

CONSEQUENCES OF MICRONUTRIENT DEFICIENCY



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Food Fortification Initiative
Enhancing Grains for Healthier Lives



What is Malnutrition?

- Malnutrition = “lack of nutrients / poor nutrition”

- Two principle constituents:
 - Protein-energy malnutrition
 - **Deficiency in micronutrients**



Overview of Micronutrient Deficiencies

- Common when dependent on relief food or even stable conditions
- Preventable, BUT
 - Food sources not common and are expensive
 - Fortification and supplementation
- Difficult to recognize
 - Symptomatic cases often represent tip of iceberg
 - Laboratory assessment difficult & expensive
- Lack of 1 micronutrient typically associated with deficiencies of other micronutrients
- Highest risk groups, Young children, Pregnant Women, Lactating women



5 Major Micronutrient Deficiencies

- Iron → Anemia
- Iodine → Iodine Deficiency Disorders (IDD)
- Vitamin A → Xerophthalmia
- Zinc → Multiple disorders
- Folic acid → Folate deficiency-NTD

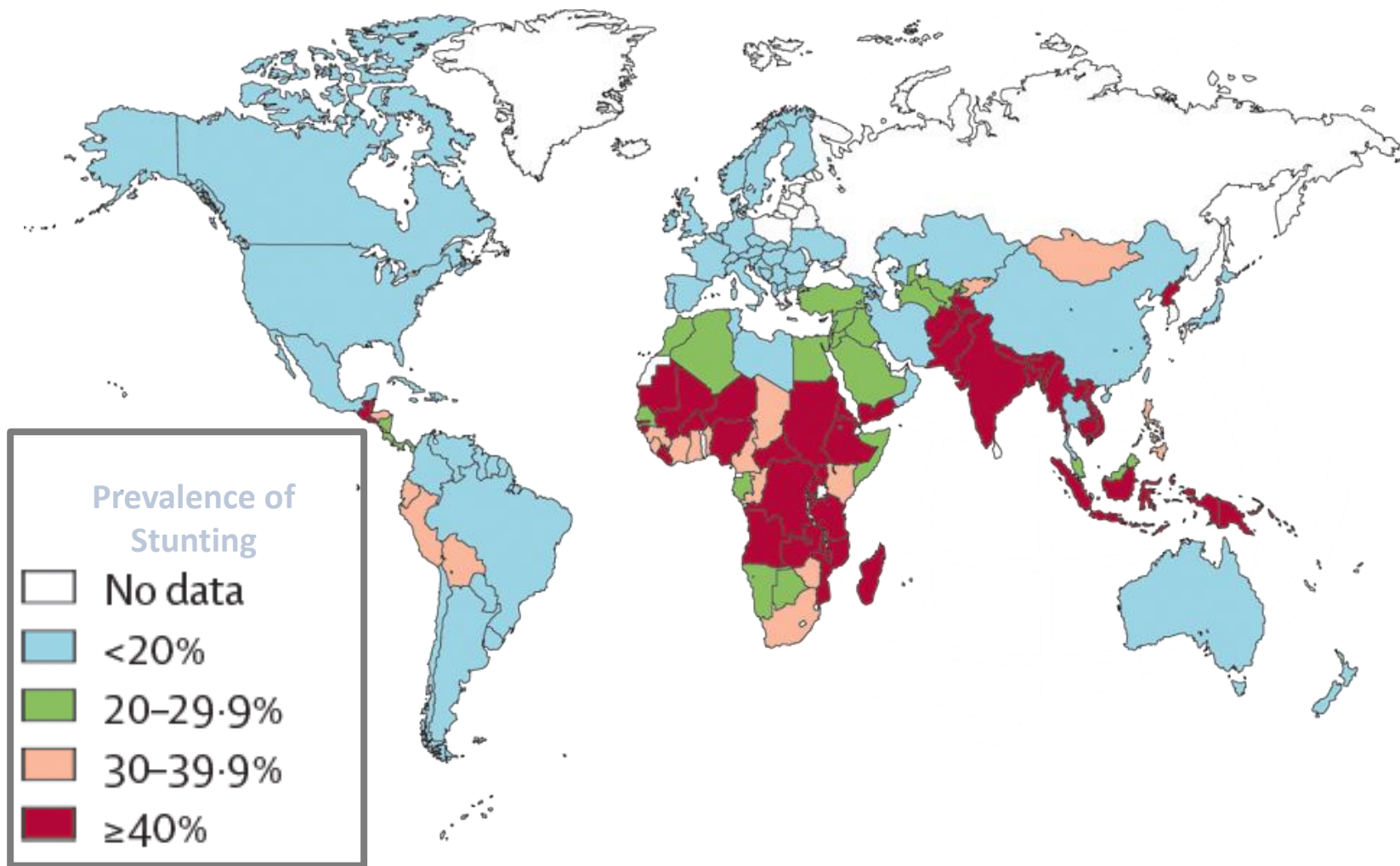


Why nutrition? The facts

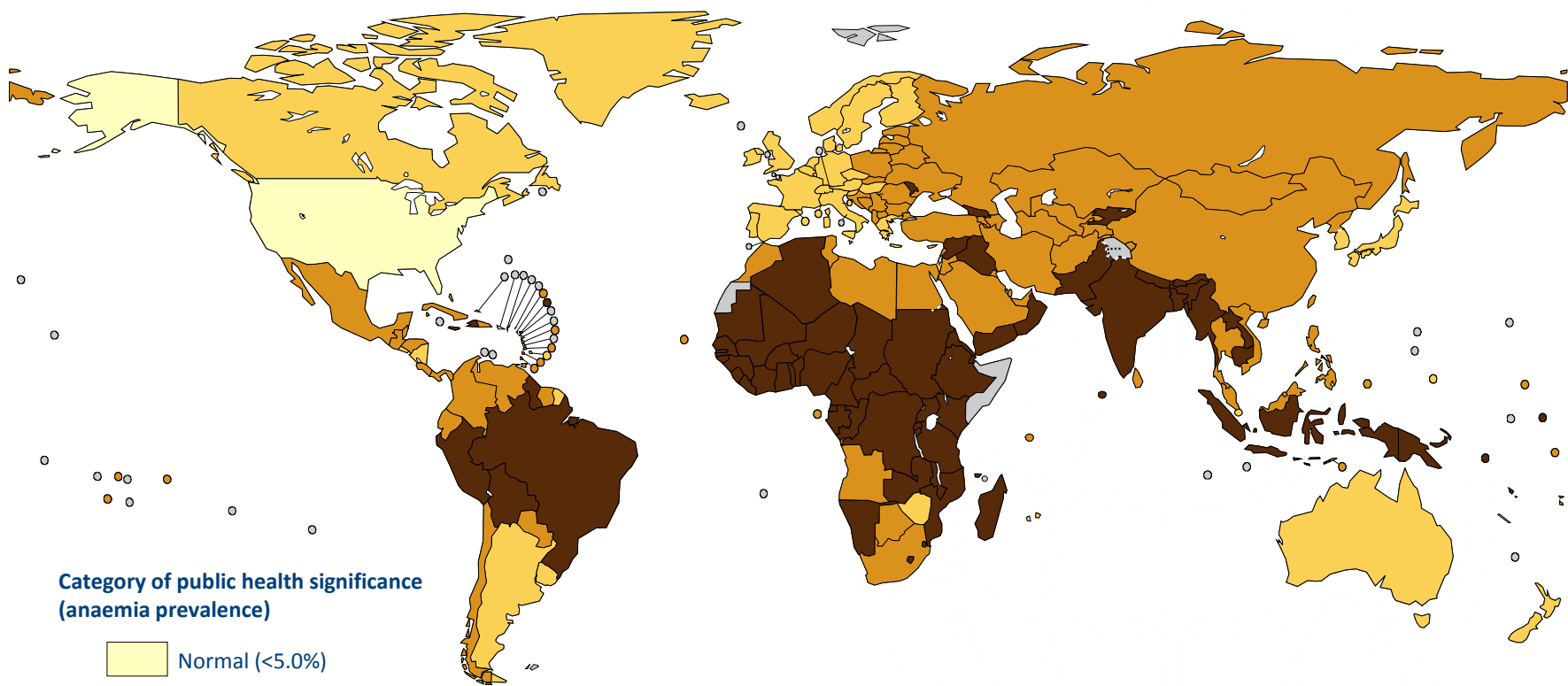
- **Over 165 million children under 5 are stunted as a result of malnutrition.**
- **52 million children** are too thin and require special treatment.
- At the same time, **43 million children** are overweight - some as a result of poverty, when families are unable to afford a balanced, nutritious diet.
- **2 billion** people are deficient in key vitamins & minerals



171 million children under 5 stunted growth (2010)



293 million children under 5 are anaemic



Category of public health significance
(anaemia prevalence)

- Normal (<5.0%)
- Mild (5.0-19.9%)
- Moderate (20.0-39.9%)
- Severe ($\geq 40.0\%$)
- No Data



Anemia- Risk Factors

- Low dietary intakes
 - Diet poor in iron-rich foods/animal foods
 - High intake of inhibitors (Tea)
- Infections (malaria, helminthes infection, schistosomiasis)
- Blood loss





Iron Deficiency:

