



THE UNITED REPUBLIC OF TANZANIA

*Improving Maternal and Pregnancy Outcomes
through Vital Interventions for Nutrition and Growth*

IMPROVING



Tanzania Policy Brief,
June 2019



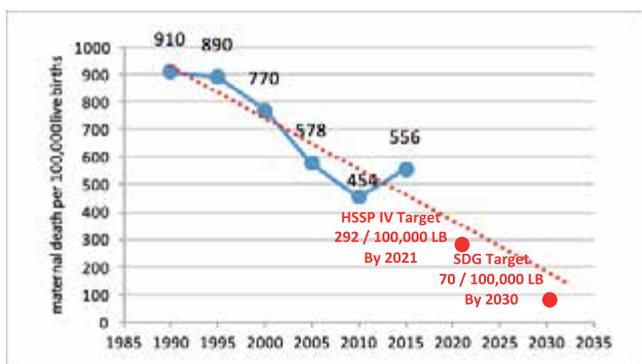
Summary

Maternal and child malnutrition is persistent in Tanzania, with long-lasting consequences for women and children, families, communities, and the country's economy. Based on existing high-quality scientific evidence—partly generated in Tanzania—it is recommended that **Tanzania transition from iron folic acid supplementation (IFAS) to multiple micronutrient supplementation (MMS) during pregnancy to improve maternal nutrition and pregnancy outcomes.** Antenatal MMS should be delivered as part of a standard package of care which includes promotion and support for nutritious diets, enhanced antenatal care, and women's empowerment.

Maternal and Child Nutrition in Tanzania

An estimated 45% of women aged 15 to 49 years and 57% of pregnant women are anemic (1), and one in three women suffer from multiple micronutrient deficiencies, especially iron, iodine, and vitamin A (2). Maternal micronutrient deficiencies, especially anemia, are among the main causes of maternal mortality, with 20% of maternal deaths attributed to severe maternal anemia. The maternal mortality ratio (MMR) increased in Tanzania in recent years, from 454 deaths per 100,000 live births (LB) in 2010, to 556 deaths per 100,000 live births in 2015 (1, 2). **According to this trend, Tanzania is not on track to meet the Sustainable Development Goal 3 (SDG-3) target of 70 deaths per 100,000 live births by 2030.**

Figure 1: Trends in MMR in Tanzania (DHS)



Despite the high coverage of antenatal care (ANC) services in Tanzania (98% for at least one ANC visit and 51% for the four recommended ANC visits), effective coverage of IFAS remains very low at only 21% (1).

Maternal micronutrient deficiencies can negatively affect fetal development and increase the risk of being born too small or too soon. For instance, maternal anemia accounts for 12% of low birth weight, 18% of perinatal mortality, and 19% of preterm births. The

adverse birth outcomes contribute to high rates of infant morbidity and mortality, childhood stunting, and longer term poor cognitive function. Currently, 34.4% of under-five children are stunted (2.7 million children) and 4.5% are wasted (600,000 children) (1) in Tanzania.

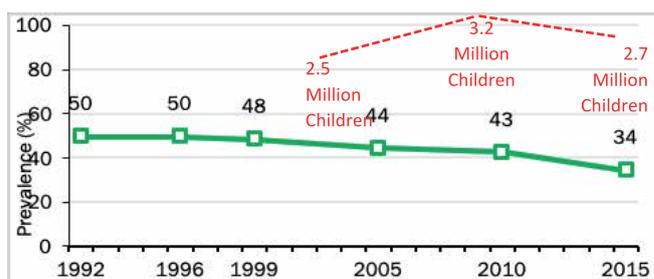
Tanzania is not on track to reach the 2025 World Health Assembly (WHA) targets associated with maternal malnutrition.

Table 1: Tanzania progress towards WHA targets

WHA Indicator	2015 Estimate	2025 Target
Child stunting (U5) (#)	2.7 million U5	40% reduction to 1.6M
Low birth weight (%)	6.9% newborn	30% reduction to 4.8%
Anemia in WRA (%)	45% of women	50% reduction to 23%

Recent trends point to a deterioration in the prevalence of anemia among women aged 15 to 49 years with rates increasing from 40% in 2010 to 45% in 2015. Low birth weight remained unchanged from 6.8% in 2010 to 6.9% in 2015. Furthermore, despite recent reductions in the prevalence of stunting among children under five years from 44.3% in 2005 to 34.4% in 2015, stunting rates are still 'very high', and due to population growth, the number of stunted children increased from 2.5 to 2.7 million during the same period (1, 2, 3).

