HF-TAG Home Fortification Technical Advisory Group

Technical Brief on the Use of Home Fortification with Micronutrient Powders Containing Iron in Malaria Endemic Regions

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Home Fortification Technical Advisory Group (HF-TAG)

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Introduction

This technical brief provides practical guidance on application of the new (2016) "*WHO Guideline: Use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years"* on home fortification interventions with iron in malaria endemic regions.

The WHO guideline emphasizes that in settings where anemia is a public health problem, every effort should be made to ensure that children 6 months to 12 years of age in malaria-endemic areas receive iron, as these children are at risk of significant morbidity, including malnutrition. Due to the potential adverse effects of iron intake among children affected by malaria, considerations should be made when implementing home (or 'point of use') fortification interventions among children in malaria endemic regions. For this reason, the WHO recommends that point-of-use fortification with iron should be implemented in conjunction with measures to prevent, diagnose, and treat malaria.

Who Should Use This Technical Brief

The brief is for use by country nutrition program specialists planning to implement (or already implementing) a micronutrient powder (MNP)[2] intervention[3,4] in areas where malaria is endemic. For programs in the planning phase, the brief can help guide the decision as to whether the MNP program can be safely implemented and where it should be implemented. For programs already distributing MNP, it can help the program manager create stronger linkages with malaria programs and make decisions, such as if and where to scale up the MNP program.

> ***"In malaria-endemic areas, the provision of iron in any form, including micronutrient powders for point-of-use fortification, should be implemented in conjunction with measures to prevent, diagnose, and treat malaria. Provision of iron through these interventions should not be made to children who do not have access to malaria-prevention strategies (e.g. provision of insecticide-treated bed nets or other vector-control measures), prompt diagnosis of malaria illness, and treatment with effective antimalarial drug therapy."***[1]

How to Use this Technical Brief

Guidance in this brief is broken down into four main stages. After working through stages 1-4 it will be possible to make a decision as to whether or not to proceed with implementing or expanding the MNP program. If the technical advisory group in charge of making the decision decides to continue, then information related to malaria and iron will need to be incorporated into the following: (i) the MNP training for health workers and any other frontline workers dealing directly with program recipients; (ii) materials and behavior change communication targeted to program beneficiaries; and (iii) relevant indicators (including malaria indicators) that will need to be incorporated into the program monitoring system. The remainder of this document will describe each of these stages in detail.

