

Zinc Saves Kids[®]

Making a Difference to Child Health and Survival

While there are far fewer children dying today, there are still 8.8 million preventable child deaths a year worldwide. By joining forces with UNICEF through the 'Zinc Saves Kids' initiative, the zinc industry is investing in improving survival, growth and development of children through a comprehensive nutrition and healthcare program focusing on zinc and other key vitamins and minerals - an investment that the world's leading economists have determined will provide the best return on investment.



**Zinc deficiency leads to over
450,000 child deaths annually.**

Introduction

In 2010, the zinc industry took a major step in its social responsibility leadership by launching the "Zinc Saves Kids" initiative in support of UNICEF. With this, it pledged to raise a minimum of US\$ 3 million over three years for pilot programs in Nepal and Peru in what is hoped will be the first steps in this global campaign by UNICEF and the zinc industry to save children's lives. By providing just a few milligrams of supplemental zinc to malnourished children, this initiative will help save many of the 450,000 children under the age of five who are at risk of dying every year due to zinc deficiency.

Zinc deficiency weakens the immune system leaving the body more susceptible to diarrhea and pneumonia, two of the leading causes of global child deaths. Diarrhea accounts for 15% of deaths of children under the age of five years as compared to only 2% of deaths caused by HIV/AIDS.

Zinc supplements reduce the duration and severity of diarrhea in children, and in 2004 UNICEF and the World Health Organization (WHO) released a joint statement on clinical management of acute diarrhea to include zinc supplementation. However, despite zinc's proven, inexpensive benefits for curing and preventing recurrence of diarrhea, strengthening the immune system and enhancing physical and mental development, it has often been crowded out of health funding by HIV/AIDS, malaria and tuberculosis.

The International Zinc Association – representing the zinc industry worldwide – has committed to raise a minimum of US\$ 3 million over 3 years for 'Zinc Saves Kids'. This initiative is a milestone in child health and survival, and highlights the vital role that zinc plays in the development of healthy, productive children and, subsequently, healthy productive adults.

This brochure stresses the importance of zinc for human health, child growth and survival and shows how 'Zinc Saves Kids' will help save the lives of children in Nepal and Peru.

Zinc Saves Kids®

An International Zinc Association (IZA) initiative in support of UNICEF



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Zinc: Natural and Essential

Zinc is one of nature's most vital elements. It is a natural component of the earth's crust. Ores rich in zinc are widely spread throughout the world and are processed in more than 50 countries.

Zinc is not only present in rock but also in soil, water, air and the entire biosphere. Plants, animals and humans contain small but critical amounts of zinc. All living organisms need zinc to function. Zinc is essential for normal growth and development, good health and survival.



Zinc and the Human Body

The adult body contains about 2 to 3 grams of zinc.

Zinc is found in all parts of the body: it is in organs, tissues, bones, fluids and cells. Muscles and bones contain about 90% of the body's zinc. High concentrations of zinc are in the prostate gland and semen.

Zinc is vital for many biological functions of the human body and plays a crucial role in more than 300 enzymes which keep the metabolism working. Zinc is essential for the synthesis of protein and DNA and the development of genes.

Zinc plays a vital role in fertility. In males, zinc protects the prostate gland from infection (prostatitis) and ultimately from enlargement (prostatic hypertrophy). Zinc helps maintain sperm count and mobility and normal levels of serum testosterone. In women, zinc is especially important during pregnancy for the growing fetus whose cells are rapidly dividing. Zinc also helps to avoid congenital abnormalities and pre-term delivery. Zinc is critical in growth - height, weight and bone development - in infants, children and teenagers.

Among all the vitamins and minerals, zinc shows the strongest effect on the all-important immune system. Zinc plays a unique role in T-cells. Low zinc levels lead to reduced and weakened T-cells which are not able to recognize and fight off certain infections. An increase of zinc levels has proven effective in fighting pneumonia, diarrhea and other infections. Zinc can also reduce the duration and severity of a common cold.

