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Nutrition for a Better Tomorrow: Scaling Up Delivery of Micronutrient Powders for Infants and Young Children

Results for Development Institute

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Executive Summary

Around the world, the diets of hundreds of millions of children are critically deficient in essential micronutrients such as iodine, iron, and Vitamin A. Sustained deficiencies – particularly during the critical “1,000 days” time period between conception and age two – can devastate the physical, cognitive, and behavioral development of a child.¹ The pervasiveness of these deficiencies in high-burden countries – for example, 70 percent of children in India are thought to be anemic² – can translate into society-wide economic constraints, shaving up to approximately two percentage points off potential GDP due to cognitive and physical productivity losses.³



Iron deficiency anemia (IDA) is the most prevalent form of micronutrient deficiency and the primary driver behind about 50 percent of the approximately 300 million⁴ anemia cases among children.⁵ In the past, children at risk for anemia were given iron syrups and drops,⁶ but adherence challenges prompted a recent search for an innovative solution.

Micronutrient powders (MNPs) – frequently referred to by the brand name Sprinkles – were invented as a low-cost substitute product with improved acceptability and adherence.⁷ Easily mixed by caregivers into homemade foods, MNPs were first endorsed in 2007 to improve the iron and anemia status of populations affected by emergencies;⁸ this endorsement was clarified and formalized in a 2011 World Health Organization (WHO) guideline as a strongly recommended public health intervention.⁹

Despite the low cost of MNPs, at only about \$0.03 per sachet, or \$1.80 per 60-sachet course, to public sector buyers,¹⁰ only a small fraction of the 34 million children in the highest-burden countries targeted for this intervention,¹¹ and less than 5 percent of all anemic children globally, have received MNPs.¹² The depth

¹Robert E. Black et al., “Maternal and Child Undernutrition: Global and Regional Exposures and Health Consequences,” *Lancet* 371 (9608): 243–260.

²“Tracking Progress in Child and Maternal Nutrition: A Survival and Development Priority,” UNICEF, 2009, www.unicef.org/publications/index_51656.html, citing 2005/6 National Family Health Survey of India.

³Sue Horton and J. Ross, “Corrigendum to: “The Economics of iron deficiency” [Food Policy 28 (2003) 51–75],” *Food Policy* 32 (2007): 141–143.

⁴Sam Loewenberg, “Easier Than Taking Vitamins,” *New York Times*, September 5, 2012, <http://opinionator.blogs.nytimes.com/2012/09/05/easier-than-taking-vitamins/#more-133577>.

⁵The estimate on IDA as a driver for anemia is from “Third Report on the World Nutrition Situation,” WHO Administrative Committee on Coordination / Sub-Committee on Nutrition (ACC-SCN) Secretariat, 1997, <http://www.unscn.org/layout/modules/resources/files/rwns3.pdf>, cited in Horton and Ross.

⁶H. Ip et al., “Improved Adherence and Anaemia Cure Rates with Flexible Administration of Micronutrient Sprinkles: A New Public Health Approach to Anaemia Control,” *European Journal of Clinical Nutrition* 63 (2007): 165–172.

⁷Ibid.

⁸“Preventing and Controlling Micronutrient Deficiencies in Populations Affected by an Emergency,” WHO, WFP and UNICEF, 2007, www.who.int/nutrition/publications/WHO_WFP_UNICEFstatement.pdf.

⁹Guideline: Use of Multiple Micronutrient Powders for Home Fortification of Foods Consumed by Infants and Children 6–23 Months of Age,” WHO, 2011, http://whqlibdoc.who.int/publications/2011/9789241502030_eng.pdf.

¹⁰Per WHO guidance, one sachet should be consumed per day for a minimum of two months, followed by three to four months without supplementation before restarting. \$1.80 is the cost for commodities only to the public sector; the costs are thought to double when program costs are also included (see Horton et al., “Scaling Up Nutrition: What Will It Cost?” World Bank, 2010, <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/Peer-Reviewed-Publications/ScalingUpNutrition.pdf>).

¹¹According to the Scaling Up Nutrition (SUN) movement. Source: Horton et al.

