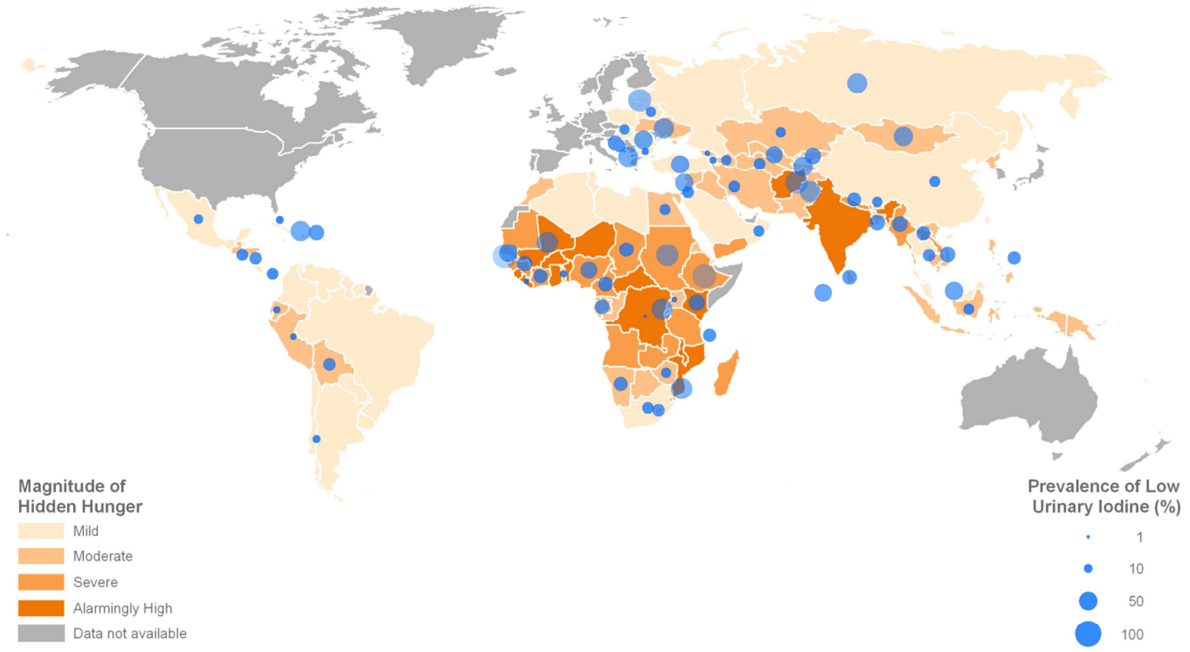
The Global Hidden Hunger Indices and Maps:

An Advocacy Tool for Action

EXECUTIVE SUMMARY



Magnitude of Hidden Hunger (Zinc, Iron and Vitamin A Deficiencies), Prevalence of Iodine Deficiency

Introduction

We're moving toward a new development agenda. The world is embracing the critical role of nutrition in improving health and increasing prosperity. And nations are beginning to implement plans to scale up nutrition. The new *Lancet* Series on Maternal and Child Nutrition has called for maternal multiple micronutrient supplementation as a key intervention that can save 102,000 lives per year as part of a package of interventions during pregnancy. Another 145,000 lives could be saved through vitamin A and zinc supplementation for children, according to the Series. The papers also called for better data on micronutrient deficiencies at the national level to help guide intervention programs in countries and to prioritize global support.

By highlighting global hidden hunger hot spots and providing, for the first time, a ranked index of countries affected by multiple micronutrient deficiencies, the Hidden Hunger Index begins to fill this gap in the evidence base. The Hidden Hunger Index provides the global health and development community with evidence to inform where to focus national strategies and programs, and on which micronutrients. To countries, donors and partners working to scale up nutrition, it offers an opportunity to develop a unified approach to target the alleviation of hidden hunger.

The Impact of Hidden Hunger

Globally, an estimated two billion people suffer from a chronic deficiency of essential vitamins and minerals (micronutrients), a condition known as hidden hunger. As the term hidden hunger indicates, the signs are not always visible in those affected by it. Nevertheless, its negative and often lifelong consequences for health, productivity and mental development are devastating. Young children and women of reproductive age living in low-income countries are the most vulnerable.

Worldwide, the most widespread micronutrient deficiencies are of iron, zinc, vitamin A, iodine and folate, but deficiencies of vitamin B12 and other B vitamins also commonly occur. In developing countries, multiple micronutrient deficiencies often occur concurrently in the same population. These deficiencies account for approximately 7 percent of the global disease burden annually. Even mild to moderate deficiencies of micronutrients lead to impaired physical and cognitive development, poor physical growth, increased morbidity from infectious diseases in infants and young children and decreased work productivity in adulthood.