Zinc Recommended Dosages

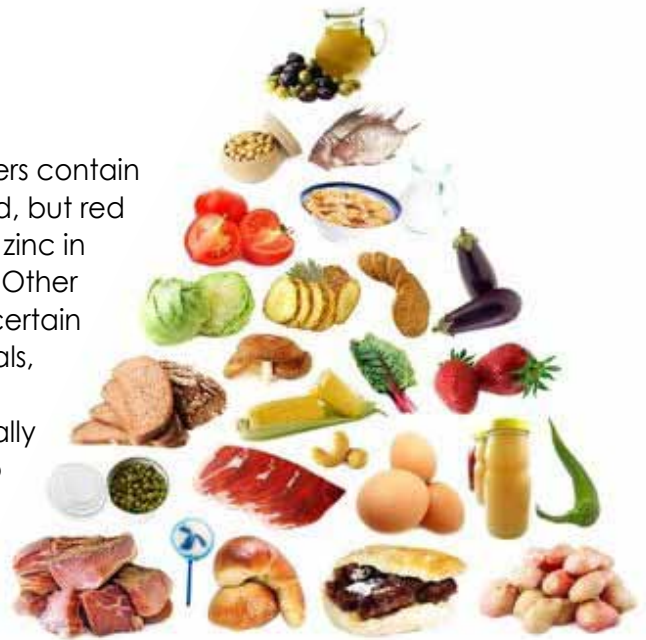
Zinc cannot be stored in sufficient quantities in the body. As such, it needs to be supplied to the body on a daily basis. Recommended daily zinc intakes by the US Food and Drug Administration (FDA)¹ are:

Age	Male	Female	Pregnancy	Lactation
0-6 months	2 mg	2 mg		
7-12 months	3 mg	3 mg		
1-3 years	3 mg	3 mg		
4-8 years	5 mg	5 mg		
9-13 years	8 mg	8 mg		
14-18 years	11 mg	9 mg	12 mg	13 mg
19+ years	11 mg	8 mg	11 mg	12 mg

1) <http://ods.od.nih.gov/factsheets/Zinc-HealthProfessional/>

Where does Zinc Come From?

We get zinc primarily from our food. Oysters contain more zinc per serving than any other food, but red meat and poultry provide the majority of zinc in the North American and European diets. Other good food sources include beans, nuts, certain types of seafood, whole grains and cereals, and dairy products. The bioavailability of zinc from grains and plant foods is generally lower than that from animal foods due to fibres and phytates – which are present in cereals, legumes and vegetables – which bind zinc and inhibit its absorption.



Selected Food Sources of Zinc²

Food	Milligrams (mg) per serving	Percent DV*
Oysters, 6 medium, breaded and fried	76.7	511
Beef shanks, cooked, 3 ounces	8.9	59
Crab, Alaska king, cooked, 3 ounces	6.5	43
Pork shoulder, cooked, 3 ounces	4.2	28
Breakfast cereal fortified with 25% of the DV for zinc, ¾ cup serving	3.8	25
Lobster, cooked, 3 ounces	3.4	23
Chicken leg, roasted, 1 leg	2.7	18
Pork tenderloin, cooked, 3 ounces	2.5	17
Baked beans, canned, ½ cup	1.7	11
Cashews, dry roasted, 1 ounce	1.6	11
Yogurt, fruit, low fat, 1 cup	1.6	11
Raisin bran cereal, ¾ cup	1.5-10.8	10-72
Chickpeas, ½ cup	1.3	9
Cheese, Swiss, 1 ounce	1.2	8
Almonds, dry roasted, 1 ounce	1.0	7
Milk, whole, 1 cup	1.0	7
Chicken breast, roasted, ½ breast with skin removed	0.9	6
Cheese, cheddar or mozzarella, 1 ounce	0.9	6
Peas, boiled, ½ cup	0.9	6
Kidney beans, cooked, ½ cup	0.8	5
Oatmeal, instant, 1 packet	0.8	5
Flounder or sole, cooked, 3 ounces	0.3	2

2) <http://ods.od.nih.gov/factsheets/Zinc-HealthProfessional/>

*DV = Daily Value. DVs were developed by the U.S. Food and Drug Administration to help consumers compare the nutrient contents of products within the context of a total diet. Food labels, however, are not required to list zinc content unless a food has been fortified with this nutrient. Foods providing 20% or more of the DV are considered to be high sources of a nutrient.

Zinc: Deficiency and Effects

If the nutritional intake of zinc is insufficient the body might show symptoms of deficiency. Mild and moderate zinc deficiency can be observed in large parts of the world whereas severe zinc deficiency is a major problem in low-income countries. Zinc deficiency is ranked the 5th leading risk factor for causing illness and disease in developing countries. On a global scale, considering developed and developing countries, zinc deficiency ranks 11th out of 20 leading risk factors.³

It is estimated that one third of the world's population – or 2 billion people – are at risk of malnutrition, lacking key micronutrients including zinc. WHO estimates that zinc deficiency alone is accountable for 800,000 deaths worldwide, of which 450,000 are children under the age of five.

Worldwide Prevalence of Zinc Deficiency in Humans

Most of the people suffering from severe zinc deficiency are residing in countries across sub-Saharan Africa, South Asia and Central and South America. The risk of zinc deficiency is particularly high in the following countries.

