



Joint Statement by the Micronutrient Initiative, International Nutrition Foundation and the Sprinkles Global Health Initiative at Sick Kids



Home Fortification with Multiple Micronutrients: Effectively Preventing Iron Deficiency Anaemia in Infants and Young Children

Anaemia in Infants and Young Children

Despite renewed global goals for its reduction, iron deficiency remains the most common preventable nutritional problem in the world. WHO/UNICEF estimates 40-50% of children less than 5 years in developing countries are iron deficient (1). In developing countries, estimates of iron deficiency among children less than five years of age are more than 40%, and in some African and South Asian countries the prevalence is as high as 80%. Demographic and Health Surveys with 31,000 haemoglobin measurements from 11 developing countries in three continents show anaemia prevalence of almost 50% among children at ages 6-24 months.

The primary cause of anaemia in young children is insufficient bio-available dietary iron intake in relation to the high iron needs to support rapid growth and brain development. (2). Anaemia in young children is serious, threatening a child's health and mental, social, emotional and physical development. The collective long term consequences reduce economic productivity and have a measurable negative effect on national development (3,4).

Other micronutrient deficiencies are also common in young children in developing countries with

additional deleterious effects. Vitamin A deficiency increases the chances of infant and child mortality, zinc deficiency reduces protection against diarrhoea and respiratory infections, and iodine deficiency curtails cognitive development in infancy.

Generating political commitment and funding support to address vitamin and mineral deficiencies remains a challenge because the symptoms of anaemia and the effects of other deficiencies in young children are not always obvious, even to parents. Moreover, traditional anaemia programs for children have not been as effective as expected.

A newly developed public health intervention holds major promise to be instrumental in controlling iron deficiency anaemia in infants and young children and providing recommended amounts of other micronutrients as well. The following statement describes its development and proposed use.

Home Fortification with Sprinkles

The Sprinkles Global Health Initiative (SGHI) based out of Sick Kids Hospital in Toronto, Canada developed a strategy of "home-fortification" to prevent anaemia in young children. A key element of "home fortification" is single-dose sachets containing stable and bio-available micronutrients in a powder form. "Sprinkles", are easily mixed into any foods especially early complementary foods

prepared in the household. The idea of ‘home fortification’ was conceived by Dr. Stanley Zlotkin in 1996, after a specialist group convened by UNICEF determined that interventions available for young children (syrup and drops) were ineffective in preventing anaemia in young children. (5). Sprinkles are simple to use because the powder is mixed with other foods and the iron (ferrous fumarate) is encapsulated by a thin lipid layer that prevents interactions. Sprinkles do not interact with food components and does not significantly change the taste, colour or texture of the foods to which it is added. Other micronutrients including zinc, vitamins C and A, and folic acid are also added. The most common formulation of Sprinkles, a ‘nutritional anaemia formulation’ is shown in Table 1. There is also a multiple micronutrient formulation with 10 additional vitamins and minerals. The ‘nutritional anaemia formulation’ is recommended for use in child health and anaemia prevention programs.

Table 1. Composition of ‘Nutritional Anaemia Formulation’ Sprinkles

Micronutrient	Amount
Iron, mg	12.5
Zinc, mg	5
Folic Acid, µg	160
Vitamin A, µg RE	300
Vitamin C, mg	30

Evidence of Efficacy and Effectiveness

Community-based studies on Sprinkles involving both anaemic and non-anaemic children have been completed in Northern Canada, China, Bangladesh, India and Pakistan, Ghana, Bolivia and Haiti. (6-11). These studies assessed the efficacy, bioavailability, safety and acceptability of Sprinkles in diverse settings. Three pilot projects showing effectiveness were done in Bangladesh, Mongolia and Pakistan. Overall results show Sprinkles is successful in treating and preventing anaemia. Sprinkles were also shown to be well tolerated by children, easy to administer and acceptable to their caregivers. Cure rates of anaemia ranged from 49-91%, depending on the confounding presence of other factors that also lead to anaemia, such as malaria.

Ensuring a Sustainable Supply

A public-private partnership was developed in 2001 between SGHI and the HJ Heinz Company. This partnership is part of the HJ Heinz Company’s ‘Corporate Social Responsibility’ program and

supports technology transfer for in-country production of Sprinkles, placing a major emphasis on increasing production of Sprinkles in developing countries while ensuring a high level of quality control. Licensed co-packers supporting local Sprinkles production are currently operating in Canada, Bangladesh, Guyana, India, Indonesia and Pakistan.

