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

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Results for Development (R4D) is a non-profit organization whose mission is to unlock solutions to tough development challenges that prevent people in low- and middle-income countries from realizing their full potential. Using multiple approaches in multiple sectors including Global Education, Global Health, Governance and Market Dynamics, R4D supports the discovery and implementation of new ideas for reducing poverty and improving lives around the world.

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1. 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

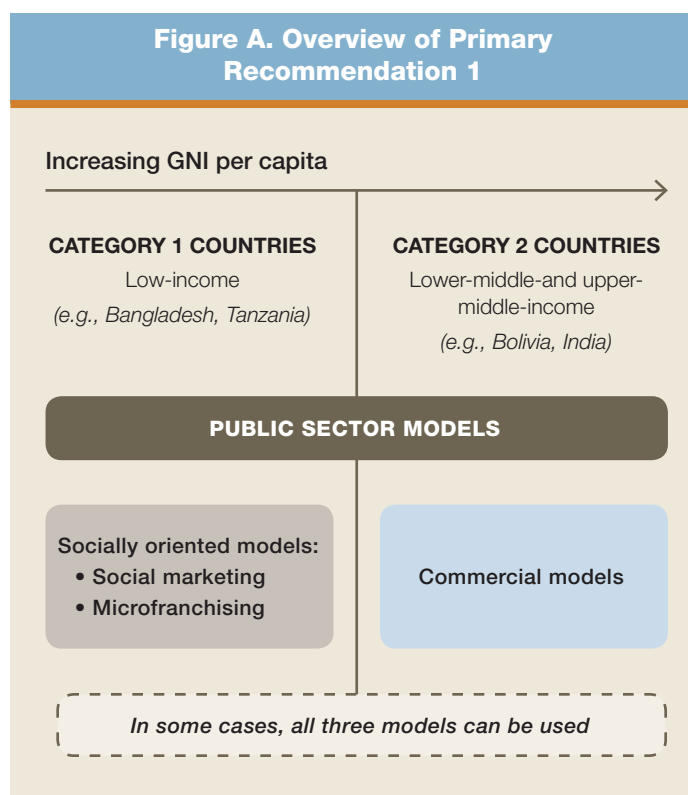
²³Global guidance on MNP administration indicates that a minimum full course of MNPs for an infant or young child is 60 sachets over a six-month period. Although there is emerging evidence that more flexible and less frequent administration is effective in reducing IDA, this report adheres to existing 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/dacandcrscodebooks.htm>. 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 resourcing 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 Shariief, 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.

2. Project Background

In June 2012, Results for Development Institute (R4D), with financial support from the Bill & Melinda Gates Foundation and technical support from the Micronutrient Initiative (MI), launched the Micronutrient Powders Access Project. This project focused on analyzing issues and opportunities in the micronutrient powder (MNP) market and developing a strategy for scaling up MNP use through complementary public and private sector channels.

Project scope

This project focused exclusively on issues and opportunities related to addressing the major public health problem of iron-deficiency anemia (IDA) among infants and young children (ages 6–23 months). MNPs are currently strongly recommended by the World Health Organization (WHO) as an intervention for improving iron status and reducing anemia among this age group. Given this endorsement and broader support from the nutrition community – for example, the Scaling Up Nutrition (SUN) movement and the Home Fortification Technical Advisory Group (HF-TAG) recommend improved availability of MNPs – this project assumed that MNPs should be brought to scale, and sought to identify demand, supply, and other market-based approaches to achieve this goal. It should be noted that while maternal IDA is also an important health concern and MNPs have been indicated as a potential solution, this report did not explore MNPs in the context of maternal health given the distinct awareness, acceptability, and availability challenges associated with targeting this product at a maternal audience.³⁶

Additionally, this project did not investigate alternative nutrition products currently being developed, some of which may help address both IDA and insufficient calorie intake. However, R4D and MI recognize the importance of new, potentially improved technologies and urge the global nutrition community to consider the interplay between MNPs and these products when they fully come to market. For example, preventive lipid-based nutrient supplements (LNS-P)³⁷ and affordable fortified complementary foods are both products that may be able to treat or prevent both micronutrient and macronutrient deficiencies. Although these products may not contain sufficient iron to prevent IDA on their own (as MNPs do), they will contain some iron and can therefore contribute to addressing this deficiency.

The issues and approaches discussed in this report are largely oriented toward the global nutrition community – which includes major financiers of nutrition, 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),

³⁶ Currently, WHO has not issued guidelines strongly recommending MNPs for maternal anemia.

³⁷ According to the website of the International Lipid-Based Nutrient Supplements (iLiNS) Project, lipid-based nutrient supplements (LNSs) are a family of products designed to deliver nutrients to vulnerable people. Most of the energy in these products comes from fats (lipids). All LNS products provide a range of vitamins and minerals as well as sources of energy. LNS products that are used to prevent undernutrition (LNS-P) contain lower amounts of daily energy than therapeutic forms such as Plumpy’Nut. Many LNS products contain a peanut base and sugar, which serve as forms of calories and taste in some formulations of the product. “Frequently Asked Questions (FAQ),” iLiNS Project, www.ilins.org/resources/faq.

and local NGOs), normative bodies, and MNP manufacturers – since each of these groups of actors will have critical roles to play in carrying out MNP scale-up.

Methodology and approach

This report relies on a range of evidence from public and private sources and stakeholder interviews. The report draws conclusions based on a preliminary literature review pertaining to MNP programs and analogous product interventions, and extensive interviews with stakeholders from multiple levels of the marketplace – demand (countries), supply (manufacturers), and global intermediaries (donors, normative bodies, NGOs, etc.).³⁸

During the literature review phase of the work, the project team identified a range of MNP projects implemented by public, private, or NGO partners. Projects that administered analogous products – for example, condoms or combination zinc and oral rehydration salts (ORS) (for treating diarrhea), which were selected due to their similarity to MNPs in their frequency of use and/or preventive benefits – were also reviewed. Closer attention was paid to those projects identified as (1) being in the scaled implementation stage as opposed to the pilot stage; (2) having commercial distribution elements, since the project team sought to assess private sector opportunities for MNPs; and (3) having availability of lessons learned – for example, through sufficient literature or feasibility of discussion with stakeholders.

Stakeholder interviews were then undertaken both remotely and during site visits to six countries – Bangladesh, Bolivia, Ethiopia, India, Kenya, and South Africa – to gather additional information, refine case studies, and test hypotheses. The support of MI’s regional and country staff was critical in enabling these visits and facilitating interviews. In total, the project team consulted more than 140 individuals across the nutrition landscape during the course of the work.

Assumptions

Finally, this report relies on the following key assumptions, which underscore the analysis and recommendations proposed:

- **Functioning public sector health systems:** This 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 up an MNP program.
- **Emphasis on access for the poor:** This report acknowledges that there can be tension between the objectives of making health and nutrition accessible to the poor and of relying on commercial approaches. This report prioritizes the first objective, seeking to ensure that the poor will have access to MNPs, while also identifying complementary approaches that utilize commercial channels to reach higher-income groups.

³⁸ It is important to note that the project team did not approach caregivers directly and spoke with primary healthcare providers only on a limited basis; therefore, the report does not offer robust findings from this frontline perspective except to the extent they were available via literature or other stakeholder interviews.

- **MNP course of 60 sachets:** Global 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.³⁹ Although there is emerging evidence that more flexible and less frequent administration is effective in reducing anemia, this report adheres to existing guidance and makes assumptions – particularly, for example, around the cost per course of MNPs – based on this minimum recommended dosing schedule.

³⁹ “Guideline: 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; “Programmatic Guidance Brief on Use of Micronutrient Powders (MNP) for Home Fortification,” HF-TAG, 2011, <http://hftag.gainhealth.org/resources/programmatic-guidance-brief-use-micronutrient-powders-mnp-home-fortification>.

Abbreviations and acronyms

ASHA	Accredited Social Health Activist	MNP	Micronutrient Powders
ATP	Ability to Pay	MoH	Ministry of Health
BCC	Behavior Change Communications	NGO	Nongovernmental organization
BCG	Boston Consulting Group	ORS	Oral Rehydration Salts
BOP	Base of the Pyramid	PATH	Program for Appropriate Technology in Health
BRAC	(formerly) Bangladesh Rural Advancement Committee	PBP	Performance-based Payment
CIDA	Canadian International Development Agency	PPP	Purchasing Power Parity
CDC	(U.S.) Centers for Disease Control and Prevention	PSI	Population Services International
CHW	Community Health Worker	R4D	Results for Development Institute
CPG	Consumer Packaged Goods	RNI	Recommended Nutritional Intake
GAIN	Global Alliance for Improved Nutrition	RUTF	Ready-to-use Therapeutic Foods
GDP	Gross Domestic Product	SMC	the Social Marketing Company
GNI	Gross National Income	SUN	Scaling Up Nutrition
HF-TAG	Home Fortification Technical Advisory Group	SWAP	Safe Water and AIDS Project
HUL	Hindustan Lever	TNVS	Tanzania National Voucher Scheme
IDA	Iron Deficiency Anemia	UNICEF	United Nation's Children Fund
IDEI	International Development Enterprise India	USAID	U.S. Agency for International Development
iLiNS	International Lipid-Based Nutrient Supplements (Project)	USDA	U.S. Department of Agriculture
IYCF	Infant and Young Child Feeding	VAS	Vitamin A Supplementation
J-PAL	Abdul Latif Jameel Poverty Action Lab	WFP	World Food Programme
LNS	Lipid-based Nutrient Supplements	WHO	World Health Organization
LNS-P	Preventive Lipid-based Nutrient Supplements	WTP	Willingness to Pay
MI	Micronutrient Initiative		

3. MNP Market Landscape

3.1 Demand

Iron-deficiency anemia burden

The WHO has categorized iron deficiency as one of the top 10 most serious health problems in the modern world. Children 6 to 23 months of age are particularly vulnerable due to their rapid growth and the low iron and micronutrient density of the foods they often consume. IDA impairs the mental development of more than 40 percent of the developing world's infants and reduces their chances of attending or finishing primary school.^{40,41}

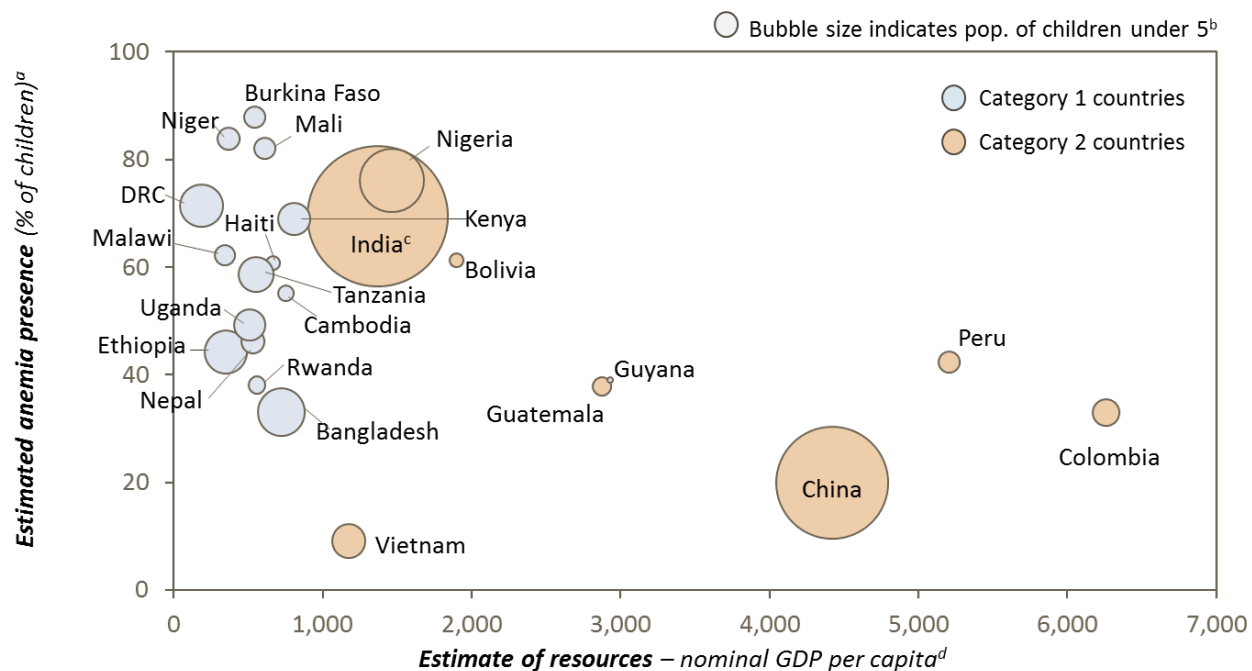
The majority of IDA burden is in poor countries, though it remains a large-scale public health concern in many higher-income countries across Africa, South America, and Asia as well (see Figure 1). For purposes of this report, R4D has divided countries into two categories based on World Bank income groups:⁴² Category 1 includes “low-income” countries and Category 2 includes “lower-middle-income” and “upper-middle-income” countries. These categorizations will be referenced in subsequent sections of the report.

⁴⁰ “Iron,” Micronutrient Initiative, www.micronutrient.org/english/View.asp?x=579.

⁴¹ As the WHO has noted, “Despite the fact that iron deficiency is considered to be the primary cause of [anemia], there are few data on the prevalence of this deficiency. The likely reason is that iron assessment is difficult because the available indicators of iron status do not provide sufficient information alone and must be used in combination to obtain reliable information on the existence of iron deficiency.” Given this lack of information, the remainder of this report relies on data that represent anemia burden as a proxy for IDA. Bruno de Benoist, Erin McLean, Ines Egli, and Mary Cogswell, “Worldwide Prevalence of Anaemia 1993–2005: WHO Global Database on Anaemia,” WHO, 2008, http://whqlibdoc.who.int/publications/2008/9789241596657_eng.pdf.

⁴² “How We Classify Countries,” World Bank, <http://data.worldbank.org/about/country-classifications>.

Figure 1. Anemia presence by country⁴³

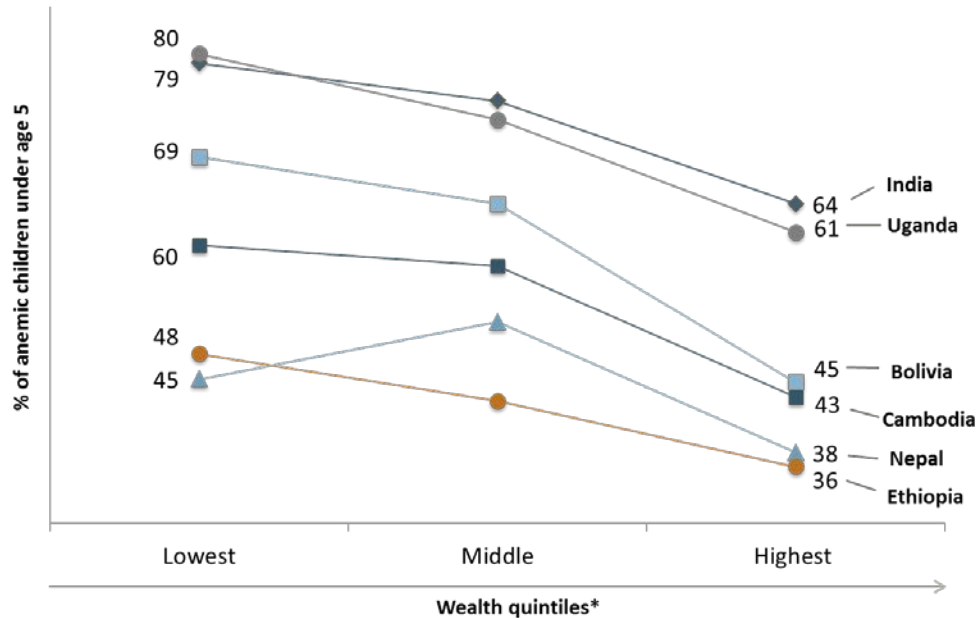


Notes: (a) Percent of children under five with any anemia. (b) UN Population Division 2010 estimate (thousands). (c) Although Guatemala, India, and Peru are formally classified as Category 2 countries, given the dramatic wealth discrepancy and burden within each country, they are often considered more as Category 1 countries from a public health perspective. (d) GDP per capita numbers are nominal GDP per capita levels according to the International Monetary Fund, 2011 (nominal GDP per capita is used instead of purchasing power parity (PPP) since micronutrient powders will likely be imported, or at least premixed, and price will reflect international market prices).

Unlike other forms of malnutrition, anemia is prevalent not only among the poor but also among middle- and even upper-income children in many countries. India presents a clear example of how anemia cuts across income segments in many developing countries, but other available data – including from Bolivia, Cambodia, Ethiopia, Nepal, Tanzania, and Uganda – demonstrate this pattern as well (see Figure 2).

⁴³ Latest anemia prevalence numbers per MEASURE DHS STATcompiler, latest year available varies by country, though the earliest figures represented are from 2005. The following countries were not available in STATcompiler or WHO Anemia Database and were taken from these respective sources: “Child and Maternal Nutrition in Bangladesh,” UNICEF, 2009, [www.unicef.org/bangladesh/Child_and_Maternal_Nutrition\(1\).pdf](http://www.unicef.org/bangladesh/Child_and_Maternal_Nutrition(1).pdf); Gabriel Ojeda et al., “Colombia Demographic and Health Survey 2005,” Measure DHS, 2005; David I. Thurnam, “Micronutrient Status in Vietnam: Comparisons and Contrasts with Thailand and Cambodia,” *Sight and Life Magazine* 26(2) (2012): 56–67, www.sightandlife.org/fileadmin/data/Magazine/2012/26_2_2012/micronutrient_status_in_vietnam_controversy_paper.pdf.

Figure 2. Anemia across income segments in multiple countries⁴⁴



* Second and fourth wealth quintiles are not represented here for graphic clarity purposes.

Micronutrient deficiency often leads to impaired development at an individual level, so a high prevalence of such a deficiency can have a dramatic and costly impact on a population as a whole. A 2003 study suggested that in Bangladesh, for example, total lifetime earnings losses resulting from iron deficiency and consequent physical and cognitive impairment could approach levels equivalent to 1.9 percent of the country's GDP in present-value terms.⁴⁵

Micronutrient powders

Historically, health providers have used iron drops and iron syrups⁴⁶ to prevent and treat IDA in infants. Iron drops and syrups are efficacious against IDA when properly dosed for a sufficient duration of time,⁴⁷ but they have poor compliance due to strong metallic taste and teeth staining, short shelf life, and high transportation costs due to their heavy weight.

Dr. Stanley Zlotkin, a professor at the University of Toronto, invented MNPs in the late 1990s in response to a request by UNICEF to develop a new technology to prevent and treat IDA in infants in high-burden

⁴⁴ Data from national country surveys: India 2005/06, Uganda 2006, Tanzania 2010, Bolivia 2008, Cambodia 2010, Nepal 2011, Ethiopia 2011; MEASURE DHS, 2013, www.measuredhs.com.

⁴⁵ Sue Horton and J. Ross, "Corrigendum to: "The Economics of iron deficiency" [Food Policy 28 (2003) 51–75]," *Food Policy* 32 (2007): 141-143.

⁴⁶ Iron drops are liquefied iron, while iron syrups contain sugar and other additives to improve taste.

⁴⁷ Stanley Zlotkin, "Overview of Efficacy, Effectiveness and Safety of MNPs," presentation for UNICEF Global Nutrition Cluster, April 2009, www.unicef.org/nutritioncluster/files/Revised_UNICEF_CombinedOverview_of_Efficacy_Effectiveness_and_Safety_of_MNPs.pdf.

countries.^{48,49} MNPs are tasteless powders that contain a range of vitamins and minerals, including specially coated iron, vitamin A, vitamin C, and folic acid, and can be sprinkled over a child’s food for instant home fortification. Two common product formulations are currently in use, one containing 5 micronutrients and another with 15 micronutrients (see Figure 3).⁵⁰ MNPs are typically packaged in a single-serving 1 gram sachet, and a standard course of treatment is 60 sachets – see further detail on dosing in Section 3.3. MNPs treat and prevent IDA and also provide a more complete set of vitamins and minerals to address an infant’s critical micronutrient needs when these are not being met by available complementary foods.

Figure 3. MNP formulations⁵¹

5-micronutrient formulation:

Micronutrient	Amount
Iron	12.5 mg
Zinc	5 mg
Folic acid	160 µg
Vitamin A	300 µg RE
Vitamin C	30 mg

15-micronutrient formulation:

Micronutrient	Amount
Vitamin A	400 µg RE
Vitamin C	30 mg
Vitamin D	5µg
Vitamin E	5 mg α-TE
Vitamin B1	0.5 mg
Vitamin B2	0.5 mg
Vitamin B6	0.5 mg
Vitamin B12	0.9 µg
Folic acid	150 µg
Niacin	6 mg
Iron	10 mg
Zinc	4.1 mg
Copper	0.56 mg
Iodine	90 µg
Selenium	17µg

⁴⁸ Sam 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>.

⁴⁹ Other innovations such as fortified food staples and double-fortified salt can serve as iron sources, but infants do not consume these products in adequate quantities to meet their required nutrient intake and therefore need supplements.

⁵⁰ The 5-component formulation – containing iron, folic acid, zinc, vitamin A, and vitamin C – was initially called “anemia formulation” and in tests proved capable of addressing IDA. The 15-micronutrient formulation, however, is considered optimal for improving the overall quality of complementary feeding and ensuring provision of required vitamins and minerals. Since there is little cost difference between the two formulations, UNICEF as well as HF-TAG recommend the 15-micronutrient formulation. For more background, see Arnold Timmer and Nita Dalmiya, “Workshop Report on Scaling Up the Use of Micronutrient Powders to Improve the Quality of Complementary Foods for Young Children in Latin America and the Caribbean,” UNICEF, 2010, [www.unicef.org/lac/MNP_workshop_report_LAC_2010_FINAL\(1\).pdf](http://www.unicef.org/lac/MNP_workshop_report_LAC_2010_FINAL(1).pdf).

⁵¹ Five-micronutrient formulation: “Standard Formulations,” Sprinkles Global Health Initiative, www.sghi.org/about_sprinkles/prod_info.html; 15-micronutrient formulation: “Micronutrient Powders (MNP),” HF-TAG, <http://hftag.gainhealth.org/products/micronutrient-powders-mnp>.

MNPs are a promising intervention because the tasteless powder allows caregivers to fortify locally acceptable, homemade foods. Additionally, since MNPs must be given with food, they promote the introduction of complementary foods⁵² at six months of age to ensure that children are receiving timely and adequate food intake. MNPs cost approximately US\$0.03 (3 cents)⁵³ per sachet⁵⁴ for public sector purchasers and are highly cost-effective (see Box 1), lightweight for low-cost transport, and easy to administer when proper counseling is provided.



While MNPs represent a significant improvement over iron drops and syrups in terms of acceptability, there remain important demand generation and utilization challenges for consideration in scale-up. High adherence (defined by experts as four or more sachets per week) to recommended MNP administration schedules has been variable – ranging from 32 to 90 percent in randomized trials examined in a Cochrane Systematic Review.⁵⁵ Because sprinkling and mixing a powder into a child’s food is a new behavior, following a daily regimen over a 60- to 180-day course is challenging, highlighting the need for significant caregiver education.

Moreover, following such a regimen is particularly difficult with a preventive product, whose benefits are not immediately evident. Adherence to MNPs has been found to be highest in trials where children received the product on an intermittent basis, as mothers found flexible administration more acceptable than a daily regimen.⁵⁶ However, daily supplementation continues to demonstrate the most impact on anemia reduction, and the evidence on less frequent dosing has not been sufficient to motivate modifications to regulatory guidance on MNP administration. Motivational counseling from caregivers and peers on sticking to the dosing schedule and on the expected positive and negative side effects of MNPs has shown to improve utilization among mothers⁵⁷ – see further discussion on acceptability in Section 4.4.

⁵² Complementary feeding is the transition from exclusive breast-feeding to solid family foods; exclusive breast-feeding should be maintained until 6 months of age, with continued breast-feeding along with complementary foods through 23 months. See “Complementary Feeding,” WHO, www.who.int/nutrition/topics/complementary_feeding/en/index.html.

⁵³ All monetary amounts are expressed in U.S. currency.

⁵⁴ Public purchase prices range from approximately \$0.017 to \$0.03 per sachet, though new tender agreements may include higher prices.

⁵⁵ High adherence is defined as consumption averaging from four sachets of MNPs per week to one a day, as stated in a number of studies: L.M. De-Regil, P.S. Suchdev, G.E. Vist, S. Wallseer, and J.P. Peña-Rosas, “Home Fortification of Foods with Multiple Micronutrient Powders for Health and Nutrition in Children under Two Years of Age,” *The Cochrane Library* 9 (2011), CD008959, <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008959.pub2/pdf>.

⁵⁶ H. 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* (2007): 1-7; Sengchang Kounnavong et al., “Effect of Daily versus Weekly Home Fortification with Multiple Micronutrient Powder on Haemoglobin Concentration of Young Children in a Rural Area, Lao People’s Democratic Republic: A Randomised Trial,” *Nutrition Journal* 10(2011): 129. <http://www.nutritionj.com/content/10/1/129>.

⁵⁷ Anecdotal evidence provided to R4D by the U.S. CDC about ongoing MNP studies in Nepal.

Box 1. MNP Cost-Effectiveness

While significant research has been conducted to establish the evidence base around the health impacts of MNPs – especially for IDA¹ – researchers have also invested in determining the cost-effectiveness of MNPs. Building on past analysis,² in 2011 Horton and Wesley determined that for children aged 6–12 months in countries with high rates of infant mortality, diarrhea, and micronutrient deficiency, the cost to provide MNPs would be quite low, at between \$12 and \$20 per disability-adjusted life year.³ Prior work also suggested that the benefit-to-cost ratio of MNPs could be very high at 37:1, given iron’s impact on enhanced cognition and future productivity.⁴ Though Horton and Wesley’s analyses of intervention trials provide evidence of high cost-effectiveness for MNPs, much more research is required to determine cost-effectiveness and the cost-benefit ratios of large-scale MNP programs. Some efforts to determine the cost benefit of a national micronutrient program, however, have been undertaken – for example in Albania, where researchers found that IDA in children costs \$5.25 million annually in lost work potential.⁵

¹ There is ongoing work to determine additional benefits for MNPs outside of IDA.

² Waseem Sharieff, Sue Horton, and Stanley Zlotkin, “Economic Gains of a Home Fortification Program: Evaluation of ‘Sprinkles’ from the Provider’s Perspective,” *Canadian Journal of Public Health* 97.1 (2006): 20–23.

³ Sue Horton and Annie S. Wesley, “Economics of Food Fortification,” in *Nutrients, Dietary Supplements, and Nutraceuticals: Cost Analysis Versus Clinical Benefits*, edited by Joe K. Gerald et al., Humana Press, 2011, Chapter 3.

⁴ Sharieff, Horton, and Zlotkin.

⁵ Jack Bagriansky, “The Economic Consequences of Malnutrition in Albania,” UNICEF, Tirana, Albania, November 2010, www.unicef.org/albania/Cost_benefit_of_nutrition_.pdf.

Current coverage of MNPs

Progress has been made in recent years to expand the reach of MNPs through various pilot and scaling initiatives, with MNP procurement by UNICEF and WFP increasing rapidly between 2007 and 2012. In 2012, UNICEF alone procured over 270 million sachets – up from approximately 26 million sachets in 2007.⁵⁸ However, only a small fraction of the 34 million children in the highest-burden countries targeted for this intervention⁵⁹ have received MNPs, and less than 5 percent of the world’s 300 million anemic children have received them.⁶⁰ Currently, the primary channel for MNP distribution is via major institutional buyers, primarily UNICEF and WFP. These institutional buyers engage with governments and NGOs to distribute MNPs free of charge in targeted, high-burden areas.

Bolivia, the Dominican Republic, Guyana, Mexico, Mongolia, and Kyrgyzstan are the only countries to date known to have implemented large-scale public sector programs. Interest is growing, however, as

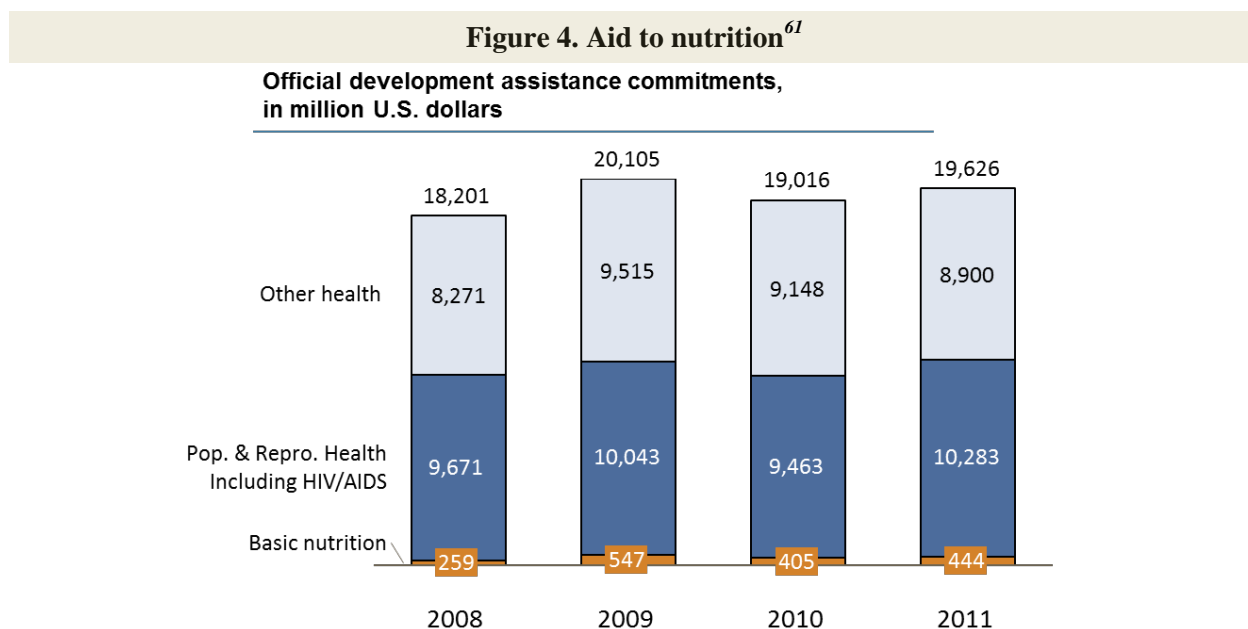
⁵⁸ UNICEF supply division data.