Nepal	Peru
India	Bolivia
Bangladesh	Ethiopia
Kyrgyzstan	Tanzania
Kazakhstan	Uganda
Indonesia	Mozambique
Cambodia	Ghana
Vietnam	DR Congo
Guatemala	Nigeria
Ecuador	Senegal

The reason 2 billion people are at risk of zinc deficiency is that they are not getting the proper levels of zinc in their daily diets. People in developing countries often have a diet consisting of staple foods deriving from cereals such as rice, maize, potatoes, wheat, rye or legumes. These foods are nutritious but do not provide the adequate amounts of zinc and other key vitamins and micronutrients. Foods rich in zinc including meat, fish, nuts, milk, eggs and cheese, are more expensive and hence inaccessible to large parts of the populations in low-income countries, contrary to the diets of people in industrialized countries.

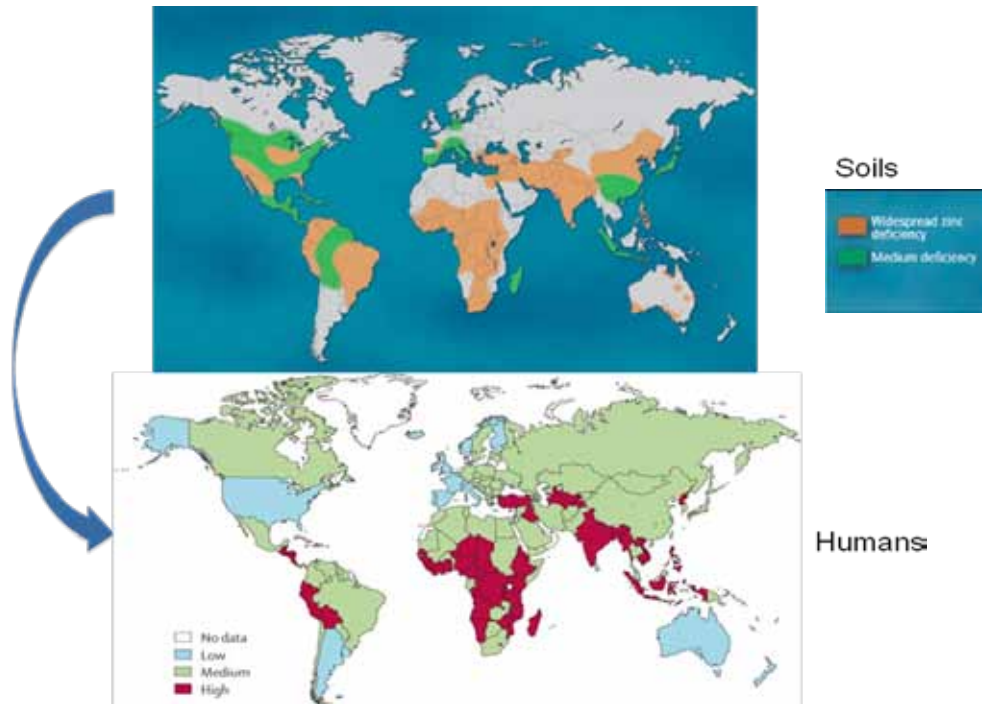
The problem is compounded by the fact that the soils on which these cereals are cultivated are also zinc-deficient. Research by leading experts has identified that nearly 50% of soils in developing countries, especially in cereal grain cultivated soils, are zinc-deficient, resulting in lower yields, poorer quality of crops and a lower nutritional content of zinc in the foods.

20 Leading Risk Factors - Global Situation in Order of Priority

- Underweight
- Unsafe Sex
- Blood pressure
- Tobacco
- Alcohol
- Unsafe water, sanitation & hygiene
- Cholesterol
- Indoor smoke from solid fuels
- Iron deficiency
- Overweight
- Zinc deficiency**
- Low fruit and vegetable intake
- Vitamin A deficiency
- Physical inactivity
- Risk factors for injury
- Lead exposure
- Illicit drugs
- Unsafe health care injections
- Lack of contraception
- Childhood sexual abuse