Figure 2: Trends in stunting prevalence in Tanzania (DHS)

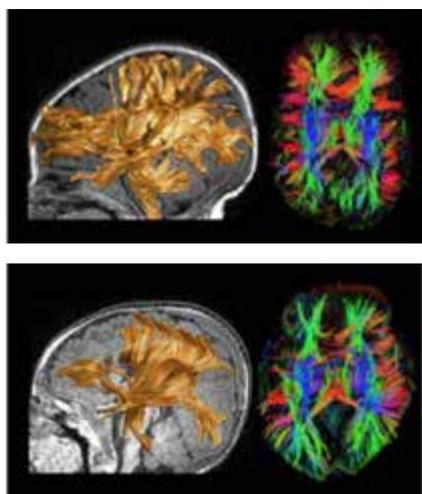


Global evidence shows that 20% of stunting is related to small for gestational age which is associated with pre-pregnancy and pregnancy nutritional status (4) and hence the need for stunting reduction strategies to consider the nutrition needs of women over the life course.

Stunted children are more likely to develop non-communicable diseases as adults, which generate high costs for the health system. Stunting also leads to impaired cognitive development, resulting in low school performance and lower earning as adults, which in turns affects national economic growth.

Figure 3 shows the difference in brain development between a healthy child (left) and a stunted child (right).

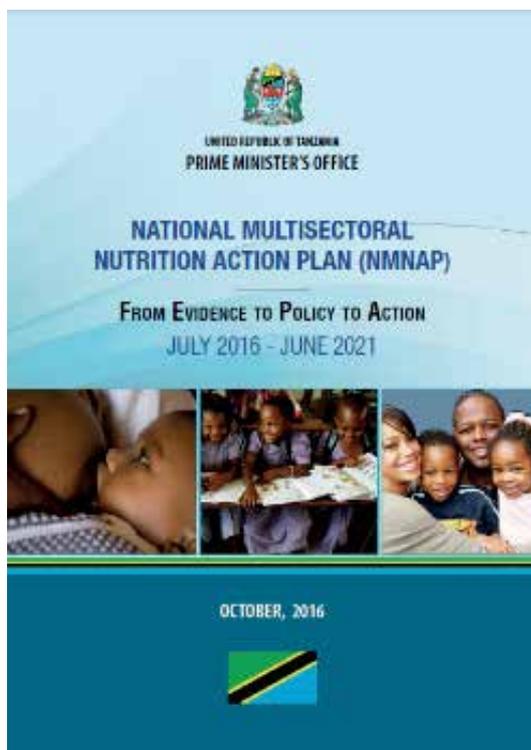
Figure 3: Brain scan of healthy and stunted child (5)



If the current nutrition situation does not improve, it is estimated that Tanzania will lose US\$ 20 billion by 2025, primarily due to anemia in women and childhood stunting. Conversely, by investing in nutrition, the country could gain up to US\$ 4.7 billion by 2025 (6).

Current programmatic landscape and recommendations

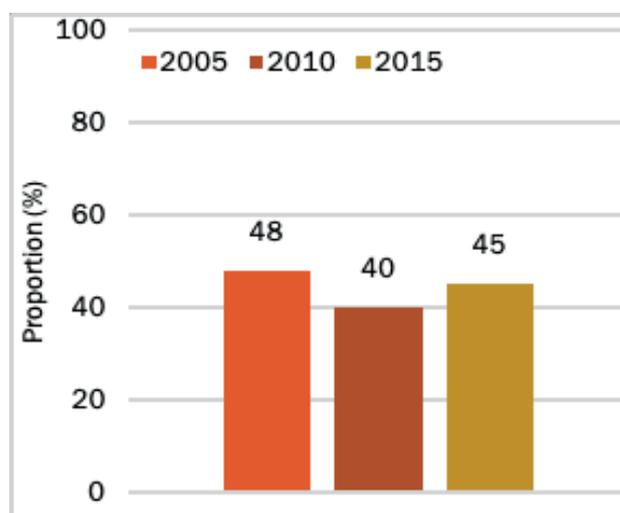
Figure 4: The Tanzania National Multisectoral Nutrition Action Plan (NMNAP)



