

# EMPOWERING HOUSEHOLDS AND INDIVIDUALS TO CO-PRODUCE POSITIVE HEALTH OUTCOMES... FOR QUALITY CARE AMIDST INFRASTRUCTURE AND RESOURCE CONSTRAINTS



## THE CHALLENGE

In the most resource-constrained settings, where the first 5 years of life represent a critical window of vulnerability, the ability to adopt healthier behaviors in the home can determine whether a child survives and thrives—or succumbs to disease before his or her fifth birthday. Too often, families lack the knowledge or resources to provide adequate nutrition to young children, increasing their exposure to infectious disease and creating life-long cognitive and developmental deficits. And while the home should be a safe sanctuary for children, common exposures in the household—from poor sanitation to parasitic worms, malaria-carrying mosquitos, and indoor air pollution—can put health at risk. New approaches are needed to help the poorest and most vulnerable families create a safe and nurturing home, building the best possible foundation for their children’s futures.

## NUTRITIONAL DEFICITS—IN UTERO AND IN EARLY LIFE—LEAVE CHILDREN ON A SHAKY FOUNDATION

Research has identified a 1,000-day window—lasting roughly from conception to a child’s second birthday—during which nutrition has life-long effects on physical and cognitive development.<sup>i</sup> Too few children receive appropriate nutrition during this window; 45% of under-5 deaths are attributable to undernutrition,<sup>ii</sup> 22.2% of children under-5 (151 million) are stunted, and 7.5% of children (51 million) suffer from wasting.<sup>iii</sup> Nutritional deficits begin in pregnancy. Worldwide, 19.2% of pregnant women suffer from iron deficiency (increasing the risk of low birthweight and maternal and child death); 7.8% of pregnant women suffer from night blindness linked to Vitamin A deficiency (associated with low birthweight and higher infant mortality); and 28.5% of the global population experiences iodine deficiency (associated in pregnancy with lower child intelligence and potentially lower birthweight).<sup>iv</sup> Underweight mothers are more likely to give birth to low birth weight babies, and 12% of child deaths are attributable to fetal growth restriction.<sup>v</sup> Poor nutritional practices continue after birth, when compliance with exclusive breastfeeding recommendations (for the first six months) is low; just three in ten babies aged 1–5 months receive exclusive breastfeeding, and suboptimal breastfeeding is associated with over 800,000 child deaths each year.<sup>vi</sup> Malnourished children





are at higher risk of death from infectious childhood diseases, and stunting specifically predicts poor educational, cognitive, and motor development.<sup>vii</sup>

## Staying Safe from Infectious Disease Requires Healthy Behavior in the Home

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Cost-effective interventions can help keep families safe from common infectious diseases—but only if families become active partners in co-producing their own health. In malaria-endemic areas, major national and global efforts have greatly expanded access to lifesaving technology, yet too many families opt to sleep outside of available nets, leaving them vulnerable to malaria transmission. In Nigeria, for example, about 80% of families owned at least one bed net, but just 43% of those families used them consistently.<sup>viii</sup> Across sub-Saharan Africa, the proportion of pregnant women using bed nets *when a net was available* frequently totaled 50% or less, and ran as low as 29% in Zimbabwe and 26% in Nigeria; however, most underlying data predated recent malaria control scale-up efforts and significant improvements have occurred in the interim.<sup>ix</sup> Likewise, routine handwashing with soap after defecation can help prevent the spread of fecal-oral pathogens and reduce risk of diarrheal disease by 23%–40%, yet this life-saving intervention is regularly practiced by just 19% of the global population.<sup>x</sup> Even where families understand the benefits of handwashing, studies suggest a large gap between their knowledge and real-world behavior.<sup>xi</sup>

## Common Exposures in the Home Put Families' Health at Risk

Household-level exposures can transform the home from a safe refuge to a source of ill-health. Three billion people cook using solid fuels, exposing households to toxic indoor air pollution and causing 3.8 billion deaths per year;<sup>xii</sup> high costs, poor understanding of the health risks, and low prioritization can prevent families from adopting safer options.<sup>xiii</sup> At times, housing itself can also create health risks. Dirt floors—common in poor rural and peri-urban settings—create an environment for parasites to reproduce and thrive, infecting children during play. In Nigeria, for example dirt floors were associated with 9x greater odds of a parasitic skin condition;<sup>xiv</sup> and in Brazil, dirt floors were associated with 4x greater odds of an intestinal parasitic infection.<sup>xv</sup>

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## THE PATH FORWARD: STAYING HEALTHY AT HOME