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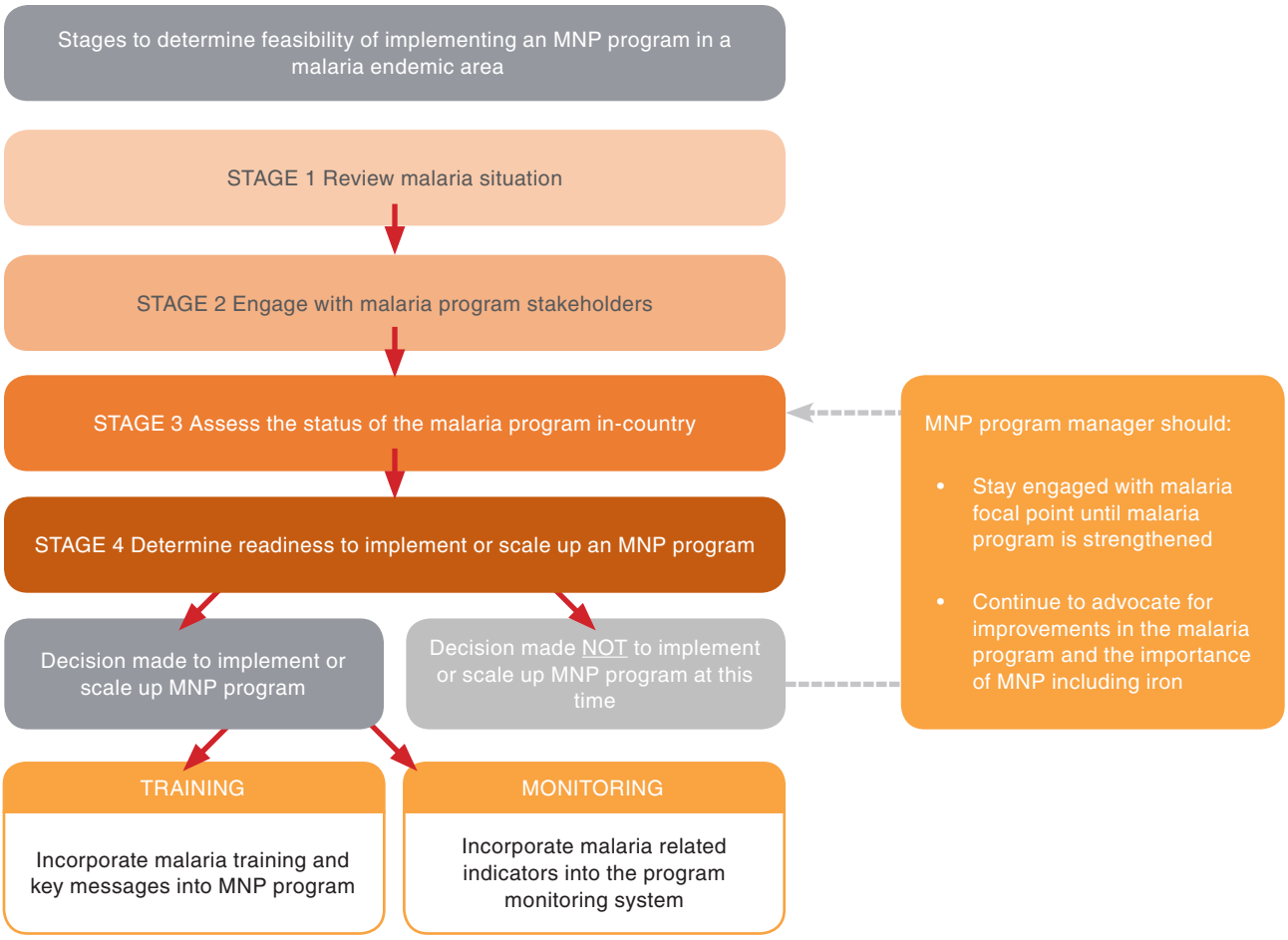
1 WHO Guideline: Use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years. November 2016

2 Other fortified products intended for infants and young children may contain iron such as iron-fortified infant cereals and small-quantity lipid-based nutrient supplements (SQ-LNS). Although there would be similar concerns with using such products in a malaria endemic region among children, this technical brief focusses on MNP for which the WHO Guideline has identified specific considerations and recommendations.

3 This brief is for use in non-emergency settings. While many of the same principles apply in emergency contexts, additional considerations may apply depending on the nature of the emergency and the functioning of the malaria control program.

4 The malaria situation of a country should not influence legislation and/or regulatory classification (food versus pharmaceutical) of MNP. In terms of program delivery, the stages and decision-making recommendations made in this technical brief apply to both public health and market-based distribution models for MNP.



STAGE 1: Conduct an initial review of the malaria situation

The nutrition program manager, or whomever will predominately be working on the MNP program design, should conduct an initial review of the malaria situation in the country.

An initial review of national and, if available, regional or state level policies on malaria prevention and control should be completed. Based on these policies, the manager can determine the types of interventions being implemented for prevention, diagnosis, and treatment of malaria at the national level and in malaria-endemic regions, especially the specific areas identified for implementation of the MNP program.

The main pillars of malaria control programs (as recommended by WHO) generally include:

- **Prevention**
  - » **Vector control,** including the use of **insecticide treated nets (ITN)** or **long lasting insecticide nets (LLIN) and/or indoor residual spraying (IRS).**
  - » **Seasonal malaria chemoprevention (SMC)**[5] is implemented in the sub-Sahel region of Africa where there is highly seasonal transmission, and involves monthly administration of antimalarial (amodiaquine-sulfadoxine-pyrimethamine) to children during the peak transmission season.
  - » **Intermittent preventive treatment in infancy (IPTi)** is recommended by WHO for areas of Africa

5 http://www.who.int/malaria/areas/preventive_therapies/children/en/

with moderate-to-high transmission where sulfadoxine-pyrimethamine (SP) remains effective, and involves administration of SP to infants (<12 months of age) at the time of the second and third rounds of DTP vaccination and measles vaccination.

