

HOLD MY HAND
POLICY BRIEF SERIES

Advancing maternal and child health through Multiple Micronutrient Supplementation (MMS) in South Africa

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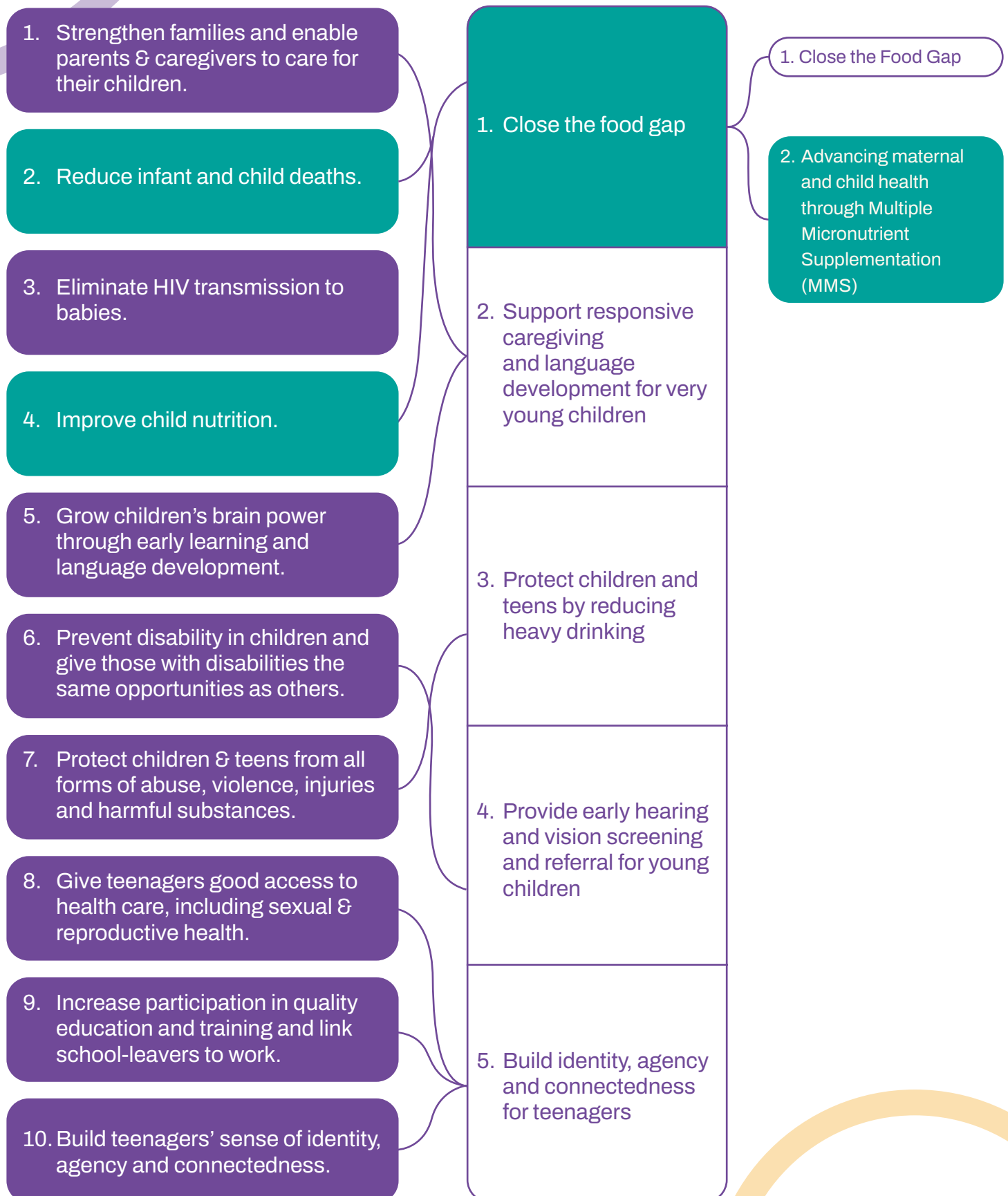


NSAAC's ten priorities to accelerate progress for children and teenagers

The Accelerators

Five Initial Strategies

Policy Briefs





Hold My Hand Accelerator

Every day, 3 000 children are born in South Africa, which equates to 1 million every year whose childhood experiences will shape both their future and the nation's. Ensuring they thrive would unlock massive opportunities – a stronger economy and a safer, happier society. Global experience shows that progress accelerates when the president leads, society unites behind a national programme for children and a dedicated, energetic organisation drives action. This is the logic behind the National Strategy to Accelerate Action for Children (NSAAC), led by the Presidency and the Department of Social Development. The Strategy identifies 10 key priorities and calls for broad partnerships across government, civil society, trade unions and the private sector.

