

# Water, Sanitation, and Hygiene (WASH) and Nutrition

## Background

Undernutrition accounts for more than one third of child deaths around the world.<sup>1</sup> When children are undernourished, they have lowered resistance to infection and are more likely to die from diarrheal diseases and respiratory infections.<sup>2</sup> Frequent illness also saps the nutritional status of those who survive, locking them into a vicious cycle of recurring sickness and faltering growth.<sup>3</sup> Stunted growth is a reduced growth rate in human development and is a primary manifestation of malnutrition in early childhood, including malnutrition during fetal development brought on by the malnourished mother.<sup>4</sup> In 2011, an estimated 165 million children under 5 years of age, or 26 percent, were stunted.<sup>5</sup> The first 1,000 days of a child's life are critical in fetal and child development when children are especially vulnerable to the adverse and chronic effects of intestinal diseases.<sup>6</sup>

## The Challenge

Today, diarrhea, often caused by poor sanitation, lack of hygiene, and unsafe drinking water (WASH), is the second leading cause of child death globally, and the leading cause of child death in sub-Saharan Africa.<sup>7</sup> Even when food consumption is sufficient, diarrheal disease inhibits nutrient absorption. As diarrhea causes undernutrition, it also reduces a child's resistance to subsequent infections.<sup>8</sup> When diarrhea doesn't kill, repeated bouts during early childhood can negatively impact physical and cognitive development.<sup>9</sup>

### WASH and Undernutrition

- Poor sanitation and unsafe drinking water cause diarrheal disease and environmental enteropathy
- These inhibit nutrient absorption, which can lead to undernutrition and stunting
- Water, sanitation, and hygiene interventions can prevent at least 860,000 child deaths from undernutrition a year<sup>7</sup>

There is emerging evidence of another intestinal disease, environmental enteropathy, which has an effect on child growth. Environmental enteropathy is a disease of the small intestine that results from chronic childhood exposure to fecal microbes and poor sanitation.<sup>10</sup> It reduces a child's capacity for nutrient absorption.<sup>11</sup> Due to environmental enteropathy, the impact that the lack of WASH has on the health burden of undernutrition may be massively underestimated.

## The Solution

Safe drinking water, proper sanitation, and hygiene can prevent undernutrition and stunting in children<sup>12</sup> by preventing the development of environmental enteropathy and diarrheal disease. Reductions in diarrheal disease alone through safe WASH can prevent long-term morbidity and at least 860,000 child deaths a year caused by undernutrition.<sup>13</sup>

Children living in households with proper sanitation and hygiene are taller for their age, or less stunted, compared to children living in

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contaminated environments.<sup>14</sup> Handwashing with soap, an element of hygiene programming, can reduce the incidence of diarrhea by 42 to 47 percent.<sup>15</sup> Access to safe drinking water nearby also reduces risk of diarrheal disease – a 15 minute reduction in water collection time can reduce diarrheal disease by 41 percent.<sup>16</sup>

### Case Study

In Ethiopia, water, sanitation and hygiene (WASH) interventions **reduced the prevalence of stunting by 12 percent.**<sup>17</sup>

Handwashing, water quality treatment, sanitation, and hygiene are core interventions for maternal and child undernutrition and survival.<sup>18</sup> The most effective interventions for child growth and development are those that combine improved nutrition with prevention and control of intestinal infections.<sup>19</sup>

<sup>1</sup> UNICEF, 2013. *Improving Child Nutrition: The Achievable Imperative for Global Progress*. [http://www.childinfo.org/files/NutritionReport\\_April2013\\_Final.pdf](http://www.childinfo.org/files/NutritionReport_April2013_Final.pdf).

<sup>2</sup> *Ibid.*

<sup>3</sup> *Ibid.*

<sup>4</sup> *Ibid.*

<sup>5</sup> Black, R., et al., 2013. Maternal and child undernutrition and overweight in low-income and middle-income countries. *Lancet* 382(9890): 427-451. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(13\)60937-X/fulltext](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(13)60937-X/fulltext).

<sup>6</sup> *Ibid.*

<sup>7</sup> Walker, C., et al., 2013. Global burden of childhood pneumonia and diarrhoea. *Lancet* 381(9875): 1405-1416. <http://www.ncbi.nlm.nih.gov/pubmed/23582727>.

<sup>8</sup> Dewey, K. & Brown, H., 2003. Update on technical issues concerning complementary feeding of young children in developing countries and implications for intervention programs. *Food Nutrition Bulletin* 24(1):5-28. <http://www.ncbi.nlm.nih.gov/pubmed/12664525>.

<sup>9</sup> Guerrant, R., et al., 2006. Early childhood diarrhea predicts impaired school performance. *The Pediatric Infectious Disease Journal* 25(6): 513-20. <http://www.ncbi.nlm.nih.gov/pubmed/16732149>.

<sup>10</sup> Spears, D., 2013. How much international variation in child height can sanitation explain? Policy Research Working Paper 6351. World Bank, USA. [http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2013/02/05/000158349\\_20130205082533/Rendered/PDF/wps6351.pdf](http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2013/02/05/000158349_20130205082533/Rendered/PDF/wps6351.pdf).

<sup>11</sup> Prendergast, A. & Kelly, P., 2012. Review: enteropathies in the developing world: neglected effects on global health. *American Journal of Tropical Medicine and Hygiene* 86(5): 756-763. <http://www.ncbi.nlm.nih.gov/pubmed/22556071>.

<sup>12</sup> Dangour, A., et al., 2013. Interventions to improve water quality and supply, sanitation and hygiene practices, and their effects on the nutrition status of children. *Cochrane Database of Systematic Reviews (Online)* 8, CD009382. <http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0057931/>

<sup>13</sup> Prüss-Üstün, A., et al., 2008. *Safer Water, Better Health: Costs, Benefits and Sustainability to Interventions to Protect and Promote Health*. [http://apps.who.int/iris/bitstream/10665/43840/1/9789241596435\\_eng.pdf](http://apps.who.int/iris/bitstream/10665/43840/1/9789241596435_eng.pdf).

<sup>14</sup> Lin, A., et al., 2013. Household environmental conditions are associated with enteropathy and impaired growth in rural Bangladesh. *American Journal of Tropical Medicine and Hygiene* 89(1): 130-137. <http://www.ncbi.nlm.nih.gov/pubmed/23629931>.

<sup>15</sup> Curtis, V. & Cairncross, S., 2003. Effect of washing hands with soap on diarrhoea risk in the community: a systematic review. *The Lancet Infectious Diseases* 3(5):275-281. <http://www.ncbi.nlm.nih.gov/pubmed/12726975>.

<sup>16</sup> Pickering, A. & Davis, J., 2012. Freshwater availability and water fetching distance affect child health in sub-Saharan Africa. *Environmental Science and Technology* 46(4): 2391-2397. <http://pubs.acs.org/doi/abs/10.1021/es203177v>.

<sup>17</sup> Fenn, B., et al., 2012. An evaluation of an operations research project to reduce childhood stunting in a food-insecure area in Ethiopia. *Public Health Nutrition* 17:1-9. <http://www.ncbi.nlm.nih.gov/pubmed/22717058>.

<sup>18</sup> Bhutta, Z., et al., 2008. What works? Interventions for maternal and child undernutrition and survival. *Lancet* 371: 417-440. <http://www.ncbi.nlm.nih.gov/pubmed/18206226>.

<sup>19</sup> Dewey, K., & Mayers, D., 2011. Early child growth: how do nutrition and infection interact? *Maternal & Child Nutrition* 7(3): 129-142. <http://www.ncbi.nlm.nih.gov/pubmed/21929641>.