Tanzania has made significant progress in addressing malnutrition. In 2011, Tanzania launched the National Nutrition Strategy 2011-2016, signed up to the Scaling-

Up Nutrition (SUN) Movement, and established a High Level Steering Committee on Nutrition under strong leadership of the Prime Minister's Office. Since 2013, Nutrition Officers and focal points were appointed in all districts and regions of Tanzania. In 2016-2017, Tanzania launched the National Multisectoral Nutrition Action Plan (NMNAP) and its Common Results, Resources and Accountability Framework (CRRAF), which is globally recognized among the strongest nutrition plans. Nutrition was also included for the first time among the key government priorities in the Five Years Development Plan 2016-2021. In 2017, the Vice President launched a Nutrition Compact, signed between the President's Office, Regional Authorities and Local Governments and all Regional Commissioners, to create accountability for achievement of NMNAP results in every region. A mechanism was also established to promote and track budget allocations for nutrition.

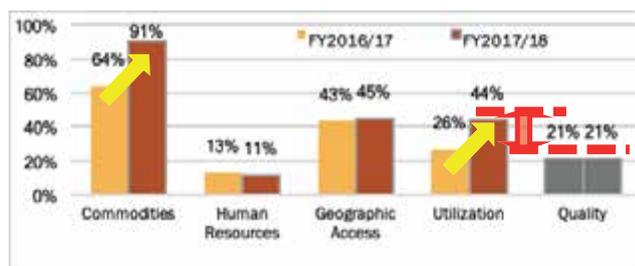
Figure 5: Trends in anemia (DHS)



High level political commitment has translated into increased coverage of high impact interventions and significant improvements in nutritional status, especially among children, as witnessed by the steady reduction in stunting prevalence between 2010 and 2015. However, actions have mainly focused on child undernutrition, while little was done to improve the nutrition of adolescents and women.

Anemia in women of reproductive age and pregnant women is one of two deteriorating nutrition indicators (Figure 5), together with increases in overweight / obesity. Anemia is mainly related with poor quality diets and diseases and has roots in social norms and gender inequalities. Interventions to address anemia such as counselling on nutritious diets, provision of IFAS during ANC visits, male involvement in maternal care, along with synergistic interventions with the food system (agriculture activities and food fortification) have very low coverage.

Figure 6: Bottleneck Analysis of IFAS in Tanzania



The annual bottleneck analysis of IFAS for the period 2016-2017 and 2017-2018 (figure 6) shows that in spite of an increase in availability of commodities, only 21% of pregnant women took IFAS for 90+ days. Despite being implemented since the 1990s, IFAS coverage in Tanzania is not reaching adequate scale and is therefore not effective to preventing anemia in pregnancy. Furthermore, it is estimated that about USD 2 million are used every year to procure IFAS tablets that are not consumed by pregnant women for the recommended period and therefore are not effective.

Recommended package of services

Greater investments in maternal nutrition are essential. Based on available evidence, **it is recommended to adopt a comprehensive package of services including promotion and support of nutritious diets, food fortification and multiple micronutrients supplementation.** To deliver this package, the following actions shall be prioritized:

1. Increase coverage and quality of ANC services.
2. Scale-up counselling on maternal diets at community and facility level and through community outreach.
3. Introduce MMS during pregnancy to gradually replace IFAS, in the context of high levels of malnutrition and micronutrient deficiencies.
4. Build synergies between health programmes and agriculture programmes, including food fortification, to improve access to nutritious food.
5. Deliver social and behavior change communication interventions targeting men to promote their role as caregivers of pregnant women and children.
6. Implement specific projects to empower women, addressing existing social norms that underlie gender inequalities in Tanzania.



These interventions address both the direct and underlying causes for maternal malnutrition in Tanzania and include both nutrition specific and sensitive approaches. They should be delivered together, using a system strengthening approach.

Evidence from Tanzania demonstrates that MMS is superior to IFAS alone

The 2016 WHO recommendations on antenatal care for a positive pregnancy experience state that: ‘policymakers in populations with a high prevalence of nutritional deficiencies might consider the benefits of MMS to outweigh the disadvantages and may choose to give MMS supplements that include IFA.

MMS contain 15 vitamins and minerals, including iron and folic acid, at approximately one recommended daily allowance (RDA) for pregnancy (Figure 7). Two global reviews have consistently concluded that MMS given to pregnant women is superior to IFA alone in improving birth outcomes and has equivalent benefits for reducing maternal anemia. (7, 10).

