposures. Some diseases related to environmental toxins may require decades to develop, so exposure during childhood may increase health risks later in life. Some scientists also believe that a mother's exposure to toxic chemicals during pregnancy can have developmental consequences on the fetus. Because growth is so rapid at this time, early toxic exposures may have a significant impact on development.

Risks of Child Exposures to Skin Care Products and Plastics

Phthalates are synthetic, man-made chemicals of increasing public importance and concern because of potential toxic effects to the developing endocrine and reproductive systems. Phthalates have been found in food products and may enter the food supply during processing and packaging. They are used in the manufacture of toys, plastic shower curtains, and lubricants, and as chemical stabilizers in cosmetics, infant care products, and personal care products.

Infants, toddlers, and young children are uniquely vulnerable to phthalate exposures because of their hand-to-mouth behavior, extensive playing on floors, and undeveloped nervous and reproductive systems. These factors also may help explain why phthalate metabolite concentrations tend to be higher in young children compared to other age groups. To date, the pathways of childhood phthalate exposure have not been well characterized, but of particular concern for children are personal care products applied directly to the skin.

Researchers at the University of Washington measured phthalate metabolites in urine in 163 infants born in the years 2000–2005. In 81% of the infants, multiple phthalate metabolites were detected. Surprisingly, the authors of this study conclude that infant phthalate exposure is widespread and that infant exposure to baby lotion, baby powder, and baby shampoo is closely associated with increased urinary concentrations of phthalate metabolites; additionally, associations increased with the number of products used, and the association was strongest in infants.[2]

You may have heard about the potential harmful effects of bisphenol-A (BPA), a chemical modifier commonly used in some plastic baby bottles, plastic containers, and the linings of some canned foods. A major study published in 2008 in the *Journal of the American Medical Association* (JAMA) linked higher urinary BPA levels with higher prevalence of cardiovascular disease, diabetes, and liver enzyme abnormalities.[3] **This research reaffirms the importance of choosing BPA-free packaging as a part of your commitment to infant and child safety.**

Children's Bath Products May Contain Formaldehyde and/or 1,4-Dioxane

Despite marketing claims such as "gentle" and "pure," dozens of top-selling children's bath products appear to be contaminated with formaldehyde and 1,4-dioxane, chemicals that are known to cause cancer in animals and listed as probable human carcinogens by the Environmental Protection Agency. A March 2009 report from the Campaign for Safe Cosmetics (CSC) documents the widespread presence of both formaldehyde and 1,4-dioxane in baby shampoos, bubble baths, and baby lotions—products made specifically for infants and children.[4] The CSC is a national coalition attempting to protect consumer health by requiring the personal care products industry to phase out the use of chemicals linked to cancer, birth defects, and other health concerns. The CSC commissioned an independent laboratory to test top-selling children's products for 1,4-dioxane and formaldehyde. Test results showed that:

- 61% contained both formaldehyde and 1,4-dioxane
- 82% contained formaldehyde at levels ranging from 54 ppm to 610 ppm
- 67% contained 1,4-dioxane at levels ranging from 0.27 ppm to 35 ppm

There are no regulatory standards that limit contamination of formaldehyde, 1,4-dioxane, or many other toxic chemicals in personal care products sold in the United States. But formaldehyde is banned from such products in Japan and Sweden, and the European Union bans 1,4-dioxane from personal care products. Although some believe that U.S. regulators are beginning to recognize the risks associated with these chemicals, our current cosmetics laws are woefully out of date and need to be updated.

Accidental Child Poisonings in the Home

So just how large is the toxic exposure risk from common products and chemicals found in the homes of children in the U.S.? In a recent study published in *Pediatrics*[5], Consumer Product Safety Commission (CPSC) researchers suggested that "despite advances in recent years, unintentional child poisonings remain an important public health concern."

Each year, there are over 1 million phone calls to U.S. Poison Control Centers for potentially toxic product ingestions in children younger than 5. According to the study findings from an estimated total of 86,194 child poisoning incidents treated in U.S. hospital emergency departments in 2004, over 25,000—or nearly 30% of the cases—were related to household cleaning products or other chemicals and substances commonly found in homes.

Most household cleaners are not subject to the same child-resistant packaging requirements as drugs and other products despite the fact that there were an estimated 11,386 child poisonings involving cleaning products in 2004. Household bleach was the cleaning product most frequently cited for child ingestions, accounting for roughly 40% of reported poisonings. Other frequently reported ingestions included laundry products, automatic dishwasher detergents, and general household cleaners.

This may be a surprise, but personal care products including perfumes, soaps, and nail and hair care products were involved in an estimated 4,048 poisonings, and an additional 8,432 poisonings were attributable to other categories of products found in homes—including auto and marine chemicals, and pesticides. Mouthwashes, oven cleaners, drain cleaners, and turpentine resulted in an additional 1,391 child poisonings.

Household Cleaners and Asthma Risk in Children

The prevalence of asthma in the U.S. increased by 75% from 1980–1994, and the asthma rates in children younger than 5 increased more than 160% during that same period, according to the Centers for Disease Control and Prevention. An average of one out of every 13 school-aged children—or 9 million U.S. children under age 18—have been diagnosed with asthma. It's the most common chronic childhood disease in the developed world and has become even more commonplace in the past three decades.

In a 2004 study evaluating the risk of asthma development in children, researchers concluded that "domestic exposure to volatile organic compounds (VOCs) at levels below currently accepted recommendations may increase the risk of childhood asthma." VOCs are found in many household products and also may be embedded in the house itself as part of the paint, flooring, or furniture.[6] Another study of nearly 14,000 children found that the more frequently household chemicals such as bleach or window cleaner were used during pregnancy, the higher the risk that the young child would have persistent wheezing.[7] More troubling was that the relationship between household chemicals and wheezing remained even after factors such as parental smoking and family history of asthma were taken into account.