About the Hidden Hunger Index

Unified global efforts to mitigate the high burden of hidden hunger in populations around the world are crucial to the achievement of most of the Millennium Development Goals (MDGs). However, a strong evidence base of the burden of collective micronutrient deficiency and its contributions to disease, both nationally and globally, has been lacking. Earlier indices such as the Global Hunger Index, reflecting measures of food security, undernourishment and child mortality, captured the multidimensional aspects and consequences of hunger caused mainly by food and caloric deficit, and did not take into account the burden and consequences of pervasive hidden hunger. Maps depicting single micronutrient deficiencies have served to inform policy makers and the scientific community of the extent of individual vitamin and mineral deficiencies, but do not illustrate the more commonly observed multiple micronutrient deficiencies.

Sight and Life developed indices and maps of global hidden hunger to help prioritize program assistance and to serve as an evidence-based global advocacy tool. The global hidden hunger indices and maps capture the collective burden of micronutrient deficiencies and their contribution to the disease burden. Indices and maps are useful tools for public health advocacy and planning, and can serve as a tool to stimulate global efforts towards scaling up nutrition interventions.

Key Messages

- An estimated two billion people are affected by deficiencies of essential vitamins and minerals, collectively known as “hidden hunger.” Young children and women of reproductive age in developing countries are the hardest hit.
- Micronutrient deficiencies account for approximately 7 percent of the global disease burden.
- Even mild to moderate deficiencies of micronutrients have detrimental effects on human functionality and productivity. Iron deficiency leads to impaired physical and cognitive development in infants and young children and decreased work productivity in adults.
- In most of the 20 countries with the highest Hidden Hunger Index scores, 40 percent of preschool children were estimated to be stunted, more than 30 percent were anemic due to iron deficiency and more than half were vitamin A deficient.
- A number of countries in sub-Saharan Africa, as well as India and Afghanistan in Asia, had an alarmingly high level of hidden hunger, with stunting, iron deficiency anemia and vitamin A deficiency all being highly prevalent among preschool children.
- In 36 countries, home to 90 percent of the world’s stunted children, micronutrients deficiencies, especially vitamin A and zinc, were responsible for up to 12 percent of the total number of life years lost (DALYs) due to ill-health, disability or early death.
- Countries with high Human Development Index scores tended to have low Hidden Hunger Index scores and vice versa, highlighting the importance of addressing hidden hunger in order to achieve adequate development, improve health care and education and vice versa.
- By highlighting the global hidden hunger hot spots and providing a ranking index of affected countries, the hidden hunger maps can inform strategies for unified efforts to eliminate hidden hunger.

The Hidden Hunger Index was developed in consultation with high-level scientists, academics and decision makers from a range of global institutions, including UN agencies, U.S. government agencies, universities and international NGOs. The paper was published in the journal *PLOS ONE*, and can be viewed at http://bit.ly/hiddenhungerindex.

Hidden Hunger Index: Key Findings

Globally, there were hot spots of hidden hunger for preschool-age children, with the prevalence being alarmingly high in sub-Saharan Africa, India and Afghanistan, and severe in many countries in South-Central/South-East Asia. Low-quality, micronutrient-poor diets, as well as frequent infections, are likely to be the key causal factors, further compounded by poor economic conditions and repressive political systems. Most South American countries only had a mild-to-moderate degree of hidden hunger. Of the 20 countries with the highest Hidden Hunger Index scores, 18 were in sub-Saharan Africa and two, India and Afghanistan, were in Asia. Of the 149 countries with a 2007 Human Development Index score of less than 0.9, the country with the highest Hidden Hunger Index score was Niger and the lowest was Hungary.

For preschool children in most of the 20 countries with the highest Hidden Hunger Index scores, more than 40 percent were estimated to be stunted/zinc-deficient, 30 percent were anemic due to iron deficiency and 50 percent were vitamin A deficient. The DALYs-based indices and maps were intended to capture the consequences of micronutrient deficiencies globally. In 36 countries, home to 90 percent of the world's stunted children, micronutrients deficiencies, especially vitamin A and zinc, were responsible for up to 12 percent of the total number of DALYs. Countries in sub-Saharan Africa, such as Sierra Leone and Niger, exhibited the highest levels of population-adjusted disease burden attributed to micronutrient deficiencies.