  - » **Intermittent preventive treatment in pregnancy (IPTp)** which involves the administration of Sulfadoxine-Pyrimethamine (SP) to pregnant women at each scheduled antenatal care visit starting in 2nd trimester.

- **Diagnosis and Treatment or Case Management**, including diagnostic testing, treatment of uncomplicated and severe malaria (including an effective artemisinin-based combination therapy, **ACT**), and management of malaria at primary health care and community levels
- **Malaria Surveillance Systems**, including health facility reporting

Additionally, new preventative interventions under evaluation may also be appropriate to consider in the future. For example, the Mosquirix™ malaria vaccine (RTS,S/AS01) which will be piloted at large scale in Ghana, Malawi, and Kenya, may be more widely implemented in the future.

All countries with ongoing malaria transmission are included in the World Malaria Report (WMR), published annually by the WHO.[6] The report includes data for 12 globally relevant outcome and impact indicators, against which progress in malaria control and elimination should be monitored. By reviewing the data for these indicators one can ascertain the status and progress of malaria control in the country.

In addition, one-page country profiles for all malaria-endemic countries[7], containing key data about the country's malaria burden, a summary of the main malaria interventions used, and information about the adoption of WHO-recommended policies can be downloaded from the WMR website. A presentation entitled *"Interpretation of the World Malaria Report Country Profile"*, which includes a country profile for Malawi that has been annotated with guidance notes and explanations for key information as an example, is available at www.hftag.org.

Together, information from the WMR and the country profile provide an *initial snapshot* of the malaria situation in a particular country.

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6 http://www.who.int/malaria/publications/world_malaria_report/en/

7 http://www.who.int/malaria/publications/country-profiles/en/

STAGE 2: Identify and Engage with Malaria Program Stakeholders

Coordinating the MNP intervention with the malaria program is essential to ensure that the MNP program is co-located in the same geographical area(s) as the malaria control program. Children receiving MNP should have access to malaria prevention strategies, prompt diagnosis of malaria illness, and treatment with effective antimalarial drug therapy.

To ensure effective coordination and engagement, nutrition and malaria program managers must identify and engage with the nutrition and malaria stakeholders in the country, both at the national and sub-national levels. Before moving forward to stage 3, a focal person working in the malaria program should be actively engaged with the MNP technical advisory group[8] to help gather malaria program information, interpret that information and assist with the decision making process.

WHO TO ENGAGE	• Identify who is involved in implementing malaria programs (both within the government and other stakeholders) • Determine who might be an influential malaria focal person in the government and/or key organizations supporting the implementation of the malaria program(s) and nominate this person to join the MNP technical advisory group • The malaria focal point should have a role within the malaria program which would enable him/her to advise the MNP technical advisory group in a manner such that they have the authority to effectively coordinate with decision makers from the malaria control team, e.g. Head of the National Malaria Control Program
HOW TO ENGAGE	• The malaria focal person will help to do the following in order to facilitate decision-making: • Use key messages about anemia, iron and malaria **(Annex 1)** to explain the rationale for support and collaboration between the malaria program and the MNP intervention • Ensure active engagement of malaria stakeholders in the annual program review of the MNP program. Engagement of the malaria focal person should involve: sharing updates on malaria program indicators; and updates on the National Malaria Control Program activities relevant to the MNP program • Integrate information on prevention, diagnosis, and treatment of malaria into the training modules for health staff working on MNP programs

STAGE 3: Assess the status of the malaria program in-country

Stage 3 involves a more detailed review of the documentation initially collected in stage 1, as well as additional data review, in order to determine if malaria is a problem in the areas under consideration for the MNP program. This more detailed assessment includes a review of the status of the malaria program in the country, including the policies to support access to malaria prevention, diagnosis, and treatment, as well as their degree of implementation.[9] To the extent possible, the assessment should be a collaborative effort between the malaria focal person and the nutrition program manager.