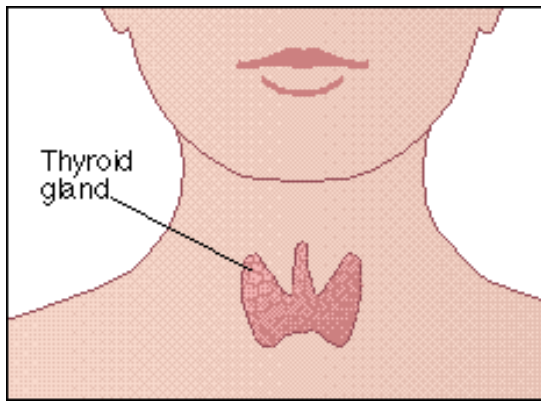
- Affects *more people* than any other health condition
- Reduces *work capacity*
- Impairs a child's physical and intellectual *development*
- Contributes to 20% of all *maternal deaths*
- Is a leading cause of anemia which affects *2 billion people* – over 30% of the world's population





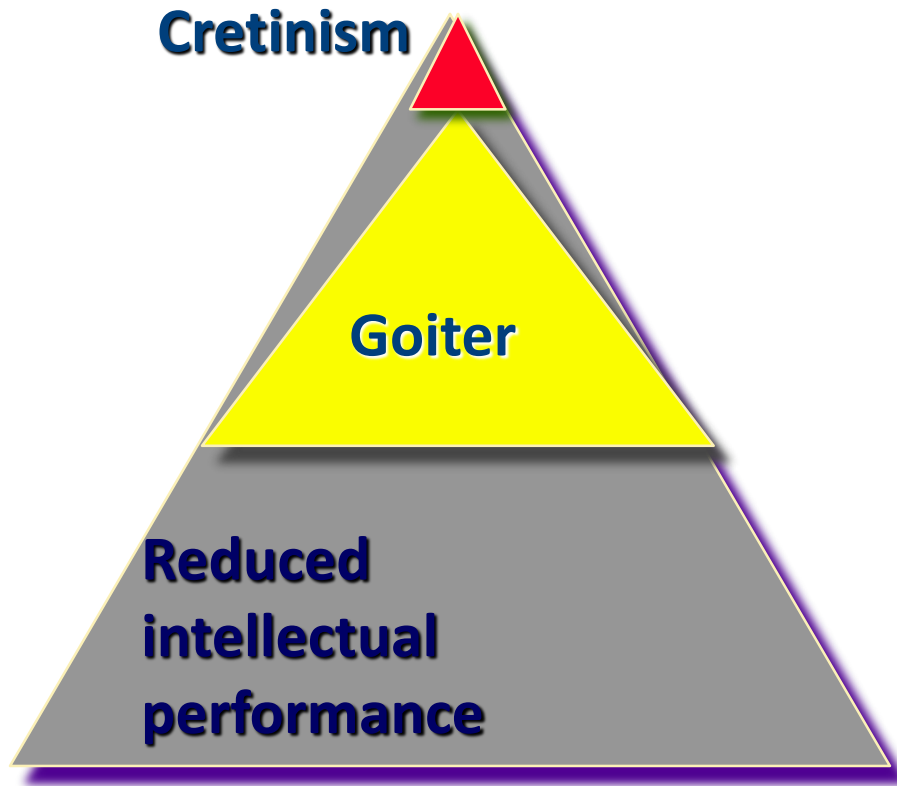
Iodine Deficiency Disorders (IDD)

- Significant cause of preventable brain damage in children
- Health effects:
 - Increased perinatal mortality
 - Mental retardation
 - Growth retardation
- Preventable by consumption of adequately iodized salt





Iodine Deficiency Affects the Brain



***Goiter manifests only a small portion of IDD**



Vitamin A Deficiency (VAD)

- Leading cause of preventable blindness among pre-school children
- Also affects school age children and pregnant women
- Weakens the immune system and increases clinical severity and mortality risk from measles and diarrhoea
- Supplementation with vitamin A capsules can reduce child mortality by 23%.
- WHO (2002) estimates that 21% of all children suffer from VAD, mostly in Africa and Asia



Zinc Deficiency

- Zinc essential for the function of many enzymes and metabolic processes
- Zinc deficiency is common in developing countries with high mortality
- Zinc commonly the most deficient nutrient in complementary food mixtures fed to infants during weaning
- Zinc interventions are among those proposed to help reduce child deaths globally by 63% (Lancet, 2003)



Zinc Deficiency- Signs & Symptoms

- Hair loss
- Skin lesions
- Diarrhea
- Poor growth
- Acrodermatitis enteropathica
- Death





Insufficient Folic Acid

- 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



Spina bifida is malformation of the baby's spine. It causes permanent disability.



Anencephaly is malformation of the baby's brain. It is always fatal.

¹ Global Report on Birth Defects, March of [Dimes](#) Birth Defects Foundation, 2006

² U.S. Centers for Disease Control and Prevention: <http://www.cdc.gov/ncbddd/folicacid/faqs.html>

Photos from Google Images



Conclusions

- Different interventions exist
 - Supplementation
 - Dietary diversification
 - Infection control like worms and malaria –etc
 - Food fortification