# ZINC DEFICIENCY, IZiNCG AND THE ZINC FORTIFICATION TASK FORCE

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# ZINC 101

| | |
|---|---|
| **Biological role:** | • Catalyst, structural element or regulatory ion in several metabolic processes, including DNA transcription, gene expression, signal transduction, and endocrine function<br>• Important for immune function, reproductive health, child growth and development |
| **Groups vulnerable to deficiency:** | • Infants, young children, pregnant women |
| **Dietary sources:** | • Animal-source foods (organ meats and flesh from mammals, poultry and seafood are highest in zinc)<br>• Fortified foods<br>• Lentils, beans, seeds (note that phytate in plant sources of zinc can impair absorption) |
| **Recommended indicators of Zn status:** | 1. Dietary zinc intake<br>2. HAZ of growing children<br>3. Plasma/serum zinc concentrations |

King et al. J Nutrition 2016

# ADVERSE OUTCOMES ASSOCIATED WITH ZINC DEFICIENCY

| | Attributable deaths with UN prevalences* | Proportion of total deaths of children younger than 5 years | Attributable deaths with NIMS prevalences† | Proportion of total deaths of children younger than 5 years |
|---|---|---|---|---|
| Fetal growth restriction (<1 month) | 817 000 | 11·8% | 817 000 | 11·8% |
| Stunting (1–59 months) | 1 017 000* | 14·7% | 1 179 000† | 17·0% |
| Underweight (1–59 months) | 999 000* | 14·4% | 1 180 000† | 17·0% |
| Wasting (1–59 months) | 875 000* | 12·6% | 800 000† | 11·5% |
| Severe wasting (1–59 months) | 516 000* | 7·4% | 540 000† | 7·8% |
| Zinc deficiency (12–59 months) | 116 000 | 1·7% | 116 000 | 1·7% |
| Vitamin A deficiency (6–59 months) | 157 000 | 2·3% | 157 000 | 2·3% |
| Suboptimum breastfeeding (0–23 months) | 804 000 | 11·6% | 804 000 | 11·6% |
| Joint effects of fetal growth restriction and suboptimum breastfeeding in neonates | 1 348 000 | 19·4% | 1 348 000 | 19·4% |
| Joint effects of fetal growth restriction, suboptimum breastfeeding, stunting, wasting, and vitamin A and zinc deficiencies (<5 years) | 3 097 000 | 44·7% | 3 149 000 | 45·4% |

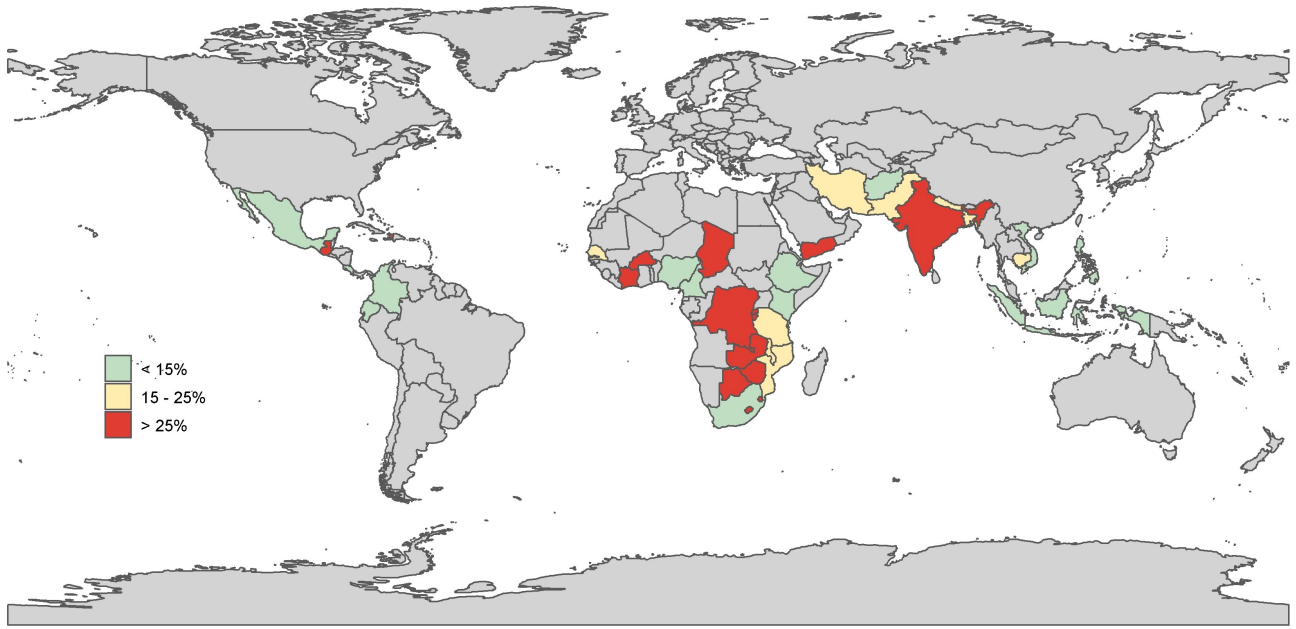
Data are to the nearest thousand. *Prevalence estimates from the UN. †Prevalence estimates from Nutrition Impact Model Study (NIMS).