⁵⁹ This number of children represents the target set by World Bank for the SUN movement. S. Horton et al., “Scaling Up Nutrition: What Will It Cost?,” World Bank, 2010, <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/Peer-Reviewed-Publications/ScalingUpNutrition.pdf>.

⁶⁰ Sam 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>. Some public health experts suggest that for anemic children also burdened by macronutrient deficiencies (insufficient calories), fortified complementary foods may be more appropriate than MNPs. This methodology, used by World Bank and SUN, reduces the addressable population from 300 million globally to 34 million in the 36 countries with the highest burden of undernutrition.

many country governments – including those of Kenya, Nepal, and Bangladesh amongst others – are currently undertaking pilot programs and planning for scale-up.

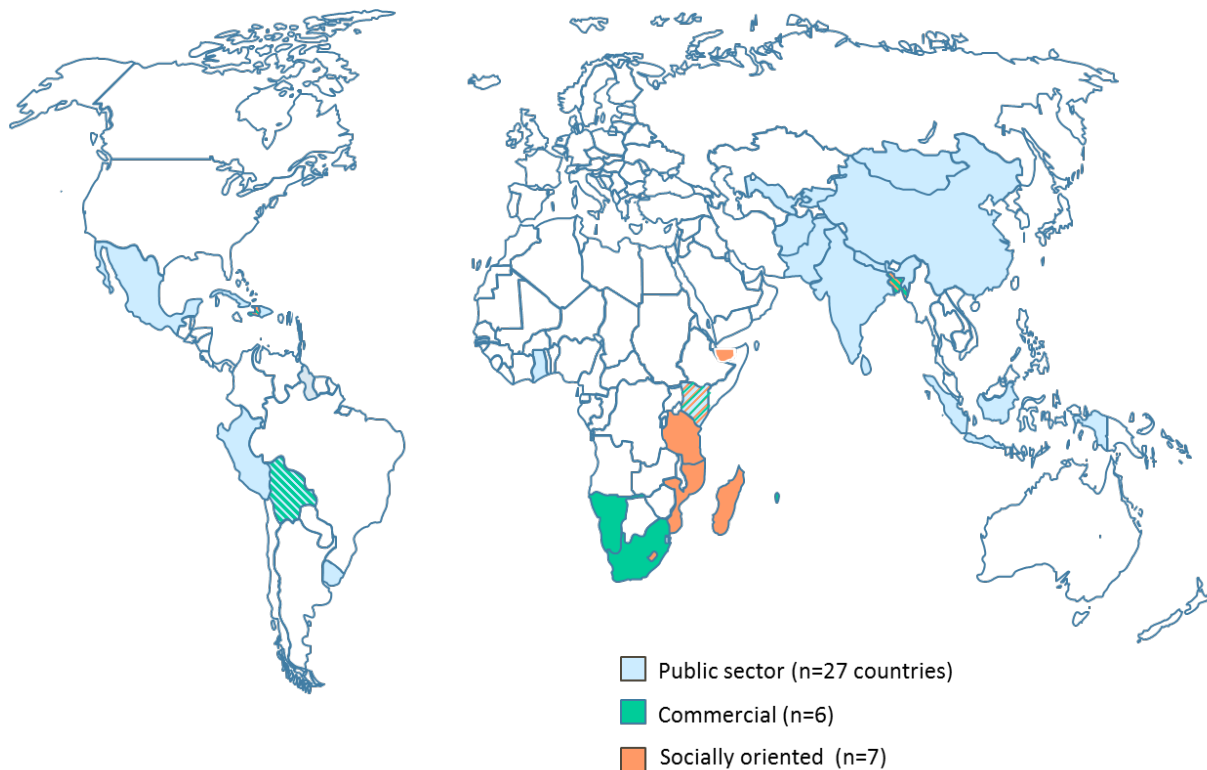
Although these programs are promising, MNPs remain one of a number of therapeutic and preventive nutrition interventions that have not achieved desired coverage levels for a number of reasons, including limited investments in nutrition and lack of political will. Nutrition remains chronically underfunded relative to health in terms of both countries’ domestic budgets and international donor resourcing. In 2011, nutrition represented just over 2 percent of official development assistance commitments to total health interventions (including reproductive health and population programs) – see Figure 4. Additionally, in most countries, responsibility for nutrition is covered under the Ministry of Health (MoH), where there are many competing priorities, or it falls between ministries, where it may not receive the requisite institutional ownership. Without a nutrition “champion” at the country level, the importance of nutrition often remains overlooked.



In addition to institutional buyers, MNPs are also sold directly to consumers through commercial sales or socially oriented models that use private sector tools, such as PSI’s efforts to socially market subsidized products and microfranchising models that utilize community vendors or health workers to sell (often subsidized) goods door to door (see Figure 5).

⁶¹ “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/dacandcrscodelists.htm>. 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). Basic nutrition includes direct feeding programs (maternal feeding, breast-feeding and weaning foods, child feeding, school feeding); determination of micronutrient deficiencies; provision of vitamin A, iodine, iron, and so on; monitoring of nutritional status; nutrition and food hygiene education; and household food security.

Figure 5. Countries with implemented MNP interventions^{62,63}



3.2 Supply

Supplier landscape

The MNP supplier landscape is primarily comprised of pharmaceutical or ‘nutraceutical’ companies selling to public sector purchasers. For most suppliers, MNPs represent a small portion of a large portfolio of products, with a relatively low profit margin. Most suppliers appear to be in the market either for corporate social responsibility reasons or as an entry point to access other large-scale public sector health and nutrition markets. The role of each MNP supplier in expanding access often relies on two key characteristics – sales geography and production type.

Three MNP suppliers that have a global market – DSM, Piramal, and Hexagon – currently represent more than 90 percent of sales volume;⁶⁴ nevertheless, local suppliers with targeted geographies also play a critical role in expanding access.

Suppliers can also be stratified by whether they are vertically integrated – completing both key steps in the production process, premix and packaging – or whether they only package (see further details on the

⁶² Loewenberg; UNICEF and CDC, “Global Assessment of Home Fortification Interventions 2011,” Geneva: Home Fortification Technical Advisory Group, 2012; stakeholder interviews.

⁶³ Although this report acknowledges that India has not supported MNPs on a large scale, partners in some districts are currently undertaking several small pilots.

⁶⁴ R4D estimate based on expert and supplier interviews.

production process below). Typically, suppliers with a global market are vertically integrated, though this is not always the case (see further detail in Figure 6).

Figure 6. Global and local MNP sales⁶⁵

Supplier	Production role	Supplier location	Sales geography	Sales channels	~Annual sales (# of sachets)
Global sales					
DSM	Premix and packaging	HQ in Europe w/multiple regional offices	Global	Public sector and social marketing ^a	Not available
Piramal Enterprises Ltd.	Premix and packaging	India	Global	Public sector	200-300M
Hexagon Nutrition Pvt. Ltd.	Premix and packaging	India	Global	Public sector	100-200M
H.J. Heinz Company Foundation	Packaging	HQ in U.S. w/ multiple regional supply facilities	Select countries ^b	Public sector; piloting social marketing	< 10M
Local/regional sales					
Renata Ltd.	Premix and packaging	Bangladesh	Bangladesh	Public sector, social marketing, and commercial	35-45M
Laboratorios Droguería INTI S.A.	Packaging	Bolivia	Bolivia ^c	Public sector and commercial	10-20M
Laboratorios Farmacéuticos LAFAR	Packaging	Bolivia	Bolivia	Public sector	Not available
SIGMA – Nutraceuticos	Packaging	Bolivia	Bolivia ^c	Public sector; considering commercial	10-20M
Nycomed: a Takeda Company	Premix and packaging	South Africa	South Africa, Namibia, Kenya, Mauritius	Commercial; considering public sector	< 2M

Notes: M = million. (a) Via partnerships, with social marketing organizations. Term as used here includes partnerships with microfranchising organizations (for example, Living Goods). (b) Haiti, Nigeria, Kenya, Tanzania, India, China, Indonesia. (c) Considering regional sales in Latin America.

Each production strategy has unique competitive advantages. Vertically integrated suppliers may achieve slight production cost benefits.⁶⁶ However, local packaging can enhance political receptivity and government support for national MNP scale-up, and can also bring corporate tax benefits and reduced tariffs for importing raw materials versus a finished product.

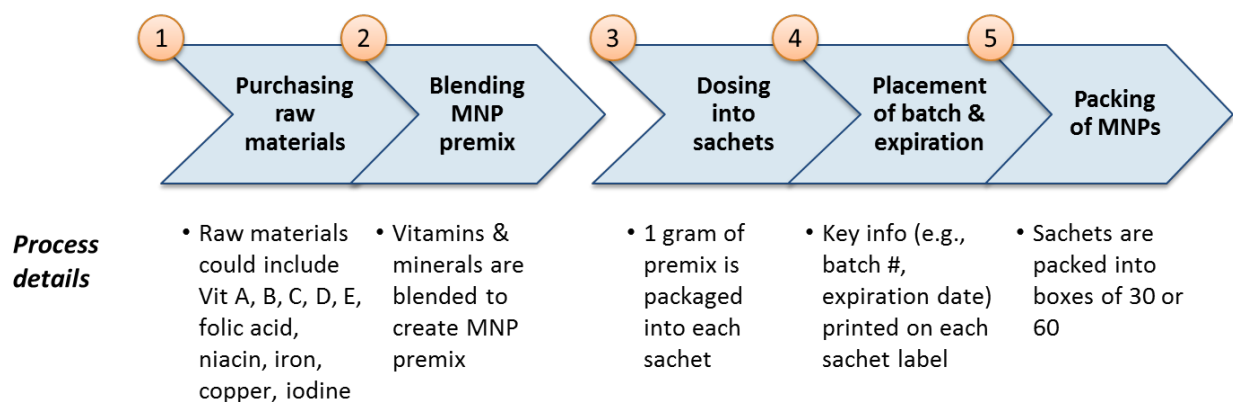
MNP production

The MNP production process is divided into two primary steps: premix production and packaging (see further detail in Figure 7).

⁶⁵ Supplier and supporting partner interviews, 2012-13.

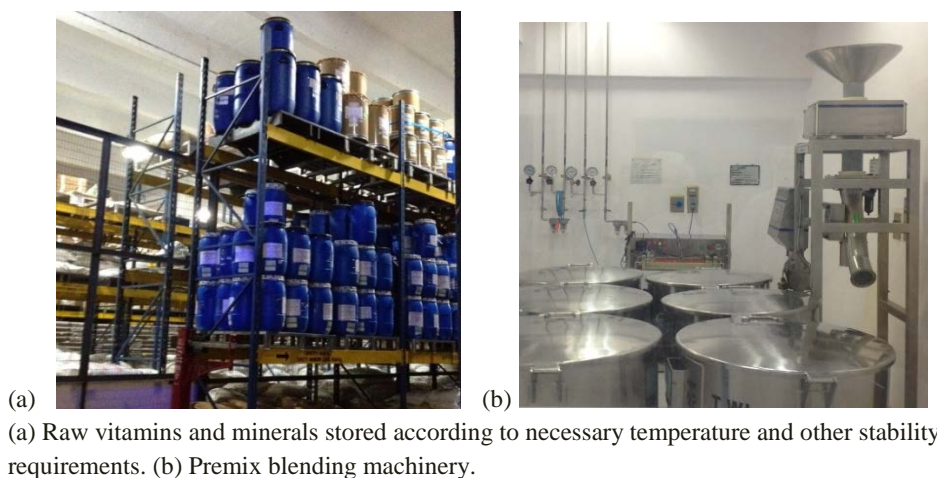
⁶⁶ The cost benefits typically represent a fraction of a cent per sachet.

Figure 7. MNP production process^{67,68}



Premix production entails significant fixed start-up costs and technical expertise. Premix manufacturing requires the appropriate machinery and specialized human resources to ensure raw ingredient stability through appropriate storage and handling, as well as extreme precision and reliability in mixing, and assured quality control (see Figure 8 for images from an MNP premix facility). Because of these requirements, new suppliers face a high barrier to entry, and generally only companies with existing premix businesses⁶⁹ will start MNP premix production.

Figure 8. MNP premix production⁷⁰



MNP packaging, on the other hand, requires relatively limited technical expertise and has low fixed costs to entry.⁷¹ The primary equipment needed is an automated “dosing machine,” which costs approximately \$100,000⁷² and yields 8 sachets per second (see Figure 9).

⁶⁷ Supplier interviews.

⁶⁸ An important step that may occur even prior to production is the design of packaging and labeling information. Local packaging design or design that incorporates factors important to the local audience can improve product acceptance.

⁶⁹ Premix is a commercially prepared blend of vitamins and minerals. Examples of MNP suppliers with premix businesses include DSM, Hexagon, and Piramal.

⁷⁰ Photos courtesy of Piramal.

Figure 9. MNP packaging machine⁷³



The production cost⁷⁴ for an MNP ranges from \$0.016 to \$0.029 per sachet. Raw materials typically represent approximately 50–80 percent of the total production cost. High-quality foil packaging must be used to maintain stability of the coated iron and therefore typically represent approximately half of the raw materials cost.

A number of variables can impact production cost, each one typically representing a fraction of a cent per sachet:

- *Supplier integration:* Vertically integrated suppliers may have slightly lower premix costs because they do not have to pay a margin to an intermediate supplier.
- *Labor:* Though more politically feasible, packaging in Africa and South America can be more expensive than in low-cost labor locations like India.
- *Importation taxes/tariffs:* In some countries (for example, Kenya) raw materials may be subject to lower import taxes than finished goods, making local packaging cost-competitive.
- *Economies of scale:* Suppliers with larger volumes may achieve economies of scale to negotiate lower costs when purchasing raw materials.

An analysis of production process and cost information from suppliers indicates that there is limited opportunity to reduce the cost of MNPs using current practices.⁷⁵ However, further research and development may present new opportunities, for example, to reduce the packaging cost by using innovative materials. The raw materials costs of vitamins/minerals and foil packaging are typically fixed at market rates, and suppliers must maintain a sustainable level of labor costs, overhead, and profit margin. However, some suppliers⁷⁶ are pursuing packaging innovation that may result in opportunities to reduce sachet costs – see further detail on innovation below.

Consumer-driven commercial potential

As noted above, institutional sales to international donors and governments currently dominate the MNP market. Most suppliers have focused on the public sector, given the significant barriers to creating a commercially viable consumer-driven MNP market. The primary barrier is that suppliers anticipate limited consumer demand from the poor, since a 60-sachet course at \$3.30 will likely be unaffordable even assuming conservative retail markup – see further discussion on affordability in Section 4.1. For

⁷¹ Local packagers therefore experience lower barriers to entry than vertically integrated suppliers or premix producers. However, it is also important to note that local programs, political support, or both are a prerequisite for a local packager to have an effective business.

⁷² Cost varies depending on machine and production source. Local packagers cited costs as low as \$60,000 for a machine purchased from South America and as high as \$130,000 for a machine purchased from Europe.

⁷³ Photo courtesy of Piramal.

⁷⁴ Based on data from three suppliers, including both global and local packagers.

⁷⁵ Analysis of costs from four suppliers, including both vertically integrated suppliers and packagers only.

⁷⁶ Specifically Sight and Life (DSM's nonprofit arm) and the Heinz Foundation.

suppliers, counting on consumer demand even from higher-income groups also presents risks, given the extensive demand generation required and the associated costs⁷⁷ (up to three times the commodity cost during the product introduction phase⁷⁸). Furthermore, marketing is restricted in some countries where MNPs are subject to the same regulations as breast milk substitutes – see further detail in Section 3.3.

MNPs are also a low-profit-margin product. Assuming a profit of \$0.003 per sachet,⁷⁹ a supplier would have to sell 100 million sachets per year to make an annual profit of \$300,000, which is a relatively small profit level compared with other pharmaceutical or health and nutrition products. Given the low margin and high risk of poor consumer demand, suppliers repeatedly noted their perception of the MNP market as an unattractive commercial opportunity.⁸⁰

“To date, we have only sold MNPs to NGOs and governments. Our company has no plans to commercialize this product for consumers because the base-of-the-pyramid individuals who are most in need do not have the income to buy MNPs.”

- MNP supplier

Inadequate market incentives have also led to limited innovation to improve MNP product characteristics. Only nonprofit organizations (Sight and Life, the Heinz Foundation) and their affiliated MNP suppliers are currently investing in innovation. Other for-profit suppliers have previously undertaken efforts to improve MNP packaging and presentation only at the request of a purchaser when sales volumes were guaranteed (see further detail in Figure 10).

Further efforts to improve product characteristics may help address some of the current MNP scale-up challenges; however, these will need to be undertaken alongside education and other important programmatic factors – see further discussion in Section 4.4.

⁷⁷ While some suppliers such as DSM are business-to-business companies, several other suppliers with business-to-consumer experience – including Piramal, Hexagon (via a sister company), and Renata– and implementation partners such as GAIN highlighted these challenges.

⁷⁸ Supplier interviews.

⁷⁹ A similar profit margin assumption could apply whether suppliers are selling to institutional purchasers or to wholesale distributors for retail sale.

⁸⁰ Supplier interviews.

Figure 10. MNP innovations⁸¹

	Packaging	Formulation	Presentation	Taste
Sight and Life <i>Nonprofit</i>	Winning solution from recent MNP packaging competition is a durable, biodegradable-film inner sack with a paper outer sack – idea is available for commercialization	Launched MixMe formulation with phytase, an enzyme to improve the bioavailability of iron so it is effective with reduced iron content; this is especially useful for malaria-endemic areas	Developed a fortified hard candy for the Arogya Parivar Program in India (planned launch in 2013)	Exploring potential to add flavor to MNPs, if sufficient demand exists
Heinz Foundation <i>Nonprofit</i>	Exploring ways to reduce packaging cost	<ul style="list-style-type: none"> Created formulation to tolerate preparation in hot liquids Reduced iron for malaria-endemic areas 		
Piramal <i>For-profit</i>	Both companies independently piloted bulk packaging at purchaser’s request; however, have not pursued due to usage concerns (e.g., incorrect dosing, not sealing package appropriately)		Created hard candy for pilot in India at purchaser’s request (no longer producing it)	
Hexagon <i>For-profit</i>				

3.3 Other Key Market Issues

In addition to the demand-side barriers noted in Section 3.1 and the lack of supply-side incentives discussed above, there are two key market issues that have hindered global scale-up of MNPs: unclear global guidance, and policy and regulatory challenges.

Unclear global guidance on formulation and use

There are three global documents that provide normative guidance on the recommended formulation (composition of vitamins and minerals), dosing frequency, and appropriate age range for MNP home fortification: (1) WHO’s “Guideline: Use of Multiple Micronutrient Powders for Home Fortification of Foods Consumed by Infants and Children 6–23 Months of Age,”⁸² (2) “Programmatic Guidance Brief on Use of Micronutrient Powders (MNPs) for Home Fortification,” issued by HF-TAG,⁸³ and (3) a joint statement by the WHO, WFP, and UNICEF titled “Preventing and Controlling Micronutrient Deficiencies in Populations Affected by an Emergency.”⁸⁴ The WHO guidelines are based on a rigorous review of randomized and quasi-randomized controlled trials in low-income countries where anemia is a public

⁸¹ Supplier interviews; “Three Winners Selected in \$25,000 Sustainable Packaging for Micronutrient Powders Challenge,” The Sackler Institute for Nutrition Science, press release, February 2013.

www.nyas.org/AboutUs/MediaRelations/Detail.aspx?cid=a8cbc82f-5840-4d0a-bc17-d61bde830080.

⁸² 2011, http://whqlibdoc.who.int/publications/2011/9789241502030_eng.pdf.

⁸³ 2011, <http://hftag.gainhealth.org/resources/programmatic-guidance-brief-use-micronutrient-powders-mnp-home-fortification>.

⁸⁴ 2007, www.who.int/nutrition/publications/WHO_WFP_UNICEFstatement.pdf. During site visits, stakeholders in multiple countries referenced the joint statement on MNP use in emergency situations as contributing to the

health problem, whereas the HF-TAG guidance was produced by nutrition partners to clarify and extend these guidelines for implementers approaching MNPs from the large-scale programmatic perspective. Meanwhile, the joint statement is specifically targeted toward emergency settings and therefore is meant to be more narrow in its application. Nevertheless, the discrepancies in content and context provided by all three of these documents have been a source of confusion among implementers (see Figure 11).

Figure 11. Global MNP guidance

	WHO guidelines	HF-TAG guidance	WHO, WFP, and UNICEF joint statement (emergency)^a
Formulation	Must include iron, vitamin A, and zinc ^b – typically 5-ingredient formulation	15-ingredient formulation	15-ingredient formulation
Indication	Improve iron status and reduce anemia	Prevent micronutrient deficiencies	Prevent micronutrient deficiencies
Dosing frequency	1 sachet per day for a minimum of 2 months, followed by 3-4 months without supplementation before restarting	Between 60 and 180 sachets every 6 months, at a consumption of no more than 1 sachet per day	1 sachet per day until the emergency is over
Age range	Children aged 6–23 months	Targeted at children 6–23 months old, though where micronutrient deficiencies are widespread also include children 24–59 months	All children aged 6–59 months

Notes: (a) Site visits suggested that the joint statement’s discussion of MNPs in the context of emergency situations – rather than steady-state or normal conditions – has created confusion about appropriate use and formulation of MNPs. (b) The guidelines also note that “in addition ... multiple micronutrient powders may contain other vitamins and minerals at currently recommended nutrient intake (RNI) doses for the target population.”

Experts have suggested that WHO has not issued new guidelines on MNP formulation due to inadequate evidence around the benefits of the 15-ingredient formulation in addressing broader micronutrient deficiencies. However, the current situation has led to significant country implementation challenges. For example, Kenya’s MoH faced delays in scale-up as it sought to determine the appropriate formulation, target age range, and dosing. In Bangladesh, there remains a division about the appropriate formulation, with some programs distributing the 5-ingredient formulation and others the 15.

Furthermore, evidence pointing to the efficacy of more flexible and less frequent administration of MNPs continues to emerge. Studies indicate that weekly dosing of MNPs can improve hemoglobin levels and reduce anemia prevalence by a significant margin⁸⁵ – for example, administration of MNPs twice weekly

⁸⁵ Sengchanh Kounnavong et al., “Effect of Daily versus Weekly Home Fortification with Multiple Micronutrient Powder on Haemoglobin Concentration of Young Children in a Rural Area, Lao People’s Democratic Republic: A Randomised Trial,” *Nutrition Journal* 10 (2011): 129, www.nutritionj.com/content/10/1/129; S.M.Z. Hyder et al., “Effect of Daily versus Once-

over a 24-week period (48 sachets total) resulted in a 32.5 percent decrease in the prevalence of anemia, compared with a 35.4 percent decrease in the group receiving daily MNP supplements over the same period.⁸⁶ Daily supplementation, however, continues to demonstrate the most impact on anemia reduction, and the evidence on less frequent dosing has not been sufficient to motivate modifications to the above guidance. The interpretation of a nondaily recommendation by caregivers also requires analysis of ongoing studies.

Policy and regulatory challenges

Despite WHO's strong recommendation in support of MNPs for preventing and treating IDA for infants aged 6–23 months, various policy issues impact scale-up. For example, not all country governments have embraced use of MNPs to date. The Planning Commission of India (headed by the prime minister), for example, prohibits the use of MNPs.⁸⁷ In other countries, such as Ethiopia, health leaders are just becoming aware of MNPs as a possible intervention⁸⁸ but have not yet developed strategies for procurement and distribution. The development of a coherent national policy environment on MNPs and broader nutrition is often the first and critical step in facilitating country scale-up, and will be a growing priority as countries seek to bring this intervention to scale. In a series of workshops in Asia, Latin America, and Africa, UNICEF and other major partners have worked with stakeholders from health ministries to begin to develop awareness around home fortification and use of MNPs as a key tool for addressing IDA among infants.⁸⁹ However, additional technical and programmatic assistance is likely necessary for all high-burden countries to include MNPs as a fundamental tool within their national nutrition programs and successfully scale up these programs.

At a regulatory level, MNPs may face various barriers to scale-up depending on how they are registered – either as a pharmaceutical product, a food, or a nutritional supplement – in a given country. While Section 4.2 provides a broader discussion of issues relating to product registration, the section below focuses on the implications of potential national marketing regulations for MNPs, assuming they are registered as a food or nutritional supplement.

In 1981, the WHO issued the International Code of Marketing of Breast-Milk Substitutes (the Code) to secure safe and adequate nutrition for infants by promoting and protecting breast-feeding and by regulating the marketing of breast milk substitutes. The Code is not legislation, but rather a set of recommendations for member countries to individually interpret and enforce within their social and legislative frameworks. The inappropriate marketing of breast milk substitutes, particularly infant formula, which may encourage mothers to displace breast milk, has been a long-standing global issue that has led to significant health risks to children when not properly controlled. Given these risks, there

Weekly Home Fortification with Micronutrient Sprinkles on Hemoglobin and Iron Status among Young Children in Rural Bangladesh,” *Food and Nutrition Bulletin* 28.2 (2007): 156–164.

⁸⁶ Kounnavong et al.

⁸⁷ National Rural Health Mission, “Minutes of 2nd Nutritional Action Group Meeting – September 2012.” The minutes include the following notes: “Use of Sprinklers [sic.] is prohibited by the Planning Commission and thus cannot be included for IFA [iron and folic acid] supplementation. Also, as its dose cannot be monitored due to portions of food consumed and wasted by the child, it should not be preferred for supplementation. Also the interaction between various food components and IFA in sprinklers [sic.] needs to be explored.”

⁸⁸ R4D site visit to Ethiopia and interviews with MoH nutrition technical advisor Teshome Desta as well as representatives of UNICEF, MI, and GAIN, August 2012.

⁸⁹ UNICEF, WHO, WFP, Asia-Pacific Regional Workshop, March 2010; UNICEF, CDC, and partners; Latin America and the Caribbean Regional Workshop, June 2010; UNICEF, CDC, and partners, Sub-Saharan Africa Regional Workshop, May 2012.

continue to be significant political sensitivity and concerns around companies marketing food products for the 6- to 23-month age group.

Regulatory restrictions on marketing of MNPs for this age group are driven both by (1) national-level interpretation and enforcement of the Code and (2) the national registration status of MNPs as a food or nutrition supplement versus a pharmaceutical (see Section 4.2 for further discussion). In most contexts, classification of MNPs as a pharmaceutical product will impose additional regulatory burden on distribution of these products and restrict the points of sale to pharmacies.⁹⁰ While this restriction allows for more control over who is selling these products, it may also lead to product access issues. However, products classified as pharmaceuticals are typically exempt from the national marketing regulations applied to infant foods.

If registered as a food or nutritional supplement, MNPs may confront fewer regulatory hurdles at the time of national registration and product introduction as well as increased options for sales points. However, MNPs can be subject to marketing restrictions depending on how the national government has interpreted the Code within its own regulations. The feasibility of marketing and promotion of MNPs for infants older than six months remains uncertain given evolving local contexts and information gaps that may lead to strict marketing regulations for infant food products. It is important to note that MNPs are designed to be added to complementary foods, which are by definition not intended to be breast milk substitutes but rather a key counterpart to continued breast-feeding up to two years of age or beyond.

⁹⁰ However, registration as a pharmaceutical product may not be pursued in certain contexts, given challenges associated with this status – for example, higher tax implications.

Box 2. Anemia in India

Approximately 73 million children below the age of three are anemic in India.¹ In 1970, the Indian government launched the National Nutrition Anemia Prophylaxis Programme to prevent nutritional anemia in mothers and children. Under the original strategy, children in the age group one to five years were targeted for treatment with iron tablets. However, in 2007, the government of India revised this plan to endorse liquid supplements instead of tablets and to expand iron supplementation to children below one year of age. The Indian government itself has recognized that “national programmes to control and prevent anemia have not been successful”² and is currently reevaluating the program. Yet central Indian government leaders remain reluctant to adopt MNPs, which are still perceived as a new, unproven intervention. The Nutritional Action Group, responsible for the anemia-control strategy, recently stated that MNPs cannot be included in the strategy because “[the] dose cannot be monitored due to portions of food consumed and wasted by the child ... also the interaction between various food components and [iron and folic acid] in [MNPs] needs to be explored.”³ A peer-reviewed clinical evidence base exists to address these concerns, but it is based on trials in countries outside of India. Indian public health experts have suggested that the Indian government has often required Indian-based evidence as a precondition for supporting an intervention. A number of state- or NGO-funded MNP trials and pilots are currently underway in the states of Bihar and Maharashtra,⁴ which will be valuable in developing a locally accepted evidence base for MNPs. Yet, there remain significant political barriers to overcome before the central government embraces MNPs as an effective intervention for IDA treatment and prevention.