A key mechanism is the Hold My Hand Accelerator for Children and Teens, established through a partnership between the Presidency and DGMT. It fast-tracks critical strategies that require public-private collaboration, focusing on closing the food gap, supporting responsive caregiving and language development for very young children, protecting children and teens by reducing heavy drinking, providing early hearing and vision screenings and referrals for young children, and building identity, agency, and connectedness for teenagers.

A series of policy briefs is being developed to support this work.

POLICY BRIEF SERIES



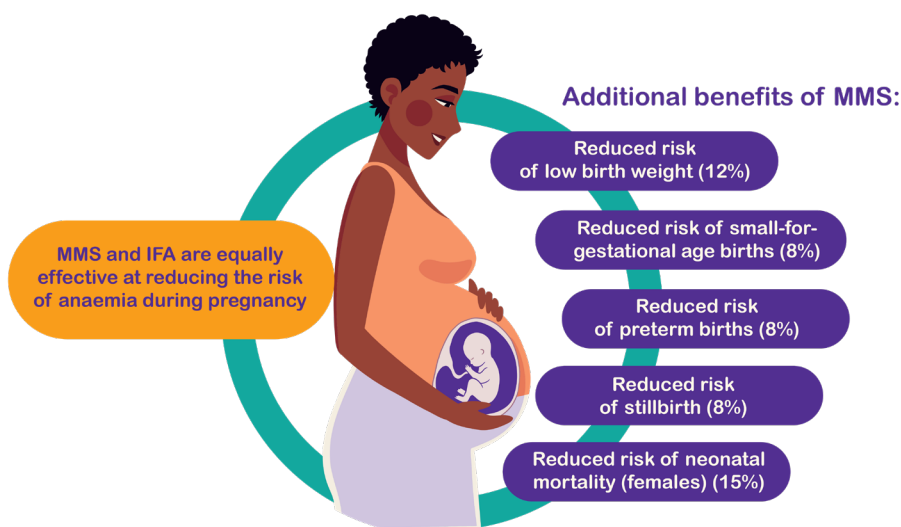
Objective

The aim is to support the transition from Iron and Folic Acid (IFA) to multiple micronutrient supplementation (MMS) into South Africa's antenatal care platform. This is to improve maternal nutritional status and reduce the risk of adverse birth outcomes and subsequent stunting by addressing the broader spectrum of micronutrient deficiencies among pregnant women.

Executive summary

Despite advancements in maternal healthcare, South Africa continues to experience high rates of maternal anaemia, poor birth outcomes and childhood undernutrition. Iron deficiency leads to anaemia, which affects nearly one in three women, increasing the risk of low birth weight, stillbirths and developmental delays. Insufficient folic acid (folate) can lead to neural tube defects, preterm birth, low birth weight and other developmental problems. That is why pregnant women are routinely given IFA supplements as per 2016 World Health Organization (WHO) recommendations.¹ However, there is growing recognition that pregnant women need other micronutrients as well, as reflected in the 2020 WHO guidelines.² MMS is now globally recognised as a superior alternative to IFA, providing essential nutrients that significantly improve maternal and child health. MMS is more effective in reducing preterm birth, low birthweight and infant mortality at six months, especially in anaemic or underweight women. MMS is not currently on the national Essential Medicines List (EML) and distribution through government channels (2010-2015) was discontinued in 2016 prior to the latest research evidence and guidance.³

This policy brief highlights the large body of evidence that is now available supporting MMS, and its cost-effectiveness compared to IFA. We also explore barriers such as policy gaps, public misconceptions and supply chain challenges, and propose clear recommendations to integrate MMS into routine antenatal care.



Source: Adapted from image produced by Nutrition International (2020), based on data published by Keats et al (2019), Smith et al (2017).

Background

Pregnancy is a period of increased physiological demand, and maternal nutrition is crucial for optimal child health and developmental outcomes. South Africa, however, faces a double burden of malnutrition – high rates of obesity (41%) coexist with widespread micronutrient deficiencies, including anaemia (33%). The true prevalence of iron deficiency anaemia in South African mothers and infants is substantially higher when accounting for inflammation, a key factor in the context of a high burden of infection such as HIV.⁴ Anaemia during pregnancy increases the risks of low birth weight, preterm birth, stillbirth and developmental issues in children. In addition to iron, deficiencies in other micronutrients such as zinc, calcium, folate, vitamins A, D and B12 also contribute to adverse pregnancy outcomes. For example, zinc deficiency is associated with pre-eclampsia and preterm labour; vitamin A deficiency with poor maternal and neonatal outcomes and night blindness; and folate and B12 deficiencies with neural tube defects and anaemia.⁵