The checklist in **Annex 2** assists with the collection of additional information to provide a more detailed

8 MNP technical advisory groups, often government led, are generally comprised of country-level leaders and committees that lead planning, implementation, coordination and advocacy efforts in support of implementing MNP programs.

9 For basic information about malaria control strategies and documentation, please refer to the following: Country Malaria Strategic Plan WHO World Malaria Report (http://www.who.int/malaria/publications/world-malaria-report-2016/report/en/) U.S. President's Malaria Initiative Malaria Operational Plan

assessment of the malaria program in-country, ideally focusing specifically on the area of the country where the MNP program will be implemented. To account for any in-country variances, the level of data disaggregation for assessments should begin at the national level and then proceed to the lowest decision-making level in the area where the MNP intervention will be implemented. For example, for decentralized health systems, an assessment will focus on the national level, as well as the state/province level and district level, where appropriate.

STAGE 4: Determine readiness to implement or scale up an MNP program

The purpose of stage 4 is to provide nutrition managers with a framework to assess readiness to implement or scale up an MNP program. The framework helps managers think through the steps in the decision making process. The framework is not intended to provide a concrete pathway that will apply in every context, but hopefully through careful consideration of the preceding stages (stage 1, initial assessment; stage 2, engaging stakeholders; and stage 3, detailed assessment of the malaria context), it will be possible to make a decision based on all available information.

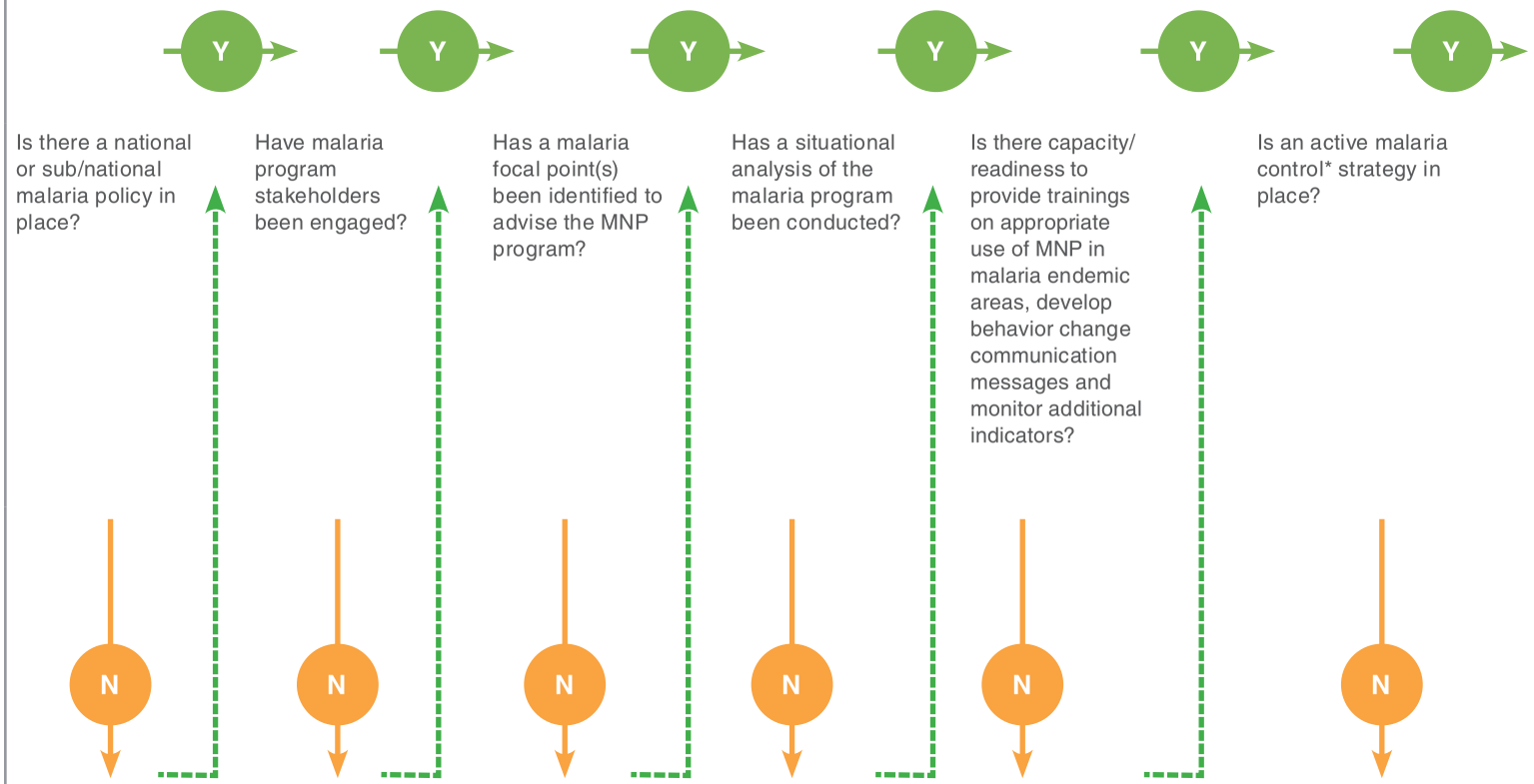
One of the most complex elements of this decision pathway is defining an “active” malaria program. Although there are indicators for determining the functioning of a malaria program, there are no internationally defined benchmarks by which to decide if a program is operating ”adequately”. There are cases where a program may be operating well in some parts of the country and not in others, or where not all elements of malaria control programming (prevention, diagnosis and treatment, and surveillance) are functioning equally well.