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### Improved Nutrition for the Best Possible Start in Life

Improved nutritional practices in the home—supported by the frontline health system—should be affordable and feasible in even the most resource constrained settings. The World Bank has estimated that a “priority package” of the most cost-effective nutrition interventions can be offered for just \$4 per child per year, averting 2.3 million child deaths over the next decade; a “full” package would cost just \$10 per child, averting an additional 1.4 million preventable deaths (see Spotlight for more details).<sup>xvi</sup> The efficacy of nutritional interventions is strongly supported by extensive research evidence, but prompting large-scale behavior change remains challenging.<sup>xvii</sup>



## A few strategies are particularly effective for promoting better nutritional practices within the household.

.....  
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At the individual level, a systematic review of research finds strong evidence that counselling and educational interventions significantly increase exclusive breastfeeding;<sup>xviii</sup> in food insecure populations, basic education alone can produce large and significant reductions in stunting and wasting.<sup>xix</sup> Strong evidence also suggests that lay community health workers can effectively educate families about the importance of improved nutritional practices; meta-analysis suggests that lay health worker interventions more than triple exclusive breastfeeding up to six months, and a separate review found that community-based interventions almost double early breastfeeding.<sup>xx</sup> At the national or societal level, universal food fortification of staple foods like cereals, salt, and milk products can help families get needed nutritional supplementation without additional cost or effort. Universal fortification programs are extraordinarily cost-effective, and despite methodological barriers to their evaluation are strongly associated with reduced anemia; higher concentrations of vitamin A, zinc, and vitamin D; and higher developmental scores in children (via salt iodization).<sup>xxi</sup>

## Toward Healthy Behavior in the Home

Distribution of long-lasting insecticidal nets (LLINs) is a central plank of global malaria control efforts; the WHO currently recommends their universal free distribution in malaria-endemic regions.<sup>xxii</sup> Consistent net use at night is strongly associated with decreased risk of contracting and dying from malaria, with meta-analyses indicating that LLINs, on average, drive a 56% reduction in malaria prevalence.<sup>xxiii</sup> Free distribution campaigns appear to increase levels ownership<sup>xxiv</sup> but population-based studies have found suboptimal usage even where nets are present.<sup>xxv</sup> Education on the importance and proper use of nets appears more promising as a strategy to increase use, with a systematic review identifying positive effects across four studies, reinforced by qualitative evidence on the determinants of long-term consistent net use from Uganda.<sup>xxvi</sup>

### TOP INTERVENTIONS

Intervention	Evidence Strength	Research Findings
Breastfeeding counselling and education	Strong	Positive
Education via lay community health workers	Strong	Positive
Universal fortification	Strong	Positive
Basic nutrition education	Strong	Positive
LLIN use	Strong	Positive
LLIN free distribution campaigns	Strong	Positive
Education on malaria bed net use	Moderate	Positive
School-based handwashing interventions	Moderate	Positive
Community-based handwashing interventions	Low	Positive
Social marketing for handwashing	Low	Mixed
Hygiene messaging	Moderate	Positive
Flooring upgrades	Moderate	Positive
Clean cook stove adoption	Moderate	Mixed

Likewise, evidence from a systematic review suggests that handwashing with soap can prevent between a quarter and a third of diarrhea cases in the worst-affected regions,<sup>xxvii</sup> but handwashing behavior remains suboptimal worldwide.<sup>xxviii</sup> Studies from low- and middle-income countries suggest that multi-level school-based interventions can help improve



handwashing behavior and health in children, decreasing the incidence of diarrhea by 53%–73% and respiratory infection by an average of 23%, along with associated absenteeism.<sup>xxxix</sup> Importantly, these interventions supplemented handwashing education with complementary measures like multimedia handwashing reminders, soap distribution, and construction of ventilated pits, making it difficult to isolate the impact of any single approach or intervention.<sup>xxx</sup> A broader systematic review points to weak to moderate evidence in favor of community-based approaches and hygiene messaging to improve handwashing behavior, but finds no consistent effect from social marketing interventions.<sup>xxxi</sup>