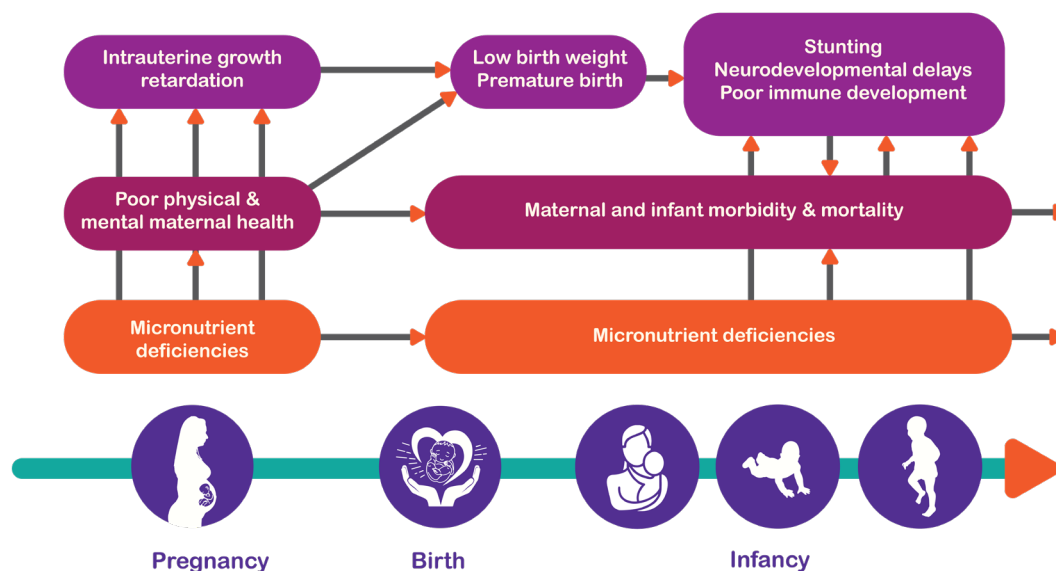
While many global studies compare MMS and IFA, research on the effectiveness of IFA in South Africa is sparse. A 2004 study on the effectiveness of IFA supplementation during pregnancy in a rural area of Limpopo province found that while iron supplements were routinely given at antenatal clinics, iron deficiency and iron deficiency anaemia remained prevalent.⁶ Similarly, a 2024 study of pregnant women in Bloemfontein in the Free State found that, despite taking iron supplements, they were still anaemic.⁷ Many pregnant women book antenatal care late, reducing early supplementation opportunities, and research indicates adherence to IFA is poor due to side effects and low palatability.⁸ Women's lack of exposure to mass media, along with low education status of husbands and rural location, have also been associated with lower adherence.⁹

The 2024 Integrated Maternal and Perinatal Guidelines continue to recommend IFA, now with the addition of calcium.¹⁰ MMS, however, is not currently included. MMS, which contains 15 essential micronutrients in a single tablet, offers a more effective

solution for foetal growth and maternal health with potential for improved adherence and acceptability.

Nutrition gaps and birth outcomes

Consequences of micronutrient deficiencies in pregnancy



Source: Child Gauge 2020¹¹

South Africa's high food insecurity rates have worsened, with moderate to severe household food insecurity rising from 15.8% in 2019 to 19.7% in 2023. Female-headed households are disproportionately affected, with rates increasing from 17.2% to 21.5% in the same period.¹²

Micronutrient deficiencies remain prevalent despite national fortification efforts. A 2017 systematic review to evaluate the status and intake of iron, vitamin A, iodine, folate and zinc in women of reproductive age (15-49 years) and pregnant women in Ethiopia, Kenya, Nigeria and South Africa found that in South Africa, 23% were anaemic, 16% were iron deficient, 22% had a vitamin A deficiency and 20% had iodine deficiency.¹³ Pregnant women with HIV, are at higher risk of anaemia,¹⁴ with estimates ranging from 60.6% to 71.3%, yet were found to have lower adherence rates.¹⁵

These deficiencies contribute to poor birth outcomes. In 2020, approximately 198 800 newborns (13.9%) were born with low birth weight, increasing their risks of mortality and long-term health complications.¹⁶ Low birth weight is a key correlate of stunting.¹⁷

The Drakenstein Child Health Study found that maternal anaemia significantly affects child brain development. Anaemic mothers had children with smaller caudate, putamen and corpus callosum volumes – brain structures essential for motor skills, learning and cognitive processing. This suggests that even mild anaemia during pregnancy can have lasting effects on a child's brain development.^{18, 19}

