



NUTRITION IN THE FIRST 1,000 DAYS

A Foundation for Lifelong Health



What if a span of just 1,000 days shaped our lifelong chance for health? A growing body of research shows that's just what happens in the time between a mother's pregnancy and her child's second birthday. During this brief but critical window, the foundation for a child's future well-being is being built.

Good nutrition in the first 1,000 days is vital to establishing a child's future health, with impacts that last into adulthood. In a real sense, nutrition is the fuel that drives a child's early development. During the first 1,000 days the brain grows more quickly than at any later time in a person's life, and a child needs the right nutrients at the right time to feed her brain's rapid development. [Click here for more on the role of nutrition on brain development during the first 1,000 days.](#) Additionally, a child's taste preferences are formed during this time, and healthy eating patterns take shape.

Unfortunately, many mothers and children do not have access to—or struggle to afford—healthy, nutritious foods. Lack of healthy food and key nutrients can have a detrimental impact on health outcomes and puts children at risk of obesity and other chronic health conditions. Key investments in public programs to support good nutrition in the first 1,000 days are critical. When families participate in public programs, food instability goes down, access to healthy foods goes up and mothers and children have more nutritious diets, better infant feeding practice and supports from nutrition counselors, lactation counselors and health care providers.¹

There are three crucial stages in the first 1,000-days: pregnancy, infancy and toddlerhood. At each stage during the 1,000-day window, nutrition is important to developing a child's physical growth, protecting them from illness and chronic disease and building healthy eating habits.



if their mothers regularly drank carrot juice during the last trimester of pregnancy or the first three months of breastfeeding.⁴

Access to a wide range of healthy and nutritious foods, as well as nutritional counseling and support, is critical during pregnancy. It can help women maintain a healthy weight during pregnancy, which is important because being overweight or obese during pregnancy is associated with health issues impacting both mom and baby. Obesity in pregnancy puts women at risk for gestational diabetes—a condition in which previously healthy women become diabetic during pregnancy.⁵ Babies born to moms with gestational diabetes have increased risks of being obese or overweight and are more susceptible to type 2 diabetes later in life.⁶ Policies designed to support pregnant women's access to healthy foods are a key support needed during this time period—and benefit children in their development, as well.

PREGNANCY

During pregnancy, the quality of a mother's diet is a crucial factor that influences her child's future health. A healthy maternal diet of nutrient-rich foods is essential for the optimal development and functioning of a baby's immune system, organs, metabolism and musculoskeletal and cardiovascular systems. When pregnant women eat foods high in protein, essential fats and vitamins and minerals, they are more likely to have full-term and healthy weight babies.² Whether a child is born premature or low birthweight is an important marker of her future health and development [see call out box "Birth Outcomes Matter"].

A HEALTHY MATERNAL DIET OF NUTRIENT-RICH FOODS IS ESSENTIAL FOR THE OPTIMAL DEVELOPMENT AND FUNCTIONING OF A BABY'S IMMUNE SYSTEM, ORGANS, METABOLISM AND MUSCULOSKELETAL AND CARDIOVASCULAR SYSTEMS.

Pregnancy is also a time when babies start to develop food preferences. What a mother eats during pregnancy influences her child's preferences for certain foods, as flavors from her diet get introduced to baby via amniotic fluid.³ For example, one study demonstrated that six-month-old infants were more likely to eat carrot-flavored cereal and less likely to express distaste

Scientists are only just beginning to understand how the interplay of a person's genes and the environment in the womb affects lifelong health. The growing field of epigenetics finds that while we are pre-programmed by the DNA we receive from our parents, nutrition and other environmental and lifestyle factors can alter the way in which our DNA is expressed [see call out box "The Science Behind Gene Expression...and Later Disease"].^{7,8}