¹²Sam Loewenberg, “Easier Than Taking Vitamins,” *New York Times*, September 5, 2012, <http://opinionator.blogs.nytimes.com/2012/09/05/easier-than-taking-vitamins/#more-133577>.

of the evidence base on impact and cost efficiency – MNPs have an estimated benefit-cost ratio as high as 37:1¹³ – suggests that MNPs warrant far greater attention and investment than they are currently receiving.

The global health community is now at a critical inflection point on nutrition, with donors, governments, and the private sector focused on using momentum built by the *Lancet* Nutrition Series¹⁴ and by the Scaling Up Nutrition (SUN)¹⁵ movement to significantly expand nutrition interventions, including the use of MNPs to address anemia and fill micronutrient gaps in the diets of infants and young children.¹⁶ As the SUN group and others work to scale up these interventions, due attention should be paid to optimal use of all approaches to delivering MNPs – including via market-based methods – in order to ensure impact and sustainability. Simultaneously, the feasibility of commercial approaches and potential for public health impact – which could be constrained by product affordability – must also be carefully assessed.

Results for Development Institute (R4D) – with technical support from the Micronutrient Initiative (MI) and in close consultation with more than 140 stakeholders from country governments, multilaterals, NGOs, academic research centers, and the private sector – has undertaken an extensive landscape analysis of both demand- and supply-side challenges and of opportunities for delivering MNPs to infants and young children from 6 to 23 months of age. The scope of this work was primarily focused on identifying the feasibility and key opportunities for use of market-based approaches, while also noting the important role of the public sector in scaling access to this vital product.

¹³Waseem Sharieff, Sue Horton and Dr. Stanley Zlotkin, “Economic gains of a home fortification program: evaluation of “Sprinkles” from the provider’s perspective,” *Canadian Journal of Public Health* (Jan-Feb 2006), 97(1):20-3.

¹⁴The *Lancet*’s Maternal and Child Nutrition Series, launched in London January 16, 2008, www.thelancet.com/series/maternal-and-child-undernutrition.

¹⁵For more information on SUN, visit <http://scalingupnutrition.org/>.

¹⁶In addition to treating anemia, MNPs have demonstrated effectiveness in reducing iron deficiency and vitamin A deficiency, making them a promising intervention for fortifying complementary food diets lacking sufficient micronutrients. Source: P.S. Suchdev et al., “Selling Sprinkles Micronutrient Powder Reduces Anemia, Iron Deficiency, and Vitamin A Deficiency in Young Children in Western Kenya: A Cluster-Randomized Controlled Trial,” *American Journal of Clinical Nutrition* 95 (5): 1223–1230.

Key Factors Affecting MNP Scale-Up

R4D's analysis has highlighted key demand-side challenges to current MNP scale-up along the parameters of *affordability*, *availability*, *awareness*, and *acceptability*. When MNPs are offered via the private sector, prices can almost double, given retail mark-ups (at approximately \$3.30 per course), quickly becoming unaffordable to lower-income consumers. This can potentially undermine adherence, which is vital to achieving public health outcomes. Importantly, however, and as noted in Primary Recommendation 1 below, commercial channels may still be viable for middle- and upper-income consumers. Meanwhile, though availability of MNPs via the public sector has been increasing, large-scale programs remain few and far between. Twenty-two out of 152 low- and middle-income countries that participated in a recent global mapping of MNP programs¹⁷ currently have MNP pilot or subnational MNP projects, and only four of these countries – Bangladesh, Bolivia, Dominican Republic, and Mongolia¹⁸ – had national-scale projects as of 2011.¹⁹ Furthermore, limited caregiver awareness of MNPs and of home fortification strategies more broadly means that significant demand-generation efforts are required to successfully scale MNPs via any channel (public, commercial, or socially oriented), and that sustained behavior change communication is required to drive acceptability and proper utilization.



Presented below is a targeted strategy intended to guide the global nutrition community – which includes major financiers, developing country governments, global and local program implementers (e.g., the Global Alliance for Improved Nutrition (GAIN), MI, Population Services International (PSI), United Nations Children's Fund (UNICEF), World Food Programme (WFP), and local NGOs), normative bodies, and MNP manufacturers – in scaling up the distribution of MNPs among infants and young children and in addressing many of the major barriers cited immediately above.