For the purposes of this document we are defining an “active” program as one where all elements of malaria control are being implemented (acknowledging that often prevention and treatment are prioritized over parasitological diagnosis). The program should be considered stable or improving by malaria program stakeholders and there should not be any anticipated challenges that would have a substantial negative impact on the program’s implementation in the foreseeable future, such as significant funding gaps or substantial reductions in funding. However, funding fluctuations are expected from time-to-time due to the cyclical nature of some interventions, such as bed net mass distribution campaigns.

After following the decision pathway, the nutrition program manager and MNP technical advisory team (including the malaria focal point), will need to make a decision in conjunction with the Ministry of Health or appropriate authority, as to whether to proceed with the MNP program or scale up. The decision to move forward will be based on the best judgement of the technical advisory group, taking into account all available information. If the conditions are determined not to be appropriate for the imminent implementation or scale up, then the nutrition program manager should maintain contact with the malaria focal person to discuss ways to strengthen the malaria program in the location of interest for the MNP program. In the future, a new situational analysis can determine if conditions have improved sufficiently for implementation of the MNP program.

If the decision is made to implement the MNP intervention, MNP program planning (or strengthening of an existing program) should include a review of the current training of public health nutrition workers, and assessment of additional training needed to implement the MNP program. The aim should be to align the training and monitoring components of the MNP program with the malaria program. The HF-TAG’s *Planning For Program Implementation of Home Fortification With Micronutrient Powders (MNP): A Step-By-Step Manual*, provides detailed guidance on the planning and implementation of MNP programs, while the decision pathway below further describes some considerations for the training and monitoring components.

DECISION PATHWAY FOR MICRONUTRIENT POWDERS (MNP) PROGRAMMING IN MALARIA ENDEMIC AREAS



*Malaria control comprises of prevention, diagnosis, and treatment

MNP program planning should continue in malaria endemic sites.

Planning stage should involve:

- Planning trainings for relevent health care workers, to include information on iron in malaria endemic settings
- Preparing training and program materials, to include messages on malaria
- Developing a monitoring plan to track key indicators related to malaria

Training and key messages on malaria for health care workers

Once a decision has been made to implement/scale up an MNP program in-country, in addition to MNP training, it is critical that the training of health care workers implementing the MNP program include the following specific malaria information:

- What malaria is and how it is transmitted
- How malaria is prevented, diagnosed, and treated
- What malaria control strategies are implemented in-country (context specific)
- Why malaria control is important when implementing an MNP program
- Two key messages on malaria and MNP for health workers to communicate to MNP program beneficiaries:
  - » All children, including those receiving MNP, should sleep under an ITN.[10,11]
  - » Children with a fever should be tested for malaria, and, if tested positive, treated with the first line of therapy (context specific). If testing is not available and the child has a fever with no signs of other childhood conditions like pneumonia or gastroenteritis, the child should also be treated with first line of therapy (context specific).[12]

A presentation entitled "*Key messages for developing training materials for health workers implementing Micronutrient Powders (MNP) in malaria endemic areas*" is available at www.hftag.org.