A pregnant woman's physical and mental health have an important influence on her developing baby, as do the environmental and emotional stresses that she experiences. Factors like poverty, homelessness and domestic or neighborhood violence all play a role in her mental health, and all can contribute to a pregnant woman's ability to afford and eat regular, nutritious meals. Smoking during pregnancy exposes babies to a number of harmful chemicals, which may slow their growth rate and lead them to be born too small or too soon.⁹ A baby whose mother smokes during pregnancy is also at a greater risk of obesity later in life.¹⁰ Similarly, alcohol and drug use during pregnancy have strong negative impacts on the future well-being of a developing child. Drinking alcohol while pregnant is associated with an increased risk of birth defects, premature birth, fetal alcohol spectrum disorders, low birthweight and stillbirth.¹¹ Likewise, a woman's drug use while pregnant is linked to an increased risk of miscarriage, low birthweight, premature labor, placental abruption and maternal and fetal death.¹²

INFANCY

Infancy—from birth to a child’s first birthday—is a critical period when babies learn what and how to eat. It is also a time when their palates are trained, and lifelong eating habits begin to form. When it comes to nutrition during infancy, for infants whose mothers can breastfeed, breastmilk is a superfood. We have only recently begun to understand the powerful role breastfeeding plays in infants’ and toddlers’ health and development.

In addition to brain-building benefits, the nutritional and immunological properties unique to breastmilk help protect babies from infection and illness. For mothers who are able, breastfeeding is key to helping reduce infant mortality. Breastfed infants are less likely to die as a result of Sudden Infant Death Syndrome (SIDS)—a leading cause of infant mortality in the U.S.—as well as respiratory infections and necrotizing enterocolitis, which is a devastating condition mainly affecting premature babies.¹³

There is also compelling evidence showing a longer duration of breastfeeding is associated with lower risk for overweight, obesity and type-2 diabetes later in life.¹⁴ Meanwhile, mothers also benefit from breastfeeding. For every year a mother breastfeeds, she significantly reduces her risk of developing ovarian cancer, invasive breast cancer and heart disease.^{15,16}

INFANTS NEED NUTRIENT-RICH FOODS - ESPECIALLY THOSE CONTAINING VITAMIN D, IRON AND ZINC - TO FUEL THEIR GROWTH.

Because of these extraordinary health benefits, the World Health Organization (WHO)*,¹⁷ the American Academy of Pediatrics (AAP)¹⁸ and the American College of Obstetricians and Gynecologists (ACOG)¹⁹ recommend babies be exclusively breastfed (i.e. fed only breastmilk with no solids or other liquids except vitamin/mineral supplements) for the first six months if possible, followed by continued breastfeeding for at least one year alongside appropriate introduction of complementary foods.

Unfortunately, too many mothers lack the support they need to start breastfeeding or continue for as long as

they want. A lack of paid family leave, limited access to breastfeeding support and lactation consultants as well as a lack of family-friendly policies at work contribute to many women falling short on their breastfeeding goals.^{20,21}



Once children are six months of age, they need diverse, nutritious foods along with breastmilk to continue fueling their growth and development. Yet many parents and caregivers introduce babies to solid foods too early before their baby is ready. It is at around six months that most babies’ tongue thrust reflexes fade and they show signs of being ready for solid foods.²² In addition, there is evidence that shows babies who begin to eat solid foods before six months are at greater risk for chronic diseases such as obesity, diabetes and celiac disease.²³

Just as important as when they are introduced are the kinds of solid foods offered to young children. Infants need nutrient-rich foods - especially those containing Vitamin D, iron and zinc - to fuel their growth.^{24,25,26,27,28} Foods high in added sugar, salt and saturated fats should not be part of an infant’s diet. These foods contribute to rapid weight gain in infancy, which is a risk factor for overweight and obesity later in childhood and can “program” a baby’s taste buds to prefer very sweet, salty or fatty foods.^{29,30}

In fact, infancy is a unique opportunity to influence a child’s preference for healthy foods. While a mother’s diet begins to shape her baby’s taste preferences in utero, breastfed babies also experience a wide range