Scientific evidence: MMS versus IFA

Extensive research demonstrates MMS is more effective than IFA in reducing adverse birth outcomes.^{20, 21} A 2019 Cochrane review of 21 clinical trials with over 142 000 women in low and middle-income countries found that compared with IFA, MMS:

- reduces low birth weight by 12%;
- decreases small-for-gestational age births by 8%; and

An individual participant data meta-analysis involving over 112 000 women across 17 trials supported these findings, showing greater reductions in anaemic and underweight women, with MMS showing a 21% reduction in relative risk for stillbirth and reduced under six-month infant mortality by 29% among anaemic women.^{22, 23}

Table 1: Percent reduction in selected birth outcomes with MMS compared with IFA alone based on individual participant meta-analysis

Outcome	Pregnant women (overall)	Anaemic pregnant women	Underweight pregnant women
Low Birth Weight	12%	19%	12%
Small-for-Gestational Age	3%	8%	Not specified
Preterm Birth	8%	Not specified	16%
Stillbirth	8%	21%	Not specified
Infant Mortality (6 mo.)	Not specified	29%	Not specified

Source: Black, R. 2023²⁴ quoting Smith, E.R., et al. 2017.

Concerns about MMS only containing 30 mg iron versus 60 mg in IFA have been addressed in research showing that MMS maintains similar haemoglobin levels and provides comparable protection against anaemia.^{25, 26}

A 2025 systematic review and meta-analysis of 19 trials that assessed the effect of MMS compared to IFA on infants' anthropometric outcomes from birth to 24 months found improved size at birth (weight, length, head circumference and MUAC (measurement of the upper arm circumference)) and subsequent infant growth through 6 months of age.²⁷ The analysis included over 20 000 mother-baby pairs from low-income or middle-income economies (LMICs). The effects were greater among trials that continued maternal supplementation postpartum. In comparison with IFA, MMS reduced the risk of stunting by 9% at birth and 14% at 3 months, with greater effects in settings with a higher prevalence of low birth weight. A reduction of 16% in small head circumference (a reflection of brain size) was observed with MMS compared to IFA, which could have implications for cognitive (visual attention/spatial ability) outcomes. Trials in Indonesia, China and Nepal demonstrated improved motor and cognitive outcomes across age groups.



What the study shows: MMS vs IFA



Length and weight from birth to 6 months of age
Head circumference from birth to 12 months of age

Prenatal MMS reduces risks of poor growth up to 3 months of age

Stunting	9%
Underweight	13%
Wasting	10%
Small head circumference	12%
Stunting or underweight	14%
Small head circumference	16%
Low mid-upper arm circumference	10%



Prenatal MMS results in healthier growth and lower risk of undernutrition up to 6 months of age

Source: Adapted from Gomes et al, 2025.

“

Our findings support the use of MMS for all women in LMICs to reduce the burden of maternal and infant undernutrition.

”

Gomes et al. 2025

Cost-benefit analysis: MMS versus IFA

Transitioning to MMS presents significant health and economic benefits. In 2021, South Africa recorded a low birth weight rate of 13.2%, indicating that more than one in 10 live-born babies weighed less than 2 500 grams at birth; it saw an increase to 14.1% in 2023.²⁸ Low birth weight is particularly relevant to human potential as it is a key correlate of stunting, which can lead to long-term health and developmental challenges.^{29, 30} Preterm birth rates are also concerning, with estimates placed at eight per 1 000 live births in 2010, increasing to 12.4 per 1 000 in 2014.³¹

Modelling suggests that scaling MMS in South Africa could annually prevent:

- between 1 100 and 2 700 preterm births;
- 300 to 600 cases of stillbirths;
- 2 600 to 6 500 cases of low birth weight and
- 1 500 to 3 600 cases of small-for-gestational-age births each year.³²

Economic analyses show MMS is highly cost-effective. The MMS Cost-Benefit Tool estimates that in 33 countries, the cost per Disability-Adjusted Life Year averted averages \$23.6.³³ According to modelling from Nutrition International, MMS provides an estimated return of \$17–\$88 for every \$1 invested, depending on country context. A commonly used global estimate places the benefit–cost ratio at 37:1, more than double that of IFA.³⁴

Countries such as Pakistan and Bangladesh have found MMS to be more cost-effective than IFA in improving maternal and child health outcomes.³⁵ MMS policy has been approved in several countries in Africa including Nigeria,³⁶ the Democratic Republic of Congo, Ethiopia, Tanzania and Burkina Faso; and Pakistan, Indonesia and Philippines in Asia.³⁷

Transitioning from IFA to MMS: key considerations

Transitioning from IFA supplementation to MMS requires careful planning and coordination across the health system. The Framework for Country MMS Scale-up (Table 2) outlines the key strategic objectives and activities needed to build an enabling environment, design and test implementation strategies, and ensure long-term scale and sustainability. It addresses five core pillars – policy and regulatory alignment, financing, product quality and supply, delivery platforms, and coordination and monitoring – to support improved maternal nutrition and birth outcomes across the country.