Behavior change communication (BCC) materials for use with MNP program recipients should also include the following information:

- Signs and symptoms of malaria and how malaria is transmitted
- Importance of using a bed net
- How to use bed nets properly
- When to seek health care
- Where to go or whom to seek help from (i.e. community health workers or health facilities) for malaria testing and treatment
- The appropriate treatment for malaria

Program monitoring

The MNP program manager needs to monitor malaria indicators in conjunction with the implementation of the MNP program. On an annual basis, HMIS data and any other new surveys with malaria data should be reviewed and discussed with malaria stakeholders and the malaria focal person—this can be facilitated by

10 Achieving universal coverage with long-lasting insecticidal nets in malaria control. World Malaria Programme , 2014. http://www.who.int/malaria/publications/atoz/who_recommendation_coverage_llin/en/

11 Caring for the child's healthy growth and development. Contents: Family Counselling Cards -- Participant Manual – Facilitator Guide http://apps.who.int/iris/bitstream/10665/204356/2/9789241504997_CounsellingCards_eng.pdf

12 Pocket book of hospital care for children: guidelines for the management of common childhood illnesses – 2nd ed. WHO, 2013 http://apps.who.int/iris/bitstream/10665/81170/1/9789241548373_eng.pdf

reaching out to the national statistics office or those who manage the HMIS. In the absence of recent national surveys on intervention coverage, the World Malaria Report contains modeled data on ITN access. Annually, the MNP program manager in coordination with the malaria focal person and stakeholders, should review indicators for:

- Coverage of ITN/ IRS
- Availability of ACTs[13] and RDTs/microscopy
- Continued funding for malaria control programming
- Any other context specific malaria-related indicator (for example, coverage of Seasonal Malaria Chemoprophylaxis)

Year to year fluctuations in the usual implementation of the malaria program are expected; however, these should not limit the implementation of the MNP program unless there are signs that the malaria situation has significantly worsened or changed in the location of the MNP program. A change in the malaria context and malaria program may be unrelated to the MNP program, but would warrant a review of the malaria situation and program, if applicable. Examples include a serious disruption to the malaria program related to funding shortfalls that affect usual program implementation or the occurrence of an emergency/crisis situation. Any concerns about the operational status of the malaria program identified by the MNP program manager and the malaria focal person(s) should be raised with other relevant malaria program stakeholders to better understand the situation. Additionally, together with the malaria focal point, assess if and when the concern is expected to be resolved, and inform any subsequent decision about the MNP program to the MNP technical advisory group.

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13 WHO recommends that all cases of suspected malaria have a parasitological diagnosis (microscopy or rapid diagnostic test (RDT) to confirm diagnosis). WHO recommends treatment of uncomplicated P. falciparum (with the exception of pregnant women in 1st trimester) with one of the following ACTs: artemether-lumefantrine (AL or LA), artesunate-amodiaquine (AS-AQ), artesunate-mefloquine (AS-MQ), dihydroartemisinin-piperaquine (DP), or artesunate-sulfadoxine-pyrimethamine (AS-SP). In a few countries outside sub-Saharan Africa where chloroquine sensitive P. falciparum exists (i.e. Haiti), chloroquine (CQ) may be used. Chloroquine or ACTs are appropriate for treatment of chloroquine- susceptible P. vivax, P. ovale, P. malariae, and P. knowlesi. In areas with chloroquine resistance, ACTs should be used for treatment.

ANNEX 1:

Key Messages related to the Co-Location of MNP and Malaria Control Interventions

Country program managers can use the following key messages to explain the need for support and collaboration with the malaria program on the MNP intervention. Contextualizing these messages with local data should result in the messages having greater influence on the audience.