*As a global public health recommendation, WHO recommends exclusive breastfeeding for 6 months followed by continued breastfeeding with appropriate complementary feeding until 2 years or beyond.

of flavors from their mother's diet through breastmilk. This plays a key role in determining what foods are familiar and thus preferred by the baby.³¹

EARLY CHILDHOOD

Many experts believe that early childhood is the best time to establish healthy eating habits. For a toddler to grow and thrive—and to gain an appropriate amount of weight—they need to eat a variety of protein-rich foods, fruits and vegetables, whole-grains, unsweetened milk and other dairy products. Caregivers must also limit the amounts of saturated fats, sugars and sodium toddlers consume.³²



The consequences of poor diet and eating habits during early childhood are significant. Rapid weight gain throughout the first two years of life is associated with lifelong negative health outcomes^{33,34} Research shows a strong connection between obesity in young children and overweight or obesity later in life.^{35,36} In addition, poorly nourished children are more likely to pass on the risk of health challenges once they become parents themselves. In this way, the damaging

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effects of poor nutrition in early life have the potential to cascade down through generations of children and families. Unfortunately, poverty and food insecurity are linked with poor nutrition and obesity—putting some children at much greater risk of weight gain.³⁷

As toddlers are introduced to an adult diet, it is especially important they have opportunities to learn to like healthy foods. There are several factors that influence development of eating behaviors in young children.³⁸ First, research shows the more opportunities children get to sample unfamiliar foods, the more likely they are to like and accept them.³⁹ Second, context matters for children's consumption of healthy foods. During mealtimes, young children need loving attention from adults and a positive atmosphere free of pressure to eat.

The AAP recommends that parents and caregivers employ a responsive style of feeding whereby they teach young children to regulate their own intake of food. Research indicates that non-responsive feeding practices, such as encouraging young children to eat more, or using food to control behavior, are associated with overeating and weight gain.⁴⁰ The AAP also recommends establishing routines for meals and snacks on a predictable schedule, minimizing mealtime distractions such as TV and smartphone use and avoiding using food as a reward or punishment.

Third, young children are powerfully motivated to imitate their parents and other caregivers. Hence, parents' consumption has been shown to be a strong predictor of their child's fruit and vegetable intake.⁴¹ Cultural factors in food choices, servings and eating rituals are also part of the experiences through which young children begin to perceive and imitate healthy eating, and the community too plays a foundational role in healthy eating.⁴² As a whole, young children are most likely to develop healthy eating habits when the adults in their lives model enjoying a variety of foods.⁴³

CONCLUSION

With such a brief, powerful window to increase the chances children thrive, it's common sense to pay special attention to the first 1,000 days of life. The fact is, many of our society's toughest challenges have their beginnings in how well we nourish and nurture our children in their early years. With nutrition affecting everything from a child's risk of chronic disease to how well she does in school, we all pay the price for poor outcomes. Food insecurity impacts a large number of infants and toddlers each year, and 16.5% of households with infants and toddlers experience very low food security.⁴⁴ Some experts estimate that the health-related costs of food insecurity in America total \$160 billion.⁴⁵

The quality of a child's nutrition is shaped not only by decisions made by her parents and caregivers but also by broader social and economic factors. Ensuring our nation's youngest children have the best nutrition for their development and growth is a responsibility that we all share – from healthcare providers to early childhood educators to community leaders to policymakers.

Federal programs that support families are critical to improving access to healthy foods. Strengthening access to programs like the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) and the Supplemental Nutrition Assistance Program (SNAP) ensures that a wide range of nutritious foods are available to pregnant women and young children. And there is considerable evidence about the positive impact that participation in these programs has on reducing food insecurity and poverty.⁴⁶ Access to quality health care and nutrition and

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lactation supports are also important during the first 1,000 days. Programs like Medicaid and the Children's Health Insurance Program make affordable health care



a reality for families. Paid family and medical leave policies can reduce the risk of pregnancy-related health complications, increase breastfeeding rates and reduce the preterm birth rate, among other things.