Figure 7: MMS composition

Nutrient	Dose
Vitamin A	800µg
Vitamin D	5µg
Vitamin E	10 mg
Vitamin C	70 mg
Vitamin B1	1.4 mg
Vitamin B2	1.4 mg
Niacin	18 mg
Vitamin B6	1.9 mg
Vitamin B12	2.6µg
Folic Acid	400g
Iron	30 mg
Zinc	15 mg
Copper	2 mg
Selenium	65µg
Iodine	150µg

Benefits were seen across most sub-groups, with larger gains among undernourished women and survival among female infants. No harmful effects were observed. Over 15 clinical trials with various micronutrients have been conducted in Tanzania under the guidance of Muhimbili University of Health and Allied Sciences (MUHAS) experts. Two of these clinical trials were conducted in Tanzania by MUHAS (8, 9). Studies show that women who take MMS have a lower risk of giving birth to infants who are born too soon or too small. MMS also improves survival and has even greater benefits among women with poor nutritional status.

Figure 8: MMS trials results on pregnancy outcomes Globally and in Tanzania

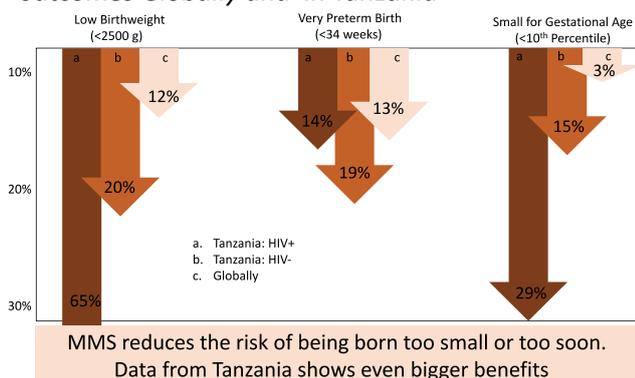
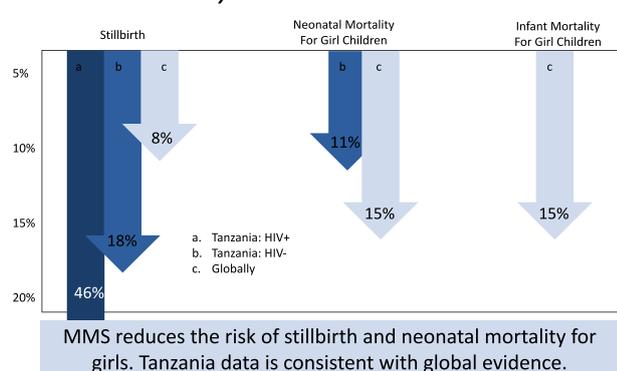


Figure 9: MMS trials results on pregnancy outcomes Globally and in Tanzania



Based on the two trials conducted in Tanzania: MMS reduces the risk of stillbirth and neonatal mortality. Babies are less likely to be born too small or too soon.

These findings are further augmented by a similar but smaller scale study where MMS was provided with or without extra provisions of protein and carbohydrate supplements (11).

MMS in pregnancy is safe. No harmful effects were observed across the two global reviews. MMS use within the range of the Dietary Reference Intake will not result in excess intake, even when including the effects of food and fortified food. MMS can help improve the nutrient supply and overcome problems of inadequacy and are safe for long-term use (> 10 years), as documented in recent clinical trials (10, 12).

Cost-effectiveness analysis shows that MMS use in pregnancy in Tanzania is more cost effective than IFAS

Nutrition International conducted a cost-effectiveness analysis of MMS vs IFAS in Tanzania. The effectiveness of IFAS relative to MMS during pregnancy was compared using eight health outcomes reported in the *Lancet* (10) (Table 2). Outcomes were aggregated using disability-adjusted life years (DALYs) to derive an overall effectiveness of IFA and MMS. Costs included the supplements and their public distribution through ANC. The incremental cost-effective ratio (ICER) for transitioning from IFAS to MMS was calculated and Monte Carlo simulations were applied to generate a measure of certainty around the results.