3) The World Health Report 2002

World Map - Zinc Deficiency



Effects of Zinc Deficiency

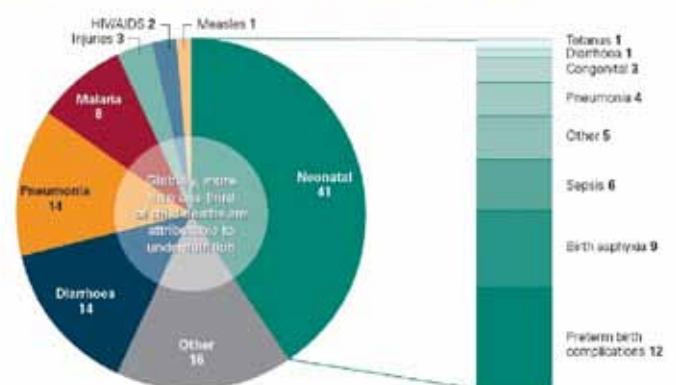
Zinc deficiency has devastating effects – especially for children under five years of age. 450,000 children are at risk of dying every year due to zinc deficiency. For those children who survive, the lack of proper zinc levels can impact their growth and development. Zinc is a growth-limiting nutrient, which means that inadequate intake can cause growth retardation and stunting in children. Zinc deficiency in the first two years of life has irreversible effects on the development of children's brains, preventing them from developing to their full intellectual potential and seriously affecting their adult productivity. 178 million children worldwide are affected by stunting.

Zinc and Childhood Diarrhea

Zinc deficiency leaves the body incapable of fighting pneumonia and diarrhea. Childhood diarrhea especially is a key public health issue in many developing countries. Diarrhea claims the lives of approximately 1.5 million children under the age of five every year – nearly one in five child deaths – according to UNICEF. The children become dehydrated, losing bodily fluids and nutrients.

Inexpensive and effective prevention and treatments for diarrhea exist, but in developing countries only 39% of children with diarrhea receive the recommended treatment. The result: diarrhea is currently causing more deaths than AIDS, malaria and measles combined.

Causes of deaths (%) among children under five (2008)



Source: Black R, Cousens S, Johnson H, Lawn J, Rutin J, Ranson D, Jha P, Campbell H, Walker C, Chabuisse R, Fiasilo T, Liu L, and Mathers C, for the Child Health Epidemiology Reference Group of WHO and UNICEF, 2010. "Global, Regional, and National Causes of Child Mortality in 2008: A Systematic Analysis." *Lancet* 375(9730): 1569-87.

Strategies to Solve Zinc Deficiency

Zinc Supplementation

Therapeutic zinc supplementation reduces the duration and severity of diarrhea in children. In 2004, UNICEF and the World Health Organization (WHO) released a joint statement on clinical management of acute diarrhea to recommend zinc supplementation along with oral rehydration salts to treat diarrhea. That statement "estimated that in the 1990s, more than 1 million deaths related to diarrhea may have been prevented each year, largely attributable to the promotion and use of these therapies." Recent information from trials in Bangladesh, Mali, India and Pakistan, where zinc was used for diarrhea treatment, showed a significant decrease in mortality, a decrease in the unnecessary use of antibiotics and non-zinc anti-diarrheals, and an increase in diarrhea care-seeking.



More recently, a systematic review of scientific trials found that preventive zinc supplementation reduced the incidence of diarrhea by approximately 20% and acute lower respiratory infections by approximately 15%. Furthermore, preventive zinc supplementation marginally reduced overall child mortality by 6%, with a greater impact among older children.

Zinc ...an Economical Solution

Not only does zinc supplementation save children's lives, it has also been recognized as the "best investment the world could make for improvement." In 2008, the Copenhagen Consensus ranked malnutrition in children as the most pressing challenge facing the world. The Copenhagen Consensus exercise, which brings together some of the world's top economists including five Nobel Laureates, prioritizes global problems and makes recommendations. They estimated that the provision of vitamin A and zinc supplements would provide the best returns on dollars invested of any problem studied – US\$ 17 for each dollar invested. By comparison, HIV/AIDS programs ranked 19th in terms of return on investment. And, compared to the billions of dollars spent annually on AIDS research, the Consensus found that a mere US\$ 60 million annually would provide enough zinc and vitamin A for over 110 million children.



This conclusion was confirmed by the WHO, which developed a system named CHOICE (CHOosing Interventions that are Cost-Effective) for identifying and reporting cost-effective health interventions consistently across different regions of the world. Zinc supplementation and fortification were shown to be very cost-effective public health interventions in all regions of the world. In relation to combined (zinc, iron and Vitamin A) interventions to reduce risks to children under five years of age, WHO observed that "Zinc fortification is, perhaps, the surprise, being more cost-effective than all the other options in all regions. To the extent that the same food vehicles could be used to fortify zinc and iron, the cost-effectiveness of the combined intervention would be even more attractive, making it one of the most effective options available of any type of intervention."