¹ Prakash V. Kotecha, “Nutritional Anemia in Young Children with Focus on Asia and India,” *Indian Journal of Community Medicine* 36.1 (2011): 8–16, <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3104701/>.

² “National Nutrition Anemia Prophylaxis Program,” India National Institute of Health and Family Welfare, <http://www.nihfw.org/NDC/DocumentationServices/NationalHealthProgramme/NATIONAL%20NUTRITIONANEMIAPROPHYLAXISPROGRAMME.html>.

³ National Rural Health Mission, “Minutes of 2nd Nutritional Action Group Meeting – September 2012.”

⁴ India site visit consultations, 2012.

4. Key Factors Affecting MNP Scale-Up Strategy

Distribution models

Three broad types of distribution models can be used to support MNP scale-up: the public sector, pure commercial models, and subsidized models that leverage market-based tools (e.g., social marketing). Each approach has a unique role to play when considering the income level, geographic location, and care-seeking or purchasing behavior of the target population. It is important to note that these models are not mutually exclusive, and in many cases the best results can be achieved by combining models in a given country context.

The public sector: Under public sector models, MNPs are purchased by NGOs or country governments for free distribution to the end user. A public sector approach typically relies on existing national distribution channels – primarily public health and child welfare systems. The advantages of this method of distribution are that it has a broad coverage area, can effectively leverage existing infrastructure, and is affordable even for the poorest. However, in many high-burden countries, health system coverage is often limited in remote areas, and there may be weak supply chains. In addition, recurrent costs to the public sector and the need for sustained political will represent key challenges to scale-up via public health systems. Despite these hurdles, Bolivia, the Dominican Republic, Guyana, Mexico, Mongolia, and Kyrgyzstan, among others, have implemented large-scale public sector MNP programs.

As discussed in Section 3.1, MNPs are currently purchased primarily by large institutional buyers, such as WFP and UNICEF, whose support may be time-limited as programs shift to increased ownership under the national government or other local partners. This report will focus on the public sector in the context of existing national programs while acknowledging that institutional buyers will likely remain part of MNP supply chains (e.g., as procurement partners).

Pure commercial model: In pure commercial models, private sector owners or entrepreneurs sell MNPs in a way similar to any other consumer good to sustain their business and maximize profits. When commercialized, MNPs can be sold through direct retail channels such as drug stores, grocery stores, pharmacies, or kiosks. This represents a sustainable model that leverages private sector resources but may exclude lower-income consumers. Pharmaceutical companies based in Bolivia and South Africa have both launched commercial sales of MNPs.

Socially oriented models using private sector tools: There is a growing trend toward models that combine aspects of both public and market-based approaches in creating affordable access to health and nutrition products. In these models, any “profit” earned through MNP sales is typically utilized by the NGO to subsidize other products or offset ancillary programmatic costs for more vulnerable populations. Selling MNPs using these channels can allow for deeper reach into rural

areas, though these channels can present challenges in reaching significant scale given the donor subsidies required. Common models include social marketing and microfranchising.

- Social marketing is commonly defined as “a process that applies marketing principles and techniques to create, communicate, and deliver value in order to influence target audience behaviors that benefit society (public health, safety, the environment, and communities) as well as the target audience.”⁹¹ This report supports and acknowledges the importance of socially marketing MNPs in this sense across public and private actors; however, it should be noted that for the purposes of this report, social marketing refers to, unless otherwise noted, a distinct method of distribution that combines attractive branding and packaging with an extensive marketing and education strategy to sell health products through traditional retail channels at subsidized prices. This approach has been pioneered globally by PSI, DKT International, and the Social Marketing Company for selling family planning products and other basic health and nutrition interventions. The retail price of socially marketed products is often lower than the manufacturing costs in order to improve affordability for low-income consumers. As such, this model is not self-sustaining and relies on donor contributions.⁹²
- Microfranchising employs an “Avon-like” network of franchised health promoters who provide health education and sell essential health products door to door at prices affordable to the poor.⁹³ The Safe Water and AIDS Project (SWAP) program in Kenya sold MNPs using this model and BRAC (formerly Bangladesh Rural Advancement Committee) continues to use this model in Bangladesh. Most social franchising organizations require donor funding support during early years, though some, such as Living Goods, which is considering introducing MNPs into its sales basket in Uganda in 2013, seek to become fully self-funded.⁹⁴

Consumer demand levers

Pure commercial and socially oriented models using private sector tools rely on consumer demand in order to be successful. Although IDA is a public health burden across wealth quintiles, low-income children remain the most vulnerable. In their review of the epidemiology and consequences of anemia in low- and middle-income countries, Balarajan and colleagues suggested, “A child living in a household in the lowest wealth quintile was 21 percent more likely to be anaemic than were those in the highest wealth quintile.”⁹⁵ As a result, each MNP distribution model must be considered in the context of maximizing access and health impact for low-income children, who have the greatest need.

In order to determine which approaches are best to bring MNPs to scale in a given country landscape, it is critical to consider the key factors that affect consumer demand: affordability, availability, acceptability, and awareness (see Figure 12), or the “four A’s.” The levers associated with each of these demand factors

⁹¹ Philip Kotler and Nancy Lee, “Social Marketing: Influencing Behaviors for Good,” Social Marketing Services Inc., 2008, www.epa.gov/owow/NPS/outreach2009/pdf/051209_0930_Lee_handout.pdf.

⁹² “What Is Social Marketing?” *Profile: Social Marketing and Communications for Health*, 2003, www.psi.org/sites/default/files/publication_files/what_is_smEN.pdf.

⁹³ “A Scalable Model For Massive Impact,” Living Goods, <http://livinggoods.org/what-we-do/>. On average, Living Goods prices are 10–40 percent below retail prices.

⁹⁴ “Sustainability,” Living Goods, <http://livinggoods.org/what-we-do/sustainability/>.

⁹⁵ Y. Balarajan et al., “Anemia in Low-Income and Middle-Income Countries,” *Lancet* 378.9809 (2011): 2113–2135.

can be utilized to improve demand. They are also often interrelated, so improving availability, for example, may also improve awareness.

Figure 12. The four A's of consumer demand⁹⁶



The implications of these four factors on selecting appropriate scale-up model(s) for MNPs are explored in detail below. Figure 13 provides a brief overview of where MNPs currently stand across each demand factor.

Figure 13. MNPs and the four A's

<i>Affordability</i>	<ul style="list-style-type: none"> • MNPs cost approximately \$1.80 per 60-day course (\$0.03 per sachet) for public sector purchasers. • In the private sector, price per course can be \$3.30 or greater given retail markups and demand-generation cost – unaffordable for many lower-income consumers.
<i>Availability</i>	<ul style="list-style-type: none"> • Only a small fraction of the 34 million children in the highest-burden countries targeted for this intervention and less than 5% of the world's 300 million anemic children have received MNPs. • Most countries with high prevalence of anemia (e.g. sub-Saharan African countries, India) have not yet achieved large-scale MNP programs.
<i>Awareness</i>	<ul style="list-style-type: none"> • There is a general lack of awareness across income tiers on micronutrient deficiency and the role of home fortification. • Home fortification is still a new intervention that requires significant demand generation and education for caregivers to adopt an unfamiliar routine that requires a novel product (MNPs) to be added to and mixed in with the infant's portion of food.
<i>Acceptability</i>	<ul style="list-style-type: none"> • Leading attributes of MNPs, such as ease of use, lack of taste, and few and minor side effects make the product more desirable to consumers than its alternative – iron drops or syrups. • Thoughtful packaging and labeling and strong interpersonal communication on side effects and proper administration are required to attain acceptability and proper utilization of MNPs.

⁹⁶ Jamie Anderson and Costas Markides, "Strategic Innovation at the Base of the Pyramid," *MIT Sloan Management Review* 49.1 (2007), <http://sloanreview.mit.edu/article/strategic-innovation-at-the-base-of-the-pyramid/>

4.1 Affordability

In situations where MNPs may be sold through pure commercial channels – which depend on significant markups to incentivize sales and distribution – these low-cost (\$0.02–\$0.03 per sachet, \$1.20–\$1.80 per course) products are likely to at least double in price – quickly becoming unaffordable to the poorest and most vulnerable groups that face constrained incomes and cash flow volatility.⁹⁷ Past studies on charging for preventive health products and early experiments with commercial sales of MNPs underscore this important consideration around affordability and suggest that, for MNPs, primary dependence on pure market channels is unlikely to lead to the desired effects of improved diet and reduced prevalence of IDA. These studies and pilots also suggest free distribution of MNPs through public channels⁹⁸ (e.g., via community health workers [CHWs] and public health clinics) and subsidized sales through socially oriented models will be necessary to offset these affordability challenges and significantly scale up this intervention. As with other health products (e.g., family planning products, zinc/ORs), this mixed distribution approach will be essential for maximizing both access and health impact.

Definition and overview

Affordability represents the degree to which consumers have the means to buy a product⁹⁹ and is a function of both household resources and product price. Low-income consumers (living on \$2–\$4 per day at PPP levels) and the poorest households (living on less than \$2 per day),¹⁰⁰ both of which also have high burdens of micronutrient deficiency and stunting, are concentrated in a handful of countries in South Asia and sub-Saharan Africa. These households face significant challenges in obtaining sufficient resources to spend on health and nutrition commodities and high-quality foods, and are therefore keenly sensitive to price.¹⁰¹

Ability to pay (ATP) and willingness to pay (WTP) are two critical concepts for determining affordability. ATP is an estimate of the incremental resources a family has to spend on a good or service – often *beyond* “mandatory” purchases such as food – and can be estimated via proxies that include income, assets, and expenditures. ATP estimates typically assume that household resources cannot be enhanced or leveraged in the near term through financial tools such as credit.

WTP estimates, on the other hand, use a range of methodologies including surveys and auctions to determine the maximum benefit a consumer sees in the product – usually, without directly imposing “real-life” constraints such as how much money the consumer actually has in his or her pocket. Since many types of WTP tests do not require consumers to purchase the product and do not impose restrictions around borrowing, WTP estimates are often much higher than true ATP – especially in the developing

⁹⁷ While MNPs may be more affordable if purchased in single sachets or in small bundles (e.g., to cover one week’s worth of the product), some public health officials (e.g., in Bolivia) advise against making the product available in small quantities since it may suggest to caregivers that MNPs in small quantities are effective when this has not been proven for addressing IDA.

⁹⁸ Free distribution via public sector channels should also involve best-in-class behavior change communications (BCC) – alternatively described as information-education-communication (IEC) – to ensure not only uptake but appropriate adherence.

⁹⁹ Jamie Anderson and Costas Markides, “Strategic Innovation at the Base of the Economic Pyramid,” 2006, www.jamieandersononline.com/uploads/ANDERSON_MARKIDES_SI_at_Base_of_Economic_Pyramid_FINAL.pdf.

¹⁰⁰ Natalie Chun, “Middle Class Size in the Past, Present, and Future: A Description of Trends in Asia,” Asian Development Bank Economics Working Paper Series No. 217, 2010, www.adb.org/sites/default/files/pub/2010/economics-wp217.pdf.

¹⁰¹ Although the relationship between IDA and income varies by country, higher-income consumers often have access to higher-quality, fortified infant cereals and other complementary foods appropriate for infants aged 6–23 months. In some settings, these fortified complementary foods may offset the need for home fortification solutions such as MNPs.

world, where access to credit may be most constrained.¹⁰² Indeed, participants in some experiments have reported a WTP for goods and services that is, on average, greater than their true ATP by a factor of three.¹⁰³

Despite these limitations on the realism of WTP estimates, they *can* be helpful in providing researchers with an estimated consumer value perception of new products. It is important, however, that these estimates be appropriately discounted and refined via market trials.

In addition to discussing ATP and WTP for MNPs and analogous products, and their implications for delivery models, this section will outline opportunities to enhance affordability through tools such as savings, credit, and product price reductions. This section will also point to limitations in these opportunities and the important role, therefore, for free distribution of MNPs via public sector models.

Ability to pay among the poor

Determining the affordability of a specific product to a particular consumer is complex: Scholars have indicated that few models exist that accurately use underlying features such as household income to make predictions across geographic and demographic contexts.¹⁰⁴ Despite the lack of robust models and reliable household data, economists and businesses do attempt a priori consumer segmentation to inform public health or business decisions.^{105,106,107}

Although country-specific data on affordability among the poorest segments is difficult to attain, more global findings on base-of-the-pyramid (BOP) customers are available. These findings suggest that low and volatile incomes – often a result of poor harvests, high unemployment, and other cyclical and structural conditions – undermine emerging desires to consume goods and services. As a recent McKinsey report on the African consumer noted, “Even though Africans value brands and product quality, *affordability* remains critical, given generally low incomes and high unemployment.”¹⁰⁸ This phenomenon is echoed in contexts outside of Africa, for example in India where two-thirds of villagers are in the lowest income band – meaning that the highest concentrations of consumers are also highly price sensitive.¹⁰⁹

¹⁰² Simona Grassi, “Public and Private Provision under Asymmetric Information: Ability to Pay and Willingness to Pay,” European University Institute, San Domenico, Italy, November 2008, www.iae.csic.es/investigatorsMaterial/a923109492351972.pdf.

¹⁰³ John List and Craig Gallet, “What Experimental Protocol Influence [sic.] Disparities Between Actual and Hypothetical Stated Values?” *Environmental and Resource Economics* 20 (2001): 241–254, www.rps-chicago.com/papers/33-fulltext.pdf.

¹⁰⁴ Stakeholder interviews: Nava Ashraf, Pascaline Dupas, and Stephen Vosti.

¹⁰⁵ This analysis leverages segmentation based on household consumption but notes that, for estimating willingness to buy an imported product such as MNPs, it is critical to consider household expenditure levels in nominal terms, rather than PPP.

¹⁰⁶ Hindustan Lever and other commercial firms in India, for example, use the country’s Socio-Economic Classification system to group and target households for product sales. This system is based on the education and occupation of the primary wage earner. The USAID’s Demographic Health Surveys (DHS), alternatively, collect data around housing and assets to develop country-specific wealth quintiles.

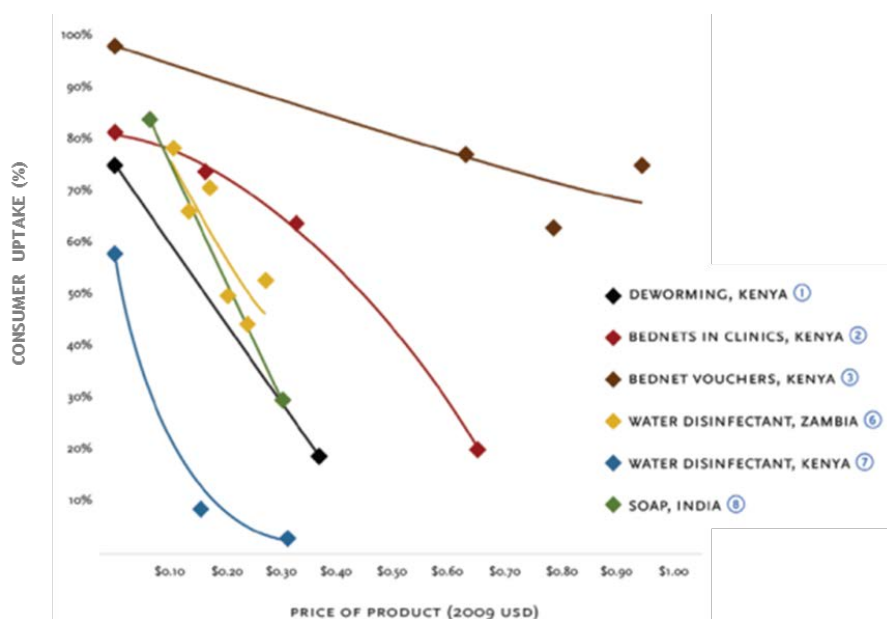
¹⁰⁷ Program for Appropriate Technology in Health (PATH), “Special Report: Commercial Approaches to Delivering Household Water Treatment and Safe Storage Products and Solutions to Low-Income Households,” PATH, Seattle, 2012, www.path.org/publications/files/TS_swp_perspectives_rpt.pdf.

¹⁰⁸ Damian Hattingh, Bill Russo, Ade Sun-Basorun, and Arend Van Wamelen, “The Rise of the African Consumer,” McKinsey, Johannesburg, October 2012, www.mckinsey.com/global_locations/africa/south_africa/en/rise_of_the_african_consumer.

¹⁰⁹ Jamie Anderson and Costas Markides, “Strategic Innovation at the Base of the Economic Pyramid,” 2006, www.jamieandersononline.com/uploads/ANDERSON_MARKIDES_SI_at_Base_of_Economic_Pyramid_FINAL.pdf.

As Figure 14 indicates, past sales trials¹¹⁰ of analogous health products (i.e., those that are preventive and face similar demand challenges to MNPs), such as water treatment solutions and deworming tablets, give evidence to this price sensitivity, suggesting that the poorest households face considerable affordability challenges when product prices go above approximately \$0.50, causing demand to drop precipitously.¹¹¹ Michael Kremer and Edward Miguel in Busia, Kenya, found that introduction of a \$0.40 charge for deworming drugs led to an 80 percent reduction in treatment rates.¹¹² Likewise, researchers found that charging a positive price for insecticide-treated bed nets significantly dampened demand – a price increase from zero to \$0.60 decreased net uptake by 60 percent.^{113,114}

Figure 14: Demand for preventive healthcare products based on price¹¹⁵



Affordability challenges among the poor are underscored by the fact that in some of the poorest households, families are reportedly spending approximately \$0.56-\$0.78 per day on food for an average household size of four to eight individuals – or an average of \$0.07-\$0.20 per family member per day,^{116,117} while, according to other reports, poor households spend less than \$0.10 per day per child on

¹¹⁰ Note that the data provided in Figure 14 are derived from experiments as opposed to actual market settings.

¹¹¹ Abdul Latif Jameel Poverty Action Lab (J-PAL), “The Price Is Wrong,” *J-PAL Bulletin*, April 2011, www.povertyactionlab.org/publication/the-price-is-wrong.

¹¹² “The Illusion of Sustainability: Comparing Free Provision of Deworming Drugs and Other ‘Sustainable’ Approaches in Kenya,” *The Quarterly Journal of Economics* 122.3 (2007): 1007–1065. This study included a shift from providing deworming drugs for free to providing treatment at a price greater than zero; some research suggests that this shift may decrease demand by a greater magnitude than if products are initially introduced at a price greater than zero.

¹¹³ Jessica Cohen and Pascaline Dupas, “Free Distribution or Cost Sharing? Evidence from a Randomized Malaria Prevention Experiment,” *Brookings Global Working Papers No. 14*, 2007, www.brookings.edu/~media/research/files/papers/2007/12/malaria%20cohen/12_malaria_cohen.pdf.

¹¹⁴ Although these demand effects will likely be critically important in the context of MNPs, additional research should also be done to understand the likely demand for MNPs when initially introduced at a price above zero.

¹¹⁵ J-PAL, “The Price Is Wrong,” *J-PAL Bulletin*, April 2011, www.povertyactionlab.org/publication/the-price-is-wrong.

¹¹⁶ Abhijit V. Banerjee and Esther Duflo, “The Economic Lives of the Poor,” *Journal of Economic Perspectives* 21.1 (2007): 141–168, <http://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.21.1.141>. Banerjee and Duflo report that those living on less than \$1 per day are spending between 56 and 78 percent of their household budget on food. With a spending level of \$0.56 to \$0.78 per household per day among those living on less than \$1 per day, and an average household size of four to eight people, depending

food.¹¹⁸ Nevertheless, these small amounts represent a significant burden on household resources – many studies have shown that relative to wealthier families the poor already “overspend” on food as a percentage of their household budget and that rising food prices will exacerbate this situation.¹¹⁹

Some experts suggest that households would likely consider MNPs to be part of the food budget.¹²⁰ With limited ability to increase household expenditure on food – and ever-increasing entry of well-marketed and enticing snack foods into these markets – MNPs would therefore face stiff competition for what marketing firms term “share of wallet.”¹²¹

While the poorest households display very high price sensitivity – especially for preventive products – Africa’s and Asia’s middle classes continue to dramatically increase consumption levels and may indeed show an ability and willingness to purchase MNPs (see discussion below on commercial opportunities).¹²²

Markups through commercial channels

Though private sector retail channels can be useful for extending availability (see Section 4.2), these channels involve markups at each point in the sales chain. The number – and size – of these markups can double and even triple product prices, likely pushing low-cost products such as MNPs beyond levels of affordability for the poorest.

According to 2012 interviews with suppliers¹²³ and personnel in the UNICEF Supply Division, the ex-factory price for MNPs is \$0.02–\$0.03 per sachet (see Section 3.2) and these ex-factory prices are increased as the product moves from producer through distributors and retailers and on to consumers. The number of links in these sales chains varies by distribution network, country, and product, as do the sales markups at each point in the sales chain. In some countries, such as Kenya, there are standard trade margins for products carried through pharmaceutical supply chains.¹²⁴ In other countries and contexts, markups are constantly negotiated and difficult to predict. Likewise, in some regions, suggested retail

on context, average daily spending per person would range from \$0.07 to \$0.20. Children may potentially fall on the lower end of this expenditure range given lower food and caloric needs, though this is not currently asserted in the literature.

¹¹⁷ U.S. Department of Agriculture (USDA) Economic Research Service, www.ers.usda.gov/. USDA Economic Research Service indicates that food spending in India is \$0.64 per household per day. Assuming a median household size in rural areas of four to five people (based on 2011 census data), Indian households are spending \$0.13 to \$0.16 per person per day.

¹¹⁸ Boston Consulting Group (BCG), “Nutrition Private Sector Engagement,” compendium of landscaping materials for the Bill & Melinda Gates Foundation, March 31, 2011.

¹¹⁹ See, for example, “Global Trends 2030: Alternative Worlds,” U.S. National Intelligence Council, December 2012, <http://globaltrends2030.files.wordpress.com/2012/12/global-trends-2030-november2012.pdf>. For additional examples and details on food trends, see “Food Price Watch,” World Bank, November 2012, <http://siteresources.worldbank.org/EXTPOVERTY/Resources/336991-1311966520397/Food-Price-Watch-Nov-2012.pdf>.

¹²⁰ Interview with Stephen Vosti, University of California Davis, October 2012.

¹²¹ Interview with Pascaline Dupas, Stanford University, November, 2012.

¹²² Grameen Danone Foods in Bangladesh, for example, has shifted its strategy for selling fortified yogurt to wealthier urban consumers after encountering considerable challenge in selling the product to rural, low-income groups. Across emerging markets, consumer packaged goods companies have turned first to higher-income groups, primarily in urban centers, as target consumers.

¹²³ Abbott, DSM, Hexagon, Nycomed, INTI, LAFAR, and SIGMA.

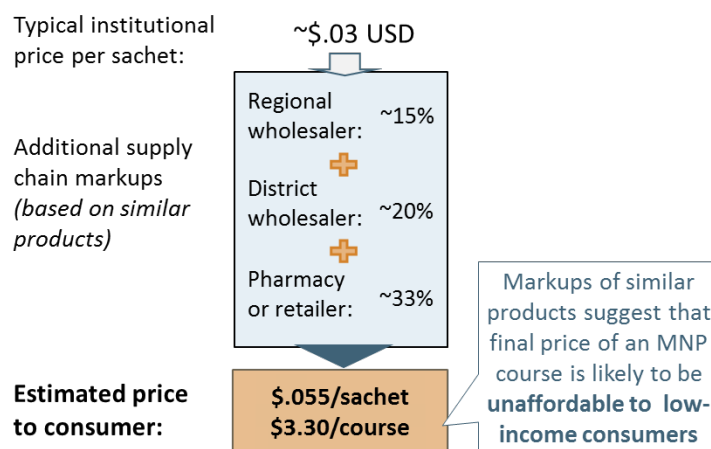
¹²⁴ See, for example, Kyle Peterson, Fay Hanleybrown, and Laura Herman, “Beyond R&D: Leveraging the Pharmaceutical Industry on Issues of Drug Access,” FSG, December 2005, www.fsg.org/Portals/0/Uploads/Documents/PDF/Leveraging_Pharma_Industry_Drug_Access.pdf; and “Pharmaceutical Sector Profile: Kenya,” United Nations Industrial Development Organization, 2010, www.unido.org/fileadmin/user_media/Services/PSD/BEP/Kenya_Pharma%20Sector%20profile_TEGLO05015_Ebook.pdf.

prices can helpfully “cap” the final price to consumers; enforcement of these caps requires extensive administrative capacity, however, which may limit the viability of such practices, especially in rural locations.

Figure 15 incorporates data from Kenya and other geographies to illustrate potential markups for MNPs through purely private channels. When these markups are applied, the price of MNPs would jump to \$0.055 per sachet or \$3.30 for a 60-day course,¹²⁵ which is well above what has been shown to be affordable for the poorest households based on analogous products. As an early indication of the likelihood of this price point, in Bolivia – where the supply chain is actually more direct than it is likely to be in Kenya and hence may underestimate the potential for markups – MNPs are beginning to be sold at around \$0.06 per sachet.¹²⁶ This price already represents a significant portion of low-income households’ daily per-person food budget.^{127,128}

Importantly, these markups represent typical trade practices for products at “steady state,” – that is, markups for products that have entered the marketplace and for which demand has begun to be built. As noted in a variety of MNP pilot programs,¹²⁹ however, introduction of MNPs can require significant additional demand-generation costs beyond these “steady state” incentives to successfully drive initial awareness and uptake.¹³⁰ In situations wherein all or some portion of these additional initial demand-generation costs are passed on to consumers, products may then become increasingly unaffordable to the poorest groups.

Figure 15. Potential MNP markups through private sector



¹²⁵ As outlined in Section 3, nutritionists have noted that effective intervention against IDA requires a full course of MNPs (though, as mentioned, there is confusion about the timing requirements for consuming a full course; see WHO’s “Guideline: Use of Multiple Micronutrient Powders”). While studies from Bangladesh have indicated positive outcomes even with some flexibility in dosing, any analysis of product affordability should consider the cost of a full course of MNPs in light of current global guidance and IDA reduction goals.

¹²⁶ Site visit to Bolivia, 2012.

¹²⁷ Low-income consumers spend less than \$.10 per day per child on food – on a per-day basis, a 60-day course of MNPs would cost \$0.055.

¹²⁸ BCG, “Nutrition Private Sector Engagement,” compendium of landscaping materials for the Bill & Melinda Gates Foundation, March 31, 2011; Abhijit V. Banerjee and Esther Duflo, “The Economic Lives of the Poor,” *Journal of Economic Perspectives* 21.1 (2007): 141-168, <http://pubs.aeaweb.org/doi/pdfplus/10.1257/jep.21.1.141>; USDA Economic Research Service, <http://www.ers.usda.gov/>.

¹²⁹ See, for example, literature on MNP project in Nyanza, Kenya.

¹³⁰ Supplier interviews.

Willingness to pay

Linked to ability to pay but distinct is the notion of WTP. WTP is an estimate of a consumer's perception of a product's value. Researchers use a wide variety of methods to assess WTP, including both "stated preference" techniques, wherein consumers are asked forms of the question "Would you pay X for this product?," and "revealed preference" methods, which use simulations to try to more precisely and accurately gauge the price consumers would pay.¹³¹ Although the methods differ as far as complexity, time, and cost requirements (and in turn, divergence from real spending patterns), all types of WTP estimates are intended to help companies, social marketing organizations, and NGOs craft an optimal pricing strategy for goods and services that meets their specific objectives.¹³²

WTP is driven by consumers' awareness of the product (market history) and by the consumer's understanding of impact.¹³³ For example, a study from Zambia on water treatment products showed that giving consumers information about an unknown product can dramatically increase the impact of price subsidies on uptake (effectively increasing the value of these subsidies).¹³⁴

In the case of MNPs, parents may have limited initial WTP, given poor knowledge of the health consequences of IDA and of the rationale for supplementation, and therefore the rates of uptake and adherence are likely to strongly depend on the quantity and quality of information provided, in conjunction with the price of the product. Active marketing and consumer education can increase recognition of key benefits (see Sections 4.3, "Awareness," and 4.4, "Acceptability"), but, as noted, these efforts are costly and can constrain affordability when passed on to consumers through increased prices.

Though active marketing can increase awareness of product benefits, it can do little to alter underlying product features that negatively impact WTP, such as whether a product is preventive (rather than curative) in nature. There is substantial evidence that consumers underinvest in preventive health and nutrition products due to the difficulty in perceiving near-term benefits.¹³⁵

As with many other preventive products, the benefits of MNPs are not easily or quickly discernible to caregivers: Studies from Kenya and Bangladesh suggest that mothers have to administer many sachets across several weeks to notice any difference in a child's health or behavior.¹³⁶ Longer-term benefits –

¹³¹ Michaela Mora, "Comparing Willingness-to-Pay Measurements to Real Purchase," *Relevant Insights*, February 2011, <http://relevantinsights.com/willingness-to-pay-measurement>. Researchers stress that when WTP studies are done, it is important to utilize revealed preference techniques such as the Becker, DeGroot, and Marschak approach, "in which the participants are obligated to purchase a product if the price drawn from a lottery is less than or equal to his or her [sic.] stated willingness to pay in response to a direct question."

¹³² That is, for most private sector companies, maximizing profit, and for most social marketing firms, creating an optimal scenario that solves for both public health impact and financial sustainability.