The primary recommendations proposed below are aimed at

- (1) achieving significantly improved coverage for MNPs leveraging a combination of distribution models, and
- (2) ensuring that nutrition is sufficiently prioritized on a global and local level in order to enable MNP scale-up.

¹⁷UNICEF and CDC, "Global Assessment of Home Fortification Interventions 2011," Final Report, Draft Version, September 2012.

¹⁸Ibid. Note: R4D's landscape analysis also indicates that Guyana, Mexico, and Kyrgyzstan have national-scale public sector MNP programs. The Bangladesh national-level MNP program referenced in the UNICEF/CDC database is the Social Marketing Company (SMC) project selling the MoniMix MNP product, which is classified in this R4D report as a "socially oriented" distribution model. While MNPs are also being distributed through the public sector in Bangladesh, this is not yet occurring on a national scale.

¹⁹Programs in Bangladesh target children ages 6 to 59 months and do not track whether MNPs were given to children under or over age two; consequently, it is difficult to discern the total number of 6- to 23-month-old children – WHO's prioritized segment for MNPs – who have been provided with the product.

While demand-side challenges serve as the primary barriers to increased coverage, there are also secondary – though still noteworthy – supply-side barriers and other market issues. Therefore, the report also highlights secondary recommendations focused on strengthening the local supply base for MNPs in contexts where this is beneficial, facilitating implementation of the intervention by clarifying global guidance, and improving the product itself by supporting MNP innovations.

Primary Recommendations

Primary Recommendation 1: Utilize primarily public sector channels to scale up MNP distribution to lower-income consumers, complemented by socially oriented and commercial channels to expand reach



Despite the immense health and productivity benefits of sufficient micronutrient intake and of treating and preventing IDA, and the broad acceptance of MNPs as the preferred intervention to address this pervasive problem among infants and young children, coverage of MNPs remains low. While significant progress has been made in recent years to expand reach, the delivery and uptake of MNPs must be dramatically scaled in appropriate geographies – namely, food-secure contexts where macronutrient intake is sufficient in the diet but micronutrient intake is not²⁰ – in order to achieve the desired public health impact. The combination of channels through which this scale-up occurs should be strategically chosen based on country context.

In many low- and middle-income countries, malnutrition (and particularly anemia²¹) is prevalent across income segments. Given this, a mix of channels and strategies should be utilized to reach all individuals in need. However, particularly in low-income countries, the public sector health system should be the channel through which MNP scale-up is primarily driven.²² Public sector distribution has the ability to maximize affordability and availability of MNPs for the poor, while also enhancing awareness when effective behavior change communication is undertaken. Use of the public health system may, for example, include utilizing public health facilities and medical personnel, frontline workers, and standard child health days or months to distribute MNPs.

²⁰According to the UNICEF programming decision tree: “Programming Guide: Infant and Young Child Feeding Guide,” UNICEF, 2011, www.unicef.org/nutrition/files/Final_IYCF_programming_guide_2011.pdf.

²¹As mentioned, iron deficiency is the primary driver of approximately 50 percent of cases of anemia and is the most prevalent micronutrient deficiency. Nutritional anemia includes anemia due to deficiency in iron plus deficiencies in folate, vitamins B and B12, and trace elements involved in red blood cell production.

²²This report assumes that public sector health systems in low-income, lower-middle-income, and upper-middle-income countries are sufficiently well functioning to support distribution of MNPs. However, the reliability of public sector channels in any particular country should be evaluated prior to scaling an MNP program.

Purely commercial sales of MNPs are likely to be unaffordable for lower-income consumers, given mark-ups throughout the retail chain. These markups can raise the product cost of a 60-day MNP course²³ from \$1.80²⁴ – which is what a typical public-sector buyer would pay – to \$3.30 or more for a consumer purchasing these products via private sector outlets such as pharmacies.

