Health and Economic Burden of Micronutrient Deficiencies

Presented by Scott J. Montgomery
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FFI advocates for and supports fortification of industrially milled cereal grains by collaborating with multi-sector partners.
Smarter, Stronger, Healthier
Vitamin and Mineral Deficiency Contributes to:

- More than one-third of all *deaths in children* under the age of 5
- Stunting of an estimated *195 million children* under age 5 in developing countries
- Undeveloped *cognitive capacity*, productivity and earning potential
Iron Deficiency:

- Affects more people than any other health condition
- Reduces work capacity
- Impairs a child’s physical and intellectual development
- Contributes to 20% of all maternal deaths
- Is a leading cause of anemia which affects 2 billion people – over 30% of the world’s population

Rwanda photo from Project Healthy Children.
Anemia leads to:

- 17% lower productivity in heavy manual labor
- 5% lower productivity in other manual labor
- Estimated 2.5% loss of earnings due to lower cognitive skills
Anemia in Seven Countries

Current data from Demographic and Health Surveys
Anemia in Seven Countries

Precent of anemia in non-pregnant women of reproductive age

Country: Tanzania, Mozambique, Uganda, South Africa, DRC, Ethiopia, Rwanda

Percent of Anemia

Current DHS Data
Folic Acid

• Vitamin B9
• 400 micrograms daily recommended for women who might become pregnant
• Deficiency can also cause anemia
Neural Tube Defects

• An estimated 300,000 neural tube defects (NTDs) occur every year globally.¹

• Most of these birth defects are preventable if the mother has enough folic acid at the right time.²

² U.S. Centers for Disease Control and Prevention: http://www.cdc.gov/ncbddd/folicacid/faqs.html
Photos from Google Images
March of Dimes estimates for all countries except South Africa. South Africa data from 2008 literature.
Equivalent of 400 µg of Folic Acid

To get the equivalent of 400 micrograms of folic acid a day, eat:

- 4 slices of beef liver or
- 44½ medium ripe tomatoes or
- 14½ cups of raw broccoli or
- 17½ cups of orange juice or
- 5½ cups of black beans or
- 200 medium red apples or
- 19½ cups of raw green beans
Fortification Strategy
### Fortification For NTD Prevention

<table>
<thead>
<tr>
<th>Meta-analysis published in 2010:</th>
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<tr>
<td>8</td>
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<tr>
<td>5</td>
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<td>31 – 78%</td>
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<td>46%</td>
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South Africa

- 41.6% decline in spina bifida after fortification
- 30 rand saved in healthcare costs for every one rand spent on fortification

Cost: 1 rand
Benefit: 30 rand

Vitamin A Deficiency

An estimated 250 million preschool children are vitamin A deficient:
• Leading cause of preventable childhood blindness
• Significantly increases risk of severe illness and death from infections, diarrheal disease and measles
• 3 meta-analysis find Vitamin A Supplementation, including fortification, reduce mortality in children < 5 years of age 23-30% (Lancet 2013).

In pregnant women:
• Causes night blindness
• May increase risk of maternal mortality
Children <5 Mortality Rates

Mortality Rate <5/1000 live births

Country

Burundi 104
Ethiopia 68
Kenya 73
Malawi 71
Mozambique 90
Rwanda 55
Tanzania 54
Uganda 69

Fortifying with Vitamin A

• Can be added to wheat flour and maize products
• Usually more practical in cooking oil or sugar
Thank You

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