¹³³ Jamie Anderson and Costas Markides, "Strategic Innovation at the Base of the Economic Pyramid," 2006, www.jamieandersononline.com/uploads/ANDERSON_MARKIDES_SI_at_Base_of_Economic_Pyramid_FINAL.pdf.

¹³⁴ The authors showed that there is strong complementarity between providing information and offering price subsidies (above and beyond the impact of either intervention in isolation). Nava Ashraf, B. Kelsey Jack, and Emir Kamenica, "Information and Subsidies: Complements or Substitutes?" J-PAL, January 2013. www.povertyactionlab.org/publication/information-and-subsidies-complements-or-substitutes.

¹³⁵ "Pricing Health Products: Is the Price Wrong?" J-PAL, www.povertyactionlab.org/policy-lessons/health/pricing-health-products.

¹³⁶ Katie Tripp et al., "Formative Research for the Development of a Market-Based Home Fortification Programme for Young Children in Niger," *Maternal and Child Nutrition* 7 (2011): 82–95, <http://onlinelibrary.wiley.com/doi/10.1111/j.1740-8709.2011.00352.x/pdf>.

such as improved cognitive development – may never become evident to caregivers, although these outcomes may initially appeal to consumers.

Despite these potential constraints on WTP for MNPs, studies from Kenya, Bangladesh, Ghana, and Niger have shown that consumers do have some desire to purchase MNPs, especially when MNP prices are kept artificially low at the cost to produce (\$0.03) and additional demand-generation and supply chain costs are subsidized by donors.¹³⁷ Likewise, initial work on demand for lipid-based nutrient supplements (LNSs) among a range of income groups in urban Ethiopia has shown unexpectedly high levels of WTP, but these findings have not been tested across some of the most vulnerable groups outside urban and peri-urban settings.¹³⁸ In addition, given consumers' tendency to overstate their actual WTP in these simulations, it is essential that these initial studies be tested and refined through long-term market trials.¹³⁹

Strategies to improve affordability

Affordability can be increased by enhancing low-income consumers' resources (on the demand side) as well as by decreasing product prices (on the supply side).¹⁴⁰ Demand-side interventions aim to increase a consumer's ATP and WTP through financing and credit mechanisms, while supply-side interventions look to reduce the unit cost of health goods and services, thereby increasing their affordability.

The points below outline affordability strategies for both pursuits but also highlight key areas for consideration around program efficiency and sustainability for deployment in the context of MNPs. Affordability can also be improved by reducing barriers to obtaining MNPs such as transportation distance and time.

Demand-side interventions: Innovative financing and credit mechanisms

- **Vouchers:** Voucher programs are intended to improve access to commodities and/or improved services by providing purchasing power to low-income individuals. Typically, a management agency distributes vouchers to a targeted population (based on, e.g., income, region, common risk factors) for free or at a heavily subsidized cost with the intention of driving utilization and – eventually – improving public health outcomes.¹⁴¹ In Kenya and Uganda, for instance, vouchers have been used with some success to improve access of low-income mothers to private sector prenatal care and better facilities for delivery; indeed, in Kenya, 77 percent of safe motherhood

¹³⁷ Seth Adu-Afarwuah et al., "Home fortification of complementary foods with micronutrient supplements is well accepted and has positive effects on infant iron status in Ghana," *American Journal of Clinical Nutrition* 87.4 (2008): 929-938; P.S. Suchdev et al., "Monitoring the Marketing, Distribution, and Use of Sprinkles Micronutrient Powders in Rural Western Kenya," *Food and Nutrition Bulletin* 31.Supp2 (2010): 168-178; Katie Tripp et al., "Formative Research for the Development of a Market-Based Home Fortification Programme for Young Children in Niger," *Maternal and Child Nutrition* 7 (2011): 82-95,

<http://onlinelibrary.wiley.com/doi/10.1111/j.1740-8709.2011.00352.x/pdf>; Marc Van Ameringen, "Bangladesh Sprinkles Project: A New Approach to Improving the Nutritional Status of & Reducing Iron Deficiency Anemia in Children," GAIN presentation, May 2012.

¹³⁸ J. Segre et al., "Willingness to Pay for Lipid-Based Nutrient Supplements for Young Children in Four Urban Sites of Ethiopia," *Maternal and Child Nutrition*, December 2012. One additional point made in this paper is that the investigators were not able to test whether the WTP findings for a week's worth of LNS would hold every week for 6 months.

¹³⁹ PSI is currently conducting WTP trials in Somaliland that include a market simulation aspect, and it intends to collect longitudinal data on the price and demand once the product is launched into the market.

¹⁴⁰ See Section 4.3 ("Awareness") for an overview of how demand generation / promotion can drive up WTP for a product.

¹⁴¹ Carrine Meyer et al., "The Impact of Vouchers on the Use and Quality of Health Goods and Services in Developing Countries: A Systematic Review," London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, 2011, <http://eppi.ioe.ac.uk/cms/LinkClick.aspx?fileticket=1PwpSEMR-9o%3D&tabid=3063&mid=5708>.

vouchers were later redeemed. This demand-side intervention also helped reward providers for offering high-quality services – the voucher program caused deliveries at one accredited facility in Uganda, for example, to rapidly increase from approximately 1.3 deliveries per month in 2008 to more than 58 per month in 2010.¹⁴²

- **Credit:** Credit schemes help smooth cash flow shortages and may significantly enhance WTP. For example, in a bed net study from India, only 2 percent of consumers purchased a net with cash at a price point of approximately \$3-5 (173-259 Indian rupees), while 52 percent purchased when nets were offered on credit at the same price.¹⁴³
- **Saving schemes:** These serve as an alternative to enhancing credit, achieving similar cash flow smoothing impacts. Experiments from Kenya have shown that providing households with savings tools can increase spending on preventive health services, though these effects were stronger for spending on health emergencies.¹⁴⁴
- **Social cash transfer programs:** These programs, which typically provide additional resources to families for food, medicines, or other health services on a conditional or unconditional basis, have been successfully used throughout Latin America to fight malnutrition. In Mexico and Colombia, for example, governments have provided substantial transfers (of more than 20 percent of household spending) to poor households and have achieved significant decreases in stunting.¹⁴⁵

Supply-side interventions: Reductions to unit prices

- **Smaller sizing:** Consumer packaged goods (CPG) companies, understanding the challenge of affordability, have created consumer products in reduced sizes and single packets to better match the resources and cash flow of low-income consumers. These reduced-sized packets include shampoos, toothpaste, laundry powder, and even packaged soups.¹⁴⁶
- **Lower-cost inputs:** CPG companies have also looked to decrease cost per unit by incorporating locally sourced inputs or through design reengineering. In 2012, for instance, Unilever launched a low-cost toothbrush priced at only 13 Indian rupees, or approximately \$0.24.¹⁴⁷
- **Subsidies for marketing costs:** In both the developing and developed world, governments have subsidized campaigns to raise awareness around public health and broader social challenges as well as generic interventions to address these issues, such as dietary changes. These investments can offset some demand-generation costs, decreasing the final cost borne by consumers.¹⁴⁸
- **Reduction in shipping, transport, and taxation costs:** Governments can reduce the final price paid by consumers, especially those in remote areas, by making improvements to critical

¹⁴² Lindsay Morgan, “More Choices for Women: Vouchers for Reproductive Health Services in Kenya and Uganda,” Results-Based Financing for Health, World Bank, January 2011, www.rbhealth.org/system/files/vouchers.pdf.

¹⁴³ Alessandro Tarozzi et al., “Micro-loans, Insecticide-Treated Bednets and Malaria: Evidence from a Randomized Controlled Trial in Orissa (India),” Bureau for Research and Economic Analysis of Development (BREAD) Working Paper No. 297, March 2011, <http://ipl.econ.duke.edu/bread/papers/working/297.pdf>.

¹⁴⁴ Pascaline Dupas and Jonathan Robinson, “Why Don’t the Poor Save More? Evidence from Health Savings Experiments,” May 2012, www.stanford.edu/~pdupas/DupasRobinson_HealthSavings.pdf.

¹⁴⁵ Kathryn Rawe et al., “A Life Free from Hunger: Tackling Child Malnutrition,” Save the Children, London, 2012.

¹⁴⁶ “Affordable Products,” Unilever, www.unilever.com/sustainable-living/betterlivelihoods/affordable/.

¹⁴⁷ Ibid.

¹⁴⁸ Alan R. Andreasen, *Marketing Social Change: Changing Behavior to Promote Health, Social Development, and the Environment*, Jossey-Bass, 1995.

infrastructure such as roads, bridges, and railways. In addition, governments can adopt favorable tax regimes for products deemed to have a social purpose, such as imported medicines.¹⁴⁹

Affordability strategies to consider for MNPs

Although these strategies can contribute to increasing access to a broad range of products and services for poor consumers, further analysis and key considerations must be made to determine their feasibility in the context of MNPs. Following is a discussion of potential strategies for MNPs.

- **Vouchers**

There is sufficient evidence to indicate that voucher schemes are successful in targeting specific low-income populations and driving up the utilization of health goods and services.¹⁵⁰ Through additional research and identifying strategic methods to minimize costs and maximize sustainability and reach, vouchers could also prove to be successful in the context of MNPs via socially oriented and commercial channels.

Despite their benefits, voucher programs do typically involve high transaction costs for management, marketing, prevention of fraud, and claims processing. In one pilot voucher program in Uganda, for example, claims processing alone accounted for 21 percent of the program budget.¹⁵¹ Therefore, any voucher system utilized for MNPs should include strategies to monitor and mitigate transaction costs. In addition, it may be worthwhile to consider use of voucher programs that support multiple health interventions, allowing these transaction costs to be cross-subsidized.¹⁵² Even if such strategies to reduce the burden of transaction costs are pursued, careful consideration should be given to whether the targeting benefits of using vouchers merit the additional transaction costs incurred.

As noted, some voucher programs have shown to be effective at targeting the most vulnerable groups and increasing utilization rates. For example, a cross-sectional, multiyear study of the Tanzania National Voucher Scheme (TNVS), a program focused on increasing access to insecticide-treated bed nets through vouchers, showed that a voucher worth \$2.45 (approximately two-thirds of average retail bed net cost), when given to every pregnant woman during antenatal care, increased ownership of treated nets from 18 percent to 36 percent and use of treated nets for infants under a year old from 16 percent to 34 percent.¹⁵³

¹⁴⁹ Interviews with suppliers and in-country stakeholders, 2012.

¹⁵⁰ Carrine Meyer et al., “The Impact of Vouchers on the Use and Quality of Health Goods and Services in Developing Countries: A Systematic Review,” London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London, 2011, <http://eppi.ioe.ac.uk/cms/LinkClick.aspx?fileticket=1PwpSEMR-9o%3D&tabid=3063&mid=5708>.

¹⁵¹ Lindsay Morgan, “More Choices for Women: Vouchers for Reproductive Health Services in Kenya and Uganda,” Results-Based Financing for Health, World Bank, January 2011, www.rbfhealth.org/system/files/vouchers.pdf.

¹⁵² PSI is currently exploring use of such a voucher program in Mozambique.

¹⁵³ Kara Hanson et al., “Household Ownership and Use of Insecticide-Treated Nets among Target Groups after Implementation of a National Voucher Programme in the United Republic of Tanzania: Plausibility Study Using Three Annual Cross-Sectional Household Surveys,” *British Medical Journal* 339 (2009): b2434, www.bmj.com/content/339/bmj.b2434. This study was given a Confidence in Findings Assessment grade of “high” in the Meyers et al. systematic review. Although the study did not cite a precise voucher redemption rate, it did note that “redemption was high throughout the entire period.”

Though the TNVS successfully drove uptake among vulnerable groups and showed that voucher programs could contribute to broader efforts to sustain net coverage,¹⁵⁴ coverage rates at the end of the study remained far below the Roll Back Malaria target of 80 percent. In addition, though the TNVS increased ownership and use among all income groups, at the end of the evaluation, net usage among infants in the highest income segment remained more than three times higher than usage among the poorest, demonstrating ongoing challenges in access in the lowest income quintiles.

The authors of a key study analyzing this intervention pointed to several potential explanations for this inequity, including the following:

- The poorest women are least likely to use antenatal care, and when they do access these services, it is likely to be from facilities where voucher distribution is least reliable.
- The lowest-income groups are most likely to face challenges in saving sufficient resources to purchase nets even when provided the two-thirds subsidy via the voucher.
- Poor women are most likely to live furthest from shops where vouchers are accepted.¹⁵⁵

The study authors concluded by suggesting that subsidized sales via vouchers may offer potential as an approach for increasing use among low- to middle-income groups, but they also found that free distribution will remain essential to dramatically enhancing access among the poorest and reaching coverage goals.¹⁵⁶

¹⁵⁴ Ibid.

¹⁵⁵ Ibid.

¹⁵⁶ Ibid.

Box 3. The World Food Programme and Vouchers

WFP has utilized cash and voucher programs since the 1980s in situations where food is available to households but at an inaccessible price point. For example, in 2009, WFP launched a project in Burkina Faso that now provides vouchers to 200,000 urban dwellers forced to cope with food prices that had risen 25 percent in one year. As a West African WFP spokesman noted, “We have markets in urban areas that are functioning properly. You have food in the markets, but it is still unaffordable for the poorest.”

WFP notes that both cash and voucher programs enhance purchasing power to access food and can be used in a complementary fashion depending on the “robustness of markets and implementation capacities.” WFP uses these strategies alongside traditional food transfers, which WFP points out are critical in emergency situations, when both food availability and implementation capacity are typically poor.

Using this model, if MNPs are manufactured and sold in a particular context through private channels but at price points unaffordable to the poorest, governments and NGOs could provide targeted vouchers to the poorest to improve accessibility. In contrast, if MNPs are simply not available through private markets, they might be distributed for free or at a subsidized price point.

Sources: “WFP Starts Food Voucher Program in Burkina Faso,” *WFP News*, February 17, 2009; “Cash and Vouchers for Food,” WFP, April 2012,

<http://home.wfp.org/stellent/groups/public/documents/communications/wfp246176.pdf>; “Vouchers and Cash Transfers as Food Assistance Instruments: Opportunities and Challenges,” draft decision document for the WFP Executive Board, October 2008.

- **Credit and savings schemes**

If available at critical moments, effective credit and savings tools can help households capture opportunities to invest in preventive health products for their children, such as MNPs, and reduce vulnerability to health shocks.

While the opportunity to enhance affordability of MNPs and other preventive health products through credit and savings programs looks promising, it has proven costly and inadequate for many poor households. For example, studies in Kenya by Pascaline Dupas and Jonathan Robinson have pointed out that while savings tools can increase spending on preventive health services, households have a much stronger tendency to spend on health emergencies:¹⁵⁷

“Earmarking for preventative health investments was ineffective for the average individual. By contrast, earmarking for health emergencies increased people’s ability to cope with shocks. The reason that earmarking for preventative health was not an attractive feature is that earmarking brings with it the substantial liquidity cost of not being able to access money when it is needed for other purposes (in particular health emergencies). By contrast, earmarking for health emergencies allows precisely the types

¹⁵⁷ “Why Don’t the Poor Save More? Evidence from Health Savings Experiments,” May 2012, www.stanford.edu/~pdupas/DupasRobinson_HealthSavings.pdf.

of emergency withdrawals that people are most concerned about, and so was highly valued.”¹⁵⁸

Even if earmarking for preventive health was effectively undertaken, however, a caregiver would potentially face many competing products alongside MNPs, which may not be prioritized when given multiple purchasing options. Additionally, similar to vouchers, credit and savings schemes can involve high administrative costs and are difficult to implement at scale. These drawbacks, in addition to MNPs’ likely status as a lower-priority savings item, suggest that these tools would not be optimal for expanding access to MNPs and should only be considered alongside other affordability strategies, if at all.

- **Unit price reduction**

While selling MNPs by the single sachet may improve affordability, it can also undermine desired health outcomes. While some suppliers have considered introducing micronutrient powder in bulk presentation (i.e., with multiple doses in one jar or package),¹⁵⁹ concerns about accurate dosing and spoilage are significant. Hence, this option may be best suited to situations wherein MNPs could be provided to multiple children for immediate consumption (i.e., so that a trained health worker could accurately dispense the right quantity of powder into a young child’s food). This might be feasible in clinic or community settings where basic education and health care are given (e.g., India’s Anganwadi Centers).

In partnership with other NGOs and research bodies, Sight and Life has run a competition to identify options for lower-cost and more environmentally friendly packaging. However, the competition yielded few innovations that would significantly reduce packaging costs. Cost efficiencies beyond packaging may be limited; suppliers have indicated that input costs are driven by global prices for vitamins and minerals, and are likely to rise over time.

Implications for each distribution model

Public sector programs

“In resource-poor settings, handing MNPs out in clinics might be the most cost-effective strategy.”

- Stephen Vosti, associate adjunct professor, Agriculture and Resource Economics, University of California, Davis, 2012

As noted above, when sold as a full course and marketed up through private sector channels, MNPs may reach price points that are simply unaffordable – or at best, unattractive – to families struggling to even purchase sufficient quantities of food. The poorest households are unlikely to buy more than a few sachets at a time.¹⁶⁰ Unless sachets are purchased and administered at least once or twice on a weekly basis over a

¹⁵⁸ Ibid.

¹⁵⁹ Interviews with suppliers, 2012.

¹⁶⁰ Terry Roopnaraine et al., “Using BRAC’s Community Health Volunteer Network to Scale Up Multiple Micronutrient Powders in Bangladesh,” unpublished draft, version date November 20, 2012.

standard duration period, for example six months (see more detail in Section 3.3), there is insufficient evidence to suggest that such infrequent and inconsistent dosing would result in any marked improvement to nutritional status.¹⁶¹

Given these affordability challenges, free distribution via public sector channels – as carried out in Bolivia through the *Desnutricion Cero* program – is most likely to maximize access and lead to the desired health outcomes. Though these “free distribution” programs can certainly carry costs to end users, such as the opportunity cost of travel time to clinics, these costs can be mitigated through strategies like providing multiple interventions during the same clinic visit. The *Oportunidades* social welfare program in Mexico is an example of integrating MNPs into a conditional cash transfer program with multiple interventions. In addition, governments can take steps to curb unlawful requests for payment by clinicians, which experts note is routine practice, and to make optimal use of CHWs, who often do not display similar profit-seeking behavior.¹⁶² Public sector programs can also look at distribution by extension workers, rather than facility-based distribution, but this strategy would need to be accompanied by appropriate counseling and support.

Commercial models

While MNPs carried through private channels are likely to reach price points inaccessible to the poorest consumers, middle- and upper-income customers may have sufficient wealth and interest in MNPs to purchase these products at full commercial prices. In Bolivia, middle- and upper-income groups are estimated to represent approximately one third of the population of around 10 million.¹⁶³ Here caregivers can now purchase locally made MNPs, known by the brand name Chispitas, from pharmacies at prices of approximately \$0.06 per sachet – even though MNPs with the same packaging and branding are also available free of charge via public health clinics.

Though it is too early to draw definitive conclusions on the viability of this approach – and business strategists would typically advise that products should be differentiated across price points and consumer segments to reduce the risk of cannibalization and minimize product leakage – the coexistence of public distribution and commercial sales of *identical products* warrants further, longitudinal analysis.¹⁶⁴ If this approach proves sustainable, it may be the case that the government’s awareness-raising about Chispitas (albeit limited at this time) may be driving truly robust demand for micronutrient powders.

Though data on private sector sales of MNPs (both alongside free distribution and in completely new markets) in Bolivia and more widely is extremely limited, the size and growth of consumer purchasing power in key countries such as India, Bangladesh, and Nigeria is sufficiently impressive to warrant sales trials of MNPs and other nutrition commodities across income tiers and contexts. Nestlé and Unilever have both noted the attractiveness of these markets, unveiling product lines targeted at the growing

¹⁶¹ Sengchangh Kounnavong et al., “Effect of Daily versus Weekly Home Fortification with Multiple Micronutrient Powder on Haemoglobin Concentration of Young Children in a Rural Area, Lao People’s Democratic Republic: A Randomised Trial,” *Nutrition Journal* 10 (2011): 129, www.nutritionj.com/content/10/1/129

¹⁶² Interviews with BRAC in Dhaka, September 2012.

¹⁶³ Market size estimate according to Bolivian MNP packager.

¹⁶⁴ This analysis will require the collection of and access to robust data, which may be unattainable. That said, the Bolivia approach to distributing identically branded MNPs via public and private sector channels seems to be uncommon. R4D did not come across any similar examples of this practice in a review of other MNP models nor those of analogous product projects.

numbers of wealthier consumers in low-income markets.¹⁶⁵ Around 2008, Nestlé, for example, launched a line of “popularly positioned products” aimed at tapping the growing middle-class consumer base in emerging markets. In addition, WTP trials of other food and nutrition products among higher-income consumers in Africa’s and Asia’s cities have shown the potential of these marketplaces: One study of Kenyan consumers in Nairobi showed that more than 60 percent of high-income shoppers were willing to pay a premium price for top-quality leafy vegetables.¹⁶⁶

“With 12.7 percent organic growth in 2009, [popularly positioned products] grew substantially faster than the rest of the Nestlé Group.”

- Nestlé popularly positioned products strategy fact sheet

Social marketing and microfranchising models

Social marketing organizations have expertise in introducing new health-related products through market channels and have the ability to leverage donor subsidies to sell their products at more affordable price points than pure commercial approaches. These organizations have an extensive history of developing marketing approaches with behavior change communication (BCC) programs tailored to local health challenges and social norms.

While social marketing can include creating sales models that leverage donor subsidies to bring down the price to consumers, these subsidies are not always accessible or sustainable for some products and contexts. Further, even when donor subsidies are included in a particular business model, these social marketing companies typically leverage existing private sector trade channels, where key intermediaries in the value chain (such as wholesalers, distributors, and retailers) conventionally require margins up to 33 percent, as noted above. Consequently, the final product price may reach close to the private sector price point. As one example, a three-pack of PSI’s Trust Studded Condoms sold in Kenya doubles in price from the subdistributor to the consumer.¹⁶⁷

Social marketing firms like the Social Marketing Company (SMC) and PSI recognize that the price points of their products can surpass affordability for the lowest income groups. In response, PSI and other groups have embraced a “total market approach” that seeks to ensure that each consumer segment has access to key health products as well as critical messages about diseases and appropriate interventions. As an example of implementation of this model, PSI provides generic, unbranded versions of its products to

¹⁶⁵ “Popularly Positioned Products,” Nestlé S.A., updated March 2012, www.nestle.com/csv/nutrition/positionedproducts.

¹⁶⁶ Marther W. Ngigi et al., “Assessment of Developing-Country Urban Consumers’ Willingness to Pay for Quality of Leafy Vegetables: The Case of Middle- and High-Income Consumers in Nairobi, Kenya,” paper presented at the Joint 3rd African Association of Agricultural Economists and 48th Agricultural Economists Association of South Africa Conference, Cape Town, South Africa, September 19–23, 2010, <http://ageconsearch.umn.edu/bitstream/96191/2/158.%20Willingness%20to%20pay%20for%20leafy%20vegetables%20in%20Kenya.pdf>.

¹⁶⁷ PSI has indicated that its sales and marketing costs are frequently subsidized when new products are launched (e-mail correspondence with Sanjeev Dham, PSI India, Oct 31 2012). However, these costs represent a minority of the overall markups and moreover are passed on to consumers once sales levels stabilize.

support demand for lower-priced PSI brands as well as for products given away by clinics and government programs.¹⁶⁸

Outside of classic social marketing – which, as noted, often relies on private sector trade channels – there are approaches that engage both subsidies and lower-cost sales channels to make products available to the poorest through market-based models. These models are sometimes known as microfranchises. One such approach, used by BRAC in Bangladesh, leverages thousands of door-to-door saleswomen known as *shasthya shebikas* to sell health and nutrition products to low-income households. These saleswomen have sold Renata’s Pushtikona MNP product for approximately \$0.03 per sachet to households across rural Bangladesh. Leveraging an approximately 10 percent subsidy from GAIN and BRAC’s existing lower-cost sales model via the *shasthya shebikas* has led to a reduced price point that might be termed “direct-to-consumer” in other contexts.¹⁶⁹

Despite the relative success of this model in achieving a lower MNP price for consumers, challenges remain: Cash-constrained consumers prefer to buy only one or two sachets at a time, threatening efficacy and health impact, given dose-response thresholds for MNPs.¹⁷⁰ Further, *shasthya shebikas* involved in a recent study of this model reported that only about 20 percent of households were typically buying Pushtikona;¹⁷¹ other programs and delivery mechanisms – likely including the public sector and additional microfranchising models – would therefore be needed to reach the 80 percent not buying from BRAC’s sales force.

In addition to the challenge of ensuring that purchasers of Pushtikona buy in sufficient quantities to achieve health impact and that enough of the population is in fact accessing Pushtikona (or other types of MNPs), there is also the challenge of scalability: BRAC’s delivery model, which minimizes links in the chain between supplier and consumer to bring low-cost products to poor customers, requires resources and investment to expand across geographies. While BRAC now has operations in 10 additional countries and NGOs such as Living Goods have begun implementing similar programs utilizing microentrepreneurs, these programs have not gone fully to scale in every context.¹⁷²

¹⁶⁸ “Development’s Changing Landscape: Broadening the Bottom Line,” PSI, www.psi.org/impact-magazine/2011/01/developments-changing-landscape.

¹⁶⁹ Terry Roopnaraine et al., “Using BRAC’s Community Health Volunteer Network to Scale Up Multiple Micronutrient Powders in Bangladesh,” unpublished draft, version date November 20, 2012.

¹⁷⁰ While more flexible dosing of MNPs (i.e., weekly or twice weekly) has demonstrated effectiveness in reducing anemia and iron deficiency, this does not suggest MNPs will be effective if consumed on a non-regular basis. See, for example, Sengchang Kounnavong et al., “Effect of Daily versus Weekly Home Fortification with Multiple Micronutrient Powder on Haemoglobin Concentration of Young Children in a Rural Area, Lao People’s Democratic Republic: A Randomised Trial,” *Nutrition Journal* 10 (2011): 129, www.nutritionj.com/content/10/1/129; and S.M.Z. Hyder et al., “Effect of Daily versus Once-Weekly Home Fortification with Micronutrient Sprinkles on Hemoglobin and Iron Status among Young Children in Rural Bangladesh,” *Food and Nutrition Bulletin* 28.2 (2007): 156–164.

¹⁷¹ Roopnaraine et al.

¹⁷² BRAC, www.brac.net.

4.2 Availability

MNPs are currently available only in a select few national programs or otherwise on a smaller-scale basis in pilots of public sector delivery, socially oriented approaches, or commercial models, which explains why coverage remains low. Given that anemia is prevalent across income sectors, there is a need for a variety of approaches to target multiple segments of a population and maximize availability. The public sector is the most effective channel for reaching the majority of the poor, but private sector delivery and social-sector models can be an important complement for targeting other segments in need. Furthermore, the national registration status of MNPs – as a food or nutrition supplement versus a pharmaceutical – can also have an important impact on the availability of the product and the channels through which it can be distributed.¹⁷³ These registration implications vary by context; therefore this decision should be made carefully on a country-by-country basis.

Definition and overview

Availability represents the degree to which customers are able to readily acquire and use a product or service. The degree of availability is a function of the channels used to distribute a product and consumers' utilization of these channels, and is a logical driver of uptake (among other factors, such as the key complements of high acceptability, awareness, and affordability).¹⁷⁴ Likewise, limited availability can undermine nascent and growing demand for a product or service.

Since initiation of global MNP programs in 2001,¹⁷⁵ availability of MNPs has remained low and has been primarily restricted to pilots and subnational programs funded and implemented by multilaterals and governments. While procurement of MNPs by WFP and UNICEF has risen dramatically in recent years, with UNICEF alone procuring over 270 million sachets in 2012,¹⁷⁶ only a small fraction of the 34 million children 6–23 months in high-burden countries¹⁷⁷ and less than 5 percent of all anemic children globally¹⁷⁸ have received MNPs, and most countries with high prevalence of anemia among children have not yet achieved large-scale programs.¹⁷⁹ Providing all 34 million children targeted for intervention via micronutrient powders with just one 60-sachet course would require 2 billion sachets annually¹⁸⁰ – more

¹⁷³ Registration status can also significantly affect cost and affordability. In many contexts, pharmaceutical manufacturing standards entail higher regulatory and manufacturing costs than food manufacturing (actual difference depends on country context, labor costs, etc.).

¹⁷⁴ Though in some cases, as with zinc/ORS, consumer preferences for substitute products can overshadow and undermine the positive effects of increased availability.

¹⁷⁵ “History: Major Accomplishments of Sprinkles Global Health Initiative,” Sprinkles Global Health Initiative, www.sghi.org/about_us/history.html.

¹⁷⁶ WFP and UNICEF supply division data.

¹⁷⁷ S. Horton et al., “Scaling Up Nutrition: What Will It Cost?,” World Bank, 2010, <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/Peer-Reviewed-Publications/ScalingUpNutrition.pdf>.

¹⁷⁸ Public health officials note that MNPs may not be the most appropriate intervention for all anemic children: Those with both micronutrient and macronutrient deficiency (insufficient calories) may be more efficiently served by provision of increased quantities of fortified complementary foods, which is why SUN targets only approximately one-third of children under two in high-burden countries with MNPs versus approximately two-thirds of children under two with fortified complementary foods.

¹⁷⁹ Sam Loewenberg, “Easier Than Taking Vitamins,” *New York Times*, Sep 5, 2012, <http://opinionator.blogs.nytimes.com/2012/09/05/easier-than-taking-vitamins/#more-133577>.

