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SPRING Working Paper

SBCC Pathways for Improved Maternal, Infant, and Young Child Nutrition Practices

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September 2014



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ABOUT SPRING

The Strengthening Partnerships, Results and Innovations in Nutrition Globally (SPRING) project is a five-year USAID-funded Cooperative Agreement to strengthen global and country efforts to scale up high-impact nutrition practices and policies and improve maternal and child nutrition outcomes. The project is managed by JSI Research & Training Institute, Inc., with partners Helen Keller International, The Manoff Group, Save the Children, and the International Food Policy Research Institute. SPRING provides state-of-the-art technical support and focuses on the prevention of stunting and maternal and child anemia in the first 1,000 days.

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DISCLAIMER

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Introduction

In their seminal framework of the causes of undernutrition,¹ the United Nations Children's Fund (UNICEF) identified three underlying causes of undernutrition: inadequate care and feeding practices,² household food insecurity, and an unhealthy household environment and inadequate health services. All are behavior related. According to an analysis of the World Health Organization's (WHO) 2010 Global Burden of Disease report, 15 of the top 20 health risk factors in sub-Saharan Africa are predominantly behavioral, and the other five are highly influenced by behavior.³ Behavior change is paramount to the prevention of stunting and anemia.

Social and behavior change communication (SBCC) is a behavior-centered approach to facilitating individuals, households, groups, and communities in adopting and sustaining improved health and nutrition related practices. The approach draws upon social science and behavior change theories to address behavior and the environment within which behavior change occurs. SBCC activities can be classified into three basic categories: behavior change communication (BCC), social and community mobilization, and advocacy.

In this paper, the Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project presents pathways between SBCC delivery strategies and improved maternal infant and young child nutrition (MIYCN) practices. These pathways are based on a review of SBCC strategies and theories as well as a systematic literature review exploring the effectiveness of SBCC approaches in changing priority MIYCN practices. The findings from this literature review and an interactive web-based tool can be found on www.spring-nutrition.org.

HIGH-IMPACT MIYCN PRACTICES

Figure 1 provides a pictorial representation of MIYCN practices prioritized in *The Lancet's* 2008 and 2013 Maternal and Child Nutrition Series, the WHO's *Essential Nutrition Actions: Improving Maternal,*

¹ United Nations Children's Fund (UNICEF). 1990. *Strategies of Improving Nutrition of Children and Women in Developing Countries*. New York, NY: UNICEF.

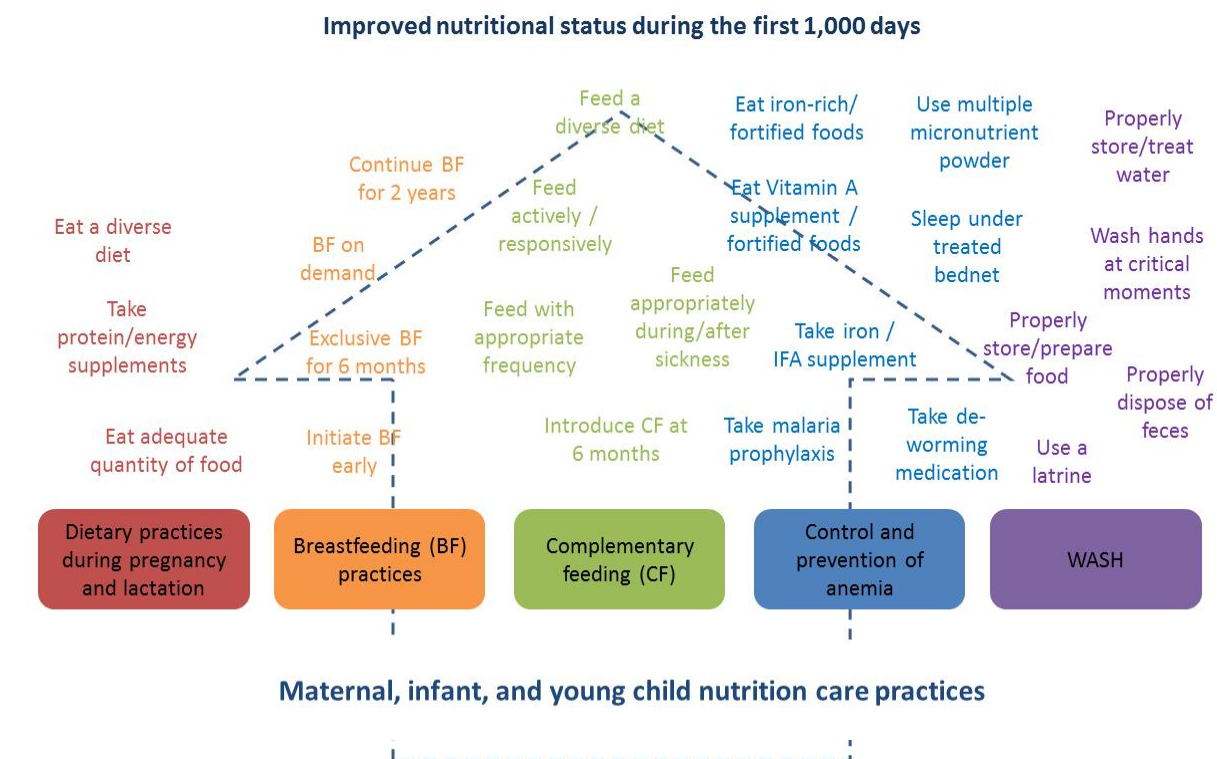
² Practices and behaviors are used somewhat interchangeably in this document. While the authors recognize subtle differences between the two, in the context of MIYCN priority care practices are much the same as priority behaviors.