UNICEF Leading the Fight against Zinc Deficiency

In 2009 WHO and UNICEF issued a report listing a seven-point plan to reduce the 1.5 million child death globally caused by diarrhea, with one of the seven points being the provision of zinc supplements as both prevention and treatment for diarrhea.⁴

The plan is made up of two treatment and five prevention strategies. For treatment, children need zinc supplements and fluid replacement to prevent dehydration. Oral rehydration therapy is the cornerstone of fluid replacement, and the gold standard is low-osmolality oral rehydration solution. Important additional components include continued feeding, including breastfeeding, and use of appropriate fluids at home if oral rehydration solution is not available, along with increased fluids in general. The prevention package consists of: i) Rotavirus and measles vaccinations; ii) Promotion of early and exclusive breastfeeding and vitamin A supplementation; iii) Promotion of hand washing with soap; iv) Improvement of water quantity and quality, including treatment and safe storage of household water; and v) Promotion of community-wide sanitation.

UNICEF has assisted over 50 countries to incorporate zinc for diarrhea management into national child health policies. However, the actual rollout of zinc at country levels has been slow often due to the need for changes to national child health plans and treatment guidelines. UNICEF provides support to countries to include diarrhea management with zinc as part of their integrated community management. Interventions include the provision of zinc tablets for diarrhea treatment for 10-14 days in children 2-59 months of age, and the provision of a zinc-containing multi-micronutrient powder for 60-90 days for children 6-24 months. UNICEF is the leading supplier of zinc-containing multiple micronutrient powders as well as zinc supplements to developing countries.

In countries like Mali, Ethiopia and Tanzania where zinc supplementation programs have been pioneered, the results have been astounding. "Before we were terrified when children's stomachs began running because we knew some of them would die," says Sala Djalla from the village of Morola in Mali.

"God gave me 10 children, and took five of them back," DjeneSira Diakite, a mother from Malawi said as she buried her fifth child, who – like his other four siblings – died from diarrhea. Every rainy season, one of her children would suddenly stop eating and then develop severe diarrhea. Days later, she would carry the little dead body to the cemetery.⁵

"But since zinc arrived (to our village), we have had no deaths from diarrhea," says another villager Maimouna Bakayogo. "I panicked when my 10-month-old son developed stomach pains, diarrhea and fever. I was really afraid. Then I remembered that there was zinc in the village. I went to get some for my son and within one day I saw a big difference. The baby looked much better."⁶

In Nepal, where zinc deficiency is rampant among children, Leela Rana, mother of two, has just been introduced by her community health worker to the benefits of zinc supplementation. "When I became a mother for the first time, nine years ago, I was not even aware that infants should be exclusively breastfed for six months."

Leela recalls feeding only rice and lentils to her daughter for the first year without realizing how important diverse and energy dense food for overall development



4) "Diarrhea: Why Children Are Still Dying and What Can Be Done" UNICEF and WHO, 14 October 2009.

5) "The Great Zinc Breakthrough", Time Magazine, August 17, 2009.

6) "The Great Zinc Breakthrough", Time Magazine, August 17, 2009.

of her baby. "I will now be giving my six-month old daughter the first round of zinc-containing multi-micronutrient powder along with high energy food," said Leela. "Although I missed the opportunity for my first child, this time I will ensure that she gets a chance to develop fully, both physically and mentally."⁷

'Zinc Saves Kids' Initiative

With the proven success of zinc supplementation programs, the zinc industry saw the need to help out children as part of its social responsibility commitment. In 2010, the International Zinc Association – representing the zinc industry worldwide – launched 'Zinc Saves Kids' to improve the survival, growth and development of undernourished children by funding UNICEF's zinc supplementation and treatment programs. By providing just a few milligrams of zinc supplements to malnourished children, this initiative will save the lives of many of the 450,000 children under the age of five who are at risk of dying every year due to zinc deficiency.

'Zinc Saves Kids' also falls squarely within the UN's and the international community's efforts to accomplish two of the Millennium Development Goals (MDGs), namely MDGs 4 and 5. MDG 4 aims at reducing under-five child mortality by two-thirds, while MDG 5 aims at improving maternal health. With regard to the former, 'Zinc Saves Kids' will contribute to save many of the 450,000 children under the age of five who are at risk of dying every year due to zinc deficiency. With regards to MDG 5, part of the 'Zinc Saves Kids' initiative includes teaching mothers about the proper diet to follow during pregnancy. Zinc is vital during pregnancy. Pregnant women and lactating mothers require more zinc to ensure optimal development of the fetus and newborn baby.

On behalf of the zinc industry the International Zinc Association has committed to raise a minimum of US\$ 3 million over a three-year period. In this phase – covering 2010 to 2012 – focus will be on zinc supplementation in Nepal and Peru as both are high-risk countries.

'Zinc Saves Kids' n Peru

41.6% of Peru's population is at risk of inadequate zinc intake, making it one of the high-risk countries. 18.3% of children under five are stunted. This prevalence rises to 32% in the rural areas, reaching 37% in the poorest populations.