Framework for country MMS scale-up

South Africa was one of the first low and middle-income countries to introduce MMS through its public health system (2010 to 2016), using a formulation consistent with UNIMAPP except for the dosage of copper (62% of the recommended dosage).³⁸ This made South Africa a pioneer in MMS implementation. However, MMS was removed from government distribution channels in 2016, speculated to be due to lack of clear WHO guidelines at the time of implementation, in addition to a lack of knowledge about its evidence base.³⁹ Since then, as seen in the previous section, global evidence has strengthened, prompting renewed interest in revisiting MMS policy.

From a regulatory perspective, no UNIMMAP MMS product is registered yet with the South African Health Products Regulatory Authority (SAHPRA), although a local manufacturer is preparing for registration.

Given the strengthening of the global evidence base and updated WHO guidance since 2016, there is renewed justification for exploring the introduction of MMS on the EML through a structured and evidence-led process aligned with South Africa's policy environment.

Table 2: Framework for Country MMS Scale-up

Pillar	Activities			Outputs	
	1. BUILDING AN ENABLING ENVIRONMENT	2. DESIGN & TEST IMPLEMENTATION STRATEGIES	3. SCALING & MAINTENANCE	STRATEGIC OBJECTIVES	OUTCOMES
	→	→	→	→	
POLICY REGULATORY 	Landscaping & analysis Stakeholder mapping & engagement Advocacy	Advocacy Policy & guideline development	Policies & guidelines adoption Operationalise Roadmap	Product is included in relevant policies & instruments at all levels of government	REACH COVERAGE ↓ IMPROVED MATERNAL AND NUTRITION & BIRTH OUTCOMES
FINANCE 	Cost-effectiveness analysis	Forecasting Financing strategy	Demand planning Finance mechanisms Market shaping	Sufficient funding committed by governments & donors for procurement & delivery of product	
QUALITY PRODUCT 	Supply readiness assessment	Manufacturing support Supply chain strengthening	Cost-effective procurement coordination Monitor and address supply chain/ distribution/ stockouts	Sufficient volumes of quality product are manufactured, available and procured	
DELIVERY CHANNELS 	Delivery platform(s) assessment Exploratory distribution of product	Demonstration projects System strengthening	National rollout Expansion of delivery channels	Product is available & accessible & pregnant women receive product during antenatal care and use as recommended	
COORDINATION AND MONITORING, EVALUATION AND LEARNING (MEL)					

Source: Adapted from Bill & Melinda Gates Foundation, Children's Investment Fund Foundation, Eleanor Crook Foundation & Kirk Humanitarian⁴⁰

A suggested MMS roadmap for South Africa

1. Policy/Regulatory

- **Stakeholder engagement:** Establish a national MMS Technical Advisory Group (MMS-TAG).
- **Research:** Conduct implementation science research to assess the feasibility and current gaps, outline the next steps and generate evidence to inform policy and guideline development in the context of high HIV-prevalence and antiretroviral treatment.
- **Engage regulatory bodies:** SAHPRA should assess the MMS formulation based on local safety, efficacy and quality standards and the global specification for UNIMMAP MMS.⁴¹
- **Include MMS on the Essential Medicines List:** The National Essential Medicines List Committee should consider the Medicine Review to evaluate the evidence for MMS and consider its inclusion based on Need (public health relevance), Quality, Safety, Efficacy & Effectiveness of registered product, Cost & Affordability and Implications for Practice (feasibility, acceptability, monitoring & evaluation).
- **Update national guidelines:** The National Department of Health, through its Maternal and Child Health Directorate, should revise current antenatal care policies to align with WHO recommendations on MMS.
- **Multisectoral alignment:** Policy shifts should be coordinated with other departments such as Social Development to integrate maternal nutrition efforts with broader development agendas.