³ Lim, S.S., T. Vos, A.D. Flaxman, G. Danaei, K. Shibuya, H. Adair-Rohani, et al. 2012. "A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010." *The Lancet*. 9859:2224– 2260.

Newborn, Infant and Young Child Health And Nutrition document (2013),⁴ the WHO's e-Library of Evidence for Nutrition Actions,⁵ and UNICEF's report *Improving Child Nutrition: The Achievable Imperative for Global Progress*.⁶ Practices are categorized into five primary intervention areas: dietary practices during pregnancy and lactation, breastfeeding practices, complementary feeding practices, control and prevention of anemia, and water, sanitation, and hygiene (WASH)-related practices. It is important to note that these areas are not mutually exclusive. Interventions will often define complementary feeding to include many of the practice for the control and prevention of anemia as well as WASH practices. Evidence supporting the positive relationship between each practice and nutritional status can be found in **Annex 1** of this document.

The practices presented in **Figure 1** do not represent an exhaustive list of practices affecting nutritional status during the 1,000 day window of opportunity. For example, correct latch and positioning for breastfeeding are very important practices, but are not listed because they are considered sub-practices related to a high-impact nutrition intervention (exclusive breastfeeding or continued breastfeeding). Furthermore, attending antenatal care visits during pregnancy and seeking timely appropriate care for pneumonia or diarrhea are closely related to nutritional outcomes, but are not included because they are not generally considered high-priority *direct* nutrition interventions.

Figure 1. Evidence-Based MIYCN Practices for Improving Nutritional Status



⁴ WHO. 2013. *Essential Nutrition Actions: Improving maternal, newborn, infant, and young child health and nutrition*. Available at www.who.int/nutrition (accessed October 2013).

⁵ WHO. E-Library of Evidence for Nutrition Actions. Available at <http://www.who.int/elena/en/>

⁶ UNICEF. 2013. *Improving Child Nutrition: The achievable imperative for global progress*. Available at http://www.unicef.org/publications/files/Nutrition_Report_final_lo_res_8_April.pdf.

SBCC PATHWAYS TO IMPROVED MIYCN PRACTICES AND STATUS

A well thought-out conceptual framework (sometimes referred to as a theory of change) can guide program design, identification of solutions and innovations, monitoring of change, and demonstration of success. **Figure 2** presents a conceptual framework illustrating pathways from SBCC delivery strategies, targeting a range of populations in order to address key behavioral determinants, improve MIYCN practices and ultimately improve nutritional status. The immediate and underlying causes of undernutrition represented at the top of the framework are consistent with the UNICEF framework:⁷ however, care practices are emphasized given the focus of this document on MIYCN practices behaviors.⁸ The bottom half of the framework presents SBCC delivery strategies for addressing the causes of undernutrition and the determinants of MIYCN practices.

Impact: Improved nutritional status is depicted at the top of the framework.

Immediate Causes: Nutritional status is influenced by two primary immediate causes or determinants: dietary intake and health status. Diet and disease are intimately related. A poorly-nourished individual is more likely to develop disease, and an ill person may require more calories, absorb calories less efficiently, or suffer from anorexia. Although either determinant can contribute to undernutrition, it often results from a combination of the two. The immediate causes of undernutrition are depicted in the second level of the framework.

