

In Brief



AGA KHAN FOUNDATION
CANADA
An Agency of the Aga Khan Development Network

This report is part of an occasional series that distills learning and highlights resources around specific development issues.

Early Human Development: Nutrition



The architecture of a person's brain begins at conception, and is formed by the time a child reaches the age of six. Interdisciplinary studies of early human development (EHD) document how every moment of care or neglect, satiation or hunger, and encouragement or stress, ultimately determines a person's potential over the long term. Access to a nurturing environment, stimulation of the mind, and good nutrition throughout fetal development and childhood, shape how an individual is able to learn and respond to future challenges.¹ These factors also help determine whether adults reach their height potential, how long they stay in school, and what level of economic productivity they ultimately reach.² Unfortunately, too few children are exposed to all the developmental building blocks required to reach their full potential.

"After age 2 years, undernutrition will have caused irreversible damage for future development towards adulthood."³

Richard Horton, Editor-in-Chief, *The Lancet*

Undernutrition in pregnancy and early childhood can have major short and long-term effects. It is the underlying cause of 3.5 million deaths per year, 35 percent of the disease burden in children younger than five years, and 11 percent of total global disability-adjusted life years (DALYs).⁴ Fetal undernutrition – especially if associated with rapid weight gain in later childhood – increases the risks of cardiovascular disease, stroke, and diabetes in later life.⁵

¹ Fraser Mustard, "Early Brain Development and Human Development," *Encyclopedia on Early Childhood Development* (2010). [Web](#)

² Robert Black et al, "Maternal and child undernutrition: global and regional exposures and health consequences," *The Lancet* 371 (Jan 2008): 243

³ Richard Horton "Maternal and child undernutrition: an urgent opportunity." *The Lancet* 371 (Jan 2008): 179.

⁴ Black et al, 243

⁵ David Barker, "The Science" *The Barker Theory*, www.thebarkerttheory.org. [Web](#)

Yet, undernutrition is entirely preventable in mothers and young children. While there are no magic bullets – no single vitamin, mineral or nutrient that will send a child on the perfect trajectory to full health and development – there are effective interventions that can reduce the disease burden and the number of child deaths. Recent research suggests all child deaths could be reduced by a quarter in the short term with the right interventions.⁶

However, there is a “golden age” at which such interventions are critical and it is younger than many may realize, writes Richard Horton in *The Lancet*. He notes that after age two, “undernutrition will have caused irreversible damage for future development towards adulthood.”⁷

Macronutrients – such as protein, fat and carbohydrates – are the building blocks of life. Micronutrients are less well known, yet are essential for early health and survival.



Vitamin A:

Helps children resist disease by keeping the immune system strong, improving their chances for survival, growth, and development.¹⁰

Iodine:

Helps prevent serious neurocognitive deficits in infants as well as mental retardation, growth stunting, apathy, impaired movement, and speech or hearing problems.¹¹

Iron:

Helps reduce the risk of hemorrhage and maternal death during childbirth, the risk of fetal mortality and low birth-weight, cognitive and physical development during childhood, and impaired immunity to disease. It can also increase physical and mental abilities.¹²

Zinc:

Helps prevent and treat diarrhea, a condition that kills 1.14 million children annually. It also encourages growth and brain development, accelerates healing, and strengthens the immune systems ability to fight illness and infections.¹³

Folic acid:

Helps reduce the risk of serious neural tube defects, which affect the development of a child’s brain and spinal cord.¹⁴

The evidence is overwhelming: undernutrition is a serious problem that cannot be ignored. It requires coordinated global leadership. Organizations such as the Aga Khan Development Network, the Micronutrient Initiative and others are spearheading change by implementing effective solutions recognizing that:

The health of newborns is inextricably linked to the health of mothers. Proper nutrition and maternal care in the two years before conception and the five years after birth can greatly enhance a child’s chance of survival and development. In the developing world, where teenagers account for up to 40 percent of all first-time pregnancies, community-based education and health intervention programs are most effective when aimed at adolescents, women and newlyweds – along with the husbands supporting these women.⁸ For instance, breastfeeding has been proven to reduce mortality in infants and young children. While breastfeeding is already prevalent in the developing world, interventions at the community level – and promoted through national broadcasts⁹ – can encourage exclusive breastfeeding for six months. The results? Fewer cases of diarrhea, which often leads to dehydration and death in the very young.

⁶ Zulfiqar Bhutta et al, “What works? Interventions for maternal and child undernutrition and survival”, *The Lancet* 371 (Jan 2008): 417

⁷ Horton, 179

⁸ Bhutta et al, 417

⁹ Ibid, 417

¹⁰ “Early Childhood: Saving Lives in Nepal through Vitamin A Distribution.” *Unicef*. www.unicef.org, 25 May 2012. Web

¹¹ “Iodine” *Homegrown Foods*, www.homegrown-foods.com, 2011. Web

¹² “Dietary supplement fact sheet: iron” *Office of Dietary Supplements*, www.ods.od.nih.gov, 24 Aug 2007. Web

¹³ “Get the facts” *Zinc & Health*, www.zincsavestives.com, 2012. Web

¹⁴ “Folic Acid and Pregnancy”, *Kids Health*, www.kidshealth.org. Web

Community-based health interventions are proven, low-cost, and highly effective tools for improving health in marginalized and underprivileged communities.

