Exploring the Cost-Effectiveness of MMS during Pregnancy

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With thanks to Canada Limestone Analytics
Outline

- Context
- Evidence
- Cost-effectiveness
- MMS Cost-Benefit Tool
- Why and what?
- Case Study
- Where to access
- Demonstration

Key Parameters and Results for Pakistan

<table>
<thead>
<tr>
<th>Assumptions</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>4,265,339</td>
<td></td>
</tr>
<tr>
<td>Coverage</td>
<td>98%</td>
<td></td>
</tr>
<tr>
<td>Costs per beneficiary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IFG</td>
<td>$0.83</td>
<td></td>
</tr>
<tr>
<td>MMS</td>
<td>$346</td>
<td></td>
</tr>
<tr>
<td>Total cost</td>
<td>$2,000,000</td>
<td></td>
</tr>
<tr>
<td>Source of health effects</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kasse et al. 2008 (Carnarvon)</td>
<td></td>
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<tr>
<td>Smith et al. 2017 (Levels)</td>
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</tr>
</tbody>
</table>

| Incremental MMS Health Outcomes (Compared to IFAS) | |
|-----------------|-----------------|-----------------|
| Global | Neomortality | -1,585,345 |
| | Neonatal mortality | -442,657 |
| | Infant mortality | 72,228 |
| | Low birth weight | 24,676 |
| | Small f. gestational age | 96,340 |
| | Maternal mortality | 903,607 |
| | Maternal anemia | 37,316 |
| | Non-significant outcome | Insufficient data |
| | Significant outcome | (4%)

<table>
<thead>
<tr>
<th>Cost Effectiveness Analysis</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment required</td>
<td>$69,583,091</td>
</tr>
<tr>
<td>Value of DALYs averted</td>
<td>$27,067,187,464</td>
</tr>
<tr>
<td>Benefit Cost Ratio</td>
<td>389</td>
</tr>
<tr>
<td>Incremental cost per DALY averted</td>
<td>$9.81</td>
</tr>
</tbody>
</table>

Very Cost Effective according to WHO guidelines.
NUTRITION INTERNATIONAL

A global nutrition organization originated in Canada

- Over 400 staff worldwide
- Offices in 10 countries (Africa & Asia)
- Technical assistance in >20
- Vitamin A assistance in >60
- Reach >500m people / year
Context: Global Goals and Targets - accelerating progress (1)

Maternal Nutrition

2. 50% reduction of anaemia in women of reproductive age

3. 30% reduction in low birth weight

4. 40% reduction in stunting for children under 5yrs
Context: Supplementation During Pregnancy (2)

- WHO ANC guidelines (2016):
  - Clear recommendation for daily IFA supplementation
  - MMS “Not Recommended” due to gaps in evidence and potential risk to newborns.

- MMS and IFA are equally effectively at reducing the risk of anaemia during pregnancy

- More recent evidence*: no increased harm and improved birth outcomes compared to IFA.

- Additional cost for MMS is a major barrier expressed by countries

- WHO are reviewing the more recent MMS evidence and may revise their guidance in 2020

* (Smith et al., 2017, Keats et al., 2019)
The need remains for country-driven knowledge translation and advocacy to demonstrate the cost-effectiveness of MMS.
Evidence: Cost Effectiveness (2)

- Kashi et al., 2019 shows that MMS is more cost-effective than IFAS in Pakistan, India, and Bangladesh.
- In all scenarios, MMS are considered very cost-effective compared to IFAS. MMS will avert 2-3x more Disability Adjusted Life Years (DALYs) than IFAS.
- MMS is cost-effective and generates positive health outcomes for both infants and pregnant women using health effect sizes from both meta-analyses.
- Methodology from Kashi et al., 2019 underpins the tool.
What is the MMS Cost-Benefit Tool?

A simple tool to answer a single policy question: *Is MMS better value for money than IFAS?*

**Purpose:**
To support the knowledge translation of economic evidence on IFAS and MMS for countries’ decision- and policy-makers

**What’s unique?**
- **Simplicity**, user-friendly, online
- Evidence-based but **rapid**
- **Timely**
- **Dynamic**

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[Image of MMS Cost-Benefit Tool interface]

**Key Parameters and Results for Indonesia**

**Assumptions**
- Population: 417,630,000
- Coverage: 30%
- Costs per beneficiary (US): $227
- MMR: $1,517
- Translation Cost: $5,926,000
- Source of health effects:
  - Mortality
  - Morbidity