Underlying Causes: Dietary intake and disease are influenced by three primary underlying causes: food insecurity, inadequate care and feeding practices (e.g., exclusive breastfeeding), and an unhealthy household environment and inadequate health services (e.g., micronutrient supplementation or timely appropriate care for diarrhea). It is important to note this includes availability and quality of services and products as well as access to and demand for products and services, for example reproductive health products and services, or fortified food products and services.

Each of these underlying causes is heavily influenced by behaviors at the household level – behaviors related to food production, purchase, storage, and intrahousehold distribution; behaviors related to MIYCN care, and behaviors related to the utilization and demand for health and sanitation services. Access to food or optimal sanitary facilities alone does not necessarily lead to improved dietary intake or health status. Where food is accessible, for example, a caretaker must still make decisions about how the food is prepared and whether and how often the food is fed to children. Furthermore, the presence of a latrine does not necessarily imply that the latrine will be utilized or utilized consistent with best practices. The underlying causes of undernutrition are depicted in the third level of the framework.

⁷ United Nations Children’s Fund (UNICEF). 1990. Strategies of improving nutrition of children and women in developing countries. New York: UNICEF.

⁸ This draws upon theories of behavior change which have been summarized by the USAID-funded Communication for Change (C-Change) Project. C-Change Program. 2012. *C Modules: A Learning Package for Social and Behavior Change Communication (SBCC)* (Version 3). http://c-changeproject.org/sites/default/files/sbcc_module0_intro.pdf. Other versions can be accessed at http://www.c-changeprogram.org/c-channel_issue39_mar2012.

Behavioral Determinants: Behavior is complex. The framework's fourth level depicts three primary determinants associated with the adoption of a behavior: demand, an enabling environment, and supply⁹:

- **Demand:** Adopting and sustaining optimal MIYCN practices and food and health services requires *demand* on the part of caregivers, their families, and communities. Demand is dependent on awareness, knowledge, and motivation to act, which is often influenced by attitudes, beliefs, and perceptions of social norms. Knowledge and motivation, however, may not be sufficient. Caregivers must also have the necessary skills, self-efficacy, agency, and control of resources (e.g. allocation of food, finances, and time) to act.
- **Environment:** The *environmental* factors that enable individuals and households to adopt and sustain practices include culture, social norms and support, and role models at all layers of society. Many global, national, and local factors affect individual and household practices as well as food and health systems. An enabling environment is one in which the social, political, financial, structural, and operational systems are conducive to ensuring the availability of and access to high-quality, affordable foods and health services, and the adoption and maintenance of priority MIYCN practices.
- **Supply:** The availability and quality of both affordable services and food, especially complementary foods and micronutrient-rich foods, in addition to health and support services, constitute *supply*. This requires enabling policies, finances, and systems to account for context (farming practices, markets, and industries, as well as cultural beliefs surrounding food and health), geography, gender, and intrahousehold resource allocation. Additional factors affecting availability and quality of services and food include the skills, time, and commitment of service providers from various sectors at both the community and facility or institutional level.

Target population: The framework's fifth layer shifts the focus from determinants to delivery science. Behavior is complex, and many people can influence whether a caretaker adopts or fails to adopt a promoted behavior. Key *target populations* for behavior change interventions include caregivers, family members, partners, or peers (direct influencers), as well as other gate keepers or enablers such as community and religious leaders. Successful behavior change programs often target more than one population group.