- Childhood anemia is a major public health problem in malaria endemic regions[14]
    - ◊ Causes of anemia are often multi-factorial—malaria and iron deficiency are both major contributing factors to anemia in many regions[15]
- Children whose diets do not provide enough iron risk the development of iron-deficiency anemia[16]
- Iron deficiency anemia increases the risk of mortality, morbidity, and adversely affects cognitive development[17]
- In areas where anemia is a public health problem (>20% among young children), the WHO recommends that children who live in malaria-endemic settings should receive adequate iron and that the provision of iron-containing micronutrient powders (MNP) should be done in conjunction with public health measures to prevent, diagnose, and treat malaria[18]
- Providing iron treatment to children does not increase the prevalence or clinical risk of malaria when regular malaria prevention or management services are provided[19]
- Malaria prevention and treatment and iron supplementation are each associated with reductions in anemia rates; coordination of efforts can synergistically reduce both the rates of clinical malaria and anemia among children[20]

14 World Health Organization. Worldwide Prevalence of Anaemia Report 1993-2005. WHO global database on anaemia. Geneva, World Health Organization. (http://whqlibdoc.who.int/publications/2008/9789241596657_eng.pdf), accessed March 14, 2018

15 WHO Guideline: Use of multiple micronutrient powders for point-of-use fortification of foods consumed by infants and young children aged 6–23 months and children aged 2–12 years. November 2016

16 Ibid.

17 Ibid.

18 Ibid.

19 Neuberger A, Okebe J, Yahav D, Paul M. Oral iron supplements for children in malaria-endemic areas. Cochrane Database of Systematic Reviews 2016, Issue 2. Art. No.: CD006589. DOI: 10.1002/14651858.CD006589.pub4 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4916933/), accessed 11 July 2017

20 Ibid.

ANNEX 2: Checklist to assess the malaria context[21]

The purpose of this form is to guide the collection of relevant information by the nutrition program manager and the malaria focal point on the malaria program in the country (or part of the country) where the MNP program may be co-located. It can be modified to meet the specific country context. This information will help stakeholders evaluate the status of the malaria program. Use the most recent data available to complete this checklist.

Name of country: _____

Areas of country under consideration for an MNP program: _____

Proportion of cases due to each parasite species: _____

Using the most recently available data (DHS, MIS, HMIS), document the following indicators, if possible, down to the state/ district level in areas where implementation of the MNP program is being considered:

	INDICATOR	INDICATOR COVERAGE/ PREVALENCE	YEAR	SOURCE OF DATA
MAGNITUDE OF THE PROBLEM	Parasite prevalence in the districts of interest (National survey data, MIS or DHS)			
CASE MANAGEMENT	Confirmed malaria cases per 1000 population			
	Proportion of suspected cases tested			
	Proportion of patients with confirmed malaria who received 1st-line antimalarial treatment			
VECTOR CONTROL	ITN access (household ownership of an ITN)			
	ITN use among children (reported sleeping under an ITN the night before the survey)			

1. Is there a clearly stated plan for the malaria program (i.e. National Malaria Control Programs—NMCP, Malaria Strategic Plan or similar document)?
2. Insecticide treated nets (ITN) coverage:
    - » When was the last ITN mass distribution?
    - » When is the next planned ITN mass distribution?
    - » Are ITNS delivered through any other channels?
        - ❒ ANC
        - ❒ School based

21 This checklist only needs to be completed if the MNP program will be implemented in an area of a country that is malaria endemic or if there are plans to scale up to a malaria endemic part of the country in the future.