¹⁸⁰ Not all MNP suppliers provided details on current or potential production capacity, making a global production capacity figure difficult to derive. One major supplier, Piramal, however, has noted that its MNP capacity has been expanded to 450 million sachets per year and can be expanded further based on need.

than five times current combined UNICEF and WFP procurement,¹⁸¹ which together presently constitute the majority of MNP purchases.

Substitute products to address IDA in infants – namely iron syrups or drops – have been more widely available in the past than MNPs since these products were part of national primary healthcare services in most countries.¹⁸² However, as noted in Section 4.4, compliance with iron drops is poor given their bitter taste and gastrointestinal side effects, short shelf life, and bulky size for transporting. Current WHO guidelines recommend use of MNPs for 6- to 23-month-olds (in place of iron syrups or drops).

Implications for each distribution model

Public sector programs

In many countries, public sector models may be most likely to maximize access of the poorest to MNPs. This conclusion is supported by the challenges around affordability noted above as well as by the past success of public sector programs for ensuring access to key interventions such as childhood vaccinations. Indeed, as of 2011, measles immunization coverage among one-year-olds in Ethiopia was 82 percent – significant progress from an immunization rate of just 40 percent in 2001.¹⁸³ Ethiopia’s public sector health extension workers have been key to driving these increased coverage rates.¹⁸⁴ Additionally, it should be noted that the public sector has been an effective delivery channel for other complex interventions, such as antiretroviral drugs, which can face significant supply chain challenges (e.g., cold chain requirements) and greater risks to patients if supply disruption occurs.

In countries with centralized health delivery systems like Ethiopia and Bangladesh, MNPs could be provided to caregivers via channels similar to those of existing health and nutrition interventions (e.g., through CHWs). In highly federalized countries such as India and Nigeria, while MNPs could also be supplied through community-based models (e.g., Integrated Child Development Services in India), it is critical to note that implementation of MNP programs in these decentralized contexts would require particularly intensive engagement with both federal *and* state-level policymakers and implementing bodies. Coverage, access, and uptake rates are likely to vary according to the resources, competency, and overall strength of each state’s key officials and health system.¹⁸⁵ This variance is evident, for example, in the coverage of vitamin A supplementation programs across states in India – with the poorest performer, Nagaland, at 28 percent coverage and the highest, Sikkim, at 90 percent coverage.¹⁸⁶

As public sector programs are brought to scale, best practices from existing public sector programs should be followed where possible and tailored to the local operating environment. For example, Bolivia’s experience with MNP delivery suggests that, as with all health products, governments should be prepared

¹⁸¹ WFP and UNICEF supply division data. As of 2010, combined WFP and UNICEF procurement totaled approximately 350 million sachets.

¹⁸² Nutrition experts at UNICEF suggest data on usage of iron syrups and drops is extremely limited, however, since many countries procure these commodities directly and coverage rates are not reliably tracked.

¹⁸³ “Country Data: Measles (MCV) Immunization Coverage among 1-Year-Olds (%) by Country,” WHO Global Health Observatory Data Repository, updated for 2011 data, <http://apps.who.int/gho/data/node.main.A826>.

¹⁸⁴ Wairagala Wakabi, “Extension Workers Drive Ethiopia’s Primary Health Care,” *Lancet* 372.9642 (2008): 880, www.thelancet.com/journals/lancet/article/PIIS0140673608613811/fulltext?rss=yes.

¹⁸⁵ It should be noted that this variance in performance within a country can also occur in centralized delivery systems.

¹⁸⁶ Ministry of Health and Family Welfare, Government of India, and UNICEF, “2009 Coverage Evaluation Survey: All India Report,” UNICEF, New Delhi, 2010, www.unicef.org/india/1_-_CES_2009_All_India_Report.pdf.

to continually refine their MNP programs to address challenges: In 2009, new legislation in Bolivia allowed municipalities to procure directly from suppliers to avoid bottlenecks that had been occurring at the central level.¹⁸⁷ As in Bolivia and other countries that have begun to implement public MNP distribution, governments will have to carefully consider implementation requirements when beginning or expanding MNP programs – for example, by increasing staff focused on MNPs at the national health ministry, enhancing training for CHWs around nutrition interventions, and making improvements to supply chains and health information systems to track and ensure MNP availability.¹⁸⁸ It is important to recognize that large-scale public sector MNP scale-up will also require significant resourcing as detailed in the recommendations (Section 5).

While more detailed notes on public sector scale-up are also outlined in the recommendations section, a few key considerations to maximize availability include the following:

- **Integrate MNPs within existing health and nutrition programs and distribution channels to capitalize on existing infrastructure.** For example, in Bolivia, MNPs are just one component of a broader child health/nutrition strategy, and their distribution and promotion is undertaken in a variety of public channels (primary health centers, CHWs, child health days). This approach has allowed the program to achieve 59 percent coverage of children under two.¹⁸⁹
- **Create opportunities for continuous refinement to operating and delivery processes.** As mentioned above, in Bolivia, procurement was moved from the federal to the state level to decrease lead times. While procurement systems will vary across countries and contexts, efforts should be made to find the right balance between leveraging national-level purchasing power and ensuring that procurement decisions are made “close to the consumer.”
- **Take time to generate buy-in from critical influencers and key opinion leaders.** Creating these “MNP champions” is essential for resource mobilization and ensuring government attention on bottlenecks, stock-outs, and program coverage among rural and other vulnerable populations.

Commercial models

Distribution via commercial delivery channels can play a helpful role in reaching middle- and upper-income consumers in Africa and Asia with MNPs – many of whom are currently accessing health and consumer goods via pharmacy and retail channels. Indeed, according to demographic and health survey (DHS) data, the private sector has been the source of about 50 percent of healthcare for middle- and upper-income groups in sub-Saharan Africa.¹⁹⁰

While the private sector can be important for extending access, as noted above, use of these channels also comes with several considerations. As one group of experts has suggested, “The heterogeneous nature of

¹⁸⁷ Ali MacLean, “National Distribution of MNP in Bolivia,” presented at the Global Health Council’s 38th Annual International Conference on Global Health, Washington, DC, June 15, 2011, <http://iycn.wpengine.netdna-cdn.com/files/National-distribution-MNP-Bolivia-presentation.pdf>.

¹⁸⁸ According to February 2013 discussions with multilateral partners, the supply chains of many countries may be insufficiently prepared for dramatic MNP scale-up. Both MNP-specific and broader investment in health system strengthening will be required to effectively expand coverage in many countries.

¹⁸⁹ Site visit to Bolivia; coverage data shared and confirmed in meetings with MI country office and Bolivian MoH.

¹⁹⁰ “Source of Healthcare – Sub-Saharan Africa,” Private Healthcare in Developing Countries, http://ps4h.org/country_data_files/SSAfrica.pdf. Per author’s notes, all data are drawn from the sum of all population-weighted sub-Saharan Africa demographic and health surveys conducted after 2000.

the private sector makes it difficult to measure, difficult to control, and difficult to direct.”¹⁹¹ In the context of MNPs, private sector actors such as shopkeepers or pharmacists may sell MNPs in single sachets rather than encouraging caregivers to give an entire course, which prevents the child from receiving the clinical benefits, or may not be equipped with the necessary education and communication at the point of sale.

How health products are registered is one way governments can mitigate these challenges, since registration status can determine where, how, and by whom these products can be sold. For MNPs, there are typically three registration alternatives – classifying MNPs as foods, as supplements, or as medicines – though these options vary by country context. Of 22 countries mapped by the Centers for Disease Control and Prevention (CDC) and UNICEF during a recent exercise, 27 percent had registered MNPs as a food product, 36 percent as a nutrition supplement, and 36 percent as a pharmaceutical product.¹⁹² Each approach has unique benefits, and whether it is best to register MNPs as a food/nutrition supplement or a pharmaceutical product should reflect the country context. In many contexts, however, registration of MNPs as a food supplement can help ensure that the product can be sold in retail outlets (kiosks, small shops, etc.) and not only in a restricted number of “official” pharmacies, typically clustered near urban areas. On balance, the registration of MNPs as food or nutritional supplements may often be optimal, given the increased access such a registration affords. Figure 16 provides an overview of each strategy.

Figure 16. MNP registration

<i>Registration</i>	<i>Sales channels</i>	<i>Advantages</i>	<i>Considerations</i>
Food or nutrition supplement	- Retail channels such as kiosks and small shops	- Greater number of points of sale with deeper penetration	- Important to ensure retailers have correct messaging and sales incentives
Pharmaceutical	- Health clinics and pharmacies	- Pharmacists may have better training - May enhance consumer perception	- Should be registered as an over-the-counter product to ensure maximum availability

MNPs as food products or nutrition supplements

In many contexts, MNPs registered as foods or nutrition supplements can be sold alongside other snacks and products in retail shops. In South Africa, for example, Nycomed’s MNP product (Emvit Sprinkles) is being introduced over the counter in the country’s largest drugstore chain, Clicks, and another leading retail pharmacy network, Dis-Chem.

As mentioned, while this classification can significantly extend access given the pervasiveness of these outlets, it is important to ensure that retailers are equipped with the appropriate incentives to encourage

¹⁹¹ “Levers of Control of Private Service Delivery,” Private Healthcare in Developing Countries, 2008, http://ps4h.org/levers_of_control.html.

¹⁹² UNICEF and CDC, “Global Assessment of Home Fortification Interventions 2011,” Geneva: Home Fortification Technical Advisory Group, 2012.

purchase of MNPs and provide appropriate messaging. One challenge that comes with classifying MNPs as a food product is the possibility that without sufficient “carve-outs” or clarifications, MNPs classified as food products could then fall within the scope of local laws that ban promotion of complementary foods or food products targeted at children under two.¹⁹³

If MNPs are registered as food products, some CPG distribution strategies could be tapped to improve supply functioning, though likely on a limited basis. In fact, the global health community has recently begun to test and explore whether private sector supply chains similar to Coca-Cola’s could be used to expand access to the one-third of the world’s population that does not have access to essential medicines.¹⁹⁴ Researchers have found that although there are some key differences between the supply chains of health and nutrition products and those of soft drinks¹⁹⁵ that make it challenging to create distribution networks that *fully* imitate soft-drink networks,¹⁹⁶ certain components of a Coca-Cola-type distribution system can be utilized to help increase availability of MNPs through private channels (see Box 4).

¹⁹³ Although MNPs are less likely to fall within the scope of these regulatory hurdles than, for example, lipid-based supplements, organizations promoting MNPs need to be cognizant of World Health Assembly Resolution 63.23 section 4, which urges member states to “ensure that nutrition and health claims shall not be permitted for foods for infants and young children, except where specifically provided for, in relevant Codex Alimentarius standards or national legislation.” In addition, local laws on promotion of infant milk substitutes may contain provisions restricting sales of MNPs if considered to be foods or supplements.

¹⁹⁴ Hans Hogerzeil and Zafar Mirza, “The World Medicines Situation 2011: Access to Essential Medicines as Part of the Right to Health,” WHO, Geneva, 2011, <http://apps.who.int/medicinedocs/documents/s18772en/s18772en.pdf>, referenced in Prashant Yadav, Orla Stapleton, and Luk N. Van Wassenhove, “Always Cola, Rarely Essential Medicines: Comparing Medicine and Consumer Product Supply Chains in the Developing World,” INSEAD Faculty and Research Working Paper, INSEAD, Fontainebleau, France, March 2011, http://flora.insead.edu/fichiersti_wp/inseadwp2011/2011-36.pdf.

¹⁹⁵ As far as production, data collection, distribution, retail networks, incentives, and consumptions benefits.

¹⁹⁶ Yadav et al.

Box 4. Distribution and Sales Lessons from Coca-Cola

Each day, people across 200 countries consume 1.8 billion servings of Coca-Cola products. In urban markets in low-income countries, Coca-Cola relies on microdistribution centers, and in rural areas, Coca-Cola depends on hub-and-spoke systems that leverage low-cost, flexible transportation solutions such as auto-rickshaws. While implementers cannot replicate Coca-Cola supply chains with medicines and nutrition products, there are several key lessons they can glean from the soft-drink industry:

- **Data collection:** Soft-drink manufacturers, like other CPG firms, employ systematic data collection tools to assist with consumer targeting, supply chain performance analysis, and evaluation of return on key investments in marketing and infrastructure. For MNPs, this type of data collection would be immensely valuable – for improving understanding of the purchasing behavior of low-income consumers, for example.
- **Retail point of sale:** Products such as soft drinks and snacks are beginning to have deep penetration into low-income rural markets. Indeed, even as early as 2003, Coca-Cola had a presence in more than 25 percent of India’s villages. While sales of MNPs through these retail points would present challenges as far as oversight of number of sachets sold to each caregiver at a time as well as final sales price, utilization of kiosks and vendors would bring MNPs “closer to the consumer” than health clinics, improving convenience and the opportunity to make frequent purchases of these products.
- **Supplier performance through incentives:** With limited ability to align or create incentives for on-time performance, it is difficult to ensure a reliable supply of essential medicines and nutritional supplies. Supply chain partners of companies like Coca-Cola are given incentives as well as tools to encourage maximum product availability.

Based on Prashant Yadav et al., “Always Cola, Rarely Essential Medicines: Comparing Medicine and Consumer Product Supply Chains in the Developing World,” INSEAD Faculty and Research Working Paper, INSEAD, Fontainebleau, France, March 2011.

MNPs as medicines

In most contexts, classification of MNPs as a medicine will impose additional regulatory burden on distribution of these products and restrict the points of sale to pharmacies.¹⁹⁷ As noted above, however, this restriction allows for more control over who is selling these products: In many contexts, pharmacists

¹⁹⁷ In Bangladesh, MNPs have been classified as a medicine due to their high nutrient content and this has imposed some challenges in making MNPs available. However, some waivers have been secured for the Pushtikona project to enable sales via BRAC’s network and other channels. This is according to: stakeholder interviews; and Business Innovation Facility, “Commercial Home Fortification Projects: Bangladesh Political Economy Mapping,” 2013, http://api.ning.com/files/gQqqlj*uUXowt-UWbb9vyW8kjt0Huj2unDrIZF2AEiMaOyV-KwxKdK2YAxvTtSrqvOaiEHGkI0A1IsYXo6QKliD-VVoHdTA8/ProjectResource_HomeFortificationMapping_Jan2013.pdf.

may have more training than retailers on the importance of nutrition and may be a better conduit for key messages around dosage of and adherence to MNPs. As noted, classification of MNPs as a medical product may also positively influence consumer perception of these products, though more research is required to understand this perception and how it may impact uptake and adherence.

If MNPs *are* registered as pharmaceutical products, it is important to understand how private sector medical supply systems and pharmacies can be leveraged to overcome the delays and stock-outs pervasive in public sector clinics and pharmacies.¹⁹⁸ The 2012 UN Millennium Development Goals Gap Task Force found the availability of generic medicines was just 51.8 percent in public medicine outlets – though with wide ranges across countries and contexts.¹⁹⁹ Private sector medical distributors – also under competitive pressure for on-time performance, much like soft-drink manufacturers – are frequently better than those in the public sector at ensuring reliable delivery of medicines to hospitals and clinics.²⁰⁰ Kentons Ltd. in western Kenya, for example, claims to have nearly 100 percent on-time performance²⁰¹ and has won many awards for its reliability. In addition, as with soft-drink manufacturers, private sector distribution systems are often better at accurately capturing data that can be analyzed and used to improve consumer targeting and key investments.

In Bolivia,²⁰² MNPs have recently been made available in private pharmacies alongside many other child health/nutrition offerings. INTI, the largest local pharmaceutical company, is producing the product and has introduced it to its pharmacy network. Although Chispitas are not in all of INTI's pharmacies yet, prospects are promising in terms of availability considering that INTI's network comprises 80 percent of the nation's pharmacies. See Figure 17 for more information on registration status and availability of MNPs in other countries.

¹⁹⁸ “What Are Stock-Outs?,” Stop Stock-Outs Campaign, <http://stopstockouts.org/stop-stock-outs-campaign/what-are-stock-outs/>.

¹⁹⁹ Hogerzeil and Mirza.

²⁰⁰ Dalberg Global Development Advisors and the MIT-Zaragoza International Logistics Program, “The Private Sector’s Role in Health Supply Chains: Review of the Role and Potential for Private Sector Engagement in Developing Country Health Supply Chains,” October 2008.

²⁰¹ Interviews with Kentons Ltd. management, September 2012.

²⁰² In Bolivia MNPs are registered within a category of medicinal products that pertain to food supplementation. This classification allows MNPs to be sold only in pharmacies and not other retail outlets; however, a prescription is not required when purchasing at a pharmacy.

Figure 17. MNP country registration status and availability²⁰³

	Country	Registration status & availability (<i>public or commercial</i>)
Countries studied during site visits	Bolivia	Registered as a nutritional supplement – <i>available in health clinics and private pharmacies (w/out an Rx)</i>
	Bangladesh	Registered as a pharmaceutical product – <i>available via social marketing and private pharmacies; ongoing public sector pilots and plans for national coverage</i>
	South Africa	Registered as a nutritional supplement – <i>available in drugstores and retail pharmacies over the counter</i>
	Ethiopia	Not yet registered – <i>not available</i>
	India	Not approved or registered – <i>available only via pilots</i>
	Kenya	Registration in process – <i>available only via pilots</i>
Other countries	Burkina Faso	Information not available
	Ghana	Registered as a nutritional supplement – <i>available only to school-age children via school feeding pilots</i>
	Malawi	Not yet registered – <i>not available</i>
	Nigeria	Not yet registered – <i>not available</i>
	Tanzania	MNP registration in process
	Vietnam	Not yet registered – <i>available only via pilots</i>

Social marketing and microfranchising models

Many socially oriented approaches utilize vendors or CHWs for door-to-door distribution to drive availability of target products. These models are primarily useful to fill the gaps of public sector distribution and demand creation by accessing hard-to-reach rural communities and ensuring routine follow-up with caregivers. These approaches can also reduce total cost to the consumer, particularly in rural areas, by decreasing travel time or time off work (both of which may occur when visiting a public clinic). In Bangladesh, for example, government frontline workers rarely reach all of Bangladesh’s rural villages. BRAC’s *shasthya shebikas*, however, reach the majority of Bangladesh’s approximately 80,000 villages and provide essential health commodities, basic treatments, and referral services. As Kaosar Afsana, director of health at BRAC, said during a discussion in September 2012, “Our *shasthya shebikas* really complement government activity. They go where government workers cannot, and provide services in a way that is comfortable for families.”

Though BRAC’s *shasthya shebikas* are volunteers, they have an opportunity to earn income through sales of essential commodities at subsidized prices (see Box 5).²⁰⁴ Today, these health workers are selling Renata’s Pushtikona MNP product in villages throughout Bangladesh, bringing these vital interventions

²⁰³ Interviews with MI country teams; UNICEF and CDC, “Global Assessment of Home Fortification Interventions 2011,” Geneva: Home Fortification Technical Advisory Group, 2012

²⁰⁴ “BRAC Annual Report 2010,” BRAC, Dhaka, 2011, www.brac.net/sites/default/files/Annual-Report-2010/BRAC-Annual-Report-2010-full.pdf; interview with Kaosar Afsana, BRAC, Bangladesh, September 2012.

to millions.²⁰⁵ As discussed in Section 4.1, the BRAC model, though promising, is challenged in terms of both finances and impact on public health: Afsana noted that *shasthya shebikas* have reported low awareness of anemia and difficulty in encouraging caregivers to maintain the required frequency and extensiveness of MNP dosage. However, socially oriented models remain an important approach to fill public sector distribution gaps, and improved messaging can help address the public health impact challenges BRAC has faced (see Sections 4.3 and 4.4).

²⁰⁵ Afsana suggested that BRAC's *shasthya shebikas* are selling 1.9 million sachets per month currently; tracking of who has purchased the sachets and in what quantities is nonexistent, however.

Box 5. Incentives for Frontline Workers

In the public sector, both monetary and nonmonetary incentives can play an important role in enhancing the performance of frontline workers. Although frontline workers are often volunteers, research has found that financial remuneration can have a critical motivating effect on their performance if deployed strategically. For example, researchers supporting the U.S. Agency for International Development's (USAID) BASICS II (Basic Support for Institutionalizing Child Survival) program suggested that "satisfactory remuneration" and "financial incentives" (pay for performance) were positive monetary incentives for CHWs, while payments made inconsistently or inequitably serve as disincentives. On the nonmonetary side, support and respect from the community, a sense of personal growth and skill acquisition, identification, and "community status" all serve as motivating factors. In contrast, inadequate supervision or training and stress or demands on time are perceived as demotivating.

Evidence of the impact of these incentives can be seen in case studies from around the world, including India. A technical team from IntraHealth reviewed India's implementation of a large-scale performance-based payment (PBP) system for frontline community health workers known as accredited social health activists (ASHAs) and found that PBPs can serve a critical function in driving improved delivery of services (for example, births in health facilities) and ultimately improving health outcomes. However, the team also found that payment delays and poor payment processes, lack of transparency, and other factors negatively affected worker and program performance.

In commercial or microfranchising models that utilize frontline workers to promote health products, many of these lessons on incentive design and implementation hold true – for example, community recognition of frontline workers is important whether these workers report to the MoH or are essentially self-employed (e.g., as a BRAC *shasthya shebikas*). However, microfranchisers typically have responsibility for purchasing their own stock and are aware of variations in margins between products. As such, liquidity and profit maximization concerns also affect whether frontline workers are incentivized to "push" certain products. As a qualitative study on the Pushtikona project found, when *shasthya shebikas* face liquidity constraints, they cannot stock sufficient quantities of Pushtikona. They also may choose to use their limited contact time with each consumer to promote higher-margin products.

Sources: Terry Roopnaraine et al., "Using BRAC's Community Health Volunteer Network to Scale Up Multiple Micronutrient Powders in Bangladesh," unpublished draft, version date November 20, 2012; Hong Wang et al., "Performance-Based Payment System for ASHAs in India: What Does International Experience Tell Us?," The Vistaar Project, IntraHealth International Inc., and Abt Associates Inc., Bethesda, MD, 2012, <http://www.intrahealth.org/files/media/performance-based-payment-system-for-ashas-in-india-what-does-international-experience-tell-us-technical-report/PerformanceBasedPaymentSystemASHAsIndiaReport.pdf>; and Karabi Bhattacharyya, Peter Winch, Karen LeBan, and Marie Tien, "Community Health Worker Incentives and Disincentives: How They Affect Motivation, Retention, and Sustainability," Basic Support for Institutionalizing Child Survival Project (BASICS II), Arlington, VA, October 2001, http://pdf.usaid.gov/pdf_docs/PNACQ722.pdf.

4.3. Awareness

Many consumers with young children in need of MNPs have little knowledge of the product or understanding of why they should use it due to the newness of the intervention and their unfamiliarity with its benefits or the anemia it addresses. This lack of awareness can be a significant detriment to MNP uptake and should be addressed through extensive demand-generation efforts that thoughtfully inform consumers about how and why to use the product, thus encouraging adoption of this new, regular, healthy behavior. MNP program experience across countries has demonstrated that promotional messages that emphasize the impact of MNPs on child health, intelligence, and growth have highly resonated with caregivers – as opposed to those that educate consumers on the more theoretical problem of anemia, for example, which is a “hidden hunger” with low self-risk perception. Furthermore, a comprehensive set of tools across sectors should be utilized to widely spread these messages and maximize awareness.

Definition and overview

Awareness is a key influence on consumer demand. Consumers’ level of awareness refers to the extent to which they understand why they should adopt products or services, particularly those with which they have had no previous experience.²⁰⁶ Naturally, the greater the consumer’s awareness, the more likely he or she is to utilize a product. This can also be said of a product’s acceptability, the extent to which its design (ingredients, functionality, etc.) is adapted to the consumer such that he or she will readily adopt it. What distinguishes these two demand drivers is that levers to improve awareness are based on marketing and communications around the product, whereas levers to improve acceptability are typically based on the product itself.

It has been well established that BOP customers present a challenge for traditional awareness-building efforts. Many low-income consumers in developing markets may be unreachable by conventional media marketing and advertising – for example, only 41 percent of the rural poor in India have access to television²⁰⁷ – though increasing ownership of cell phones²⁰⁸ and radios among the rural poor is providing marketers with new means of reaching these consumers.

Meanwhile, middle- and upper-income consumers have extensive access to traditional marketing channels such as print, television, or radio, which are a primary source of product information. A recent McKinsey study on the African consumer, which surveyed primarily middle-class individuals living in urban centers, found that 80 percent of sub-Saharan consumers use television as a significant source of grocery information. However, nontraditional channels are still an important source as well, with the study finding that many consumers rely on word of mouth and digital media for product information.²⁰⁹

With MNPs, generating awareness among the BOP segment (and other segments to a certain extent) is

²⁰⁶ Jamie Anderson and Costas Markides, “Strategic Innovation at the Base of the Economic Pyramid,” 2006, [www.jamieandersononline.com/uploads/ANDERSON MARKIDES SI at Base of Economic Pyramid FINAL.pdf](http://www.jamieandersononline.com/uploads/ANDERSON_MARKIDES_SI_at_Base_of_Economic_Pyramid_FINAL.pdf).

²⁰⁷ Ibid.

²⁰⁸ Kevin Voigt, “Mobile Phone: Weapon against Global Poverty,” CNN, October 9, 2011, www.cnn.com/2011/10/09/tech/mobile/mobile-phone-poverty. In this article, Jeffrey Sachs, director of the Millennium Villages Projects, estimates that approximately 30 percent of households in rural villages in sub-Saharan Africa owned cell phones as of 2011.

²⁰⁹ Damian Hattingh, Bill Russo, Ade Sun-Basorun, and Arend Van Wamelen, “The Rise of the African Consumer,” McKinsey, Johannesburg, October 2012, www.mckinsey.com/global_locations/africa/south_africa/en/rise_of_the_african_consumer.

that much more challenging because these consumers have essentially no familiarity with the product or limited to no history of home fortification. Unlike with treatment and prevention for high-visibility diseases, such as malaria, in many developing-country contexts there is a general lack of awareness about malnutrition and the role that home fortification can play in resolving nutritional deficiencies.^{210,211} Child health outcomes can suffer as a result of the absence of effective nutrition campaigns, particularly among the low-income groups in high-burden countries such as India.²¹² It was reported in January 2012, for example, that 42 percent of India's children under five were underweight; this situation has been attributed, in part, to general lack of awareness around the signs and consequences of undernutrition and proper strategies for prevention and treatment.²¹³

While there may be some knowledge of infant IDA among caregivers due to past public sector administration of iron syrups or drops, directly fortifying meals in the home to address this issue is still a new intervention that requires caregivers to adopt an unfamiliar, routine behavior and even, in many cultures, change overall feeding practices in order for MNPs to be effective. The novelty of both the product and its administration – coupled with its preventive nature (rather than the urgency of a treatment) – creates a significant barrier to demand for MNPs.

The best practices of social marketing for the poor – for example, widespread educational campaigns, a mix of marketing strategies and dissemination channels – particularly interpersonal communications, and attractive branding/advertising for a targeted audience²¹⁴ – can be utilized to overcome this hurdle and encourage the adoption of this new, healthy behavior while simultaneously imbuing a sense of value in the product.²¹⁵ Extensive implementation of these and other demand-generation techniques is critical for MNP uptake. Social support and interpersonal counseling are among the most important techniques for adherence, while mass media may help drive uptake.

MNPs require significant demand generation and education

Since MNPs are new, preventive, and designed to address a problem of which few are aware, simply making them available (through any channel) could have little impact on demand unless product introduction is accompanied by some form of promotion/education.²¹⁶

²¹⁰ C. Hotz and R.S. Gibson, “Participatory Nutrition Education and Adoption of New Feeding Practices Are Associated with Improved Adequacy of Complementary Diets among Rural Malawian Children: A Pilot Study,” *European Journal of Clinical Nutrition* 59 (2005): 226–237, www.nature.com/ejcn/journal/v59/n2/pdf/1602063a.pdf. This study highlights lack of awareness of malnutrition and appropriate complementary feeding practices.

²¹¹ “Global Monitoring Report 2012: Food Prices, Nutrition, and the Millennium Development Goals,” World Bank, Washington, DC, 2012, <http://siteresources.worldbank.org/INTPROSPECTS/Resources/334934-1327948020811/8401693-1327957211156/8402494-1334239337250/Chapter-2.pdf>. This report notes that women's lack of education, knowledge of appropriate care practices, and low status in the household contribute to malnutrition.

²¹² *Ibid.*

²¹³ *Ibid.*

²¹⁴ “What Is Social Marketing?,” PSI, www.psi.org/sites/default/files/publication_files/what_is_smEN.pdf.

²¹⁵ These social marketing best practices can and should be used even when a product is being distributed for free rather than at a subsidized price, as is typical of social marketing programs.

²¹⁶ C. Hotz and R.S. Gibson, “Participatory Nutrition Education and Adoption of New Feeding Practices Are Associated with Improved Adequacy of Complementary Diets among Rural Malawian Children: A Pilot Study,” *European Journal of Clinical Nutrition* 59 (2005): 226–237, www.nature.com/ejcn/journal/v59/n2/pdf/1602063a.pdf; Eveline Roks, “Feasibility of Segmented Markets: How to Provide Access to Life-Saving and Potential-Developing Micronutrients to All Socio-economic Segments of a Population,” World Food Programme, GAIN, and DSM, September 2009,

Significant behavior change communications (BCC) efforts raise awareness about the product, informing consumers about infant health and nutrition, the impact of MNPs, and the IDA they address. Information has a powerful influence on consumer demand; when the messages put forth are compelling and appeal to the caregivers' motivations, consumers are likely to be more receptive toward a new product.^{217,218} This BCC can also enhance acceptability or address acceptability concerns associated with MNPs – for example, an intensive dosing schedule (see Sections 3.3 and 4.4) or gastrointestinal changes – by familiarizing consumers with the product's proper use and setting expectations around minor side effects.