Given the approximately \$3.30 price point for a full course, cash-constrained consumers may prefer to buy only one or two sachets at a time, potentially undermining the health impact of MNPs given the importance of consuming a minimum of 60 sachets as recommended by WHO and the Home Fortification Technical Advisory Group (HF-TAG). Thus, provision of the full recommended course of MNPs for free through the public health system can play an important role in adherence and improved health outcomes, particularly for the poor.²⁵

That said, since there is a high need for MNPs among children in all income segments in many countries (see Figure A below), implementers should pursue distribution beyond the public sector. Public sector distribution efforts can and should be effectively complemented with socially oriented approaches (e.g., social marketing or microfranchising) to broaden reach – for example, to those groups with limited access to public sector facilities. Meanwhile, commercial sales can broaden reach to higher-income segments that also face high levels of childhood anemia, allowing the public sector to focus its limited resources on the base of the pyramid.

Concretely, the report suggests broadly classifying countries into one of two categories based on income. Category 1 countries (World Bank–classified “low-income” countries) are geographies where the majority of consumers would confront significant affordability concerns if asked to purchase MNPs at commercial prices. In these countries, public sector distribution of MNPs should be primarily complemented by social marketing or microfranchising models that sell subsidized MNPs to consumers in need who may not be reached by the public sector (e.g., the rural poor).

Category 2 countries (World Bank–classified “lower-middle-income” and “upper-middle-income” countries) are countries where, in most cases, there is a sizable share of consumers whose affordability threshold is higher and who may already seek health products and/or infant foods in the private sector. In multiple country contexts, such as in India and Bolivia, childhood anemia has been shown to be highly prevalent among these wealthier segments. Commercial distribution models should therefore be utilized in these geographies to reach higher-income consumers with the ability to pay for MNPs at unsubsidized prices. This approach has multiple benefits: it allows a significant number of children with IDA to be reached with this vital product via commercial sales, it provides a healthy consumer base for suppliers, and it enables the public sector to devote scarce resources to targeting the poor with MNPs.

Despite this typology, programs should be carefully designed and tested prior to large-scale implementation to determine which distribution approach is most appropriate for MNPs in a certain context. The dual models

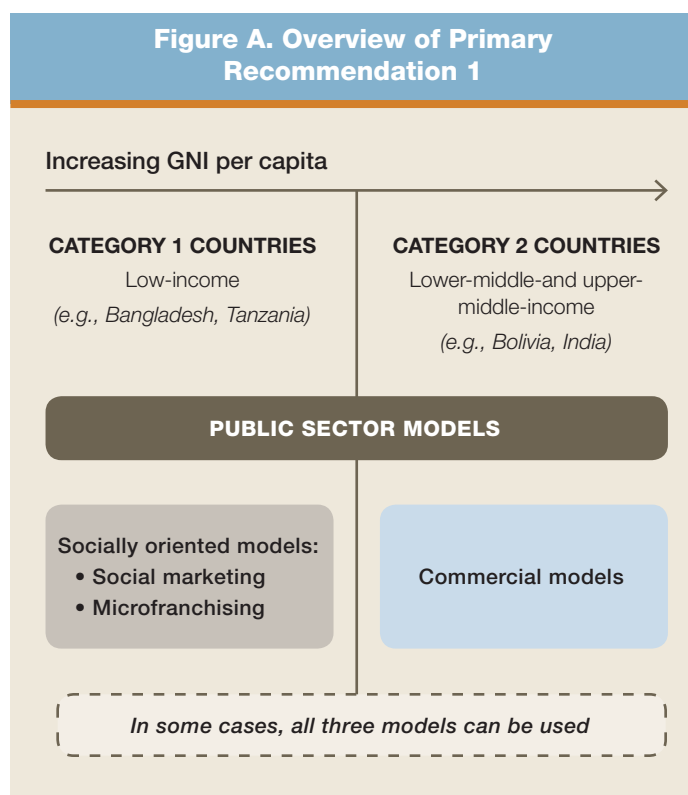
²³Global guidance on MNP administration indicates that a minimum full course of MNPs for an infant or young child is 60 sachets over a six-month period. Although there is emerging evidence that more flexible and less frequent administration is effective in reducing IDA, this report adheres to existing guidance and makes assumptions – e.g., particularly regarding the cost per course of MNPs – based on this minimum recommended dosing schedule.