## Empowering Families to Build Healthier Households

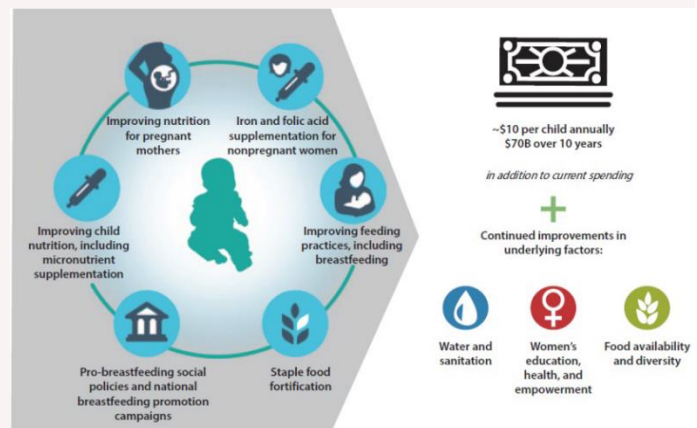
Creative solutions and government interventions can help empower families to ditch health-harming household infrastructure in favor of healthier options. In Mexico, the *Piso Firme* program provided free cement flooring upgrades to poor households; a rigorous evaluation found that the program reduced parasitic infections by 78%, diarrhea by 49%, and anemia by 81%.<sup>xxxii</sup> For the poorest communities and most resource-constrained governments, the price tag for cement flooring—about \$150 per household under *Piso Firme*,<sup>xxxiii</sup> but potentially far higher in countries without a domestic cement industry—may still be out of reach. To make floor upgrades more affordable, social entrepreneurs operating in Rwanda (EarthEnable) have generated a new technological solution for more affordable earthen floors; their for-profit Rwandan subsidiary will install upgraded flooring for about \$3 per square meter, with financing options to help spread the cost over months or years.<sup>xxxiv</sup> Likewise, a range of subsidy and financing models have helped families adopt clean cookstoves; however, many families revert to traditional solid-fuel methods without continued subsidies to purchase clean fuels.<sup>xxxv</sup> Research evidence is inconsistent, with mixed findings on the links between clean cookstove adoption and improved health outcomes.<sup>xxxvi</sup>

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## SPOTLIGHT

### An Affordable Package to Address Childhood Nutrition Deficits

► In 2017, the World Bank estimated the programmatic and financing needs to achieve four global nutrition targets defined in 2012 by the World Health Assembly: a 40% reduction in stunting; a 50% reduction in anemia among reproductive-aged women; at least 50% prevalence of exclusive breastfeeding (to 6 months); and acute malnutrition prevalence below 5%. Combing through mountains of evidence on intervention costs and effectiveness, the report authors calculated that achieving these ambitious goals would cost \$70 billion over 10 years—the equivalent of just \$10 per child—with enormous benefits: averting 3.7





million deaths and 65 million cases of stunting. To address the reality of constrained resources, the authors also ranked interventions by cost-effectiveness and suggested a \$4 per child “priority-package” of the seven interventions with greatest “bang for the buck”: antenatal micronutrient supplementation; infant and young child nutrition counseling; intermittent presumptive treatment of malaria in pregnancy in malaria-endemic regions; vitamin A supplementation; treating severe acute malnutrition; intermittent weekly iron and folic acid supplementation for 15–19 year-old girls attending school; and fortifying wheat and maize flour with iron and folic acid. Fully implementing this prioritized package would save 2.3 million lives and prevent 50 million cases of stunting over the next decade, greatly improving global nutrition but falling short of ambitious international targets.<sup>xxxvii</sup>

### Healthier Flooring at an Affordable Price Point

- ▶ Rigorous evidence shows that replacing dirt floors with upgraded, impermeable materials can dramatically improve a family’s health.<sup>xxxviii</sup> However, concrete, the most common and feasible upgrade option, can be financially out of reach to the poorest households. In 2013, after exploratory field research in Rwanda revealed the enormous health and social burden of dirt flooring, a team of Stanford graduate students started searching for a more affordable solution. Through chemistry trial and error, they discovered a proprietary process to construct and seal earthen floors for just \$3 per square meter—a fraction of the cost of concrete. Since then, the team has established a global non-profit (EarthEnable) with local for-profit Rwandan and Ugandan subsidiaries to install the floors at a self-sustaining yet affordable price point.<sup>xxxix</sup>
- ▶ Demand for their service is high, and customers are willing to pay—sometimes facilitated by financing options. By mid-2018, EarthEnable had floored 2,280 homes in rural Rwanda and Uganda, providing full-time employment to a staff of 80 members of the local communities.<sup>xl</sup> EarthEnable’s floors have won international acclaim, including a €500,000 first-place prize in 2017 for outstanding sustainable entrepreneurship from the Dutch Postcode Lottery Green Challenge.<sup>xli</sup> However, its operations have not been subject to rigorous impact evaluation.

### ENDNOTES

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