A high Hidden Hunger Index score was strongly correlated with a low Human Development Index score (a composite measure of three basic dimensions of human development: a long and healthy life, education and standard of living), and vice versa. This highlights the importance of addressing hidden hunger in order to achieve adequate development, reduce general deprivation and improve health care and education. In many countries, the Hidden Hunger Index score was high even though the percent of the population not getting enough dietary energy (calories) was low, confirming that the Hidden Hunger Index measures a form of hunger associated with micronutrient deficiency, rather than energy deficiency.

Iodine deficiency did not correlate with the other micronutrient deficiencies, likely because of varying country laws mandating salt iodization. The greatest proportions of children with iodine deficiency were in the Eastern Mediterranean (47 percent), European (44 percent) and African (40 percent) regions.

A Tool for Advocacy

The Hidden Hunger Index and maps provide much-needed information on the collective magnitude and distribution of multiple micronutrient deficiencies across the globe, and their attributed disease burden. They provide a useful tool for advocates to illustrate the real need for multiple micronutrient interventions to address hidden hunger. In addition, they provide useful information for policy makers in decision-making and prioritizing interventions, and offer valuable information for public health scientists as a basis for action, and subsequent monitoring and evaluation of preventive programs.

One application of the Hidden Hunger Index is for countries in the Scaling Up Nutrition (SUN) Movement. The current and growing support for the SUN Movement illustrates the unprecedented global political will to prioritize food and nutrition security as being central to development and the achievement of the Millennium Development Goals, as well as the post-2015 goals currently in development. The main investors in SUN are national governments themselves. Governments require tools that enable them to make informed policy and budget decisions.

The Hidden Hunger Index enables the development of appropriate interventions, such as home fortification with micronutrient powders for preschool-age children, multiple micronutrient supplementation for pregnant women and food fortification for the general population, which can effectively target those populations most affected by micronutrient deficiencies. In this way, the Hidden Hunger Index can be used as an advocacy tool to target the alleviation of hidden hunger.

Top 20 Countries Affected by Multiple Micronutrient Deficiencies

Rank	Country	Hidden Hunger Index Score	Deficiency Prevalence (%)		
			Zinc (Stunting as Proxy for Zinc)	**Iron** (Anemia Due to Iron Deficiency)	**Vitamin A** (Low Serum Retinol) (<0.7 µmol/L)
1	Niger	52.0	47.0	41.8	67.0
2	Kenya	51.7	35.8	34.5	84.4
3	Benin	51.3	44.7	39.1	70.7
4	Central African Republic	51.0	43.0	42.1	68.2
5	Mozambique	51.0	47.0	37.4	68.8
6	Sierra Leone	50.0	37.4	37.9	74.8
7	Malawi	49.7	53.2	36.6	59.2
8	India	48.3	47.9	34.7	62.0
9	Burkina Faso	48.3	44.5	45.8	54.3
10	Ghana	47.7	28.6	39.0	75.8
11	São Tomé and Príncipe	47.7	29.3	18.4	95.6
12	Afghanistan	47.7	59.3	19.0	64.5
13	Democratic Republic of the Congo	47.7	45.8	35.7	61.1
14	Mali	46.0	38.5	40.7	58.6
15	Liberia	45.3	39.4	43.4	52.9
16	Côte d'Ivoire	44.0	40.1	34.5	57.3
17	Gambia	43.7	27.6	39.7	64.0
18	Chad	43.3	44.8	35.6	50.1
19	Madagascar	43.0	52.8	34.2	42.1
20	Zambia	42.0	45.8	26.5	54.1

Methodology

The Hidden Hunger Index is the average, for preschool children, of three deficiency prevalence estimates: stunting (as a proxy for zinc deficiency, as recommended by the International Zinc Nutrition Consultative Group), iron-deficiency anemia and vitamin A deficiency. The three components were equally weighted (Hidden Hunger score = [stunting (%) + anemia (%) + low serum retinol (%)]/3). Iodine deficiency was measured separately due to its weak correlations with other micronutrient deficiencies. Two separate datasets were compiled for the development of hidden hunger indices and maps. One was a database of national prevalence estimates of anemia, stunting, vitamin A deficiency in pre-school aged children and iodine deficiency in school-aged children, for 190 countries for the years 1999-2009. The other dataset was of the most recent disability-adjusted life year (DALY) estimates attributed to deficiencies of iron, zinc, vitamin A and iodine for 192 countries. Deficiencies of folate and vitamin B12 were excluded from the dataset, due to the limited availability of national data. More high-quality national data on the deficiency status of other key vitamins and minerals and a better estimation of zinc and iron deficiency are warranted to improve the measure of global hidden hunger.