Table 2. Relative risk and prevalence of health outcomes in Tanzania

Health Outcomes	Prevalence #/100,000	MMNS vs. IFAS RR (SE)	Disability Weight	Durations (Years)
Maternal anemia	48,000	1.03 (0.11)	0.05	1.00
Preterm birth	16,900	0.92 (0.02)	0.06	63.1
SGA	17,800	0.97 (0.01)	0.06	63.1
LBW	6,300	0.88 (0.01)	0.06	63.1
Maternal mortality	556	0.97 (0.26)	N/A	50.9
Stillbirth	2,240	0.92 (0.04)	N/A	63.1
Neonatal mortality	2,508	0.98 (0.04)	N/A	63.1
Infant mortality	4,350	0.97 (0.05)	N/A	63.1

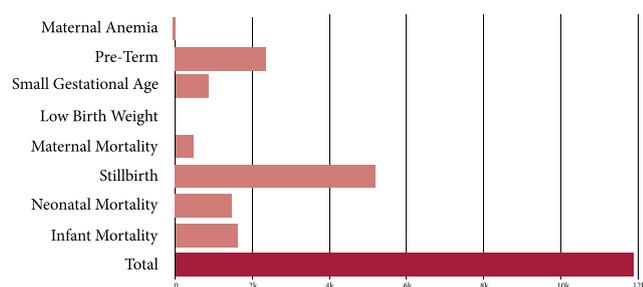
The analysis concluded that transitioning from IFA to MMS would avert 11,878 more DALYs in Tanzania per 100,000 pregnancies (Table 3).

Table 3. Cost-effectiveness of transitioning from IFA to MMS in Tanzania

Outcome	Tanzania
Population reached	100,000
Total DALYs averted	11,878
Total cost	US\$ 183,000
Cost per DALY averted	US\$ 15.41
Cost effective? (confidence)	YES (100%)
Very cost effective? (confidence)	YES (100%)
Confidence in positive health outcomes	97%

Nearly half of the DALYs averted due to transitioning from IFAS to MMS are related to the effects of MMS on preventing stillbirths. The remainder of the DALYs averted are mainly due to the effects of MMS on preventing pre-term births, infant mortality, neonatal mortality and small for gestational age compared to IFA (Figure 10).

Figure 10: Incremental DALYs averted by health outcome in Tanzania by transitioning from IFAS to MMS during pregnancy



MMS are more cost effective than IFAS because of the added benefits on preventing low birth weight, stillbirths, preterm birth, small for gestational age, and infant and neonatal deaths, and similar benefits on reducing the risk of anemia during pregnancy. MMS helps more mothers and babies to live longer and improves their quality of life.

The estimated cost of transitioning from IFAS to MMS is equal to US\$ 183,000 per 100,000 pregnancies, or 15.41 USD (2016) per DALY averted.

Scaling up the coverage of MMS to 50% of all pregnant women would cost 1.8 million USD per year and result in 122,580 DALYs averted. A full coverage scenario of 95% of all pregnant women would cost 3.5 million USD per year and result in 232,904 DALYs averted.

Local production of MMS, an opportunity in line with Tanzania industrialization priorities

Sight & Life conducted a situation analysis of procurement and production of MMS in 12 lower and upper middle-income countries (13), which resulted in 4 possible scenarios:

- A. Import or local production of straight ingredients (vitamins and minerals) that are blended, tableted, packaged, distributed, and marketed in country;
- B. Import or local production of premix blend that are tableted, packaged, distributed, and marketed in country;
- C. Import of bulk finished product that is packaged, distributed, and marketed in country; or
- D. Import of finished branded product distributed and marketed in country.

Tanzania is currently at the scenario D stage, as MMS are imported as a finished branded product, and marketed by the private sector. In the future, a transition to scenario A or B could be considered in line with the Government's industrialization priorities.

Initial activities for introduction of MMS during pregnancy in Tanzania

The 2019 National Guideline on Prevention and Control of Micronutrients Deficiencies among Children Adolescents and Women includes MMS among the key interventions to address anemia and other micronutrients deficiencies and improve maternal nutrition and pregnancy outcomes. Based on the high-quality evidence generated in Tanzania and globally, there is an opportunity to introduce MMS during pregnancy in one region of Tanzania (Mbeya) and assess its operationability and benefits compared to IFAS through a series of studies, including:



1. A micronutrient survey among pregnant women;
2. Baseline and endline surveys to measure adherence to MMS as compared to IFAS by pregnant women;
3. Analysis of barriers to intake and compliance (for 90+ days) of MMS compared to IFAS;
4. Monitoring of maternal and pregnancy outcomes through the routine information system; and
5. Assessment of local production of MMS.