The studies are conclusive: interventions that include both education and health programs reduce mortality, particularly at early ages, by empowering mothers to practice effective hygiene and proper care for themselves and their children. These measures can mean the difference between life and death in areas where quality health care is often inaccessible.

Fortification of food substances such as wheat, milk and salt are powerful, passive ways to ensure mothers and children receive the nutrients they need.

This approach has become commonplace throughout the developed world. For example, iodized salt and milk fortified with vitamin D paved the way for a variety of nutritionally enhanced products that promote wellness and health. In the developing world, there are opportunities to work with both the private and the non-profit sectors to encourage the uptake of vitamins among those who need them the most, by fortifying foods they already eat.



Proper nutrition during the school day helps ensure the continuity of children's learning.

PROJECT SPOTLIGHT:

Weekly Supplementation for Young Women in Chhattisgarh, India

The Micronutrient Initiative



In Chhattisgarh, India, more than half of all girls are married before reaching the age of 18. In 2010, some 87 percent of adolescent girls were anemic. Anemia limits girls' capacity to take full advantage of their education and, for those who will become pregnant, puts both them and their future fetuses at risk.

To address the problem, The Micronutrient Initiative (MI) supported a pilot project to administer a weekly dose of iron and folic acid (IFA) to more than 95,000 adolescent girls in three districts of Chhattisgarh, through 424 schools and 6,832 health centres. MI provided the supplements and ongoing supervision. School teachers, peer guides and health workers were identified and trained in administering the supplements and in counseling girls to manage side effects and adhere to the regimen. The results? Anemia prevalence in Chhattisgarh has fallen by 14 percent and seven percent in school-going and out-of-school adolescent girls, respectively.

About The Micronutrient Initiative

The Micronutrient Initiative (MI) is the leading organization working exclusively to eliminate vitamin and mineral deficiencies in the world's most vulnerable populations. In 2010-2011, MI reached nearly 500 million people in more than 70 countries. For more information on MI programs, visit micronutrient.org.



PROFILE:

Dr. Zulfiqar Bhutta Professor and Founding Chair
Division of Women & Child Health, Aga Khan University

Dr. Zulfiqar Bhutta has dedicated his 30-year career to saving lives. He first started practicing neonatal pediatrics in the early 1980s, when the field was nascent in the developed world and non-existent in Pakistan. Since that time, Dr. Bhutta has demonstrated what success in this field can look like, even in the direst of circumstances. “Pakistan has many dimensions of poverty,” Dr. Bhutta told *The Lancet*. “There is the poverty that you and I can see out on the streets, a poverty of means, but there is also an enormous poverty of hope and poverty of imagination, even among the learned classes. People think there are just no innovative solutions.”¹⁵

Dr. Bhutta does not abide by that principle. He has worked in a variety of urban and rural settings in Pakistan, and with several

public and private sector initiatives, to develop and implement evidence-based solutions. Through community-based interventions, rich research initiatives and strong academic programs, Dr. Bhutta has saved the lives of innumerable children in some of Pakistan’s most impoverished areas. His ground-breaking work has won many awards in Pakistan and internationally.¹⁶

Dr. Bhutta recommends these top five articles on EHD and Nutrition from the leading British medical journal, *The Lancet*.

“Maternal and child undernutrition: global and regional exposures and health consequences.” [PDF](#)

“What works? Interventions for maternal and child undernutrition and survival.” [PDF](#)

“Effect of a participatory intervention with women’s groups on birth outcomes and maternal depression in Jharkhand and Orissa, India: a cluster-randomised controlled trial.” [PDF](#)

“Community participation: lessons for maternal, newborn, and child health.” [PDF](#)

“A tipping point for child survival, health, and nutrition.” [PDF](#)

The Aga Khan Development Network and Early Human Development

The Aga Khan Development Network (AKDN) has been supporting early human development initiatives for several decades. The Network’s agencies and institutions were international pioneers in recognizing the critical and long-term impact of early human development for both individuals and society. The Aga Khan University plans to establish an Institute for Human Development to continue focusing intellectual resources on these issues in the developing world. The AKDN works in a variety of ways to support EHD initiatives. Each are guided by the principle that EHD interventions should be culturally appropriate, affordable for families, based on sound and current evidence on child development, genuinely involve families and communities, and be sustainable over the long term.

¹⁵ David Holmes, “Zulfiqar Bhutta: patriotics and paediatrics”, *The Lancet* 379 (June 2012): 2141.

¹⁶ Ibid, 2141

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