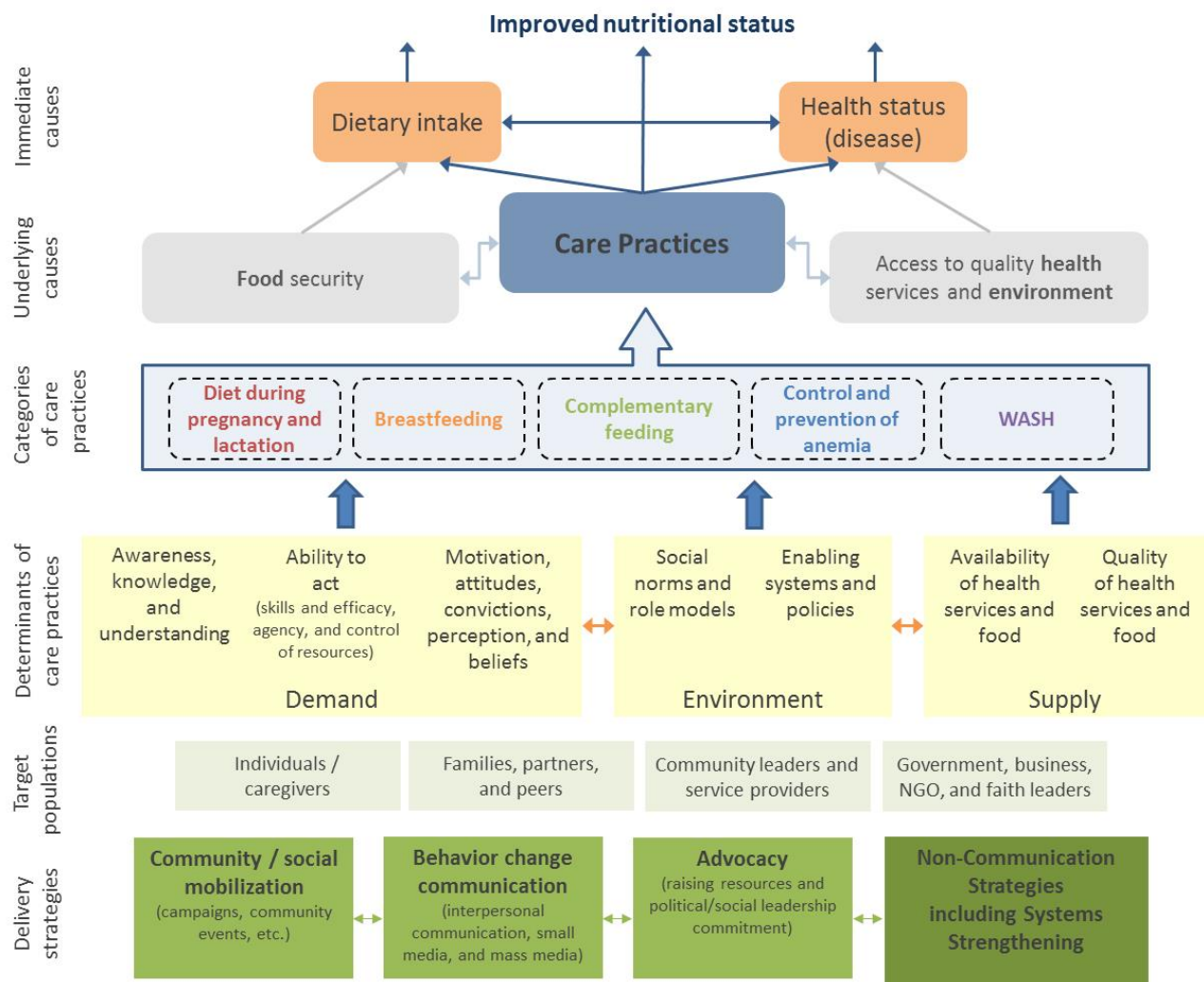
Delivery strategies: Finally, the framework illustrates key delivery strategies for improving MIYCN practices. As the primary focus of this document is to map the pathways of SBCC, greater attention has been given to SBCC delivery strategies which include community and social mobilization, BCC, and advocacy. In addition there is a wide range of non-communication strategies that can promote or enable improved MIYCN practices.

1. **Community and social mobilization** engages and supports participation of institutions, community networks, social/civic and religious groups to shift attitudes, structures, and norms to better support priority practices.

⁹ These categorizations of demand, supply (including availability and quality), and environment are based on the work by Marsh, Alegre, and Waltensperger. 2008. *Journal of Nutrition* 138: 630-633.

2. **Behavior change communication** involves face-to-face dialogue with individuals or groups to inform, motivate, problem solve, or plan, with the objective to promote and sustain behavior change. BCC activities typically target those who need to adopt and sustain priority practices (mothers, fathers, caregivers, and service providers) and may occur at home, in the community, or at a facility.
3. **Advocacy** informs and motivates leadership to create a supportive environment to achieve program objectives and development goals. Advocacy creates awareness and encourages leaders to take actions to enable the adoption of promoted practices.
4. **Non-communication strategies** include policy development, distribution of products (e.g., food, micronutrients, de-worming medication), and strengthening of human resource management systems, logistics or supply chain management, food value chain systems, or health management information systems.

Figure 2. Conceptual Framework of the Pathways from SBCC Delivery Strategies to Improved MIYCN Practices and Status



EVIDENCE-BASED SBCC DELIVERY STRATEGIES

SBCC approaches are grounded in theories of behavioral and social science. SBCC, adapted to local contexts, is generally considered effective mechanisms for improving MIYCN practices at the household level. However, there is little evidence to assist governments, donors, and programmers in understanding which approaches and tools are most effective for different types of audiences and behaviors. Donors are increasingly seeking more rigorous scientific justification to guide their investments in SBCC.