R4D's site visits with suppliers and central-level stakeholders, in addition to other studies, confirmed that interpersonal communication is, at least initially, seen as the most effective way to instill this requisite education and behavior change required to generate awareness and demand.²¹⁹ Key trusted influencers, such as health providers; community leaders; or even peers, family, and friends, can have a significant impact on a consumer's choice to adopt (and in some cases, purchase) a new product for a new purpose.

CHWs and community vendors are particularly influential, have broad reach, and are able to enhance messages with regular follow-up visits.²²⁰ After the launch of MNPs through the SWAP program in Nyanza, Kenya, for example, "peer-to-peer communication among vendors and community members reinforced the rationale, benefits, and appropriate use of Sprinkles. It also provided opportunities for neighbors to follow up with vendors if there were problems or concerns."²²¹

However, this kind of interpersonal communication critically relies on sufficient marketing at the channel level so that providers are appropriately informed. Frequent and high-quality product launches (see Figure 18), educational activities targeted at medical providers by sales representatives (known as "medical detailing"), and training of CHWs and vendors can ensure sufficient knowledge among key providers.

In addition to interpersonal communication, other awareness-building vehicles – traditional media, billboards, street performances, mobile technology, and so on – can and should be used to amplify MNP messages and extend marketing reach.

http://hftag.gainhealth.org/sites/hftag.gainhealth.org/files/Segmented_Markets_WFP_DSM_GAIN_2.pdf; and interviews with multiple experts, implementers, and other stakeholders.

²¹⁷ Steven Tadelis and Florian Zettelmeyer, "Information Disclosure as a Matching Mechanism: Theory and Evidence from a Field Experiment," June 15, 2011, http://faculty.haas.berkeley.edu/stadelis/autoauction_060911.pdf.

²¹⁸ Providing information about a product can also affect consumers' elasticity of demand and in some cases may reduce price sensitivity. Justin P. Johnson and David P. Myatt, "On the Simple Economics of Advertising, Marketing, and Product Design," *The American Economic Review* 96.3 (2006): 756–784, <http://david-myatt.org/pdf-papers/ampd-aer-2006.pdf>; Nava Ashraf, B. Kelsey Jack, and Emir Kamenica, "Information and Subsidies: Complements or Substitutes?" Poverty Action Lab, January 2013, www.povertyactionlab.org/publication/information-and-subsidies-complements-or-substitutes.

²¹⁹ Confirmed in Bolivia, South Africa, Bangladesh, and Kenya.

²²⁰ Site visits; Stephen Kodish et al., "Understanding Low Usage of Micronutrient Powder in the Kakuma Refugee Camp, Kenya: Findings from a Qualitative Study," *Food and Nutrition Bulletin*, 32.3 (2011): 292–303; P.S. Suchdev et al., "Monitoring the Marketing, Distribution, and Use of Sprinkles Micronutrient Powders in Rural Western Kenya," *Food and Nutrition Bulletin* 31.Supp2 (2010): 168–178; S.M.Z. Hyder et al., "Effect of Daily versus Once-Weekly Home Fortification with Micronutrient Sprinkles on Hemoglobin and Iron Status among Young Children in Rural Bangladesh," *Food and Nutrition Bulletin* 28.2 (2007): 156–164.

²²¹ Suchdev et al.

Figure 18. SMC markets MNPs in Bangladesh



Source: GAIN, www.gainhealth.org.

While all of these demand-generation efforts are effective, they can also be costly and resource intensive. For example, demand-generation costs for MNPs have been cited to be as high as three times the cost of the commodity, particularly in programs where commercial or socially oriented distribution is undertaken.²²² Furthermore, public sector efforts with significant BCC campaigns may dedicate resources between demand generation and commodity purchases at a ratio of at least 1:2.²²³ When resources are constrained, however, the scope of these much-needed awareness-building activities may be significantly limited.

²²² Interviews with MNP supplier and in-country implementers.

²²³ Interviews with MI, WFP, and in-country implementers.

Box 6. Compelling MNP Messaging

A trend observed across programs was the utilization of or inclination toward promotional messages that highlight how MNPs could improve a child's *health, growth, and intelligence*. In multiple MNP programs (see below), this impact- and benefit-oriented messaging has been identified as more effective and compelling than anemia-related education. These program experiences suggest that there may be a key “universal selling proposition” for MNPs that can be utilized in any MNP program regardless of the distribution model, though this message must be tested more rigorously and should be refined further to maximize demand-generation potential.

While the general message around MNPs' value can focus on these universal qualities, it is important to note that some aspects of MNP promotion should remain tailored to the local context. Localizing the product should occur to the extent that the local language and contextually appropriate images are used in promotional materials, and especially in the packaging and branding, to improve acceptance.

The following anecdotes and messages from a variety of MNP programs illustrate this trend toward communications that highlight the benefits of MNPs for children.

Kenya: “The key messages that home study participants identified included increased child appetite, disease prevention, reduced illness severity, healthier children, and strengthened immunity. Few home study participants mentioned the prevention of anemia or iron deficiency as an important message.” – Maria Jefferds et al., “Formative Research Exploring Acceptability, Utilization, and Promotion in Order to Develop a Micronutrient Powder (Sprinkles) Intervention among Luo Families in Western Kenya,” *Food and Nutrition Bulletin* 31.Suppl2 (2010): S179–S185.

Bolivia: “We are encouraging providers to change their messaging around Chispitas [based on what we've seen mothers react best to]. This involves moving away from the standard public health message on anemia, and instead saying, ‘This will make your baby smart, make him grow tall, and will prevent him from getting sick.’” – MoH, Bolivia

Nepal: Product name and slogan appearing on MNP packaging reads: “Baal Vita makes food nutritious, children become active and strong.”

Implications for each distribution model

Of the MNP or analogous product programs examined *across distribution models*, those that have achieved positive impact on uptake and health outcomes to date have all used some form of consistent, concerted BCC; implemented demand-generation strategies; and trained providers to harness consumer demand. On the other hand, programs that have been less effective along uptake and health impact

dimensions – for example, MixMe programs in Cox’s Bazar, Bangladesh, and Kakuma Refugee Camp, Kenya – failed to adequately inform caregivers and/or providers of the intention of the product, how to administer it, and the possibility of side effects, which ultimately resulted in consumers’ rejection of MNPs.²²⁴

Although many factors feed into the level of effectiveness of a program, it would appear that awareness-building activities are important among these. This fact demonstrates the strong need for conceiving robust social marketing at the program design phase, given its impact throughout a program’s duration.

Public sector programs

In public sector programs, best practices for awareness building appear to be a combination of (1) a broad nutrition campaign, which demonstrates governmental prioritization of nutritional issues; (2) incorporation of MNPs within standard infant and young child feeding (IYCF) programs, including regular promotion activities through child health days, for example; and (3) MNP-specific medical detailing and CHW trainings that then inform the messages and instruction provided directly to the caregiver at the point of treatment.

Mongolia’s national scale-up of MNPs has taken this multipronged approach to awareness building. First, the program intervention benefited from strong championing among key MoH leaders, which allowed for its relatively smooth integration into the national IYCF strategy and programming. Social marketing around MNPs was then added to the variety of promotional actions the MoH and partners (e.g., World Vision) were already taking for broader infant nutrition – for example, posters, billboards, and television and radio spots. Similarly, MNPs were also introduced to training and capacity-building sessions for providers and health workers. Doctors, nurses, and pharmacists received training on rickets and anemia while health facilitators and community nutrition workers were trained to carry out home distribution and community education.²²⁵

In other public sector IYCF interventions, uptake and resultant health impact have been shown to improve with the introduction of promotional/educational campaigns. For example, a study conducted by the All India Institute of Medical Sciences and UNICEF in a New Delhi slum community indicated that food supplementation combined with nutritional guidance from trained health workers generated improved nutritional status. The nutritional counseling involved a trained nutritionist’s providing 30- to 45-minute monthly sessions to caregivers on feeding frequency, portion size, and energy density, as well as the design of a feeding plan for the child over the next month. This guidance, complemented by the simultaneous distribution of a fortified cereal product, helped children of 4–12 months of age experience

²²⁴ Eveline Roks, “Feasibility of Segmented Markets: How to Provide Access to Life-Saving and Potential-Developing Micronutrients to All Socio-economic Segments of a Population,” WFP, GAIN, and DSM, September 2009, http://hftag.gainhealth.org/sites/hftag.gainhealth.org/files/Segmented_Markets_WFP_DSM_GAIN_2.pdf; Stephen Kodish et al., “Understanding Low Usage of Micronutrient Powder in the Kakuma Refugee Camp, Kenya: Findings from a Qualitative Study,” *Food and Nutrition Bulletin* 32.3 (2011): 292–303.

²²⁵ Carolyn MacDonald and Solongo Altengral, “National Scale-Up of Micronutrient Powders in Mongolian Integrated Program,” presented at Infant and Young Child Nutrition Satellite Meeting, Washington, DC, June 13, 2011, http://iycn.wpengine.netdna-cdn.com/files/FINALSprinklesGHCJun2011_v5061511.pdf; World Vision Mongolia, “Effectiveness of Home-Based Fortification of Complementary Foods with Sprinkles in an Integrated Nutrition Program to Address Rickets and Anemia,” World Vision, Ulaanbaatar, Mongolia, 2005.

weight increases of from 100 to 250 grams, compared with children receiving only nutrition counseling or basic morbidity ascertainment visits without the food supplement or no intervention at all.²²⁶

Commercial models

In commercial models, many of the standard practices and innovative demand-generation strategies used by the CPG and pharmaceutical industries can be utilized to effectively increase awareness. Advertising via conventional marketing and media; medical detailing via dealer/distributor and subdealer channels; and providing educational entertainment – street performers or mobile vans – are several key methods.

For example, Hindustan Lever (HUL) promoted its pilot PureIt Classic durable water purifier through public product demonstrations in targeted communities in India that were not familiar with the HUL brand. A partnership with a local microfinance institution allowed HUL to leverage existing networks to reach specific communities with a high perceived need for clean water and modify its marketing approach to suit each consumer segment and channel with flexible pricing plans. As a result of its targeted marketing and promotion activities, a Program for Appropriate Technology in Health (PATH) study reported the PureIt product generated uptake levels up to 44 percent and was determined commercially viable.²²⁷

Where there is an emerging or existing public sector MNP distribution model, it can be leveraged to decrease commercial marketing costs for suppliers. The public sector can prime the pump for commercial involvement by allowing private sector players to rely on government and NGOs as trusted sources of information on MNPs, and by creating opportunities for broad public education campaigns that raise awareness about anemia and offer unbranded (generic) promotion of MNPs.

²²⁶ Nita Bhandari et al., “Food Supplementation with Encouragement to Feed It to Infants from 4 to 12 Months of Age Has a Small Impact on Weight Gain,” *The Journal of Nutrition* 131.7 (2001): 1946–1951, <http://jn.nutrition.org/content/131/7/1946.long>.

²²⁷ Ramakrishnan Ganesan and Slavea Chankova, “Lessons Learned from the Safe Water Project Pilots in India, Kenya, and Vietnam,” Abt Associates, Bethesda, MD, January 2012, <http://sites.path.org/water/files/2012/09/cross-country-report.pdf>.

Box 7. Driving Demand through Public and Private Channels

Donor funds or unbranded public sector awareness building can take pressure off commercial actors to drive demand on their own. As an example, International Development Enterprise India (IDEI) relied on significant donor funding to create the market for a low-cost drip irrigation product it had developed in the early 2000's. The Bill & Melinda Gates Foundation provided approximately \$11.5 million of a \$16 million grant toward demand-generation activities that would make farmers aware of the benefits of drip irrigation. "Using this money, IDEI showed Bollywood-style films in villages, conducted product demonstrations, and installed demonstration plots in the fields of the most receptive farmers, which then generated word-of-mouth publicity about the product's benefits ... The annual growth rate in sales increased from 40 percent in the years before the grant to 73 percent in subsequent years" as a result.

Source: Harvey Koh, Ashish Karamchandani, and Robert Katz, "From Blueprint to Scale: The Case for Philanthropy in Impact Investing," Monitor Group, Mumbai, April 2012, http://www.mim.monitor.com/downloads/Blueprint_To_Scale/From%20Blueprint%20to%20Scale%20-%20Case%20for%20Philanthropy%20in%20Impact%20Investing_Full%20report.pdf.

Public sector promotion of unbranded products or interventions has also been effective for raising awareness. An emerging public-private partnership in India to scale up treatment with zinc and ORS will look to state-level governments to provide media time essential for delivering the key messages that underpin the large-scale BCC campaign. Past campaigns from the Point-of-Use Water Disinfection and Zinc Treatment Project have also developed generic marketing and promotion material for zinc and ORS in conjunction with country governments.

Sources: Clinton Health Access Initiative, <http://www.clintonfoundation.org/main/our-work/by-initiative/clinton-health-access-initiative/about.html>; "Point-of-Use Water Disinfection and Zinc Treatment Project (POUZN)," Center for Private Sector Health Initiatives, <http://pshi.fhi360.org/whatwedo/projects/pouzn.html>.

However, even when the appropriate awareness-building strategies exist, the use of such demand-generating tools for MNPs and other infant nutrition products may be restricted for commercial models in certain contexts, depending on the local interpretation and implementation of the International Code on Marketing of Breast-Milk Substitutes (see Section 3.3). The feasibility of marketing MNPs commercially in certain locations is uncertain due to complex local laws and information gaps.

"In India, strict enforcement of the International Code of Marketing Breast-Milk Substitutes will make any type of social marketing or commercial-sector approach extremely challenging given that the promotion tools banned would critically be needed for generating demand for MNPs."

- Micronutrient Initiative

“We would be unlikely to pursue pure commercial sales of MNPs for multiple reasons, but one is simply that it would be difficult to actively market the product in the context of local laws.”

- Indian MNP supplier

“We stay away from getting involved in food/nutrition products for the infant age group given the highly politicized nature of the space and the restrictive regulatory environment.”

- Global CPG company

Advocacy at the global and national levels, however, can help reduce restrictiveness of the regulatory environment for infant nutrition products. In Kenya, for example, GAIN, MI, and UNICEF have worked closely with the government to ensure that MNPs are not considered among the infant food products whose marketing is restricted, thus opening up opportunities for commercial/hybrid approaches of distributing and promoting MNPs.²²⁸ GAIN and partners are now pursuing a pilot private sector launch of MNPs in Kenya.

Similarly, in Vietnam, UNICEF and other key implementation partners worked with the Vietnamese government in 2012 as it passed an advertisement policy that banned the marketing of breast milk substitutes. This national legislation has been lauded for its commitment to secure breast-feeding by preventing the promotion of substitute products, while also being careful not to overreach in its restrictiveness.²²⁹ The engagement of key external nutrition actors in these policy development discussions can help protect infant nutrition products such as MNPs, meant for children over six months old and beyond the exclusive breast-feeding period, from marketing bans.

Social marketing and microfranchising models

In social marketing and microfranchising models, person-to-person marketing and quality training for vendors have proven effective in generating awareness of MNPs and positively affecting demand. In both SWAP’s microfranchise approach to distributing MNPs in Nyanza, Kenya, and BRAC’s *shasthya shebika* approach to selling MNPs throughout Bangladesh’s villages, vendors and health workers were the key influencers of consumers’ purchasing choices. After having received quality training about the product, these providers were equipped with the appropriate information and tools to encourage caregivers to purchase and utilize the product.

In the Nyanza program, a follow-up survey reported that “almost all mothers (98 percent) reported having heard about Sprinkles, most commonly from SWAP vendors (49 percent), promotional launches (30 percent), and training sessions (27 percent). More than one-fourth of the mothers (28 percent) reported that their household was visited by a SWAP vendor at some point.” It appears that there was a correlation

²²⁸ Interviews with GAIN and MI country offices.

²²⁹ Interviews with UNICEF and GAIN.

between these awareness-building activities and uptake of Sprinkles. The follow-up survey reported that “among these 124 households visited by a vendor, the most commonly purchased health product was Sprinkles (76 percent of households), followed by Waterguard (41 percent) and soap (19 percent).”²³⁰

²³⁰ P.S. Suchdev et al., “Monitoring the Marketing, Distribution, and use of Sprinkles Micronutrient Powders in Rural Western Kenya,” *Food and Nutrition Bulletin* 31.Supp12 (2010): 168–178.

4.4 Acceptability

MNPs have several defining features that make them generally accepted among mothers and children, but these features alone cannot compel utilization of the product. In all three distribution models (public, commercial, and socially oriented), an effective approach must be adopted to reinforce those key attributes and allow MNPs to maintain high acceptability at scale. This approach should involve careful design of culturally relevant packaging and labeling as well as strong interpersonal communication, via trained providers, on side effects and proper administration.

Definition and overview

Acceptability represents the extent to which a product or service is adapted to the unique needs of the customer such that he or she is willing to consume it.²³¹ The more acceptable the product, the more readily a consumer will use it and be able to incorporate it into his or her behavior. Tailoring a product's presentation, ingredients, and functionality to the target consumer's context can achieve acceptability. With emerging markets and BOP customers, it is therefore important to acknowledge that "for cultural, societal, religious, or even political reasons, it might not be possible to simply offer products designed for developed-world customers."²³²

Product innovations such as HUL's packet soaps/shampoos, popular among low-income Indian consumers, or Haier's modified washing machine, used for cleaning clothes as well as vegetables in rural China, are good examples of how products can be intentionally and carefully designed to meet the needs of a specific consumer segment.

MNPs are in fact another example of similar social innovation, in that they were designed with the faults of iron drops and syrups in mind (see Figure 19 for more detail). MNPs have been found to be more acceptable than these earlier interventions to address anemia, as well as acceptable in general.²³³

Acceptability can be difficult to measure and is often determined by the extent to which the caregiver sees that the child is willing to consume the complementary food mixed with the MNP. A caregiver may be asked if he or she observed that the child "liked" the product as a proxy measurement. However, it is important to note that in order to include the MNP in the diet other changes outside of the social and cultural norms, such as giving a semisolid food, may have been required and could have an effect on acceptability.²³⁴ Acceptability also needs to extend to the influencers, such as grandmothers, female

²³¹ Jamie Anderson and Costas Markides, "Strategic Innovation at the Base of the Economic Pyramid," 2006, www.jamieandersononline.com/uploads/ANDERSON_MARKIDES_SI_at_Base_of_Economic_Pyramid_FINAL.pdf.

²³² Ibid.

²³³ Sight and Life, "In-Home Fortification with Micronutrient Powders: An Update on Evidence and Safety," *Sight and Life Magazine* 26.2 (2012): 90–94, www.sightandlife.org/fileadmin/data/Magazine/2012/26_2_2012/positions_statements_in_home_fortification_with_micronutrient_powders.pdf.

²³⁴ L.M. De-Regil et al., "Home Fortification of Foods with Multiple Micronutrient Powders for Health and Nutrition in Children under Two Years of Age," *The Cochrane Library* 9 (2011): CD008959, <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008959.pub2/pdf>; Katie Tripp et al., "Formative Research for the Development of a Market-Based Home Fortification Programme for Young Children in Niger," *Maternal and Child Nutrition* 7 (2011): 82–95, <http://onlinelibrary.wiley.com/doi/10.1111/j.1740-8709.2011.00352.x/pdf>; Stanley Zlotkin et al., "Micronutrient Sprinkles to Control Childhood Anaemia," *PLoS Med* 2.1 (2005): e1, www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.0020001.

relatives, and other mothers, who may be the individuals supporting the mother in her decisions around infant feeding.

Figure 19. MNPs versus iron drops²³⁵

<u>Negative attributes of iron drops</u>	<u>Advantages of MNPs</u>
1) Potential risk of acute iron poisoning if child consumes a very high dose	1) Potential for overdose is low
2) Strong metallic taste and prevalence of teeth staining	2) Various vitamins and minerals can be added to formulation, with no taste-changing effects
3) Gastrointestinal side effects occur when dose of iron is too high	3) Lightweight and simple to store, transport, and distribute
4) Complicated dispensing instructions, so that correct dosing may require literacy	4) Does not conflict with breast-feeding practices
	5) Promotes the introduction of complementary foods at six months of age and proper weaning practices

Several leading attributes of MNPs make them more desirable to users than alternative interventions, including their ease of incorporation into normal feeding practices; lack of taste change when sprinkled onto foods; few and minor side effects, which can be managed with basic care; and attractive packaging when appropriately designed. However, it must be stated that these key features alone do not allow MNPs to attain acceptability among households. Without the deployment of thoughtful marketing activities and proper training for caregivers and providers, product acceptability can be jeopardized.

Key factors affecting MNP acceptability

Ease of use

MNPs are easy to mix with any semisolid complementary foods and staples that are prepared in the household, and the directions (if appropriately depicted) are easy to follow even without literacy. However, it is important to note that MNP administration in cultures where there is a tradition of feeding liquids and broths to infants can be challenging.

The ease of adding MNPs to a child's food enhances acceptability, but their intensive and lengthy administration regimen can simultaneously hinder it. Compliance with a 60- to 180-sachet regimen over time can be challenging, particularly for households with multiple children ingesting MNPs.

Acknowledging that daily supplementation can be a barrier to proper utilization and adherence, the nutrition community is currently exploring whether more flexible, less frequent administration of MNPs is possible and effective (see Section 3.3).

²³⁵ Stanley Zlotkin, "Overview of Efficacy, Effectiveness and Safety of MNPs," presentation for UNICEF Global Nutrition Cluster, April 2009, www.unicef.org/nutritioncluster/files/Revised_UNICEF_CombinedOverview_of_Efficacy_Effectiveness_and_Safety_of_MNPs.pdf; J.M. Pettifor and Stanley Zlotkin, eds., *Micronutrient Deficiencies during the Weaning Period and the First Years of Life: Nestlé Nutrition Workshop Series Pediatric Program Volume 54*, Nestlé Nutrition, 2003, www.nestlenutrition-institute.org/Library/view/Documents/54_booklet.pdf.

Taste

Another attractive feature of MNPs is their lack of taste, which makes them nearly undetectable by children once the powder is mixed in with their food. The lipid-encapsulation coating prevents iron from dissolving into the food and thereby prevents any change in the color, flavor, or taste of the food.

Caregivers in multiple implementation sites – such as Bangladesh and China – have noted an appreciation for the fact that MNPs had no taste or smell and did not alter the food.²³⁶

However, it should be noted that MNPs' lack of taste may put it at a disadvantage when compared with alternative supplements with a distinct flavor. In studies conducted in Niger, for example, 73 percent of mothers preferred the peanut-flavored preventive LNS product Nutributter® over the MNP Sprinkles product. One of the reasons mothers cited for selecting Nutributter® was its “sweet taste that the child liked.”²³⁷

Side effects and safety

Research and trials in a variety of contexts have shown many of the disagreeable side effects commonly associated with ferrous sulfate drops – an unpleasant metallic taste in the mouth, teeth staining, and abdominal discomfort – to be rare and mild with MNPs. Although infrequent with MNPs, these side effects can negatively affect acceptability if caregivers are not informed to expect that their child may experience darkened stool, for example.^{238,239}

Although visible improvements in a child's health can take several weeks to appear, caregivers in Niger and Kenya who adhered to the recommended dosing regimen largely embraced MNPs after noticing increased appetite, weight gain, and increased energy and activity in their children.²⁴⁰ A few caregivers noted a concern about their child's increased appetite (and their ability to satisfy the child's hunger as a result), but this was not viewed as a widespread problem or barrier to Sprinkles use.²⁴¹

MNPs are also considered a safe intervention with a low risk of toxicity. Although there are safety and overdose concerns with other methods of food fortification, according to a systematic review carried out in 2009,²⁴² the potential for overdose when ingesting MNPs is very small because numerous

²³⁶ Zlotkin et al.; Waseem Sharieff et al., “Short-Term Daily or Weekly Administration of Micronutrient Sprinkles™ Has High Compliance and Does Not Cause Iron Overload in Chinese Schoolchildren: A Cluster-Randomised Trial,” *Public Health Nutrition* 9.3 (2006): 336–344.

²³⁷ Tripp et al.

²³⁸ Sharieff et al.; Siddhivinayak Hirve et al., “Low-Dose ‘Sprinkles’ – An Innovative Approach to Treat Iron-Deficiency Anemia in Infants and Young Children,” *Indian Pediatrics* 44.2 (2007): 91–100, www.indianpediatrics.net/feb2007/91.pdf.

²³⁹ In a study in Ghana, rates for the darkening of stools and episodes of diarrhea were similar for children receiving the MNP and those receiving iron drops. This is to be expected, however, since most of the iron is excreted in stool. Fewer caregivers reported staining of children's teeth in the MNP groups than in the drops group, though. Stanley Zlotkin et al., “Treatment of anemia with microencapsulated ferrous fumarate plus ascorbic acid supplied as sprinkles to complementary (weaning) foods,” *American Journal of Clinical Nutrition* 74.6 (2001): 791-795

²⁴⁰ Maria Jefferds et al., “Formative Research Exploring Acceptability, Utilization, and Promotion in Order to Develop a Micronutrient Powder (Sprinkles) Intervention among Luo Families in Western Kenya,” *Food and Nutrition Bulletin* 31.Supp12 (2010): S179–S185; Tripp et al.

²⁴¹ Ibid.

²⁴² Kathryn Dewey, Zhenyu Yang, and Erick Boy, “Systematic Review and Meta-analysis of Home Fortification of Complementary Foods,” *Maternal and Child Nutrition* 5.4 (2009): 283–321.

individual packages (approximately 20 sachets) would have to be opened and ingested to reach toxicity levels.²⁴³

While there is a low risk of toxicity with MNPs, some research has surfaced potential concerns over the relationship between MNP administration and malaria burden. A major 2006 study from Pemba, Zanzibar,²⁴⁴ suggested that iron and folic acid supplementation could increase morbidity and mortality in malarial areas; however, the evidence of safety risks for MNPs is considered insufficient and the recent WHO guidelines on MNPs recommend using MNPs in malarial areas along with efforts to prevent and treat malaria.²⁴⁵

Given the iron content in MNPs, concerns have also been raised about potential risks of this intervention in areas where the incidence of diarrhea in children is high. Malnourished children are at greater risk of being affected by diarrhea and other infectious diseases and of mortality as a result of developing these illnesses. While micronutrient powders may cause the gastrointestinal discomfort and darkened stool, diarrhea has been reported only in rare cases.²⁴⁶ HF-TAG guidance notes that it is not known whether these diarrhea cases are related to the MNP itself, and therefore MNP consumption should not be dissuaded as a result.²⁴⁷ Other experts (such as WFP, the UN High Commissioner for Refugees, and Sight and Life) similarly confirm that there is no clear correlation between MNP consumption and increased risk of diarrhea.²⁴⁸

Packaging

Significant research demonstrates that MNP users in multiple contexts have been more attracted to and accepting of products with contextually relevant images, local colors, and writing in the local language. For example, the SWAP program in Nyanza, Kenya, found that the sachet packaging and size mimicked the packages of other familiar food products and items, which improved acceptance in some cases. Several families reported that children requested Sprinkles because they thought it was sugar due to its white, powdery consistency and the package size and coloring.

²⁴³ “Why Were Micronutrient Supplements Like Micronutrient Powder (MNP) Developed?,” Republic of the Philippines Department of Health, updated October 2011, www.doh.gov.ph/content/why-were-micronutrient-supplements-micronutrient-powder-mnp-developed.html.

²⁴⁴ Sunil Sazawal et al., “Effects of Routine Prophylactic Supplementation with Iron and Folic Acid on Admission to Hospital and Mortality in Preschool Children in a High Malaria Transmission Setting: Community-Based, Randomised, Placebo-Controlled Trial,” *Lancet* 367.9505 (2006): 133–143.

²⁴⁵ Sight and Life, “In-Home Fortification with Micronutrient Powders: An Update on Evidence and Safety,” *Sight and Life Magazine* 26.2 (2012): 90–94, www.sightandlife.org/fileadmin/data/Magazine/2012/26_2_2012/positions_statements_in_home_fortification_with_micronutrient_powders.pdf. See also O. Fontaine et al., “Conclusions and Recommendations of the WHO Consultation on Prevention and Control of Iron Deficiency in Infants and Young Children in Malaria-Endemic Areas,” *Food and Nutrition Bulletin* 28 (2007): S621–S627.

²⁴⁶ See, for example, Purnima Menon et al., “Micronutrient Sprinkles Reduce Anemia among 9- to 24-Month-Old Children When Delivered through an Integrated Health and Nutrition Program in Rural Haiti,” *Journal of Nutrition* 137 (2007): 1023–1030; and Marcello Giovannini et al., “Double-Blind, Placebo-Controlled Trial Comparing Effects of Supplementation with Two Different Combinations of Micronutrients Delivered as Sprinkles on Growth, Anemia, and Iron Deficiency in Cambodian Infants,” *Journal of Pediatric Gastroenterology and Nutrition* 42.3 (2006): 306–312.

²⁴⁷ “Programmatic Guidance Brief on Use of Micronutrient Powders (MNP) for Home Fortification,” HF-TAG, 2011, <http://hftag.gainhealth.org/resources/programmatic-guidance-brief-use-micronutrient-powders-mnp-home-fortification>.