2. Finance

- **Cost-effectiveness evidence:** South Africa could draw on data from international studies (e.g., Bangladesh and India) showing MMS's superior value for money over IFA and contextualise this evidence for local use. While MMS may have a higher upfront cost than IFA, long-term benefits include improved productivity and reduced healthcare costs. The cost comparison per beneficiary (180 supplements) circa 2020 is:
 - South Africa: MMS \$3.27 | IFA \$2.27⁴²
 - India/Bangladesh/Pakistan: MMS \$3.46 | IFA \$1.63⁴³
- **Budget analysis and cost projections:** The National Department of Health should commission an economic modelling study to assess the cost of procuring, distributing and scaling up MMS, taking into account potential long-term health system savings for consideration by National Treasury.
- **Public-private partnerships:** Financing strategies should explore collaborations with local pharmaceutical companies, non-governmental organisations and international development partners to support procurement and research costs.

3. Quality Product

- **Local availability and policy action:** MMS is already developed to international standards and is available locally, pending registration with SAHPRA by the manufacturer. Local production could make it more cost-effective in addition to supporting job creation.
- **Product registration and quality assurance:** SAHPRA should ensure that any imported or locally produced MMS meets UNIMMAP MMS quality standards and undergoes rigorous regulatory assessment.⁴⁴
- **Packaging and labelling:** Ensure MMS products are clearly labelled and packaged in user-friendly formats to support adherence among pregnant women.

4. Delivery channels

- **Antenatal care platforms:** Integrate MMS into routine antenatal services at public health clinics, prioritising high-burden districts with poor maternal and child health outcomes.
- **Training healthcare providers:** Equip nurses, midwives and community health workers with the knowledge and tools to promote MMS, counter misinformation and monitor adherence.⁴⁵
- **Community outreach and demand generation:** Implement public awareness campaigns, especially in at-risk rural areas, to educate pregnant women about the importance of maternal nutrition and prescribed supplements.
- **Monitoring and evaluation (M&E):** Develop a robust M&E framework and information system to track uptake, coverage, supply chain performance and health outcomes related to MMS use.⁴⁶

Conclusion

South Africa has a critical opportunity to improve maternal and child health by transitioning from IFA to MMS. The evidence is clear – MMS is more effective in reducing low birth weight, preterm birth and stillbirth, particularly for women who are anaemic or undernourished. With the country's high rates of HIV, anaemia and micronutrient deficiencies among women of reproductive age, the adoption of MMS has the potential to change the trajectory of maternal and newborn health.

The transition to MMS is not just a health intervention. It is a cost-effective, high-impact strategy that aligns with South Africa's broader development goals. Modelling estimates that for every dollar invested in MMS, there is a return of \$37 in economic benefits through improved birth outcomes, better cognitive development in children and increased future productivity. The long-term gains for the health system and increased productivity are a good investment for the country.

By taking decisive action to transition from IFA to MMS, South Africa could join other countries that are prioritising maternal nutrition as a foundation for national development.