For evidence of the effectiveness of SBCC delivery strategies in improving MIYCN practices, please see SPRING's "Evidence of Effective Approaches to Social and Behavior Change Communication for Preventing and Reducing Stunting and Anemia: Findings from a Systematic Literature Review" and an interactive web-based tool for identifying evidence for particular strategies and MIYCN practices at www.spring-nutrition.org.

Annex I. Supporting Evidence for MIYCN Practices

This annex provides detailed citations associated with each of the key practices portrayed in **Figure 1** of the core document. The citations represent some of the best evidence available at the time this document was developed in 2013, supporting the prioritization of these practices for improving maternal and child nutrition during the first 1,000 days. It is not an exhaustive list of all references on the subject. The citations are organized by practice.

ACTIVELY AND RESPONSIVELY FEED

The WHO and UNICEF have issued guidelines on the importance of feeding behaviors and responsive feeding (WHO 2003). Relatively few studies explored feeding practices, and those that did were unable to fully separate the influence of responsive or active feeding practices from other changes in breastfeeding practices and types of complementary foods.

PAHO/WHO. Guiding Principles for Complementary Feeding of the Breastfed Child. 2003. Washington, DC: PAHO, WHO.

Vazir, Shahnaz, Patrice Engle, Nagalla Balakrishna, Paula L Griffiths, Susan L Johnson, Hilary Creed-Kanashiro, Sylvia Fernandez Rao, Monal R Shroff, and Margaret E Bentley. 2013. "Cluster-randomized Trial on Complementary and Responsive Feeding Education to Caregivers Found Improved Dietary Intake, Growth and Development Among Rural Indian Toddlers." *Maternal & Child Nutrition* 9 (1) (January): 99–117. doi:10.1111/j.1740-8709.2012.00413.x.

Some evidence suggests that active or responsive feeding does not affect weight gain.

Aboud, Frances E, Sohana Shafique, and Sadika Akhter. 2009. "A Responsive Feeding Intervention Increases Children's Self-feeding and Maternal Responsiveness but Not Weight Gain." *Journal of Nutrition* 139 (9) (September): 1738–1743. doi:10.3945/jn.109.104885.

CONTINUE BREASTFEEDING THROUGH TWO YEARS OF AGE

Edmond, Karen M, Betty R Kirkwood, Seeba Amenga-Etego, Seth Owusu-Agyei, and Lisa S Hurt. 2007. "Effect of Early Infant Feeding Practices on Infection-specific Neonatal Mortality: An Investigation of the Causal Links with Observational Data from Rural Ghana." *The American Journal of Clinical Nutrition* 86 (4) (October): 1126–1131.

Kramer, Michael S, and Ritsuko Kakuma. 2004. "The Optimal Duration of Exclusive Breastfeeding: a Systematic Review." *Advances in Experimental Medicine and Biology* 554: 63–77.

WHO. 2013. *Long-term Effects of Breastfeeding: a Systematic Review*. Geneva: WHO.

EAT ADEQUATE QUANTITY OF FOOD DURING PREGNANCY AND LACTATION

Evidence focuses primarily on the relationship with low birthweight.

Khoushabi, F. 2010. "Impact of Nutritional Status on Birth Weight of Neonates in Zahedan City, Iran." *Nutrition Research and Practice* 4 (4): 339–344.

- Mason, John B, Lisa S Saldanha, and Reynaldo Martorell. 2012. "The Importance of Maternal Undernutrition for Maternal, Neonatal, and Child Health Outcomes: An Editorial." *Food and Nutrition Bulletin* 33 (2 Suppl) (June): S3–5.
- Rao, B.T., K. Arun Aggarwal, and R. Kumar. 2007. "Dietary Intake in Third Trimester of Pregnancy and Prevalence of LBW: A Community-based Study in a Rural Area of Haryana." *Indian Journal of Community Medicine* 32 (4): 272–276.
- Singh, M., S. Jain, and M. Choudhary. 2009. "Dietary Adequacy of Pregnant Women of Four District of Rajasthan." *Journal of Human Ecology* - Delhi 25 (3): 161–165.