Policymakers must invest in these programs to ensure they have sufficient funding to meet the needs of everyone eligible, to reduce administrative barriers to nutrition programs and strengthen the benefit packages for what moms and babies need and to support culturally and linguistically appropriate enrollment and outreach activities to get and keep people enrolled. It's up to all of us—from policymakers to parents—to take action to improve kids' nutrition during the first 1,000 days: because everyone benefits when children can reach their full developmental potential.

BIRTH OUTCOMES MATTER

Low birthweight is a leading cause of infant mortality in the U.S. and elsewhere throughout the world. A baby is considered to be low birthweight when she weighs less than 5 pounds, 8 ounces at birth. There are two main reasons why a baby may be born with low birthweight:

Preterm birth—that is, born before 37 weeks of pregnancy. The earlier a baby is born, the lower her birth weight may be.⁴⁷

Growth restriction during pregnancy (also called small for gestational age) when a baby doesn't gain the weight she should before birth, typically because something slowed or stopped her growth in the womb.⁴⁸

Poor maternal nutrition before and during pregnancy is recognized as an important risk factor for low birthweight.⁴⁹ There are other factors, however, that put babies at risk for low birthweight including: food insecurity, smoking, poverty, exposure to domestic violence, alcohol or

substance abuse and environmental factors, such as air pollution and lead exposure.^{50,51,52,53,54,55,56} And in the U.S., black mothers are more than twice as likely than their white counterparts to have low birthweight babies, though researchers are not sure why.⁵⁷

Low birthweight babies are at greater risk for long-term health and developmental problems. Evidence shows that there is a strong link between low birthweight and obesity, heart disease and type 2 diabetes later in life. In a study examining the connections between newborn health and cognitive development, researchers found that birth weight was correlated with educational outcomes for children across all income groups.⁵⁸ The study's authors note that, "while high-quality schools have the potential to improve the outcomes of all children, they do not reduce the gaps generated by poor neonatal health."⁵⁹ In this way, a child's school readiness begins before birth with the health of his mother.

THE SCIENCE BEHIND GENE EXPRESSION...AND LATER DISEASE

Our external environment affects our genes, influencing our overall well-being as well as our susceptibility to disease. The study of how external factors, such as diets, affect our genes—both by causing them to turn 'on' and 'off' and by impacting the way our cells express genes—is called epigenetics. The first 1,000 days is a particularly critical period in which external and environmental factors, such as the food a pregnant mother eats or the home in which a baby lives, can alter a young child's biology.⁶⁰ In fact, a person's cells are effectively programmed in childhood for how they will respond to their environment throughout the remainder of their life. There is also evidence to suggest that some epigenetic changes can be passed down from one generation to the next. In this way, what a child experiences in her first 1,000 days may impact not only her development and health throughout her life, but also potentially

that of her children as well. There is a growing body of research that suggests that heart disease, obesity, type 2 diabetes and behavioral health problems may have their origins in epigenetic changes during pregnancy, and that nutrition plays a key role in these changes.⁶¹ In one recent groundbreaking study, scientists discovered that nutritional deficiencies in a mother's diet as well as her weight status at the time of conception can permanently alter her baby's genes.⁶²

Ultimately, epigenetics adds to our understanding of the importance of good nutrition and healthy environments for young children. It also brings new urgency to the need for action during the first 1,000 days, as improvements in the nutrition of one generation could help prevent increasingly common diseases in future generations.

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WHO WE ARE

1,000 Days leads the fight to give mothers and babies in the U.S. and around the world the nutrition they need to thrive. We work with global leaders and grassroots communities of parents to make the 1,000 days between a woman's pregnancy and her child's 2nd birthday a window of opportunity to build healthier, brighter futures.



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