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References

1. World Health Organization. 2016. WHO recommendations on antenatal care for a positive pregnancy experience. World Health Organization. <https://www.who.int/publications/i/item/9789241549912>
2. World Health Organization. 2020. WHO Antenatal Care Recommendations for a Positive Pregnancy Experience. Nutritional Interventions Update: Multiple Micronutrient Supplements During Pregnancy. <https://iris.who.int/bitstream/handle/10665/333561/9789240007789-eng.pdf>
3. Bajoria, M., Beesabathuni, K. & Kraemer, K. 2020. The Case for Reintroducing Multiple Micronutrient Supplements in South Africa's Essential Medicines List: Creating an enabling environment for nutrition-specific interventions in antenatal care. *Sight and Life Special Report*. Basel, Switzerland.
4. Ringshaw, JE, et al. 2025. Iron Deficiency Anaemia in Mothers and Infants from a South African Birth Cohort: Prevalence and Profile in the Context of Inflammation [Preprint]. doi.org/10.1101/2025.01.23.25321033.
5. Keats, E.C. et al. Multiple-micronutrient supplementation for women during pregnancy. *Cochrane Database of Systematic Reviews* 2019, Issue 3. Art. No.: CD004905. DOI: 10.1002/14651858.CD004905.pub6.
6. Mamabolo, R.L. et al. 2004 Feb/Mar. Evaluation of the effectiveness of iron and folate supplementation during pregnancy in a rural area of Limpopo province. *South African Journal of Clinical Nutrition*. 17(1).pp.15-21.
7. Carboo, J.A., et al. 2024. Iron status, anemia, and birth outcomes among pregnant women in urban Bloemfontein, South Africa: the NuEMI study. *BMC Pregnancy Childbirth* 24, 650 <https://doi.org/10.1186/s12884-024-06845-w>
8. Mkhize, PZ, Naicker, T, Onyangunga, O & Moodley, J. 2019. Adherence to iron prophylactic therapy during pregnancy in an urban regional hospital in South Africa. *South African Family Practice*. 61(5):203–208. doi.org/10.1080/20786190.2019.1654705.
9. Mare, K.U., Et al. 2024. Non-adherence to antenatal iron supplementation and its determinants among pregnant women in 35 sub-saharan African countries: a generalized linear mixed-effects modeling with robust Poisson regression analysis. *BMC Pregnancy and Childbirth*. 24(1):872. doi.org/10.1186/s12884-024-07105-7.
10. National Integrated Maternal and Perinatal Care Guidelines For South Africa National Integrated Maternal And Perinatal Care Guidelines For South Africa. 2020. <https://knowledgehub.health.gov.za/elibrary/national-integrated-maternal-and-perinatal-care-guidelines-south-africa>.
11. Symington, E., Norris, S. & Smuts, M. 2020. Food and nutrition of the unborn child: The role of maternal nutrition. *Child-centred food systems: Ensuring healthy diets for children*. In: May J, Witten C & Lake L (eds) *South African Child Gauge 2020*. Cape Town: Children's Institute, University of Cape Town.
12. Statistics South Africa. 2025. Food Security in South Africa in 2019, 2022 and 2023: Evidence from the General Household Survey.
13. Harika, Ret al. 2017. A. Micronutrient Status and Dietary Intake of Iron, Vitamin A, Iodine, Folate and Zinc in Women of Reproductive Age and Pregnant Women in Ethiopia, Kenya, Nigeria and South Africa: A Systematic Review of Data from 2005 to 2015. *Nutrients*;9(10):1096. doi: 10.3390/nu9101096.
14. Turawa, E., et al. 2021. Prevalence of Anaemia, Iron Deficiency, and Iron Deficiency Anaemia in Women of Reproductive Age and Children under 5 Years of Age in South Africa (1997–2021): A Systematic Review. *International Journal of Environmental Research and Public Health*. 18(23):12799. doi.org/10.3390/ijerph182312799.
15. Mkhize, P.Z., et al. 2019. Adherence to iron prophylactic therapy during pregnancy in an urban regional hospital in South Africa. *South African Family Practice*. 61(5):pp.203–208. doi.org/10.1080/20786190.2019.1654705.
16. Food and Agriculture Organisation of the United Nations (FAO). 2023. *Africa: Regional Overview of Food Security and Nutrition – Statistics and Trends*.
17. Western Cape Stunting Baseline Survey on under 5-year-old children. 2023. <https://dgmt.co.za/wp-content/uploads/2023/06/WC-Stunting-Baseline-Survey-Report.pdf>.
18. Wedderburn, C.J et al. 2022. Association of Maternal and Child Anaemia with Brain Structure in Early Life in South Africa. *JAMA Netw Open*. 2022;5(12):e2244772. doi:10.1001/jamanetworkopen.2022.44772
19. Ringshaw, JE, et al. 2025. Persistent impact of antenatal maternal anaemia on child brain structure at 6–7 years of age: a South African child health study. *BMC Medicine*. 23(1):94. doi.org/10.1186/s12916-024-03838-6.
20. Gomes, F., et al. 2022. Multiple micronutrient supplements versus iron-folic acid supplements and maternal anemia outcomes: an iron dose analysis. *Annals of the New York Academy of Sciences*. 1512(1):pp.114-125. doi: 10.1111/nyas.14756.
21. Kashi, B., et al. 2019 Multiple Micronutrient Supplements Are More Cost-effective Than Iron and Folic Acid: Modeling Results from 3 High-Burden Asian Countries, *The Journal of Nutrition*, Volume 149, Issue 7. pp. 1222-1229. ISSN 0022-3166. <https://doi.org/10.1093/jn/nxz052>
22. Black, R. 2020. The Impact of Antenatal Multiple Micronutrients on Women's Health and Pregnancy Outcomes. Presentation. https://micronutrientforum.org/wp-content/uploads/2020/05/2_Impact-of-Antenatal-MMS-on-Women%E2%80%99s-Health-and-Pregnancy-Outcomes_R-Black.pdf
23. Smith, E.R., et al. 2017. 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*. <https://pubmed.ncbi.nlm.nih.gov/29025632/>
24. Black, R. Antenatal Multiple Micronutrients
25. Bourassa, M.W. et al. 2019. Review of the evidence regarding the use of antenatal multiple micronutrient supplementation in low- and middle-income countries. *Annals of the New York Academy of Sciences*, 1444(1), pp.6–21. <https://doi.org/10.1111/nyas.14121>
26. Gomes, F. et al. 2023. Antenatal multiple micronutrient supplements versus iron-folic acid supplements and birth outcomes: Analysis by gestational age assessment method. 19(3). doi:<https://doi.org/10.1111/mcn.13509>.