EAT A DIVERSE DIET DURING PREGNANCY AND LACTATION

- Arimond, M., D. Wiesmann, E. Becquey, A. Carriquiry, M. C. Daniels, M. Deitchler, N. Fanou-Fogny, et al. 2010. "Simple Food Group Diversity Indicators Predict Micronutrient Adequacy of Women's Diets in 5 Diverse, Resource-Poor Settings." *Journal of Nutrition* 140 (11) (September 29): 2059S–2069S. doi:10.3945/jn.110.123414.
- Kennedy, G., N. Fanou-Fogny, C. Seghier, M. Arimond, Y. Koreissi, R. Dossa, F. J. Kok, and I. D. Brouwer. 2010. "Food Groups Associated with a Composite Measure of Probability of Adequate Intake of 11 Micronutrients in the Diets of Women in Urban Mali." *Journal of Nutrition* 140 (11) (September 29): 2070S–2078S. doi:10.3945/jn.110.123612.
- Martin-Prevel, Y., E. Becquey, and M. Arimond. 2010. "Food Group Diversity Indicators Derived from Qualitative List-Based Questionnaire Misreported Some Foods Compared to Same Indicators Derived from Quantitative 24-Hour Recall in Urban Burkina Faso." *Journal of Nutrition* 140 (11) (September 29): 2086S–2093S. doi:10.3945/jn.110.123380.

EAT IRON-RICH/FORTIFIED FOODS

- Angeles-Agdeppa, Imelda, Marcela Saides, Mario Capanzana, Lekh R Juneja, and Noboru Sakaguchi. 2011. "Pilot-scale Commercialization of Iron-fortified Rice: Effects on Anemia Status." *Food and Nutrition Bulletin* 32 (1) (March): 3–12.
- Gera, T., H. S. Sachdev, and E. Boy. 2012. "Effect of Iron-fortified Foods on Hematologic and Biological Outcomes: Systematic Review of Randomized Controlled Trials." *American Journal of Clinical Nutrition* 96 (2) (July 3): 309–324. doi:10.3945/ajcn.111.031500.
- Gibson, R. S., E. Kafwembe, S. Mwanza, L. Gosset, K. B. Bailey, A. Mullen, K. Baisley, and S. Filteau. 2011. "A Micronutrient-Fortified Food Enhances Iron and Selenium Status of Zambian Infants but Has Limited Efficacy on Zinc." *Journal of Nutrition* 141 (5) (March 16): 935–943. doi:10.3945/jn.110.135228.
- Huo, Junsheng, Jing Sun, Jian Huang, Wenxian Li, Lijuan Wang, Lilian Selenje, Gary R Gleason, and Xiaodong Yu. 2012. "Effectiveness of Fortified Flour for Enhancement of Vitamin and Mineral Intakes and Nutrition Status in Northwest Chinese Villages." *Food and Nutrition Bulletin* 33 (2) (June): 161–168.
- Huo, Junsheng, Jing Sun, Jian Huang, Wenxian Li, Lijuan Wang, Lilian Selenje, Gary R Gleason, and Xiaodong Yu. 2011. "The Effectiveness of Fortified Flour on Micro-nutrient Status in Rural Female Adults in China." *Asia Pacific Journal of Clinical Nutrition* 20 (1): 118–124.
- Pinkaew, S., P. Winichagoon, R. F. Hurrell, and R. Wegmuller. 2013. "Extruded Rice Grains Fortified with Zinc, Iron, and Vitamin A Increase Zinc Status of Thai School Children When Incorporated into a School Lunch Program." *Journal of Nutrition* 143 (3) (January 9): 362–368. doi:10.3945/jn.112.166058.
- Thankachan, P., S. Selvam, D. Surendran, S. Chellan, M. Pauline, S.A. Abrams, and A.V. Kurpad. 2012. "Efficacy of a Multi Micronutrient-fortified Drink in Improving Iron and Micronutrient Status Among Schoolchildren with Low Iron Stores in India: a Randomised, Double-masked Placebo-controlled Trial." *European Journal of Clinical Nutrition* 67 (1) (December 12): 36–41. doi:10.1038/ejcn.2012.188.
- Yang, Zhenyu, and Sandra L. Huffman. 2011. "Review of Fortified Food and Beverage Products for Pregnant and Lactating Women and Their Impact on Nutritional Status: Review of Fortified Food and Beverage Products." *Maternal & Child Nutrition* 7 (October): 19–43. doi:10.1111/j.1740-8709.2011.00350.x.

EAT VITAMIN A-RICH/FORTIFIED FOODS

Berger, S.G., S. de Pee, M.W. Bloem, S. Halati, and R.D. Semba. High malnutrition and morbidity among children who are missed by periodic vitamin A capsule distribution for child survival in rural Indonesia. *Journal of Nutrition*. 2007;137:1328–33.