²⁴⁸ DSM, Sight and Life, UN High Commissioner for Refugees, and WFP, “Dealing with Diarrhoea in Children in Refugee, Emergency and Development Situations in the Context of Micronutrient Powder Use,” Technical Brief 1.3 August 2010, http://hftag.gainhealth.org/sites/hftag.gainhealth.org/files/MNP_brief_Diarrhoea_use.pdf.

However, when poorly designed, logos and information provided on packaging can also cause concerns and confusion about MNPs, as demonstrated by the MixMe MNP product in the Kakuma Refugee Camp (see Box 8).²⁴⁹ These negative experiences with MNPs indicate that high acceptability should not be assumed and that significant formative research and design testing must be conducted prior to launch.

Box 8. Low Usage of MNPs in Kakuma Refugee Camp, Kenya

MixMe brand MNPs were distributed for free along with general food rations in the Kakuma refugee camp by targeted members of the camp. The program insufficiently investigated the role of cultural factors in MNP use and the importance of proper messaging. As a result, the rate of uptake (actual collection of MNPs) declined at a monthly rate of 10 percent, from 99 percent uptake in February 2009 to 30 percent in July 2009.

The decline in uptake was attributed to a number of acceptability-related factors:

- *Insufficient information:* There was confusion and distrust from the communities as a result of the lack of detail and background provided about the product before distribution (e.g., ingredients, benefits, taste, and expected side effects). Household members were turned off by untrained MixMe distributors who were unable to answer basic questions about the product.
- *Packaging and logo misconception:* Each community expressed distaste for the MixMe box logo of a three-person family, which gave mothers the impression that the product was for family planning. So too did the color, size, and shape of the aluminum foil sachet, which resembled a condom package. The use of contraception is either forbidden or heavily stigmatized among some Kakuma Camp communities.



Images: family of three on MixMe box; cartoon logo on MixMe box and individual sachets

Source: Stephen Kodish et al., “Understanding Low Usage of Micronutrient Powder in the Kakuma Refugee Camp, Kenya: Findings from a Qualitative Study,” *Food and Nutrition Bulletin* 32.3 (2011): 292–303.

²⁴⁹ Stephen Kodish et al., “Understanding Low Usage of Micronutrient Powder in the Kakuma Refugee Camp, Kenya: Findings from a Qualitative Study,” *Food and Nutrition Bulletin* 32.3 (2011): 292–303.

Requirement of behavior change communication

Although MNPs are a generally accepted product, the behavior of sprinkling a powder on food and mixing it in before a meal is new for its consumers and requires significant education for proper uptake and adherence. Clear communication materials should be provided to consumers, together with a strong marketing campaign and adequate training for those distributing the MNPs. Given that adherence to MNPs is as low as 32 percent in some cases,²⁵⁰ these materials need to include details of appropriate instructions for use (e.g., dosing frequency and duration of use, appropriate foods into which MNPs should be mixed), the benefits of the product, and common side effects from consumption.

As noted in Section 4.3, in-person BCC, particularly via trained health providers, has been essential to MNP programs and for improving acceptability in addition to awareness. For example, mothers in the Sprinkles evaluation in Niger emphasized the value of being informed of the MNP product's details and side effects before use. Few caregivers showed any concern when they noticed their children's stools had become darker and looser after ingesting the Sprinkles, noting they had been warned of this side effect by field workers in advance.²⁵¹

Implications for distribution models

Distributors and manufacturers must incorporate all of these factors into their strategies to ensure that MNP products are highly accepted by targeted communities through any and all distribution models (public sector, socially oriented, and commercial). Where multiple distribution methods are in place, some alignment in product presentation and in the administration regimen followed is critical to reinforce acceptability and prevent mixed messaging.

While alignment in presentation and regimen is essential for preventing confusion, middle- and upper-income customers can be attracted with premium products that contain additional features, such as tailored branding or increase in daily energy content. Some of these more aspirational versions of MNPs are currently entering the market: For example, DSM's MixMe product can now include phytase, an enzyme that helps overcome the plant-based materials in many traditional diets that inhibit zinc and iron absorption so that lower doses of iron and zinc are effective at reducing deficiency. DSM's humanitarian initiative, Sight and Life, is also exploring options to add flavor to MNPs.

²⁵⁰ L.M. De-Regil et al., "Home Fortification of Foods with Multiple Micronutrient Powders for Health and Nutrition in Children under Two Years of Age," *The Cochrane Library* 9 (2011): CD008959, <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008959.pub2/pdf>.

²⁵¹ Katie Tripp et al., "Formative Research for the Development of a Market-Based Home Fortification Programme for Young Children in Niger," *Maternal and Child Nutrition* 7 (2011): 82–95, <http://onlinelibrary.wiley.com/doi/10.1111/j.1740-8709.2011.00352.x/pdf>.

5. Recommendations

Presented below is a targeted strategy intended to guide the global community in scaling up the distribution of MNPs in order to address the significant public health problem of IDA among infants and young children. The primary recommendations proposed below are aimed at (1) addressing the key demand-side barriers that have inhibited progress to date so that full coverage for MNPs can be achieved through 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. These are followed by secondary recommendations aimed at 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.

5.1 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 broad acceptance of MNPs as the preferred intervention to address IDA in infants and young children (6–23 months of age) and the immense health impact this product can have – for example, anemia reduction rates of up to 50 percent and protection against other micronutrient deficiencies,²⁵² in addition to improved cognitive function and potential productivity later in life – coverage of MNPs remains low. Only a negligible fraction of the 34 million children in the highest-burden countries targeted for this intervention²⁵³ have received them, and less than 5 percent of all anemic children globally are covered.²⁵⁴ MNPs should therefore be dramatically scaled up in appropriate geographies where, according to UNICEF’s programming decision tree for IYCF, nutrition situation analysis demonstrates that there is adequate food security and intake of macronutrients in the diet, but insufficient intake of micronutrients (see Figure 20).

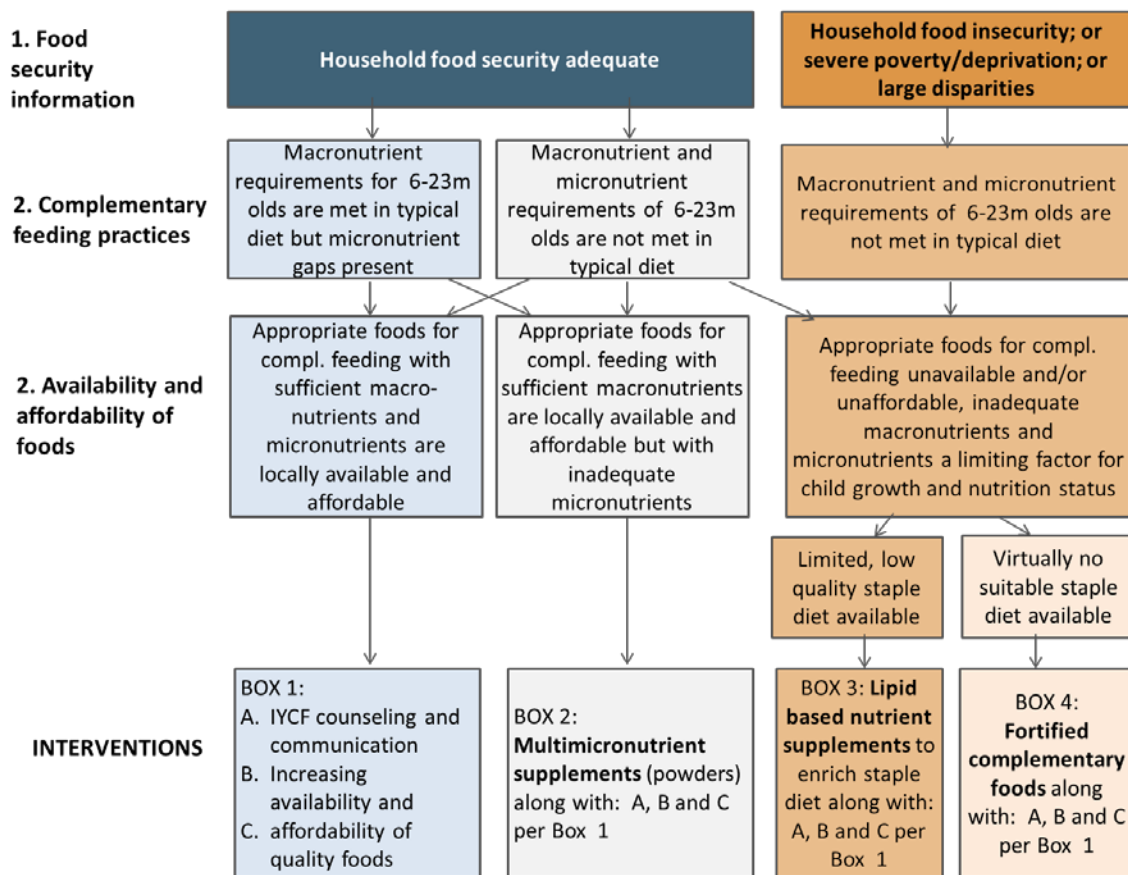
Scale-up in such contexts can help achieve the much-needed improvements in global IDA status and improve the overall health and potential of the world’s future generations. The channels through which this significant scale-up occurs should be strategically chosen based on countries’ socioeconomic context, geography, and associated demand-generation needs, as well as with due consideration for cost-effectiveness and sustainability.

²⁵² 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. 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 (2012): 1223–1230, www.hki.org/research/nna_en_1205.pdf.

²⁵³ S. Horton et al., “Scaling Up Nutrition: What Will It Cost?,” World Bank, 2010, <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/Peer-Reviewed-Publications/ScalingUpNutrition.pdf>.

²⁵⁴ Sam 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>.

Figure 20. UNICEF example of decision tree on IYCF interventions²⁵⁵



IDA can be prevalent among children across population income segments in many low- and middle-income countries. All of these segments should be targeted through a mix of channels and strategies to maximize coverage; however, the public sector should be the starting point through which MNP scale-up is driven, given that reaching the many at-risk poor is a high priority for the global nutrition community as is ensuring an adequate complementary feeding diet through IYCF programs. Every effort should therefore be made to introduce MNPs in national nutrition or IYCF initiatives where they are not yet available in countries that meet the conditions in the UNICEF decision tree.

Although pure commercial approaches in which the whole commodity cost is borne by the consumer²⁵⁶ may be appropriate for a variety of consumers and products, for low-income consumers in particular, “markets are failing to address the malnutrition problem wherever families do not have the money to buy adequate food or healthcare.”²⁵⁷ Private sector sales of MNPs can be unaffordable for lower-income

²⁵⁵ “Programming Guide: Infant and Young Child Feeding Guide,” UNICEF, New York, May 2011, www.unicef.org/nutrition/files/Final_IYCF_programming_guide_2011.pdf.

²⁵⁶ “Commercial models” may also be used to indicate models wherein costs are shared across sectors or that utilize private sector supply chains but provide cash transfers to increase access to vulnerable groups.

²⁵⁷ “Nutrition: Overview,” World Bank, <http://go.worldbank.org/TZNY94JIK0>.

consumers, particularly due to markups throughout the retail chain, which can raise the cost of a 60-day MNP course from \$1.80 in the public sector to \$3.30 or greater for just the commodity alone.

In addition to improving affordability of MNPs, the public sector – in close coordination with private and social marketing actors – should be utilized to maximize availability of the product, particularly for the poor.²⁵⁸ As discussed in Section 4.2, the public sector – in some instances – can be a highly effective channel for reaching the majority of children on a national scale,²⁵⁹ as evidenced by experience with a variety of health and nutrition products, such as vaccines, vitamin A supplements, and antiretroviral drugs. Learning from commercial and social actors, the public sector can also leverage strategic messaging around MNPs to critically drive awareness and long-term adherence.

Box 9. Robust Public Sector Scale-Up

As the foundation of MNP scale-up, a public sector MNP program must operate as smoothly and effectively as possible, which is contingent on several key success factors related to the level of commitment and resourcing dedicated to the program. Robust public sector scale-up requires the following:

- High-level political commitment – for example, support from the head of state, ministry of finance, and/or MoH; and high-level advocacy for the MNP program
- Sufficient allocation of resources domestically and/or internationally to nutrition – for example, Bolivia’s MoH has budgeted \$5.6–\$6.7 million (\$40–48 million bolivianos at current exchange rates) annually to the *Desnutricion Cero* program since 2010 and is budgeting approximately \$84 million (\$600 million bolivianos) total between 2013 and 2020¹
- Significant awareness-raising efforts to inform caregivers of the purpose of MNPs, their proper use, and support for continued administration
- Continuous effort to improve the program – for example, after recognizing that centralized procurement of MNPs was leading to delays and stock-outs, Bolivia shifted procurement to the municipal level
- Inclusion and integration of MNPs into social assistance programs such as conditional cash transfer programs, where caregivers have routine contact with the health system – for example, Mexico’s *Oportunidades* program

¹ “Plan Sectorial de Desarrollo 2012–2020: ‘Hacia la Salud Universal,’” Estado Plurinacional de Bolivia Ministerio de Salud y Deportes, La Paz, Bolivia, 2010, <https://cedosi-procosi.googlecode.com/files/006.pdf>.

Although the public sector can serve as the core of any MNP scale-up effort for the above-mentioned reasons, additional channels can play important roles in extending coverage and improving targeting. Socially oriented distribution (for example, social marketing or microfranchising models) and/or commercial distribution models should complement public sector programs and should be carefully

²⁵⁸ In some cases, especially when public sector capacities are highly constrained, approaches led by the public sector can also be supported by private sector actors – for example, through use of private sector supply chain, delivery, or marketing partners.

²⁵⁹ However, it should be acknowledged that many country systems may have weak supply chains and limited reach to certain segments (e.g., rural populations).

adapted to the country context, paying particular attention to each consumer segment’s ability to pay. When these approaches are used, the government can play an important enabling role rather than simply a direct delivery role. The value of these complementary models and the scenarios in which such hybrid approaches work best are discussed further below.

Scale-up in Category 1 countries

In Category 1 countries – that is, countries categorized as “low income” according to World Bank designations – the majority of consumers are likely to have limited ability to pay for a product like MNPs.²⁶⁰ Here, free public sector distribution of MNPs will help address this demand barrier significantly, though challenges may remain with the hardest-to-reach consumers – for example, those in remote areas. Given that public health infrastructure may not reach all consumers in need, complementary approaches should also be utilized to provide affordable MNP access for low-income users who are untouched by the public sector.

As discussed in Section 4.2, socially oriented models that use community health workers, vendors, or rural outposts (e.g., *shasthya shebikas* in Bangladesh, SWAP vendors in Kenya, LivingGoods model in Uganda) to target these unreached populations, often at subsidized prices, can serve as a key complement to public sector MNP programming in Category 1 countries.

These models also (as detailed in Section 4.3) typically involve significant communications elements, such as social marketing campaign approaches, which are important for reinforcing public sector messages, extending awareness, improving product acceptability, and driving demand.

Scale-up in Category 2 countries

In Category 2 countries – categorized as “lower-middle” and “upper-middle income” according to World Bank classifications – many consumers will still benefit from free public sector distribution, but there will also be a sizeable portion of consumers whose affordability threshold is much higher and who may already seek health products or infant foods in the private sector (see Section 4.1). In certain contexts, anemia may also be highly prevalent among these wealthier segments – for example, in Bolivia, 45 percent of children under five in the highest income quintile are anemic.²⁶¹ Given the income profile in these settings, scarce donor resources should be used as effectively as possible by focusing public sector efforts on the poor and allowing complementary commercial approaches to target more of the wealthy consumers, who also require IDA prevention and treatment but have the ability to pay for MNPs at unsubsidized prices.

²⁶⁰ To illustrate, 40 percent of consumption in Africa’s urban markets will be driven by people making \$20,000 or more, but that represents approximately 1 percent of population. Damian Hattingh, Bill Russo, Ade Sun-Basorun, and Arend Van Wamelen, “The Rise of the African Consumer,” McKinsey, Johannesburg, October 2012, www.mckinsey.com/global_locations/africa/south_africa/en/rise_of_the_african_consumer.

²⁶¹ MEASURE DHS, www.measuredhs.com.

Box 10. Preconditions for Commercial Distribution

Although further investigation is needed to more precisely determine the key preconditions for effective commercial distribution of MNPs, current insights indicate that the following would serve as some baseline criteria:

Demand:

- A significant market of high-income consumers (capable of paying for the product at its final marked-up price) suffers from IDA and would benefit from micronutrient supplementation.
- MNPs are demanded or could be demanded by these high-income consumers with appropriate marketing campaigns and BCC.

Supply:

- Suppliers, distribution partners, and retailers see sufficient demand and market size to be fully engaged in production, distribution, and promotion.

Regulatory environment:

- Neither registration status nor local marketing regulations prevent promotion of MNPs.
- Government actors and other influential actors (e.g., physician groups) endorse MNPs as an appropriate strategy for addressing IDA and improving micronutrient intake of complementary food diets.

Simultaneous public and private sector distribution of MNPs should be undertaken with careful consideration during the design and implementation phases such that a high degree of efficiency and complementarity can be achieved. As discussed above, the benefit of hybrid models is that awareness in one sector can reinforce that in another – particularly if messages are consistent or complementary (e.g., utilizing the universal messages that have been effective in other contexts [see Box 6 in Section 4.3]) – and costs for demand generation can be shared.

Box 11. Bolivia: Prime for Public-Private Mix

Context: Bolivia is designated as a “lower-middle-income” country according to the World Bank, with a gross national income per capita of \$4,890 (PPP) and 51.3 percent of the population living at or below the national poverty line. Anemia among young children is prevalent across all income segments, ranging from 69 percent among children in the lowest income quintile to 45 percent in the highest income quintile.

Public sector MNP program: As part of Bolivia’s *Desnutricion Cero* initiative and in close collaboration with local and regional nutrition partners, a national program for MNP distribution via public sector health facilities and workers was launched in 2006. The program targets low-income households who receive Bolivia’s universal maternal and infant health insurance, which fully covers full courses of MNPs, called Chispitas, for children 6–23 months old. In 2011, national coverage of Chispitas among under-twos was 59 percent.

Private sector complement: INTI, one of the leading pharmaceutical companies in Bolivia, supplies the public sector program and in late 2011 initiated sales of Chispitas (with the same product presentation) in private pharmacies. While approximately 2 million sachets are being sold to private sector pharmacies annually,¹ a lack of monitoring and consumer research prevents firm conclusions from being drawn about consumer purchasing and utilization of Chispitas made available through this retail channel. However, Bolivia’s income profile and purchasing/care-seeking behavior indicate potential for this emerging commercial model to be a key complement to the public sector, as evidenced by the following:

- There are many popular, much more expensive substitute products available in the private sector. PediaSure, a powdered, flavored beverage retailing at \$16–\$21 per container in pharmacies in La Paz is considered to be especially popular.
- Middle- and higher-income families often do not utilize public health facilities and will instead frequent private medical services. These consumers will then purchase their health and nutrition products from pharmacies upon doctor or pharmacist recommendations.
- It is possible that awareness around Chispitas built through the public sector program will influence demand in the private sector.



¹INTI reported that approximately 20 percent of its Chispitas production volumes are sold to private pharmacies; the 2 million sachet estimate assumes approximately 10 million sachets are produced for sale annually, which is consistent with volumes INTI reported during interviews with R4D.

Sources: Visit to Bolivia, August 2012: interviews with MI, MoH, clinicians, INTI, SIGMA, and LAFAR; “Prevalence of Anemia in Children: Percentage of Children Classified as Having Anemia,” MEASURE DHS, www.measuredhs.com; World Bank, “Data: Bolivia,” <http://data.worldbank.org/country/bolivia>.

When a public-private mix is not appropriately coordinated, however, there is a risk of leakage of free products into the market, or of the destruction of commercial brand equity when a product is simultaneously available through both the public sector for free and the private sector at a retail price. Product presentation differentiation (e.g., different branding, packaging, attributes) is a proven method for mitigating such risks, and should be recommended.

Male condom distribution in Lesotho is a promising example of how the same product can be successfully distributed through multiple channels without risk of market leakage or equity damage. Figure 21 presents an overview of the two primary male condom distribution channels in Lesotho, involving USAID, the MoH, and PSI.

Figure 21. Male condoms in Lesotho²⁶²

	MoH and USAID – generic	PSI – branded
<i>Distribution channels</i>	<ul style="list-style-type: none"> Public health clinics, hospitals, hotels, taverns, businesses, and so on PSI distributes all of the USAID-procured condoms at these outlets and most of the MoH-procured 	Traditional retail outlets as well as less traditional sales points such as kiosks, small supermarkets, and so on
<i>Cost</i>	Free	Tiered pricing between brands ^a <ul style="list-style-type: none"> TRUST: \$0.37–\$0.44 per 3-pack Lovers Plus: \$1.00–\$1.19 per 3-pack
<i>Presentation</i>	Unbranded, no logo 	<ul style="list-style-type: none"> TRUST (economy brand) Lovers Plus (premium) with colored and flavored variants 
<i>Promotion</i>	<ul style="list-style-type: none"> Standard MoH education on sexual and reproductive health PSI-branded field educators inform public about all condoms (not just branded) and where to find them 	<ul style="list-style-type: none"> PSI-branded field educators Promotional materials (signs, stickers) at point of sale

(a) PSI suggested retail prices.

In 2010, national condom coverage in Lesotho was at 66 percent; PSI condom sales alone represented 53 percent of the coverage.²⁶³ One key success factor in this example is PSI’s careful branding of its condoms as a more attractive product, given their packaging and product options. Additionally, PSI

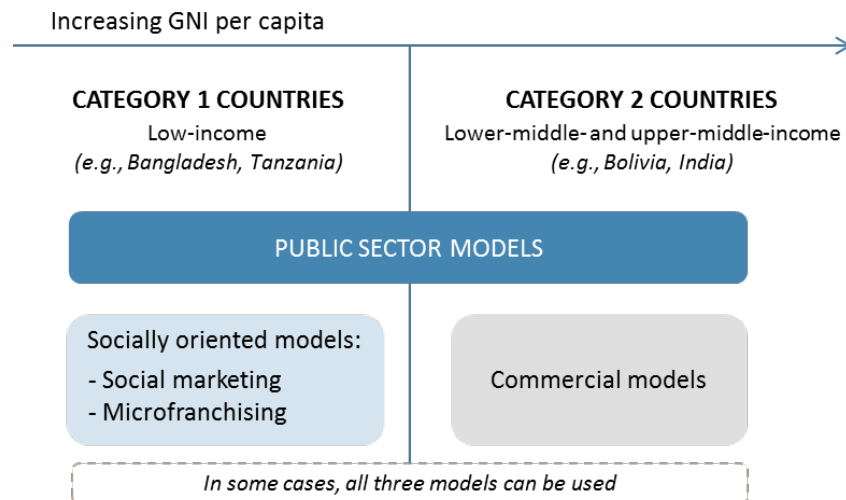
²⁶² Consultation with PSI; “Lesotho,” PSI, www.psi.org/lesotho; “Lesotho (2010): MAP Study Evaluating Coverage, Quality of Coverage and Penetration of Male Condoms in Lesotho,” PSI, Maseru, Lesotho, 2011, www.psi.org/sites/default/files/publication_files/2010-lesotho_map_cdm.pdf.

²⁶³ “Lesotho (2010): MAP Study.”

closely collaborates with the MoH to ensure complementarity between the respective public and private sector distribution efforts, and has received significant political and implementation support from the Lesotho government since 2001.²⁶⁴ PSI representatives noted, “Currently, PSI receives about 50 percent of its free-issue condoms from the MoH, which relies on our distribution expertise to get condoms quickly to where they are needed. The MoH values our contributions since they recognize that even our branded campaigns help grow the entire category of condom users in Lesotho.”²⁶⁵

To determine what distribution approach is most appropriate for MNPs in a certain context, programs should be carefully designed and tested prior to large-scale implementation. The dual models outlined in Figure 22 for Category 1 and Category 2 countries should not be viewed as absolute, but rather indicative guidelines of the predominant channels in each context. Depending on the socioeconomic profile of the country and the burden of IDA across population segments, a combination of public sector, commercial, and socially oriented models could be utilized.

Figure 22. Overview of recommendation 1



Finally, all scale-up efforts, regardless of channel utilized, should be critically supported with sufficient capacity and resources for effective demand generation and BCC. Since MNPs are new, preventive, and designed to address a problem of which few are aware, they require significant awareness-raising activities to elicit demand. Introduction of MNPs through public sector, socially oriented, and/or commercial channels should be appropriately accompanied by effective promotion and education.

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

As discussed in Section 3, nutrition remains chronically underfunded both domestically and internationally relative to other health priorities. In 2011, just over 2 percent of official development assistance commitments to total health interventions (including reproductive health and population

²⁶⁴ “Lesotho,” PSI, www.psi.org/lesotho; consultation with PSI.

²⁶⁵ Consultation with PSI.

programs) went toward supporting basic nutrition efforts.²⁶⁶ In order to increase MNP coverage beyond current low levels, it is critical to mobilize new and existing funds for nutrition as a whole, with MNPs serving as a crucial part of an integrated nutrition strategy for countries where micronutrient deficiencies are prevalent and where diets of children 6 to 23 months old are lacking in critical vitamins and minerals, as per RNIs and normative indicators for IYCF. The global community should therefore carefully budget, reprioritize resources, and advocate for MNPs and nutrition more broadly in order to enable effective scale-up.

Specifically, and in accordance with World Bank estimates for SUN initiative objectives, the global community – including donors and high-burden countries – should commit at least approximately \$200 million annually to achieve full coverage among infants and young children targeted for MNPs in the 36 countries with the highest burden of undernutrition.²⁶⁷

Despite the dramatic increase in nutrition funding from current levels that this scale-up effort would imply, and the inevitable challenge of mobilizing the requisite funds, the long-term payoff clearly justifies the investment. MNPs have an estimated benefit-cost ratio as high as 37:1 (see Figure 23).²⁶⁸ By addressing or preventing IDA within the critical window from 6 to 23 months of age²⁶⁹, MNPs displace some of the need for investment in the longer term to address the effects of malnutrition in older children and adults.

²⁶⁶ “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/dacandcrscodelists.htm>. 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). Basic nutrition includes direct feeding programs (maternal feeding, breast-feeding and weaning foods, child feeding, school feeding); determination of micronutrient deficiencies; provision of vitamin A, iodine, iron, and so on; monitoring of nutritional status; nutrition and food hygiene education; and household food security.

²⁶⁷ S. Horton et al., “Scaling Up Nutrition: What Will It Cost?” World Bank, Washington, DC, 2010, <http://siteresources.worldbank.org/HEALTHNUTRITIONANDPOPULATION/Resources/Peer-Reviewed-Publications/ScalingUpNutrition.pdf>. The latest estimates for achieving full coverage of MNPs in high-burden countries is determined on the cost basis of approximately \$3.60 per child, including both commodity and programmatic costs. SUN is currently revising its costing estimates for MNPs and other nutrition interventions.

²⁶⁸ Waseem Sharieff, Sue Horton, and Stanley Zlotkin, “Economic Gains of a Home Fortification Program: Evaluation of ‘Sprinkles’ from the Provider’s Perspective,” *Canadian Journal of Public Health* 97.1 (2006): 20–23.

²⁶⁹ It is important to note that MNPs cannot completely protect a child from anemia in the full 1,000-day window, since they are administered beginning at six months. In order to protect a child between zero and six months, effective iron-folic acid supplementation must occur among pregnant and lactating women.

Figure 23. Benefit-cost ratio by product²⁷⁰

	Intervention	Benefit:Cost Ratio
Nutrition	Vitamin A supplementation	100:1 ^a
	Micronutrient powders	37:1
	RUTF	25:1 ^a
	Iron fortification of staples	8:1
	AMFm subsidy for ACT ^b	35:1
	TB diagnosis and treatment	15:1
	Deworming school children	10:1

Notes: RUTF = ready-to-use therapeutic foods; (a) Assuming 1 disability-adjusted life year = \$1,000; (b) Affordable Medicines Facility – Malaria (AMFm) offers subsidized artemisinin-based combination therapies (ACTs)

Unfortunately, promising MNP interventions have been halted or limited due to restricted resources and a focus on time-limited pilots and studies rather than full scale-up. For example, the SWAP Kenya program stopped distributing MNPs at the end of the pilot study and there were no longer resources for MNPs to be purchased on a sustained basis at the district level.

²⁷⁰ S. Horton, “Cost-Effectiveness of Micronutrient Interventions: Financing the Scale-Up,” Global Health Conference, 2011; Dean Jamison et al., “Challenge Paper: Infectious Disease,” Copenhagen Consensus, 2012; Sharieff, Horton, and Zlotkin.

Box 12. Vitamin A Supplementation

The global community's experience in dramatically improving access to vitamin A supplementation (VAS) is a clear example of how targeted advocacy efforts and resultant funding are critical to success. Addressing vitamin A deficiency through supplementation can prevent blindness in children and also reduce mortality from all causes by approximately 23 percent.¹

Similar to MNPs, VAS is an extremely cost-effective intervention² that was facing low coverage rates in the late 1990s. To address this issue, global partners including the Canadian International Development Agency (CIDA), MI, UNICEF, USAID, and WHO, among others undertook a concerted effort to work closely with national governments to support scale-up of VAS through pure public sector approaches with free distribution. As a result, the global coverage rates of children fully protected³ improved from 16 percent in 1999⁴ to 77 percent by 2009.⁵

¹ Nita Dalmiya and Amanda Palmer, "Vitamin A Supplementation: A Decade of Progress," UNICEF, New York, 2007, http://www.unicef.org/publications/files/Vitamin_A_Supplementation.pdf.