²⁴For the commodities alone; the total course of MNPs costs public sector implementers approximately \$3.60 when program costs are also included.

²⁵This report acknowledges that there can be tension between the objectives of making health and nutrition accessible to the poorest and of relying on commercial approaches. This report prioritizes the first objective, seeking to ensure that the poorest will have access to MNPs, while also identifying complementary approaches that utilize socially oriented and commercial channels to reach higher-income groups.

suggested here for low-income countries and lower-middle- and upper-middle-income countries should not be viewed as absolute, but rather as indicative guidelines for the predominant channels in each context. Depending on the socioeconomic profile of the country and the burden of anemia across population segments, a combination of public sector, commercial, and socially oriented models should be explored.

Finally, all scale-up efforts – regardless of the channels utilized – should be robustly supported with sufficient capacity and resources for effective demand generation and behavior change communication. Since MNPs are new, preventive, and designed to address a problem of which few rural health practitioners or caregivers may be aware, they require significant awareness-raising activities in order to elicit demand. Introduction of MNPs through public sector, socially oriented, and/or commercial channels should be appropriately accompanied by effective forms of promotion and education.



Primary Recommendation 2: Advocate for and mobilize resources for MNPs both globally and locally to ensure scale-up

Globally and locally, nutrition is chronically underfunded relative to other public health interventions. In 2011, nutrition represented just over 2 percent of official development assistance commitments to health (including population programs and reproductive health).²⁶ In order to achieve scale-up to full MNP coverage in targeted geographies in need, the global community must significantly increase its investments in nutrition and make the intervention a high priority on the global agenda.

The global community, including donors and high-burden countries, should mobilize a minimum of approximately US\$200 million²⁷ annually to scale up MNPs. This target is the latest World Bank estimate²⁸ for

²⁶"Aid Statistics: Development Assistance Committee (DAC) and Creditor Reporting System (CRS) code lists," OECD, Last updated March 21, 2013, <http://www.oecd.org/dac/stats/dacandcrscode.html>. Estimate derived based on dividing basic nutrition spending (CRS Code 12240, \$444 million in 2011) over the sum of Total Health spending (\$9.3 billion in 2011, DAC Code 120) and spending on Population Policies/Programmes and Reproductive Health (\$10.3 billion in 2011, DAC Code 130).

²⁷This target assumes MNPs cost \$3.60 per child per year, including both commodity and programmatic costs. This World Bank analysis for SUN also assumes that approximately one-third of children under age two in the highest-burden countries are eligible for MNPs; the remaining two-thirds of children should receive fortified complementary foods since they are likely to experience macronutrient as well as micronutrient deficiencies.

²⁸World Bank estimate for SUN in 2010; SUN is currently revising this analysis.

achieving coverage of MNPs among targeted children six months to two years of age in the 36 countries with the highest burden of undernutrition.²⁹

Strong advocacy must be undertaken with global donors and high-burden countries to fill the persistent re-sourcing gap and meet this goal, and these efforts should closely align with existing advocacy led by the SUN movement to expand coverage of MNPs and other interventions. Advocacy efforts should distinctly highlight the benefit-cost ratio of MNPs (up to 37:1)³⁰ and significant positive benefits for individuals and society, as well as the successes of current MNP programs in driving down rates of IDA and filling other micronutrient gaps in the diets of young children.

Secondary Recommendations

Secondary Recommendation 1: Support local suppliers in contexts where their presence can improve political and consumer acceptance and/or create efficiencies



The current MNP supply landscape is dominated by a few global manufacturers – representing more than 90 percent of sales volumes³¹ – which has positive implications for the current market. These include, for example, economies of scale and increased quality control. However, local supply of MNPs can also play an important strategic role, since local suppliers can be particularly helpful in boosting political support for MNP interventions and positively influencing consumer acceptance.