27. Gomes, F, Adu-Afarwuah, S, Agustina, R, Ali, H, Arcot, A, Arifeen, S, Arnold, CD, Black, RE, et al. 2025. Effect of prenatal multiple micronutrient supplementation compared with iron and folic acid supplementation on size at birth and subsequent growth through 24 mo of age: a systematic review and meta-analysis. *The American Journal of Clinical Nutrition*. (April):S0002916525002382. doi.org/10.1016/j.ajcnut.2025.04.022.
28. Health Systems Trust. Maternal and Reproductive Health Indicators. https://indicators.hst.org.za/Maternal%20and%20reproductiv20health/Neonatal/sahr_153/IND
29. Western Cape Stunting Baseline Survey on under 5-year-old children. 2023. <https://dgmt.co.za/wp-content/uploads/2023/06/WC-Stunting-Baseline-Survey-Report.pdf>
30. WHO. 2022. Malnutrition. https://www.who.int/health-topics/malnutrition#tab=tab_1.
31. Ramokolo, V., et al. 2019. South African Health Review: A landscape analysis of preterm birth in South Africa. https://www.hst.org.za/publications/South%20African%20Health%20Reviews/12%20SAHR_2019_A%20landscape%20analysis%20of%20preterm%20birth.pdf
32. Bajoria, M., Reintroducing Multiple Micronutrient Supplements
33. Verney, A.M.J. et al. 2023. Multiple micronutrient supplementation cost-benefit tool for informing maternal nutrition policy and investment decisions. *Maternal & Child Nutrition*. Vol. 19,4 2023: e13523. doi:10.1111/mcn.13523
34. Ibid.
35. Cost-effectiveness analyses for the WHO review on multiple micronutrient supplements during pregnancy: Technical Report. Ottawa: Nutrition International; 2020.
36. Nutrition International. 2023. Multiple micronutrient supplementation implementation research in Nigeria: Optimizing adherence to maternal multiple micronutrient supplementation. <https://www.nutritionintl.org/wp-content/uploads/2023/10/MMS-Nigeria-Brochure-Final-DIGITAL.pdf>
37. World Map of MMS Activities. Accessed 9 May 2025 <https://hmhbconsortium.org/world-map/>
38. Monterrosa, E.C., et al. 2017. Situation analysis of procurement and production of multiple micronutrient supplements in 12 lower and upper middle-income countries. *Maternal & Child Nutrition*, 14, p.e12500. <https://doi.org/10.1111/mcn.12500>
39. Bajoria, M., Reintroducing Multiple Micronutrient Supplements.
40. Bill & Melinda Gates Foundation, Children's Investment Fund Foundation, Eleanor Crook Foundation, & Kirk Humanitarian. 2024. Healthier Pregnancies and Brighter Futures for Mothers and Babies: A global investment roadmap for multiple micronutrient supplementation. <https://hmhbconsortium.org/knowledge-hub/mms-global-investment-roadmap/>
41. Ajello, C.A., Atwater, J., & De Lange, J. 2024. Expert Consensus on an Open-Access UNIMMAP MMS Product Specification: 2024 revision. *Annals of the New York Academy of Sciences*. <https://doi.org/10.1111/nyas.15204>
42. Nutrition International. 2020. Policy Brief: South Africa. Cost-effectiveness of Transitioning from Iron and Folic Acid to Multiple Micronutrient Supplementation for Pregnancy.
43. Kashi, Bahman, et al. 2019. Multiple Micronutrient Supplements Are More Cost-effective Than Iron and Folic Acid: Modeling Results from 3 High-Burden Asian Countries. *The Journal of Nutrition*, vol. 149, no. 7, 2019, pp. 1222–1229. Oxford University Press, <https://doi.org/10.1093/jn/nxz052>.
44. Ajello, C.A., Expert Consensus.
45. Silubonde, T.M., et al. 2022. Barriers and facilitators of micronutrient supplementation among non-pregnant women of reproductive age in Johannesburg, South Africa. *PLOS global public health*, 2(11), pp.e0001310e0001310. doi:<https://doi.org/10.1371/journal.pgph.0001310>.
46. DHIS2 Nutrition - System Design Document. n.d. Available from: <https://docs.dhis2.org/en/implement/health/nutrition/nutrition-aggregate/design.html> [Accessed 30 May 2025].

Imagine if every child born today,
tomorrow and the next day
and the next....
had enough love, enough food,
enough safety and brain power.

Together we would change
our future.

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