² VAS has a benefit-cost ratio of 100:1 according to S. Horton, "Cost-Effectiveness of Micronutrient Interventions: Financing the Scale-Up," Global Health Conference, 2011.

³ Fully protected defined as children receiving two doses of vitamin A.

⁴ Dalmiya and Palmer.

⁵ Micronutrient Initiative, www.micronutrient.org.

Advocacy with both global donors and high-burden countries is needed to emphasize the importance of micronutrient powders in addressing IDA, filling the nutrient gap in the diets of infants and young children in households with inadequate complementary foods, and protecting children from micronutrient deficiencies.²⁷¹ This advocacy is also needed to highlight the persistent resource gap and dramatically increase funding for both MNPs and the broader package of high-impact nutrition interventions. As such, any MNP advocacy campaign should closely align with existing efforts led by the SUN movement to expand coverage of this and other interventions.

Advocacy efforts should distinctly highlight the cost-effectiveness of MNPs and significant positive benefits for individuals and society, as well as the successes of current MNP programs in driving down rates of IDA. These advocacy efforts, however, should also emphasize the critical need for more rapid and sustained scale-up and the resources required to enable this progress. Finally, these efforts should highlight the need for more extensive planning for high-impact preventive interventions in appropriate balance with treatment-oriented programming for malnutrition.

²⁷¹ In 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. 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 (2012): 1223–1230, www.hki.org/research/nna_en_1205.pdf.

5.2 Secondary recommendations

Recommendations presented below address other aspects of the MNP market, which if enhanced, could contribute to scale-up by improving the MNP product itself, facilitating implementation, and strengthening the MNP supply base.

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 that represent more than an estimated 90 percent of sales volumes, as discussed in Section 3. While the predominance of these global suppliers has many positive implications for the current MNP market – for example, some economies of scale, quality control, and so on – local manufacturing or packaging can also play an important role. The few local MNP suppliers – vertically integrated or not – that do exist demonstrate the strategic value of these enterprises. There are two key benefits of local suppliers: They can (1) boost political support for MNP interventions and (2) positively impact 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 suppliers²⁷² so that they can rapidly produce high-quality MNP products at low cost and can also continue to provide high-quality premix in instances where local suppliers do packaging only, which is the case in Bolivia. Likewise, as with ready-to-use-therapeutic foods, multilaterals and government procurement bodies can dedicate some percentage of procurement agreements (or “off-take agreements”) to MNP suppliers located in high-burden countries.

²⁷² In 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.

Box 13. Significance of Local MNP Supply in Kenya

In 2012, Kenya made a push for establishing a national MNP program, utilizing both public and private sector distribution channels. An MNP scale-up committee comprised of key partner organizations (GAIN, MI, the Kenyan MoH – Division of Nutrition, PSI, UNICEF, WFP, WHO, etc.) was established to support this effort.

It was decided that a local MNP manufacturer should supply both channels, which in-country stakeholders indicated was a critical component to build momentum behind the national scale-up. The MNP committee, through WFP support, is developing local packaging and branding for MNPs that the local supplier will use specifically for public sector distribution. This design will include Kenya’s national colors and a Swahili product name. This effort is indicative of the broader sense of national pride that is being generated around this product.

It should be noted, however, that the viability of MNP distribution in Kenya through private sector channels in particular could have been jeopardized if local nutrition partners had not worked closely with national policymakers on Kenya’s legislation regarding marketing of infant food products. Commercial and hybrid approaches for distributing and promoting MNPs were made feasible in Kenya as a result of a recent collaboration between GAIN, MI, UNICEF, and the government to ensure that MNPs would not be among the infant food products whose marketing is restricted.

Source: Kenya visit, September 2012: interviews with Division of Nutrition and local representatives of GAIN, UNICEF, WFP, MI, PSI, and WHO.

As demonstrated by the case of Kenya’s emerging public-private national MNP program (see Box 13), local suppliers can play an important role in generating political acceptance of the intervention. The opportunity to support local industry and drive national ownership across sectors can be particularly appealing for governments considering large-scale implementation of MNPs. In the case of Kenya, partners also noted that a local MNP supplier was pursued given 1) the opportunity to achieve a reduced final product price (tariffs on raw inputs are preferable to those imposed on externally sourced final products) and 2) the potential to explore product innovation. Given the aim of distributing MNPs through both public sector and private sector retail channels, GAIN and other business experts have been working with the local supplier on developing an aspirational, differentiated MNP for the private sector distribution component of the project.²⁷³

In addition to improving political will, local suppliers can also have a positive effect on consumer demand simply by the practical virtue of understanding the local context. Local suppliers – such as Renata in Bangladesh – are careful in designing packaging for MNPs that is appealing to their consumers, in the

²⁷³ Site visit interviews in Kenya, primarily with GAIN; Ira Leeds, “Micronutrient Powders as a Sustainable Solution for Child Malnutrition,” Blue Oceans for Health, updated August 15, 2012, <http://blueoceansforhealth.org/2012/08/15/micronutrient-powders-as-a-sustainable-solution-for-child-malnutrition/>.

local language, and in accordance with national marketing regulations. Furthermore, in some cases, consumers have demonstrated a distinct concern about where MNPs are produced and a sensitivity toward “foreign” products – for example, in India, Bangladesh, and Kenya.²⁷⁴

Finally, local manufacturing and/or packaging of MNPs can also be beneficial from a price perspective. For example, in commercial and social marketing models, a local supplier with its own distribution network can be helpful for decreasing “links in the chain” and driving down consequent markups.

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 of MNPs. The WHO guideline document; the programmatic guidance brief issued by HF-TAG; and the WHO, WFP, and UNICEF joint statement on MNP use in emergency situations differ slightly in terms of recommended MNP formulations and dosing schedules, and there is no readily available communication on how implementers should interpret this guidance jointly (see Section 3.3 for more detail).

Given that countries are using different formulations and dosing schedules and that a variety of administration models continue to be evaluated, implementers are left without a “global standard” to rely on. Many reported finding the MNP dosing/formulation decision confusing and difficult to make. The global nutrition community should therefore urge global normative bodies and partners to develop more clear-cut guidance on MNPs so that countries are provided with a standard interpretation of guidance but also have an understanding of how guidelines can be adapted to each context when undertaking MNP programs. Updates to this guidance should also be regularly communicated should the evidence from emerging studies modify recommendations.

²⁷⁴ Site visit interviews; Eveline Roks, “Feasibility of Segmented Markets: How to Provide Access to Life-Saving and Potential-Developing Micronutrients to All Socio-economic Segments of a Population,” case studies on MixMe in Cox’s Bazar, Bangladesh, and on MixMe in Kakuma, Kenya, World Food Programme, GAIN, and DSM, September 2009, http://hftag.gainhealth.org/sites/hftag.gainhealth.org/files/Segmented_Markets_WFP_DSM_GAIN_2.pdf.

Box 14: Challenges in Bangladesh Resulting from Unclear Guidance on Formulation

In Bangladesh, there is significant confusion across stakeholders about the appropriate MNP formulation (i.e., 5 versus 15 micronutrients) to use in anemia control programs. The local supplier Renata, in partnership with GAIN, developed a 15-micronutrient formulation called Pushtikona, which has been sold via BRAC and through private sector pharmacy chains since 2011. Renata also produces a 5-micronutrient formulation for sale to other domestic organizations such as the Social Marketing Company, UNICEF, and CARE.

In 2012, the national government began undertaking MNP pilot programs for anemia control using a 5-ingredient formulation in accordance with current national policies, with the understanding that the joint statement recommends the 15-ingredient formulation exclusively for emergency situations. The lack of consistency in formulation across programs within the same country and the lack of clarity on the difference between and appropriate usage of these products have left multiple partner organizations unsure of how to approach future implementation. For example, given the current policies, Renata recently sought and gained regulatory approval for a “Pushtikona-5” product; however, the regulatory approval process for this product is time- and resource-intensive and may not be worthwhile if guidance on MNP formulations later changes. As of September 2012, the WHO Bangladesh office indicated it is planning a consultation to evaluate evidence around the different formulations.

Source: Bangladesh visit, September 2012: interviews with MI, BRAC, GAIN, Renata, Ministry of Health and Family Welfare, WHO.

In addition to improving transparency and clarity on MNP administration for implementers, normative bodies and the global community should develop a robust fact base around the status of national implementation of the International Code of Marketing Breast-Milk Substitutes to improve suppliers’ and implementers’ ability to assess MNP market opportunities on a country-by-country basis. Because particularly restrictive regulatory environments can dissuade participation in the infant nutrition space and limit opportunities for socially oriented and commercial models, it is critical that the nutrition community remain informed of these contextual constraints and work wherever possible to minimize them. As discussed in Section 4.3, global nutrition partners (such as UNICEF, GAIN, and MI) can and should work with local policymakers to ensure that national legislation allows for the appropriate marketing of nutritious products for 6- to 23-month-olds, including MNPs.

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 MNP acceptability and health impact, and potentially reduce cost. For example, Sight and Life recently hosted a competition for innovation in MNP packaging, which yielded opportunities for developing biodegradable sachets. The organization is also exploring additional opportunities to add enzymes, proteins, and fats to MNPs (as

accomplished with Ying Yang Bao in China,²⁷⁵ a product introduced by Biomate with support from the CDC and GAIN) to improve micronutrient absorption and potentially address other deficiencies.

Box 15. Sight and Life Packaging Competition

The current foil sachet packaging for MNPs cannot be recycled, repurposed, burned, or composted, generating significant waste when the sachets are used. To address this problem, Sight and Life, in partnership with Scientists without Borders and the Sackler Institute, recently held an innovation challenge to “crowdsource” ideas for more sustainable and low-cost packaging. The challenge was designed as an open competition with a cash prize for the winners selected by an independent expert selection panel.

In February 2013, Sight and Life and partners announced three winners, who will share a \$25,000 prize for their innovative ideas around more environmentally friendly packaging. The winning ideas are publicly available online and the organizers are encouraging any interested stakeholders to adopt and commercialize these ideas. In particular, the solution that received first place – an inner sack made of a biodegradable film with a paper outer sack – was noted as the most viable for implementation.

Source: “Three Winners Selected in \$25,000 Sustainable Packaging for Micronutrient Powders Challenge,” press release, The Sackler Institute for Nutrition Science, February 2013, <http://www.nyas.org/AboutUs/MediaRelations/Detail.aspx?cid=a8cbc82f-5840-4d0a-bc17-d61bde830080>.

The global community should continue to support these partners as they try to improve the MNP product.²⁷⁶ Specifically, this might entail providing soft loans and grants to reduce research and development risk, 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.

²⁷⁵ “Ying Yang Bao,” HF-TAG, <http://hftag.gainhealth.org/products/ying-yang-bao>.

²⁷⁶ It 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.

A way forward: Immediate next steps for the global community

With the above tool kit of recommendations in mind, the global community should begin to work toward improving existing MNP programs and design new ones to effectively scale up the intervention. However, prior to full-fledged implementation in target geographies, the global community should pursue several critical next steps in order to set the stage for scale-up. The global community is urged to consider and engage in the following:

- **Build a robust knowledge base to enable rapid segmentation and precise targeting for social and commercial models**
 - Undertake consumer research across a range of income tiers and geographies via best-practice WTP research (e.g., auction methodologies) and market trials to understand likely markets for commercial and socially oriented approaches
 - Further explore the availability and role of product substitutes (e.g., PediaSure) in middle-income countries and how they may impact MNP demand
 - Undertake more robust consumer research to determine precise “universal selling propositions” for MNPs that can be utilized in marketing to drive WTP
 - Work with pricing and marketing experts from leading business schools, research firms, and potentially CPG companies to develop tools that operationalize market research – for example, credible segmentation models
 - Ensure that all knowledge is codified and shared with the nutrition community via forums like HF-TAG and through partners such as GAIN, MI, and UNICEF
 - Provide opportunities for this community to link with external pricing and marketing experts and individuals with experience with analogous products

- **In parallel to the ongoing research specified above, prepare for national-level MNP scale-up**
 - Further investigate existing and emerging programs to determine how complementary distribution programs should be introduced and sequenced
 - Begin development of country-level scale-up plans once there is emerging certainty on increased MNP funding flows
 - Establish national MNP product standards to facilitate product registration and development
 - Review national-level barriers to MNP scale-up related to trade constraints and tariffs on MNPs and their inputs; determine feasibility of and strategies for addressing these in target geographies
 - Provide technical assistance to countries for MNP scale-up as necessary, including, for example, on national strategic planning; policy and regulatory support; healthcare training support; and procurement and distribution
 - Test hybrid models described in the above recommendations in existing programs’ sites

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Appendix B: Interview List

Global stakeholders and other experts

Name	Organization
Blair Hanewall	Bill & Melinda Gates Foundation
Ellen Piwoz	Bill & Melinda Gates Foundation
Joel Segre	Bill & Melinda Gates Foundation
Shelly Sundberg	Bill & Melinda Gates Foundation
Senoe Torgerson	Bill & Melinda Gates Foundation
Maria Elena Jefferds	CDC
Cria Perrine	CDC
Amita Chebbi	CHAI
Megumi Gordon	CHAI
Ateen Paliwal	CHAI
Kate Schroder	CHAI
Christina Foley	CIDA
Nadia Hamel	CIDA
Erin McLean	CIDA
Phedra Moon Morris	CIDA
Tobias Nussbaum	CIDA
Jorge Casimiro	(formerly) The Coca-Cola Company
Simon Berry	ColaLife
Rohit Ramchandani	ColaLife
James Droop	DFID
Anna Taylor	DFID
Dominic Schofield	GAIN
Thomas Feeny	HANSHEP
Nava Ashraf	Harvard Business School
Jessica Cohen	Harvard School of Public Health
Elizabeth Zehner	Hellen Keller International
Linda Meyers	Institute of Medicine
Erick Boy	International Food Policy Research Institute

Name	Organization
Janet Voûte	Nestlé
Christine Johnson	New York City Health Department
Abel Irena	PSI
David Walker	PSI
Kalpana Beesabathuni	Sight and Life
Klaus Kraemer	Sight and Life
Pascaline Dupas	Stanford University
Will Masters	Tufts University
David Clark	UNICEF
Jan Komrska	UNICEF
Ruth Situma	UNICEF
Arnold Timmer	UNICEF
David Nabarro	United Nations Food Security and Nutrition
Mary Arimond	University of California Davis
Stephen Vosti	University of California Davis
Prashant Yadav	University of Michigan
Joris Van Hees	WFP
Juan Pablo Peña-Rosas	WHO
Ziauddin Hyder	World Bank
Meera Shekar	World Bank

In-country stakeholders

Name	Organization
Teweldebrhan Hailu Abrha	Alive and Thrive, Ethiopia
Joseph Samuel	Arogya Parivar, India
Kaosar Afsana	BRAC
Riasul Haque	BRAC
Garth Smith	Business Innovation Facility
Mohammed Shariff	Directorate General of Family Planning, Bangladesh
Andrew Pillar	DKT, Ethiopia
Basanta Kar	GAIN, Bangladesh
Alem Abay	GAIN, Ethiopia
CJ Jones	GAIN, Kenya
Daisy Mundia	GAIN, Kenya
Stefan Engels	GAIN, South Africa
Kevin Peddie	GAIN, South Africa
Rajan Sankar	GAIN, South Asia
Engidu Legasse	Guts Agro Industry, Ethiopia
Purnima Menon	International Food Policy Research Institute, India
Neel Shah	Kentons Ltd., Kenya
Vishaal Shah	Kentons Ltd., Kenya
Abdulaziz Adish	MI, Africa region
John McCormack	MI, Africa region
Md Ataur Rahman	MI, Bangladesh
Zeba Mahmud	MI, Bangladesh
Cecilia De la Vega Baradi	MI, Bolivia
Marcelo Loayza	MI, Bolivia
Henock Gezahegn	MI, Ethiopia
Azeb Lelisa	MI, Ethiopia
Suvabrata Dey	MI, India
Mathew Joseph	MI, India
Chris Wanyoike	MI, Kenya
Macha Raja Maharjan	MI, Nepal

Name	Organization
Deepika Chaudhery	MI, South Asia
Melanie Galvin	MI, South Asia
Lucy Alcon	Ministry of Health, Bolivia
Susana Sanjines	Ministry of Health, Bolivia
Mary Quintanilla	Ministry of Health, Bolivia
Teshome Desta	Ministry of Health, Ethiopia
Evelyn Kikechi	Nutrition Division, Kenya
Terry Wefwafwa	Nutrition Division, Kenya
Shibani Gosain	Project Dharma, India
Wondwosen Keremenz	PSI, Ethiopia
Amit Bhanot	PSI, India
Sanjeev Dham	PSI, India
Rachel Mutuku	PSI, Kenya
Isaac Onyonyi	PSI, Kenya
Toslim Uddin Khan	SMC, Bangladesh
Ashfaq Rahman	SMC, Bangladesh
Mahbubur Rahman	SMC, Bangladesh
Alie Eleveld	SWAP, Kenya
Noreen Prendiville	UNICEF, Bangladesh
Wigdan Madani	UNICEF, Ethiopia
Jee Hrah	UNICEF, India
Grainne Moloney	UNICEF, Kenya
Ruth Situma	UNICEF, Kenya
Chantell Witten	UNICEF, South Africa
Siti Halati	WFP, Kenya
Farzana Bilkes	WHO, Bangladesh
T. Karki	WHO, Bangladesh
Francisco Katayama	WHO, Bangladesh
Assumpta Muriithi	WHO, Kenya

MNP Suppliers

Name	Organization
Shailendra Bobhate	Abbott
Pushpak Khare	Abbott
Vaibhav Kulkarni	Abbott
Vivek Mohan	Abbott
Kishore Shintre	Abbott
Georg Steiger	DSM
Rajiv Chopra	DSM, India
Pankaj Nemade	DSM, India
Advait Pandit	DSM, India
Peter Wathigo	DSM, Kenya
Cecilia Iturribarria	DSM, Latin America
Thabang Matlhafuna	DSM, South Africa
Ronnie Pankhurst	DSM, South Africa
Heidi-Lee Robertson	DSM, South Africa
Michael Yeomans	Heinz
Vikram Kelkar	Hexagon
Gonzalo Muñoz-Reyes	INTI
Juan Jose Quispe	INTI
Mercedes Roca	INTI
Jaime Ocampo	LAFAR
Monica Zeballos	LAFAR
Shirley Joscelyne	Nycomed
Refilwe Kgare	Nycomed
Thabo van Straten	Nycomed
Jeevan Karnik	Piramal
Neeraj Katare	Piramal
Dhawal Kulkarni	Piramal
TV Rao	Piramal
Shantiran Ray	Piramal
Monowarul Islam	Renata
Sree Kartha	Renata
Khalil Musaddeq	Renata
Sergio Pol	SIGMA
Eduardo Torres	SIGMA

Project Partners

Name	Organization
Chris Dendys	MI
Emma Dunkley	MI
Mark Fryars	MI
Noor Khan	MI
Ali MacLean	MI
Venkatesh Mannar	MI
Lynnette Neufeld	MI
Marion Roche	MI

Appendix C: Case Studies

Chispitas MNP Program and Commercial Sales in Bolivia

<p>Background</p>	<ul style="list-style-type: none"> • What: Free distribution of Chispitas via the public sector and emerging sales through commercial channels • Who: MoH, local MNP packagers (INTI, LAFAR, SIGMA), and support of MI country team • How: MoH distributes MNPs, purchased from local packagers, for free nationwide through public sector health facilities, child health days, and frontline health workers (targeted at children 6-23 months); meanwhile one local packager – INTI – sells Chispitas through its network of pharmacies • When: 2006-present for public sector program; 2011-present for commercial
<p>Affordability</p>	<ul style="list-style-type: none"> • In public sector, Bolivia’s universal maternal and infant health insurance fully covers the recommended course of MNPs • Chispitas sold in private pharmacies are available for USD \$3.60/course (or \$0.06/sachet)
<p>Availability</p>	<ul style="list-style-type: none"> • In 2011, national coverage of Chispitas in the public sector program among children 6-23 months was 59% • INTI sells ~20% of its annual volumes to private pharmacies (~2M sachets per year); no data available on consumer uptake, however • These pharmacies are predominantly located in urban areas and no prescription is required to purchase Chispitas
<p>Awareness</p>	<ul style="list-style-type: none"> • Education on Chispitas is most commonly provided to caregivers by health practitioners during a child’s medical check-up; there are also awareness-raising components to Chispitas distribution during child health days and household visits by frontline workers • Public sector program aims to change its anemia-focused messaging to an approach that emphasizes the physical and cognitive benefits of Chispitas; planning to pilot a significant communications campaign in 2013 • INTI is not currently undertaking demand generation for commercial sales
<p>Acceptability</p>	<ul style="list-style-type: none"> • Generally high acceptability of Chispitas • Public and private sector product have identical presentation, but consumer perception of this has not yet been studied

Key Learnings:

Although bearing further investigation and ongoing monitoring, Bolivia is emerging as a key example of the potential of complementary distribution models for MNPs. Here the MoH has been able to effectively target the poor, while INTI has offered consumers with higher incomes – who also experience high rates of anemia and who are not likely to seek care in the public sector health system – the opportunity to be reached through private sector channels.

Additionally, Bolivia’s public sector program demonstrates a number of key best practices and success factors. The rapid scale and increasing coverage achieved by the program is attributable in part to 1) strong commitment from the Bolivian government to this intervention and nutrition as a whole, which was bolstered by support from key nutrition partners (MI, PAHO, UNICEF, etc.), 2) smooth integration of the program with existing services, such as Bolivia’s IYCF strategy and the universal maternal infant health insurance, and 3) willingness and concerted effort to improve the program.

MixMe MNP Program in Cox’s Bazar Refugee Camp, Bangladesh

Background	<ul style="list-style-type: none"> • What: Distribution of MNPs in the Cox’s Bazar Refugee Camp, Bangladesh • Who: Led by UNHCR and WFP, with support from implementing partners (e.g., Action Contre le Faim) • How: “MixMe” MNPs, manufactured by DSM, were distributed for free along with general food rations and provided at maternal and child health clinics in the camp (offered to pregnant and lactating women, adolescent girls, and children aged 6 months to 5 years) • When: Since 2008*
Affordability	<ul style="list-style-type: none"> • N/A – the MixMe product was distributed for free
Availability	<ul style="list-style-type: none"> • Refugees were given sachets with general food rations or MixMe was pre-mixed into porridge offered at clinics during additional feeding times
Awareness	<ul style="list-style-type: none"> • Lack of intensive communication about the product when introduced led to negative reactions and misconceptions (e.g., MixMe was thought to be a contraceptive by some) • Adolescent girls were the most difficult to engage • Product information was not appropriate for an illiterate audience
Acceptability	<ul style="list-style-type: none"> • Relatively high consumption of the product was reported initially • However, product packaging and information was not well-received – there were negative comments on the resemblance to contraceptives, the logo used; the lack of local language and of pictorial instructions, and non-disclosure of the manufacturing country • Furthermore, without appropriate communication on side effects to expect, refugees claimed MixMe caused diarrhea and vomiting

*Note: this case study offers reflections on the first year of MNP distribution in Cox’s Bazar and is not indicative of present conditions as programming has since been modified; however, there is limited information publicly available on more recent efforts.

Key Learnings:

Insufficient awareness-raising efforts and lack of appropriate and discernible information on the product itself caused refugees to form misconceptions and negative opinions about MixMe. Because the product had not been pre-tested in this community prior to distribution, there were limited opportunities to prevent and address the issues identified.

The experience of MixMe in Cox’s Bazar, similar to the MixMe experience in Kakuma Refugee Camp, Kenya, highlights the importance of careful program design and of strategic communications efforts to raise awareness about the product, its purpose, and its benefits. Given that the adolescent group proved most difficult to reach, this example also demonstrates a potential need for differentiated awareness-building efforts to target specific audiences within wide age groups.

MixMe MNP Program in the Kakuma Refugee Camp, Kenya

Background	<ul style="list-style-type: none"> • What: Distribution of MNPs in the Kakuma Refugee Camp, Kenya • Who: Led through a partnership between WFP and DSM, with support from implementing partners (e.g., UNHCR) • How: “MixMe” MNPs were distributed for free along with general food rations in the Kakuma refugee camp (offered for all children in the refugee camp) • When: February 2009 to June 2010
Affordability	<ul style="list-style-type: none"> • N/A – the MixMe product was distributed for free
Availability	<ul style="list-style-type: none"> • The product was distributed along with food rations by specific members of the camp called “scoopers”
Awareness	<ul style="list-style-type: none"> • Social marketing efforts lacked coverage and intensity, causing misconceptions around the uses and benefits of the MixMe product • The scoopers were not adequately trained to answer questions about the MixMe product
Acceptability	<ul style="list-style-type: none"> • Lack of detail and background provided before distribution of the product created confusion and distrust among the camp’s communities. Moreover, the MixMe product did not include usage instructions. • Each community expressed distaste for the MixMe logo and packaging, which resembled condoms and other family planning products

Key Learnings:

Insufficient social marketing efforts and lack of product information caused refugees to form misperceptions of MixMe. As a result, the rate of MNP uptake (actual collection of MNPs) in the Kakuma Refugee Camp declined at a monthly rate of 10%, from 99% uptake in February 2009 to 30% in July 2009. This program experience reinforced the importance of careful program design and planning, notably including testing packaging design and proper messaging for effective distribution and use of MNPs.

Pushtikona MNPs in Bangladesh: Microfranchising and Commercial Sales

Background	<ul style="list-style-type: none"> • What: Distribution of MNPs under brand name Pushtikona in Bangladesh, through microfranchising and private sector channels • Who: Manufactured by Renata and distributed by BRAC, with support from GAIN • How: BRAC’s door-to-door sales ladies known as <i>shasthya shebikas</i> sell Pushtikona MNPs targeted at low-income rural consumers, while Renata sells via private sector pharmacy channels • When: 2010-present
Affordability	<ul style="list-style-type: none"> • MNPs are sold at \$0.03 USD per sachet (via both channels) by leveraging a subsidy from GAIN • BRAC reports affordability constraints around consumer cash flows: “Poorer families tend to buy 1 or 2 sachets at a time, while families with more cash at their disposal tend to buy boxes”
Availability	<ul style="list-style-type: none"> • The <i>shasthya shebikas</i> reach the majority of Bangladesh’s ~80,000 villages providing access to low-income rural customers

	<ul style="list-style-type: none"> • Urban customers can purchase Pushtikona from pharmacies
Awareness	<ul style="list-style-type: none"> • <i>Shasthya shebikas</i> have reported low awareness of anemia among communities and have found it difficult to encourage caregivers to maintain the frequency and duration of recommended MNP dosing
Acceptability	<ul style="list-style-type: none"> • Pushtikona has a customized packaging design, which uses the local language and images • While generally well-accepted, some mothers report problems convincing children to accept Pushtikona mixed into their foods

Key Learnings:

Pushtikona’s hybrid distribution model has been successful in reaching various consumer groups in Bangladesh through well-developed microfranchising (BRAC *shasthya shebikas*) and retail locations (pharmacies). Although successful, the sale of Pushtikona MNPs still requires significant upfront investments in marketing and education to generate demand. These types of investments have created challenges for BRAC to reach full-scale across geographies and ensure its *shasthya shebikas* are well-incentivized to sell low-margin MNPs. Additionally, BRAC and partners are still working to ensure that cash-constrained families who purchase single sachets are providing their infants with a full course of MNPs to achieve the maximum benefit.

SWAP Microfranchising MNP Program in Nyanza, Kenya

Background	<ul style="list-style-type: none"> • What: Monitoring the marketing, distribution, and use of Sprinkles in rural western Kenya • Who: Led by the Safe Water and AIDS Project (SWAP) and CDC, with support from GAIN • How: Sprinkles sold at a subsidized price using microfranchising approach targeting low-income population (majority of the population consists of subsistence farmers) • When: May 2007 to June 2008
Affordability	<ul style="list-style-type: none"> • Wholesale (~1.3 cents) and retail (~2.7 cents) prices were deemed affordable by consumers • Free sachets and promotional offers provided as demand-generation incentives for vendors and consumers
Availability	<ul style="list-style-type: none"> • Wholesale Sprinkles were sold through SWAP field offices, but were difficult to access for vendors living more than 4 km away. Vendors living < 4 km from office sold 7x more sachets than vendors living 8-12 km from offices • ‘Buy one, get one free’ promotions drove up retail sales of Sprinkles dramatically, but this led to market saturation and supply stockouts
Awareness	<ul style="list-style-type: none"> • During a follow-up survey, almost all mothers (98%) reported being aware of Sprinkles and their benefits • A special mobilization event with free promotional materials took place in each village to introduce vendor groups and Sprinkles to community members
Acceptability	<ul style="list-style-type: none"> • In a follow-up survey, most families reported that the children ate food with Sprinkles without any discontent • Despite high acceptability for Sprinkles, utilization among most children was low. Only 35% of mothers reported their child had used Sprinkles in the past 24 hours

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| | <ul style="list-style-type: none">• Consumer incentives, such as free sachet giveaways and promotional offers, affected confidence in Sprinkles among regular users of Sprinkles |
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Key Learnings:

Community-based social marketing activities and peer-to-peer communication among vendors and families proved to be an effective way to distribute Sprinkles in Kenya. Frequent follow-up visits to households and interpersonal promotion by formally-trained vendors were essential in stimulating demand and awareness for Sprinkles throughout the community.

However, careful monitoring over the course of the program was critical to maintain high demand for Sprinkles and improve promotional strategies. Ongoing assessment of the intervention allowed field officers to effectively market the product to populations in greatest need and evaluate ongoing program challenges and successes.

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