Pinkaew, S., P. Winichagoon, R. F. Hurrell, and R. Wegmuller. 2013. “Extruded Rice Grains Fortified with Zinc, Iron, and Vitamin A Increase Zinc Status of Thai School Children When Incorporated into a School Lunch Program.” *Journal of Nutrition* 143 (3) (January 9): 362–368. doi:10.3945/jn.112.166058.

Souganidis, E. The Relevance of Micronutrients to the Prevention of Stunting. *Sight and Life*, Vik 26(2), 2012.

Thorne-Lyman, Andrew L., and Wafaie W. Fawzi. 2012. “Vitamin A and Carotenoids During Pregnancy and Maternal, Neonatal and Infant Health Outcomes: a Systematic Review and Meta-Analysis.” *Paediatric and Perinatal Epidemiology* 26: 36–54. doi:10.1111/j.1365-3016.2012.01284.x.

EXCLUSIVELY BREASTFEED FOR SIX MONTHS

Evidence regarding exclusive breastfeeding focuses primarily on mortality/survival. There is little evidence available regarding some of the specific practices (e.g., breastfeeding on demand, correct positioning, and proper attachment).

Bhandari, Nita, Rajiv Bahl, Sarmila Mazumdar, Jose Martinez, Robert E Black, Maharaj K Bhan, and Infant Feeding Study Group. 2003. “Effect of Community-based Promotion of Exclusive Breastfeeding on Diarrhoeal Illness and Growth: a Cluster Randomised Controlled Trial.” *The Lancet* 361 (9367) (April 26): 1418–1423. doi:10.1016/S0140-6736(03)13134-0.

Dewey, K.G., R.J. Cohen, K.H. Brown, and L.L. Rivera. 2001. “Effects of Exclusive Breastfeeding for Four Versus Six Months on Maternal Nutritional Status and Infant Motor Development: Results of Two Randomized Trials in Honduras.” *Journal of Nutrition* 131 (2) (February): 262–267.

Edmond, Karen M, Betty R Kirkwood, Seeba Amenga-Etego, Seth Owusu-Agyei, and Lisa S Hurt. 2007. “Effect of Early Infant Feeding Practices on Infection-specific Neonatal Mortality: An Investigation of the Causal Links with Observational Data from Rural Ghana.” *The American Journal of Clinical Nutrition* 86 (4) (October): 1126–1131.

Kramer, Michael S, and Ritsuko Kakuma. 2004. “The Optimal Duration of Exclusive Breastfeeding: a Systematic Review.” *Advances in Experimental Medicine and Biology* 554: 63–77.

WHO. 2013. Long-term Effects of Breastfeeding: a Systematic Review. Geneva: WHO.

FEED CHILDREN A DIVERSE DIET

Arimond, M, Ruel M. 2004. “Dietary diversity is associated with child nutritional status: evidence from 11 demographic and health surveys.” *Journal of Nutrition* 134:2679-2585.

FEED CHILDREN APPROPRIATELY DURING AND AFTER ILLNESS

PAHO/WHO. Guiding Principles for Complementary Feeding of the Breastfed Child. 2003. Washington, DC: PAHO, WHO.

FEED CHILDREN WITH APPROPRIATE FREQUENCY

Dewey, K and Brown, K. 2003. Update on technical issues concerning complementary feeding of young children in developing countries and implications for nutrition interventions. *Food and Nutrition Bulletin* 24:5-28

INITIATE BREASTFEEDING EARLY

Evidence focuses primarily on mortality/survival.

Edmond, Karen M, Betty R Kirkwood, Seeba Amenga-Etego, Seth Owusu-Agyei, and Lisa S Hurt. 2007. "Effect of Early Infant Feeding Practices on Infection-specific Neonatal Mortality: An Investigation of the Causal Links with Observational Data from Rural Ghana." *The American Journal of Clinical Nutrition* 86 (4) (October): 1126–1131.

INTRODUCE COMPLEMENTARY FOODS AT SIX MONTHS

Dewey, Kathryn G., and Seth Adu-Afarwuah. 2008. "Systematic Review of the Efficacy and Effectiveness of Complementary Feeding Interventions in Developing Countries." *Maternal & Child Nutrition* 4 (s1) (April): 24–85. doi:10.1111/j.1740-8709.2007.00124.x.

Lin, Carol A, Mark J Manary, Ken Maleta, André Briend, and Per Ashorn. 2008. "An Energy-dense Complementary Food Is Associated with a Modest Increase in Weight Gain When Compared with a Fortified Porridge in Malawian Children Aged 6-18 Months." *The Journal of Nutrition* 138 (3) (March): 593–598.