**Health Outcome Analysis**
- Additional DALYs averted by MMS compared to IFAS (Significant outcomes only)
- Stunting
- Maternal mortality (95%)
- Maternal mortality (80%)
- Preterm
- Low birth weight
- Small for gestational age
- Maternal anemia

**Cost-Effectiveness Analysis**
- Value of DALYs averted:
- $2,861,657,663
- $15,692,575
- 182 Benefit/Cost Ratio
- $44.96
- Additional cost per DALY averted

**Very Cost Effective**
According to WHO guidelines

For more information contact: health@nutritionint.org
Last updated: (date)
Analytical Capacity

- Comparison based on effect sizes from Smith 2017 / Keats 2019 systematic reviews
- The tool estimates the impact of MMS compared to IFAS for all significant health outcomes and calculates budget impact, cost-effectiveness, and return on investment.
- Currently for 12 countries in Africa and Asia – and expanding in 2020

1 Keats et. al. 2019
2 Smith et. al. 2017
Case Study: Is MMS better value for money than IFAS for Indonesia?

Yes

- Compared to IFA, MMS will avert an additional 925,250 DALYs; 8,000 child deaths
- Valued at: $7B
  - Via averting: stillbirth, neonatal mortality (females), pre-term, low birth weight and small for gestational age births.
- This will cost an additional $15.7M, or $17 per DALY averted.
- The benefits outweigh the costs on an order of 483 to 1.
- This is “very cost effective.”

\[1\text{Over 10 years}\]
Case Study: Key Takeaways

• Transitioning to MMS leads to additional significant perinatal health outcomes compared to IFAS.

• The transition is very cost-effective compared to the WHO threshold (using either the Smith et al. or the Keats et al. scenarios)

• The transition has a high return on investment—the long-term economic benefits outweigh the costs on the order of 483 times.

Where to access this tool & resources:

• Dissemination and application in various contexts underway

• Tool, relevant materials and Policy briefs: NutritionIntl.org/mms-cost-benefit-tool/

• For more information contact: MoMS@nutritionIntl.org

• Interactive Learning Lab: Learning Center – Micronutrient Forum
Demonstration
NutritionIntl.org/mms-cost-benefit-tool/
Static Demo Slides
MMS Cost-Benefit Tool

MMS at the heart of Multiple Micronutrient Supplementation

Recent evidence has encouraged low- and middle-income countries to consider transitioning from single-vitamin to multiple-micronutrient supplementation (MMS) for infant and young child programs. However, globallyobbn to facilitate this transition is limited.

This tool was developed to aid countries in decision-making. It uses a rigorous methodology to calculate the incremental benefits and costs of transitioning from single-vitamin to multiple-micronutrient supplementation. It is designed to be used as a tool in training sessions or as a resource for policymakers.

Please note:
1. The tool will display data for the country specified in the database. Click the search icon on the web browser to reset. Please ensure the site will return to default and you will view any new data.
2. This page may be viewed in various browsers, but may not display properly and have limited options on desktop.

USER GUIDE
- This guide provides an overview of the functionality of each section and guidance on interpreting the results.

DATA SOURCES
- This document provides the recommended data sources for each parameter in the tool.

POWERPOINT TEMPLATE
- This is a presentation template for communicating the results generated from the tool.

MMS Cost-Benefit Tool

Report Custom Analysis

Key Parameters and Results for Bangladesh
Key Parameters and Results for Indonesia

### Assumptions
- **Population:** 4,178,320
- **Time span:** 10
- **Coverage:** 30%
- **1,253,496
- **Costs per beneficiary:**
  - IFAS: $2.27
  - MMS: $3.27
- **Transition**
  - Cost: $0

### Health Outcome Analysis

<table>
<thead>
<tr>
<th>Health Outcome</th>
<th>Additional DALYs Averted</th>
<th>DALYs Averted Compared to IFAS (Significant outcomes only)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stillbirth</td>
<td>925,250</td>
<td>243,127</td>
</tr>
<tr>
<td>Neonatal mortality (F)</td>
<td>8,616</td>
<td>287,564</td>
</tr>
<tr>
<td>Neonatal mortality (M)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Infant mortality</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Pre-term</td>
<td>0</td>
<td>162,206</td>
</tr>
<tr>
<td>Low birth weight</td>
<td>2,340</td>
<td>130,013</td>
</tr>
<tr>
<td>Small for gestational age</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maternal mortality</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Maternal anaemia</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Significant:**