- ❒ Community based
- ❒ Other (specify)

3. Indoor residual spraying (IRS) coverage
   - » Is IRS implemented in the areas of interested?
   - » If yes, where is IRS implemented?
   - » When was the last time spraying occurred?
4. Surveillance
   - » Is there a system to systematically capture the malaria cases?
   - » If there is a system, which age groups are included?
   - » How does the surveillance system work in terms of functionality (e.g. the processes)?
5. Availability of Artemisinin Combination Therapies (ACTs)
   - » What is the first line treatment in-country?
   - » Is the first line antimalarial available at central and facility levels?[22]
   - » Is diagnostic testing a prerequisite for treatment of malaria?
   - » Is there a policy allowing community health workers to distribute antimalarials?
6. Funding for malaria control programs
   - » Is there a stable funding source to support malaria programs (i.e. National Government funding, President's Malaria Initiative (PMI)[23], Global Fund, Department for International Development (DFID)) for the next 2-3 years?
   - » Are there any proposed changes to the malaria control program for the next cycle? (If yes, describe)
7. Training and behavior change communication (BCC)
   - » Are key malaria prevention and control messages in the training of health workers implementing the MNP program?
   - » Are key malaria prevention and control messages in the BCC materials for the MNP program?
   - » Are there existing training modules with key malaria messages that could align with the training under the MNP program?
8. Collaboration between nutrition and malaria programs
   - » Describe any coordination efforts in place between nutrition and malaria programs in the MNP implementation area

22 Central level data should be available through the Central Medical Stores, and in PMI countries, through the Procurement Planning and Monitoring Report for malaria (PPMRm). Facility level data is available through the Logistics Management Information System (LMIS), in countries where this system exists, as well as through End User Verification (EUV) Surveys in PMI countries

23 PMI has annual funding cycle in which plans are made 18 months in advance

ANNEX 3: Reference and Resources

For further information from the studies and reviews that were key in the development of this technical brief, please refer to the following references:

1. De-Regil LM, Jefferds MED, Peña-Rosas JP. *Point-of-use fortification of foods with micronutrient powders containing iron in children of preschool and school age (Protocol)*. Cochrane Database of Systematic Reviews 2012, Issue 2. Art. No.: CD009666. DOI: 10.1002/14651858.CD009666. (http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD009666/pdf, accessed 11 July 2017)

2. De-Regil LM, Suchdev PS, Vist GE, Walleser S, Peña-Rosas JP. *Home fortification of foods with multiple micronutrient powders for health and nutrition in children under two years of age.* Cochrane Database of Systematic Reviews 2011, Issue 9. Art. No.: CD008959. DOI: 10.1002/14651858.CD008959.pub2. (http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD008959.pub2/abstract;jsessionid=239FC36DA6B8B8D45B861B1FA1C5B4BB.f02t03, accessed 11 July 2017)

3. Dewey KG, Baldiviez LM. *Safety of universal provision of iron through home fortification of complementary foods in malaria-endemic areas.* Adv Nutr. 2012 Jul 1;3(4):555-9. doi: 10.3945/an.111.001131. (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3649726/, accessed 11 July 2017)

4. *Essential Nutrition Actions: Improving Maternal, Newborn, Infant and Young Child Health and Nutrition.* Geneva: World Health Organization; 2013. (http://www.who.int/nutrition/publications/infantfeeding/essential_nutrition_actions.pdf, accessed 11 July 2017)

5. *Guideline: Daily iron supplementation in infants and children.* Geneva: World Health Organization; 2016 (http://apps.who.int/iris/bitstream/10665/204712/1/9789241549523_eng.pdf, accessed 11 July 2017)

6. Neuberger A, Okebe J, Yahav D, Paul M. *Oral iron supplements for children in malaria-endemic areas.* Cochrane Database of Systematic Reviews 2016, Issue 2. Art. No.: CD006589. DOI: 10.1002/14651858.CD006589.pub4 (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4916933/, accessed 11 July 2017)

7. Stoltzfus RJ. *Iron and malaria interactions: programmatic ways forward.* Adv Nutr. 2012 Jul 1;3(4):579-82. doi: 10.3945/an.111.000885. (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3649729/, accessed 11 July 2017)

8. *UNHCR Operational Guidance on the Use of Special Nutritional Products to Reduce Micronutrient Deficiencies and Malnutrition in Refugee Populations.* Geneva, United Nations High Commissioner for Refugees, 2011 (http://www.unhcr.org/4f1fc3de9.pdf, accessed 11 July 2017)