Although there's no cure, asthma often can be controlled by avoidance of triggers, appropriate dietary and supplement strategies, and, of course, medication as prescribed. Exclusive breast-feeding is believed to be effective in reducing subsequent development of allergies and may reduce the the risk of asthma in children. Antioxidants in the diet, including selenium and vitamins C and E, may have a protective effect. Probiotics are promising as they may produce changes in the gut that stimulate the immune system. And preliminary research has shown that omega-3 fatty acid supplementation may decrease the inflammatory response, including the production of inflammatory mediators in asthmatic patients.

Other Health Hazards Related to Cleaning-Product Ingredients

Asthma and related conditions are not the only risks associated with ingredients in common household products. Butyl cellosolve, often found in all-purpose cleaners, abrasive, and glass cleaners, is a potentially toxic chemical in the glycol-ether family of chemicals. Ingesting large amounts of butyl cellosolve may cause breathing problems, low blood pressure, low hemoglobin levels, acidic blood, and blood in the urine.

Exposure to high levels of ammonia, found in glass cleaners, may be irritating to the skin, eyes, throat, and lungs, and it can cause coughing and burns. Also, asthma sufferers may be more sensitive to breathing ammonia than others. Hypochlorite, found in common household bleach and automatic dishwasher detergents, causes more poisoning exposures than any other household cleaning substance and was the source of over 50,000 poisonings in 2005 alone, according to a report from the Poison Control Center's National Poisoning and Exposure Database.[8]

Drain cleaners, oven cleaners, and toilet bowl cleaners are some of the most dangerous products in our homes. Drain and oven cleaners may contain lye or sodium hydroxide, which can cause severe corrosive damage to eyes, skin, mouth, and stomach if swallowed. Toilet bowl cleaners may contain chlorine or hydrochloric acid. Even brief exposure to low levels of hydrochloric acid vapor can result in throat irritation, and increased exposure can result in rapid breathing, narrowing of the bronchioles, blue coloring of the skin, accumulation of fluid in the lungs, and even death.

There's a long list of dangerous chemicals that are under most sinks in this country—they're even in some products that claim to be green. For more detailed information about the chemicals used in household products, visit the National Library of Medicine and the National Institutes of Health (NIH) Web site at www.householdproducts.nlm.nih.gov.

Keep Your Home Environment Green and Your Children Safe

What can you do as a parent or caregiver to protect a child's health against home-based environmental chemical exposures? We recommend that you first build a healthier, safer home environment and try to take simple, everyday steps to minimize chemical exposures from common household and personal care product ingredients. Be an informed consumer and look for safe and effective alternatives to traditional products without sacrificing your children's long-term health:

1. Build a Safer and Healthier Home Environment

- **Keep the dirt outside.** Most of the dirt in our homes is tracked in through the front door or the garage. Get a good doormat and leave your shoes at the door.
- **Keep windows open** to allow fresh air in and keep toxins flowing out.
- **Select home furnishings made from natural fibers.** Select carpets, pads, bedding, and furniture made from wool, cotton, hemp, and wood.
- **Avoid wall-to-wall carpeting** and choose a powerful vacuum cleaner to help minimize indoor pollution. Use area rugs instead of wall-to-wall carpeting.
- **Avoid phthalates.** These plastic softeners are found in polyvinyl flooring, wall coverings, shower curtains, toys, and even in baby care products and personal care products.
- **Avoid BPA** found in reusable clear polycarbonate plastic water bottles, baby bottles, and food containers (labeled #7) that may leach BPA into food and drink.

2. Make Smart Choices in Household Cleaners

- **Replace chemical-filled household cleaners** with natural, safe, multipurpose cleaners that work on a variety of surfaces.

- **Choose cleaning products from a company committed to product safety,** efficacy, and sustainability; one that offers nontoxic, natural cleaning product choices that are safe, powerful, green, and smart.
- **Look for nontoxic cleaning choices** and hypoallergenic products free of harmful fumes, volatile organic compounds, phenol, lye, hydrochloric acid, sulfuric acid, petroleum distillates, ammonia, sodium hydroxide, butyl cellosolve, or formaldehyde.

3. Make Smart Choices for Personal Care Products Designed for Infants and Children

- **Choose safer products.** Search for safer products that are clinically tested and free of synthetic fragrance or dyes, parabens, 1,4-dioxane, sodium lauryl sulfate (SLS), formaldehyde, phthalates, PEG-100 stearate, and ceteareth-20.
- **Look for gentle products** that are pediatrician tested, sensitivity tested, natural- and organic-ingredient based, hypoallergenic, and pH balanced
- **Look for healthy products** free of synthetic fragrances and artificial colors; products with BPA-free packaging, no phthalates, or toxic inks.

And don't forget that good nutrition and fitness are essential for healthy growth and development of infants and children. Be sure to promote regular exercise, encourage healthful eating habits, and provide a balanced and nutritious diet rich in fresh fruits and vegetables, whole-grain cereals, low-fat dairy products, and lean meats, poultry, and fish. For nutritional insurance, consider additional sources of antioxidants, probiotics, and omega-3 fatty acids for optimal health and vitality.

To find safety information on specific household products, visit the National Institutes of Health Household Products Database at www.household-products.nlm.nih.gov/

Visit the link below to read the Campaign for Safe Cosmetics report: *No More Toxic Tub, Getting Contaminants out of Children's Bath and Personal Products,* http://www.safecosmetics.org/downloads/NoMoreToxicTub_Mar09Report.pdf#page=8

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