Vazir, Shahnaz, Patrice Engle, Nagalla Balakrishna, Paula L Griffiths, Susan L Johnson, Hilary Creed-Kanashiro, Sylvia Fernandez Rao, Monal R Shroff, and Margaret E Bentley. 2013. "Cluster-randomized Trial on Complementary and Responsive Feeding Education to Caregivers Found Improved Dietary Intake, Growth and Development Among Rural Indian Toddlers." *Maternal & Child Nutrition* 9 (1) (January): 99–117. doi:10.1111/j.1740-8709.2012.00413.x.

Wuehler, Sara E., Sonja Y. Hess, and Kenneth H. Brown. 2011. "Accelerating Improvements in Nutritional and Health Status of Young Children in the Sahel Region of Sub-Saharan Africa: Review of International Guidelines on Infant and Young Child Feeding and Nutrition: IYCN in the Sahel." *Maternal & Child Nutrition* 7 (April): 6–34. doi:10.1111/j.1740-8709.2010.00306.x.

PROPERLY DISPOSE OF FECES

Humphrey, Jean H. 2009. "Child Undernutrition, Tropical Enteropathy, Toilets, and Handwashing." *The Lancet* 374 (9694) (September): 1032–1035. doi:10.1016/S0140-6736(09)60950-8.

Islam, Mohammad Sirajul, Zahid Hayat Mahmud, Partha Sarathi Gope, Rokon Uz Zaman, Zakir Hossain, Mohammad Shafiqul Islam, Dinesh Mondal, et al. 2012. "Hygiene Intervention Reduces Contamination of Weaning Food in Bangladesh." *Tropical Medicine & International Health* (December): n/a–n/a. doi:10.1111/tmi.12051.

PROPERLY STORE/PREPARE FOOD

Esrey, Steven A. 1990. "Food Contamination and Diarrhoea." *World Health* 19–20.

Humphrey, Jean H. 2009. "Child Undernutrition, Tropical Enteropathy, Toilets, and Handwashing." *The Lancet* 374 (9694) (September): 1032–1035. doi:10.1016/S0140-6736(09)60950-8.

Islam, Mohammad Sirajul, Zahid Hayat Mahmud, Partha Sarathi Gope, Rokon Uz Zaman, Zakir Hossain, Mohammad Shafiqul Islam, Dinesh Mondal, et al. 2012. "Hygiene Intervention Reduces Contamination of Weaning Food in Bangladesh." *Tropical Medicine & International Health* (December): n/a–n/a. doi:10.1111/tmi.12051.

PROPERLY STORE/TREAT WATER

Clasen T.F., I.G. Roberts, T. Rabie, W.P. Schmidt, and S. Cairncross. 2006. "Interventions to improve water quality for preventing diarrhoea." *Cochrane Database of Systematic Reviews* 2006, Issue 3. Art. No.: CD004794. DOI: 10.1002/14651858.CD004794.pub2.

Esrey, Steven A. 1996. "Water, Waste, and Well-Being: A Multicountry Study." *American Journal of Epidemiology* 143 (6): 608–623.

SLEEP UNDER AN INSECTICIDE-TREATED BEDNET

Gamble, C.L., J.P. Ekwaru, and F.O. ter Kuile. 2006. "Insecticide-treated nets for preventing malaria in pregnancy." *Cochrane Database of Systematic Reviews*, Issue 2. Art. No.: CD003755. DOI: 10.1002/14651858.CD003755.pub2

TAKE DEWORMING MEDICATION

Among Children

Guyatt, H.L., S. Brooker, C.M. Kihamia, A. Hall, and D.A. Bundy. 2001. "Evaluation of Efficacy of School-based Anthelmintic Treatments Against Anaemia in Children in the United Republic of Tanzania." *Bulletin of the World Health Organization* 79 (8): 695–703.

Hall, A. et al. A review and meta-analysis of the impact of intestinal worms on child growth and nutrition. *Maternal and Child Nutrition*, 2008, 4:118-236 doi:10.1111/j.1740-8709.2007.00127.x

Idris, M.A., M.A. Shaban, and M. Fatahallah. 2001. "Effective Control of Hookworm Infection in School Children from Dhofar, Sultanate of Oman: a Four-year Experience with Albendazole Mass Chemotherapy." *Acta Tropica* 80 (2): 139–143.

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Among Pregnant Women

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