The prevalence of acute diarrheal diseases reaches 18% at the national level. It is slightly higher in rural areas and reaches 28.4% in the Amazon region.

The main objective of 'Zinc Saves Kids' in Peru is to contribute to the improvement of child survival, growth and development, through the strengthening of national policies for the prevention and control of micronutrient deficiencies – with a special emphasis on zinc – and through supporting its implementation nationwide. The goal for this objective is to reduce by 15% the stunting in children under three years old in populations with high risk of zinc deficiency in the country. 'Zinc Saves Kids' will initially be implemented in the districts of Apurimac, Huancavelica, Ayacucho, Cusco and Lima.

The specific objectives of the program in Peru will be to:

1. Improve zinc intake by 40% in children under three years old through the multi-micronutrient powder supplementation and the promotion of adequate complementary feeding.



⁷) *Micronutrient Powder supplementation brings new hope for children of Nepal, Ashma Shrestha Basnet and Pragma Mathema, March 2011.*

2. Reduce by 15% the incidence and severity of diarrheal diseases in children under five years old in vulnerable areas, through using zinc supplementation as a therapy.
3. Reduce by 30% the anemia prevalence in children under three years old through multi-micronutrient supplementation.
4. Improve the knowledge about effective zinc interventions in public programs of survival, growth and child development.

The Peruvian ministry of health does not currently have a specific strategy to prevent and control zinc deficiency. Activities implemented within the 'Zinc Saves Kids' campaign will help the ministry of health adjust its strategy for zinc supplementation nationwide.

This will be achieved through:



1. **Advocacy to institutionalize a national policy to prevent and control micronutrient deficiency, emphasizing zinc deficiency, towards the improvement of the survival, growth and development of children.** This line of action seeks to ensure the institutionalization of interventions for the prevention and control of zinc deficiency by including them in regulations and standards. Advocacy activities aimed at raising awareness of zinc deficiency will be carried out together with national, regional and local authorities in order to position the problem of micronutrient deficiency on the national agenda and to mobilize resources and actions to implement prevention and control strategies.
2. **Strengthening the capacities of health and other social-sector personnel in the prevention and control of zinc deficiency as part of the strategies to reduce stunting.** This line of action aims to strengthen the capacities of technical personnel from health and social sectors and programmes in the prevention and control of micronutrient deficiency to improve survival, growth and child development. It includes training activities in complementary feeding, multi-micronutrient powders (MNP) supplementation and therapeutic zinc supplementation. The activities will be implemented in the regions where UNICEF has already been working and will be extended progressively to other regions of the country.
3. **Strengthening social communication strategy to promote family practices of micronutrients consumption.** This activity aims at promoting adequate complementary feeding and the consumption of multi-micronutrient supplements by showing the positive impact on childhood growth, development and well-being. Educational packages and communication campaigns will be developed with the appropriate messages and targeted towards a range of audiences: families, local organizations and community leaders.
4. **MNP supplementation as part of the care package for children, zinc supplementation as adjunctive therapy for diarrhea in children and local production of MNP and zinc supplement.** The purpose of this activity is to encourage proper implementation of supplements as part of comprehensive care for children. This implies not only improving the care provided in health facilities, but also improving management mechanisms, from planning to monitoring supplement consumption.

'Zinc Saves Kids' in Nepal

In Nepal, almost 50% of the 3.7 million children between six months and five years currently suffer from chronic malnutrition. Malnutrition drastically increases among children between six and 23 months of age. Poor infant feeding practices are the primary reason. Only 60% of children aged six and seven months receive complementary food and are fed 1.2 meals per day. Food provided is generally monotonous, consisting of low-energy cereal porridge.

Also of great concern is that almost half of the under-five child population and approximately 75% of the under-two child population suffers from anemia. A large proportion of children also suffer from concurrent zinc deficiency. Stunting is the proxy indicator for zinc deficiency. With 50% of children suffering from stunting, the government has recognized the need for an approach to improve zinc status in children to aid stunting reduction.

For most families in Nepal, regular access to micronutrient-rich foods is a distant dream, and as micronutrient fortification initiatives are in early stages of development there is a need for preventive multiple micronutrient supplementation.

Zinc intervention as treatment is also critical for child survival. Diarrhea and pneumonia are the current leading causes of under-five child death in Nepal. Use of zinc tablets as part of diarrhea management can enhance a child's immunity and reduce severity of illness as well as decreasing the risk of future diarrheal episodes.