*Table 2:* **Global deaths in children younger than 5 years attributed to nutritional disorders**

- ↑ incidence of diarrhea and respiratory infections in children
- ↑ risk of child stunting
- ↑ risk of preterm birth
- ↑ risk of child mortality

Black RE et al. Lancet 2013

# ZINC DEFICIENCY IS A PUBLIC HEALTH PROBLEM IN 40 LMICs




- 18 countries with an estimated prevalence of inadequate zinc intake > 25% and prevalence of stunting > 20%
- 18 countries with a prevalence of low plasma zinc concentration among WRA or PSC > 20%
- 4 countries meeting all 3 criteria

# WHAT IS IZiNCG?

- **I**nternational **Zi**nc **N**utrition **C**onsultative **G**roup

- An international group whose primary objectives are to promote and assist efforts to reduce the global burden of zinc deficiency.

- IZiNCG focuses on the identification, prevention and treatment of zinc deficiency in the most vulnerable populations in low-income countries.

# WHAT DOES IZINCG DO?

| TECHNICAL ASSISTANCE, INTERPRETATION & DISSEMINATION OF RESEARCH | |
|---|---|
| **Applied Research** | **Programmatic & Policy Guidance** |
| • RCT of different doses, forms, and frequencies of zinc supplementation in young Bangladeshi infants | • Technical briefs posted to IZiNCG website |
| • Efficacy trial of multiply-fortified salt among WRA | • FAO/INFOODS/IZiNCG global food composition database for phytate & evaluation of lab methods for phytate assessment |
| • Kinetic modeling for zinc metabolism in stunted, zinc-deficient infants | • Incorporation of zinc deficiency data into WHO Micronutrient Database |
| • Comparison of laboratory methods for analysis of plasma zinc | • Working group for the promotion of biomarkers of micronutrient status in national nutrition/health surveys |
| • BRINDA2: Adjusting plasma/serum zinc for inflammation | • Zinc Fortification Task Force |
| • Systematic review of tolerable upper intake level in young children | • Communications, advocacy, fundraising |

# ZINC FORTIFICATION TASK FORCE

**Goal:** To assess the efficacy and effectiveness of zinc fortification interventions, and to identify opportunities to enhance impact.

**Task force members:**

- GAIN, FFI, Nutrition International, IZiNCG (UCSF, BMGF, UC Davis, Johns Hopkins)

**Summary of key activities:**

- Systematic review of LSFF with zinc
- Key informant interviews to identify barriers to and enablers of LSFF with zinc
- Advocacy resources: Call to Action, Country Briefs
- Analysis of FBS data to assess potential impact of LSFF with zinc

# KEY RESOURCES

2020

*Article*

**Enablers and [illegible]xperience from 10 Low- and Middle-Income Countries with Mandatory Large-Scale Food Fortification**

https://www.mdpi.com/journal/nutrients

Ann Tarini [1,*], Mari S. Manger [2,3], Kenneth H. Brown [3,4], Mduduzi N. N. Mbuya [3,5], Laura A. Rowe [3,6], Frederick Grant [3,7], Robert E. Black [3,8] and Christine M. McDonald [2,3,9]

**Effects of Foods Fortified with Zinc, Alone or Cofortified with Multiple Micronutrients, on Health and Functional Outcomes: A Systematic Review and Meta-Analysis**

Becky L Tsang,[1,2] Erin Holsted,[1,3] Christine M McDonald,[1,4,5] Kenneth H Brown,[1,6] Robert Black,[1,7] Mduduzi NN Mbuya,[1,8] Frederick Grant,[1,9] Laura A Rowe,[1,2] and Mari S Manger[1,4]

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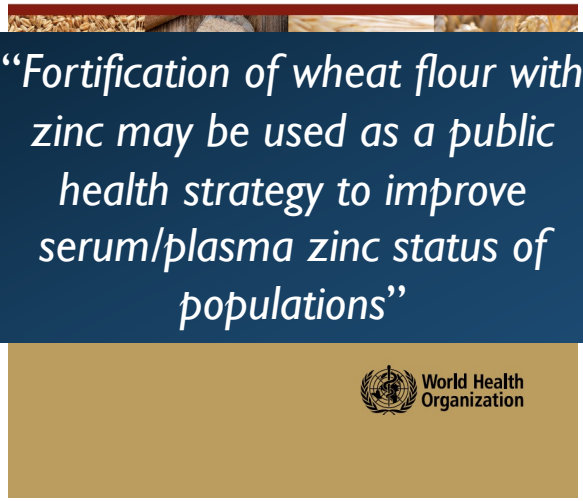
2021


2022

GUIDELINE:
**FORTIFICATION OF WHEAT FLOUR WITH VITAMINS AND MINERALS AS A PUBLIC HEALTH STRATEGY**




NUTRITION INTERNATIONAL
Nourish Life
Food Fortification Initiative
Enhancing Grains for Healthier Lives
BILL & MELINDA GATES foundation
gain
Global Alliance for Improved Nutrition
UCDAVIS
Institute for Global Nutrition
JOHNS HOPKINS
BLOOMBERG SCHOOL of PUBLIC HEALTH

# THANK YOU!

www.izincg.org

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