Sachet costs

Costs per sachet ex factory range between \$0.013 – 0.025 USD, depending on the volume, content and production site. Packaging for distribution is most commonly done in bulk. Wholesale shipments by land, sea or air are normally made in 48”x 48”x 40” palletes, each carrying 56 boxes with 3,000 sachets per box for a total of 168,000 sachets per palette.

Scaling Up For Country-Wide Distribution

Pilot projects of Sprinkles in 9 countries are the precursor to scale-up to large programs in South Asia and Latin America. The mix of distribution models includes public sector free-distribution, NGO-operated subsidized distribution and private sector social marketing.

Cost effective use in Emergencies

Sprinkles have been widely and effectively used in emergencies in Haiti and for post tsunami relief in Indonesia.

Guideline to Use Sprinkles

Experience from the community-based studies have established a workable guide for the optimal use of Sprinkles sachets and the length of interventions for prevention and treatment. Sprinkles are designed principally for children six – 24 months of age. The typical home fortification regimen calls for 60 single-dose sachets for each child, consumed over a 60 to 120 day period. No more than one sachet a day should be used for a child. This schedule generally raises or maintains the child’s iron levels above the cut-off for anaemia. It also helps prevent a child from becoming anaemic again for at least the following 6 months. Depending on program priorities, Sprinkles may be used effectively to improve the micronutrient nutrition of children up to five years of age. Sprinkles should be added to the food after cooking, not before. The contents of the sachet should be mixed with an individual serving of any complementary food for a single child just before feeding. Food mixed with Sprinkles should be used within one hour of mixing. Food servings with Sprinkles should not be re-heated because temperatures above 60° C can

melt the protective layer around the iron and cause changes in the colour and smell of the food.

Iron-containing supplements should be withheld from severely malnourished children during treatment of electrolyte imbalance (usually during the first 7 days of treatment), according to WHO guidelines. Sprinkles can be used effectively and safely after this initial period. In regions that are malaria-endemic, use of Sprinkles or any use of vitamin or mineral supplements should be combined with malaria prevention or treatment programs.

Communication support and Social marketing

When introducing a new or modified activity or product related to young child feeding, communication support at three levels is needed. That support includes **advocacy** to obtain policy support and resources, **training and motivational strategies** targeting those involved in distributing and promoting Sprinkles and effective **communication to educate caregivers** on how to obtain and effectively use Sprinkles for home fortification to prevent anaemia and other vitamin and mineral deficiencies. The Sprinkles Global Health Initiative (SGHI), the Micronutrient Initiative (MI), and the Iron Deficiency Program Advisory Service (IDPAS) and other global partners are collecting models and lessons learned on effective communication support for new interventions with Sprinkles and can be contacted for assistance in this area.

Monitoring

All home-fortification programs should be monitored to evaluate supply, delivery, utilization (coverage and compliance) and allow for operational adjustments that may be needed.

Technical and Supply Assistance

The MI and IDPAS collaborate closely with the SGHI on activities to improve the vitamin and mineral nutrition of young children and endorse the use of Sprinkles as a new, efficacious home fortification product and anaemia-prevention and treatment strategy. IDPAS includes up-to-date free-of-charge documentation on the development and use of Sprinkles on its website (www.micronutrient.org/IDPAS) and Iron World CDROMs. IDPAS will attempt to quickly respond to all technical and program related queries on home fortification interventions and forward information requests to the SGHI as well. MI and IDPAS will also try respond to requests related to

designing effective communication strategies to introduce and develop effective and sustainable interventions based on home fortification with Sprinkles.

Endorsements:

The widespread use of Sprinkles to fortify complementary foods in the home in developing countries holds the potential to effectively prevent and control widespread iron deficiency anaemia that is permanently harming the cognitive development and health of million of children 6-24 months of age. This intervention is fully endorsed by the Micronutrient Initiative, the Iron Deficiency Project Advisory Service and the International Nutrition Foundation as a component of overall strategies to prevent iron deficiency anaemia throughout the lifecycle.

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