In 2005, after adopting the new WHO and UNICEF guidelines on clinical management of acute diarrhea in children under five, the Nepalese Ministry of Health started administration of zinc tablets as part of diarrhea treatment. As per the protocol, any child suffering from diarrhea is to be provided with a ten-day supply of zinc tablets (children less than six months receive half the dose) alongside low osmolar oral rehydration salts. Children suffer on average two diarrhea episodes per year. The target of the zinc program is to have at least 80% of diarrheal cases treated with zinc supplementation. Nepal has 75 health districts. The intervention was initiated in two districts in 2006 and was rolled out to 68 districts by 2009.



Though nationwide implementation is very near, zinc coverage is far from optimum. A survey recently conducted in 40 districts has found coverage to be approximately 7% including both public and private distribution. Major reasons for low coverage include erratic and inadequate supply of zinc tablets; poor logistics management; lack of awareness and low acceptance of the intervention in the community; inadequate understanding of the treatment amongst health service providers; and a large proportion of mothers seeking treatment through the private sector which is presently not promoting zinc.



As a result it is necessary to support procurement of zinc tablets by external partners to prevent tablet shortages; provide relevant training to health workers; and to establish a Behavior Change Communication strategy to increase the awareness and acceptance level of treating diarrhea with zinc.

Although there are three local pharmaceutical firms within the country now manufacturing and marketing various zinc formulation brands, availability of these products needs to improve. Many chemists are also still recommending other anti-diarrheals as the first line of drugs. A key underlying factor is the higher profit margin of the latter treatment. This situation is leading to irrational use of anti-diarrheals and also creating unnecessary economic burden for families. Promotion of zinc aims to reduce

household spending on anti-diarrheals and antibiotics and is critical for preventing resistance build-up to these drugs.

UNICEF will support the Government of Nepal in increasing the use of zinc tablets in combination with low osmolar oral rehydration salts to treat diarrhea in children under five years of age. UNICEF will specifically provide technical and coordination support to improve and sustain program performance by supporting capacity building of district staff and community health workers; raising awareness of the importance of zinc for the treatment of diarrhea; strengthening the national supply and logistics management; and monitoring and evaluating program effectiveness.

UNICEF will also support the government in reducing micronutrient deficiencies by supplementing children between six and 23 months with MNP containing zinc. UNICEF will support a pilot project in six districts to compare the efficiency of two MNP distribution models: community-based distribution through female community health volunteers and distribution via health facilities. On the basis of the outcome a national program will be designed.

UNICEF will support program implementation in 30 districts by 2012. Thereafter, the Government will utilize its resources from health-sector pool funds to scale up the approach in the remaining 45 districts. IZA will fund the pilot in four out of six districts and roll out in 15 districts. The remaining 15 districts will be covered through funding by the European Commission.

Within the national scale-up of the program, it is envisaged that approximately two million children under two years of age will be reached with zinc supplementation.

The MNP program will be linked with the government's infant and young child feeding (IYCF) program which includes training of health workers; orientation of mother groups; demonstration of locally-prepared energy-dense complementary foods; raising feeding to three to four times per day; and promotion of hygiene and sanitation. IYCF aims at improving the growth and nutritional status of approximately 3.8 million children aged below five years.



Milestones in combating worldwide zinc deficiency:

1900-1950: Researchers make many discoveries related to zinc's essentiality for the growth and survival of plants and animals.

1960s: Dr. Ananda Prasad, an Indian biochemist who specialized in the role of zinc in human metabolism, provides clear evidence of zinc and human growth. He gives Middle Eastern adolescents suffering from dwarfism and delayed sexual maturity zinc supplements and notes that their height, weight, bone development and sexual maturation improved significantly.⁸ Since then, many researchers working in different areas of the world have found that zinc supplementation increases growth among stunted children.

2004: UNICEF and WHO recommend zinc tablets in combination with Oral Rehydration Salts (ORS) for the effective treatment of diarrhea. Diarrheal diseases account for nearly 1.5 million deaths annually among children under the age of five in low-income countries.

2008: The Copenhagen Consensus, an independent body of the world's leading economists – including five Nobel Laureates – consider malnutrition in children as the world's biggest problem and suggest that the provision of vitamin A and zinc supplements would be the best investment the world could make for improvement.

2009: The Clinton Global Initiative endorses IZA's Zinc and Nutrition initiatives. The Clinton Global Initiative is a group started by former USA President Bill Clinton that includes world leaders and executives and has raised billions for social causes.

2010: IZA launches the 'Zinc Saves Kids' program to improve child survival, growth and development through scaling up the provision of zinc-containing supplements.