The global community should continue to encourage the establishment of local MNP suppliers and support existing ones in contexts where they can impart these benefits. In particular, global suppliers can provide technical assistance to these local suppliers³² so that they can rapidly produce high-quality MNP products at low cost and can also continue to provide high-quality premix. Likewise, multilaterals and government procurement bodies can dedicate some percentage of procurement agreements (or “off-take agreements”) to MNP suppliers located in high-burden countries.

²⁹S. Horton et al., “Scaling Up Nutrition: What Will It Cost?” World Bank, 2010, <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/Peer-Reviewed-Publications/ScalingUpNutrition.pdf>.

³⁰Waseem Sharieff, Sue Horton and Dr. Stanley Zlotkin, “Economic gains of a home fortification program: evaluation of “Sprinkles” from the provider’s perspective,” *Canadian Journal of Public Health* (Jan-Feb 2006), 97(1):20-3.

³¹R4D estimate.

³²In some contexts, corporate social responsibility may serve as the only incentive for global suppliers to provide local suppliers with technical assistance. In other contexts, partnering with local suppliers may provide benefits given distinct comparative advantages – e.g., market understanding and access to distribution networks for local companies.

Secondary Recommendation 2: Address international guidance and regulatory issues

In-country stakeholders and MNP program implementers have expressed a strong need for clearer guidance on the administration and formulation of MNPs. The WHO guidelines; guidance from HF-TAG; and the WHO, WFP, and UNICEF joint statement on MNP use in emergency situations³³ differ slightly in terms of recommended MNP formulations and dosing schedules, and there is no readily available communication on how implementers should interpret this collective guidance, causing confusion on the ground.

The global nutrition community should therefore urge global normative bodies and partners to develop more clear-cut guidance on MNPs such that countries are provided with a standard interpretation of the existing guidance but also have an understanding of how guidelines can be adapted to each context when undertaking MNP programs. Furthermore, normative bodies and partners should regularly communicate updates to this guidance should the evidence from emerging studies modify recommendations.

In addition, a robust fact base relating to the status of national implementation of the International Code of Marketing Breastmilk Substitutes should be developed to improve suppliers' and implementers' ability to assess MNP market opportunities on a country-by-country basis. As particularly restrictive regulatory environments can dissuade participation in the infant nutrition market and limit opportunities for socially oriented and commercial distribution models, it is critical that the nutrition community remain informed of these contextual constraints and work wherever possible to minimize them. Specifically, global nutrition partners (such as UNICEF, GAIN, and MI) should work with local policymakers to ensure that national legislation allows for the appropriate marketing of nutritious products for children ages 6–23 months, including MNPs, as has been done successfully in several country contexts.

Secondary Recommendation 3: Support MNP innovation

The nonprofit arms of major MNP suppliers – namely, Sight and Life and the Heinz Foundation – are currently pursuing several promising areas of innovation to improve MNPs' acceptability and health impact and potentially reduce their cost. For example, Sight and Life recently hosted a competition for innovation in MNP packaging, which yielded opportunities for biodegradable sachets. The organization is also exploring opportunities to add proteins and fats to MNPs to improve micronutrient absorption and potentially address other deficiencies, as was accomplished with Ying Yang Bao in China – a product introduced by Biomate with support from the Chinese Center for Disease Control and Prevention and GAIN.³⁴

The global community should continue to support these partners as they try to improve the MNP product.³⁵ Specifically, this might entail providing soft loans and grants to de-risk research and development, offering financial or technical support for similar competitions that focus on attracting new ideas from across sectors, or committing to procure enhanced MNP products that deliver specified results.

³³During site visits, stakeholders in multiple countries referenced the joint statement on MNP use in emergency situations as contributing to the confusion, even though it applied to distinct circumstances. In particular, they were unclear whether its recommendations – for example, on the use of a 15-micronutrient formulation versus a 5-micronutrient formulation – applied outside emergency circumstances.

³⁴“Ying Yang Bao,” Home Fortification Technical Advisory Group, <http://hftag.gainhealth.org/products/ying-yang-bao>.

³⁵It should be noted that the global community is encouraged to support such efforts only when innovations will be made available to the public and intellectual property is not overly protected to the degree that widespread benefits cannot be achieved.

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