**Not significant:**

**Not reported:**

### Cost-Effectiveness Analysis
- **Value of DALYs averted:** $7,585,767,378
- **Additional investment over 10 years:** $10,692,575
- **Benefit-Cost Ratio:** 709
- **Additional cost per DALY averted:** $11.56

**Very Cost Effective**

According to WHO guidelines

For more information contact MoMS@nutritionintl.org

Last updated: 2019-10-10

Dashboard developed with Limestone analytics
Key Parameters and Results for Indonesia

Assumptions
- Population: 4178320
- Timespan: 10
- Coverage: 30%
- Costs per beneficiary
  - IFAS: $2.27
  - MMS: $3.27
- Transition Cost: $0
- Source of health effects
  - Keats et al. 2019 (Cochrane)
  - Smith et al. 2017 (Lancet)

Health Outcome Analysis
- Additional DALYs averted by MMS compared to IFAS (significant outcomes only)
  - Stillbirth: 0
  - Neonatal mortality (F): 0
  - Neonatal mortality (M): 0
  - Infant mortality: 0
  - Pre-term: 0
  - Low birth weight: 2340
  - Small for gestational age: 346,702
  - Maternal mortality: 0
  - Maternal anaemia: 0

  - significant
  - not significant

- 349,041 Additional DALYs averted
- 0 Additional child deaths averted
- 100.0% Confidence in positive health outcomes

Cost-Effectiveness Analysis
- Value of DALYs averted: $2,861,657,663
- Additional investment over 10 years: $10,692,575
- Benefit-Cost Ratio: 268
- Additional cost per DALY averted: $30.63
- Very Cost Effective according to WHO guidelines

Dashboard developed with Limestone analytics

For more information contact: MoMS@nutritionIntl.org
Last updated: 2019-10-10
Policy Briefs
Policy Briefs are available for the countries listed on the map. These documents summarize the results of the analysis and are designed for policymakers to answer the question “Is antenatal MMS better value for money than IFAS?”

<table>
<thead>
<tr>
<th>POLICY BRIEFS</th>
</tr>
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<tbody>
<tr>
<td>Bangladesh</td>
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<tr>
<td>India</td>
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<tr>
<td>Nigeria</td>
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<tr>
<td>Philippines</td>
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<tr>
<td>Burkina Faso (English</td>
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<tr>
<td>Indonesia</td>
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<tr>
<td>Madagascar</td>
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<tr>
<td>Senegal (English</td>
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<tr>
<td>Ethiopia</td>
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<tr>
<td>Kenya</td>
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<tr>
<td>Pakistan</td>
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<tr>
<td>Tanzania</td>
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</tbody>
</table>
# MMS Cost-Benefit Tool

**Report:**

<table>
<thead>
<tr>
<th>Country</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region:</td>
<td>Caucasian a.</td>
</tr>
<tr>
<td>GDP per capita</td>
<td>$0.00</td>
</tr>
<tr>
<td>Value of Statistical Life</td>
<td>$0</td>
</tr>
<tr>
<td>Life expectancy at birth</td>
<td>30.0</td>
</tr>
<tr>
<td>Life expectancy at median age of first pregnancy</td>
<td>30.0</td>
</tr>
</tbody>
</table>

| Stillbirth per 1000 births | 0.0 |
| Neoretrial mortality (female) per 1000 live female births | 0.0 |
| Neoretrial mortality (male) per 1000 live male births | 0.0 |
| Neoretrial mortality (total) per 1000 live births | 0.0 |
| Infant mortality per 1000 live births | 0.0 |
| Maternal mortality per 100,000 live births | 0.0 |

**Cost-Efficiency Analysis**

- **Value of DALYs averted:** $0
- **Additional investment over 10 years:** $255,906
- **Benefit-Cost Ratio:** 0
- **Additional cost per DALY averted:** according to WHO guidelines

## Key Parameters and Results for Country

### Assumptions

- **Population:** 100,000
- **Time: 10**
- **Coverage:** 30%
- **Costs per beneficiary:**
  - IFAS: $2.27
  - MMS: $3.27
- **Transition:**
  - Cost: $0
- **Source of health effects:**
  - Heal et al. 2013 (Cochrane)
  - Smith et al. 2017 (Lancet)

### Health Outcome Analysis

- **Additional DALYs averted**
- **Additional child deaths averted**
- **Confidence in positive health outcomes**

## Dashboard developed with NUTRITION INTERNATIONAL

For more information contact MolMS@nutritionint.org
Last updated: 2019-10-10