Beyond Zinc Supplementation

As important as the provision of zinc supplementation is in saving the lives of children, it is only a short-term solution. A sustainable solution is the systematic inclusion of zinc in the food consumed in developing countries. This can be done through several means:

1. Food fortification: which is the addition of nutrients to commonly eaten foods, beverages or condiments. Food fortification has played a major role in eliminating micronutrient deficiencies in industrialized countries. Infant formulas, infant cereals and ready-to-eat breakfast cereals are often fortified with zinc. Mexico is presently conducting a national, voluntary zinc-fortification program, where zinc and other micronutrients are added to wheat and corn flours used for preparing bread and tortilla. Mexico has also developed a fortified, milk-based beverage mix for pregnant and lactating mothers.

2. Biofortification: which is the use of zinc fertilizers to increase the zinc content and yield of cereal grains. Leading work has been done in Turkey, India and a



8) Prasad A.S., Miale A. Jr., Farid Z., Sandstead H.H., Schulert A.R. Zinc metabolism in patients with the syndrome of iron deficiency anaemia, heptosplenomegaly, dwarfism and hypogonadism. 1963. *J Lab Clin Med* 1990; 116: 737-49.



few other countries on the results of zinc-fortified fertilizers on increased production, food security and improved human health. Among the most outstanding conclusions has been the fact that bio-fortification of rice and wheat grain with zinc may save the lives of up to 48,000 children annually in India.⁹

3. Plant breeding: which is developing varieties of corn, barley and rice with significantly lower levels of phytate and/or the ability to take up more zinc. When adults received a corn-based diet in which the phytate content was reduced by more than 55%, the average zinc absorption increased by 78%.

4. Other long-term strategies: include genetic modification of plants to increase their level of absorbable zinc, and the promotion of small livestock husbandry and aquaculture that will improve the availability of zinc-rich foods.

References and Useful Links

UNICEF

The United Nations Children's Fund (UNICEF) was created in 1946 to provide emergency food and healthcare to children in countries that had been devastated by World War II. In 1953, UNICEF became a permanent part of the United Nations System. Funded by governments and private donors, UNICEF provides long-term humanitarian and developmental assistance to children in developing countries. Programs are targeted at developing community-level services and to promote health and wellbeing.

For further information, visit <http://www.unicef.org>

International Zinc Association (IZA)

The International Zinc Association (IZA) is a non-profit organization representing the global zinc industry by promoting zinc's essentiality in present and potential product applications, human health and crop nutrition and by highlighting zinc's contribution to sustainable development. IZA conducts programs in Technology & Market Development, Environment & Sustainable Development and Communications.

For further information, visit <http://www.zinc.org>

International Zinc and Nutrition Consultative Group (IZiNCG)

IZiNCG is an international group of nutrition scientists whose primary objectives are to promote and assist efforts to reduce global zinc deficiency through interpretation of nutrition science, dissemination of information, and provision of technical assistance to national governments and international agencies. IZiNCG focuses on the identification, prevention and treatment of zinc deficiency in the most vulnerable populations of low-income countries.

For further information, visit <http://www.izincg.org>

References and Useful Links (continued)

Micronutrient Initiative (MI)

Passionate about developing and implementing solutions for hidden hunger, the Micronutrient Initiative (MI) works in partnership with governments, the private sector and civil society organizations to address this serious problem that affects one third of the world's population.

For further information, visit <http://www.micronutrient.org>

International Fertilizer Industry Association (IFA)

International Fertilizer Industry Association (IFA) promotes efficient and responsible production and use of plant nutrients to maintain and increase agricultural production worldwide in a sustainable manner.

For further information, visit <http://www.fertilizer.org>

Clinton Global Initiative (CGI)

Established in 2005 by President Bill Clinton, the Clinton Global Initiative (CGI) convenes global leaders to devise and implement innovative solutions to some of the world's most pressing challenges. Since 2005, CGI Annual Meetings have brought together more than 100 current and former heads of state, 14 Nobel Peace Prize laureates, hundreds of leading CEOs, heads of foundations, major philanthropists, directors of the most effective nongovernmental organizations, and prominent members of the media. These CGI members have made more than 1,400 commitments valued at US\$46 billion, which have already improved the lives of 200 million people in 150 countries. For more information, visit www.clintonglobalinitiative.org

Copenhagen Consensus Center

The Copenhagen Consensus Center (CCC) is a think tank in Denmark that publicizes the best ways for governments and philanthropists to spend aid and development money. The Copenhagen Consensus Center is a center under the auspices of the Copenhagen Business School. It commissions and conducts new research and analysis into competing spending priorities. In particular it focuses on the international community's effort to solve the world's biggest challenges and on how to do this in the most cost-efficient manner.

For more information, visit <http://www.copenhagenconsensus.com>