Mbeya region was selected because its nutrition indicators among women and children are poorer than national average, but quality infrastructures are available.

The MMS introduction programme will be coordinated by a Technical Advisory Group (TAG) led by MOHCDGEC in collaboration with PORALG and TFNC, as well as Mbeya LGAs and key partners, including MUHAS, NIMR, IHI, AAPH, UNICEF, WHO, and Nutrition International. The TAG will work in close collaboration with the Global MMS Task Force, *Sight & Life*, and other key stakeholders.

Evidence generated by the MMS introduction programme will be validated by the TAG and used to inform decision makers and eventually scale up MMS in Tanzania.

Contributors:

1. Dr. Vincent Assey, acting Managing Director, Tanzania Food and Nutrition Centre (TFNC).
2. Prof. Karim Manji, Professor of Pediatrics, Muhimbili University of Health and Allied Sciences, Tanzania.
3. Dr. Festo Kavishe, Independent Human Development Consultant.
4. Dr. Mary Mwanyika Sando, Chief Executive Officer, Africa Academy for Public Health (AAPH), Tanzania.
5. Dr. Emily Smith, Programme Officer, Bill & Melinda Gates Foundation.
6. Mauro Brero, Chief of Nutrition, UNICEF Tanzania.
7. Nita Dalmiya, Nutrition Specialist Maternal Nutrition, UNICEF HQ.
8. Jennifer Busch-Hallen, Senior Technical Advisor Maternal and Neonatal Nutrition, Nutrition International.

References

1. Tanzania Demographic and Health Survey 2015.
2. Tanzania Demographic and Health Survey 2010.
3. National Bureau of Statistics, Population data.
4. Christian et al. *International Journal of Epidemiology*, Volume 42, Issue 5, October 2013, Pages 1340–1355.
5. Bick J, Fox N, Zeanah C, Nelson CA. Early deprivation, atypical brain development, and internalizing symptoms in late childhood. *Neuroscience*. 2017 Feb 7; 342: 140-153. doi: 10.1016/j.neuroscience.2015.09.026. Epub 2015 Sep 16.
6. Ash, Deborah; Sethuraman, Kavita; Sommerfelt, A. Elisabeth; Oot, Lesley; Kovach, Tara; Kaganda, Joyceline; Chiduo, Geoffrey; and Yokobety, Malisa. 2014. *Reducing Malnutrition in Tanzania: Estimates to Support Nutrition Advocacy: Tanzania PROFILES 2014*. Washington, DC and Dar es Salaam, Tanzania: FHI 360/FANTA, Tanzania Food and Nutrition Centre and Prime Minister's Office, Tanzania.
7. Keats, Haider, Tam, Bhutta. "Multiple-micronutrient supplementation for women during pregnancy." *Cochrane Database of Systematic Reviews*. 2019.
8. Fawzi et al. "A Randomized Trial of Multivitamin Supplements and HIV Disease Progression and Mortality." *New England Journal of Medicine*. 2004; 351:23-32.
9. Fawzi et al. "Vitamins and Perinatal Outcomes among HIV-Negative Women in Tanzania." *New England Journal of Medicine*. 2007; 356: 1423-31.
10. Smith et al. "Modifiers of the effect of maternal multiple micronutrient supplementation on stillbirth, birth outcomes, and infant mortality: a meta-analysis of individual patient data from 17 randomised trials in low-income and middle-income countries." *The Lancet Global Health*. 5.11.2017.
11. Magohe A, Mackenzie T, Kimario J, Lukmanji Z, Hendricks K, Koethe J, Neke NM, Tvaroha S, Connor R, Waddell R, Maro I, Matee M, Pallangyo K, Bakari M, von Reyn. CF; DarDar-2 Study Team. "Pre- and post-natal macronutrient supplementation for HIV-positive women in Tanzania: Effects on infant birth weight and HIV transmission." *PLoS One*. 2018 Oct 11;13(10): e0201038. doi:10.1371.
12. Biesalski et al., 2016 Biesalski HK, Tinz J. "Multivitamin/mineral supplements: Rationale and safety. A systematic review." *Nutrition*. 2017 Jan; 33:76-82. doi: 10.1016/j.nut.2016.02.013.
13. Eva C. Monterossa, et al. "Situation analysis of procurement and production of multiple micronutrient supplements in 12 lower and upper middle-income countries." *Maternal and Child Nutrition*. 2018; 14(S5): e12500.



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