

## **Control of Anemia: The Time to Act is Now**

Dr. R.A. Mashelkar, Director General of the Council of Scientific & Industrial Research (CSIR), India's premier national R&D organization was quoted in the Tribune last year stating that India has made laudable achievements in information technology and that by 2008 it is expected that 35 per cent of all exports will be software-based, and all this will be achieved by 600,000 young people, whose current age is just 26 years(1). The Consuming class is expected to triple in ten years, reaching 450 million people by 2010. The Consuming class was reported to have an annual income between \$1,300 and \$6,000. Two-thirds of them own a scooter, colour TV, electric iron, blender, and sewing machine, but less than half of them own a refrigerator. More than 32 million of those have cable, growing 8% a year. India is in the midst of an enormous socio-economic transformation. But there is a huge gap in income and in availability of health care, and in markers of health, between the wealthy south-west and the poor north-east.

I think that this is the most opportune time to reduce the gap between the health of the middle and the poor class in India, particularly in the field of child nutrition. In April 2005, the Prime Minister, Dr. Manmohan Singh formally launched the new National Rural Health Mission, aimed at providing accessible, affordable, accountable, effective and reliable health care, especially to poor and vulnerable sections of the rural population(2,3). I believe there can be no better example of what the NRHM can potentially accomplish than the improvement in the rural nutritional health of infants and young children, especially in the poorest states targeted by the Mission. The time for talking about improving the nutritional health of infants is long overdue. As far back as 1969, the National Institute of Nutrition, to its credit, listed improvement of child nutrition as one of its primary goals(4). Thirty eight years later, it is time to act.

It is time to act because enough research has been done and the infrastructure is in place. (or is about to be in place). The goal today must be to emphasize what is being called 'knowledge translation'. Knowledge translation is basically taking something that works and figuring out how to apply it. It assumes that research, policy and practice inform each other. In the context of my work, mineral and vitamin malnutrition is estimated to be associated annually with more deaths than malaria, involving up to 100 million deaths per year. In India, according to UNICEF-based statistics, the estimated prevalence of iron deficiency anemia in children under 5 years of age is 75% (5). This is a mere 5% decline over the past 10 years. Other countries sharing this level of prevalence include Angola, the Central African Republic, Chad, Eritrea, Gambia, Guinea, Madagascar, Mali, Mauritania, Senegal and Togo. In the 2004 UNICEF Global Progress report, only 10 countries had higher reported prevalence rates than India. These countries included Benin, Bhutan, Burundi, Burkina Faso, Ethiopia, Guinea-Bissau, Malawi, Mozambique and Sierra Leone. It is time for India to leave this infamous list.

There are five general public health approaches to control iron deficiency in infants and young children. These include (i) exclusive breast feeding for 6 months, (ii) control of infections, including gastrointestinal parasites, (iii) supplementation of those identified with the problem, (iv) use of a variety of nutrient-dense complementary foods, and (v) food fortification. The first two approaches, when used alone, will not solve the problem. Regarding supplementation, there is no documentation of the success of iron drops or syrup as a viable public health approach(6). Acceptability is compromised by the strong metallic taste, staining of the child's teeth and difficulty in administration. Regarding a diversified diet for infants, Dewey and Brown have clearly demonstrated that it is not possible to meet the nutritional requirements for many minerals and vitamins with unfortified complementary foods,

even from a mixed diet (7). And in India, the quality of complementary foods commonly consumed by children is often not optimal, with inadequate density of iron, zinc, vitamin A and other vitamins and minerals. Indeed, unfortified complementary foods and community based nutrition education alone have not solved the problem of malnutrition in infants and young children (8-10). Sprinkles™ was specifically designed to increase the nutrient density of complementary foods.

Sprinkles, which contains zinc as well as iron, is an incredibly simple intervention. It has the potential to decrease morbidity (based on the impact of zinc on the prevalence of diarrhea), and increase the GDP of a developing country by as much as 1-2% through the impact of anemia control on child development and educational achievement. The cost-effectiveness of a Sprinkles intervention in a developing country model was recently documented using three different measures of cost effectiveness: the cost per death averted; the cost per 'disability adjusted life year' (DALY) saved; and the gain in earnings due to higher cognitive functioning for each dollar spent (effect via iron supplementation on reduced anemia) (11). It was estimated that the cost per death averted was \$406 (range \$273-3248), the cost per DALY saved was \$12.20 (\$8-97) and the present value of the gain in earnings is \$37 (\$18-51) for each dollar spent on the Sprinkles program. These estimates were developed for a low income country (GDP per capita = \$417) with a high infant mortality rate (IMR = 83/1000), a high prevalence of anemia (93%), and high mean longitudinal prevalence of diarrhea (17%).

The results with Sprinkles support the Copenhagen Consensus view, which ranked interventions to increase the availability of micronutrients as the second highest priority in advancing 'the lives of people living in developing countries'(12). The cost: benefit estimates as shown above are comparable to other primary health care prevention programs. For example, the cost per death averted is estimated to be: \$67.2 for vitamin A supplementation in children between 6-59 months of age in the Philippines, and \$327 in Nepal; \$115 - \$919 for breastfeeding promotion in

young infants in Central and South America; and for diarrhea control in young children in developing countries, \$333 for rotavirus immunization, \$3025 for cholera immunization and \$3405 for oral rehydration therapy. Similarly, home-based care for HIV/AIDS varies from \$100 to \$1000 per DALY saved (11). Thus, a short-term intervention with Sprinkles appears cost effective. Likewise the benefit: cost ratio is also favorable (benefit:cost ratios are not widely available for primary health care interventions).

Our knowledge translation work involves 6 years of clinically-based research, followed by 2 years of advocacy resulting in Sprinkles being incorporated into national nutrition policy in 7 countries, followed by the establishment of Sprinkles manufacturing facilities in 6 countries (including India) to support distribution(13). But our continuing challenge is to determine how this intervention can be effectively translated into a decreased prevalence of anemia in children. And specifically, how can Sprinkles be distributed to children and their mothers in the poorest states of India. That is where the ministries of health, both at the state and federal level must play a role to expand its support of health systems research and targeted research on delivery strategies and equity.

Many of my colleagues have said to me, now that you have finished your studies showing that Sprinkles work to treat and prevent anemia, I guess your research is finished. Nothing could be farther from the truth. The most challenging research about Sprinkles remains to be completed. It is to understand factors that will impede or enhance Sprinkles distribution—including how to involve the private sector to make the product, how to demonstrate to governments and ministries of health that they should include the control of anemia in their national nutrition policy and most importantly, how to distribute the intervention both within the public and private sector.

India needs a framework which values investment not only in generating new knowledge, but also in research that seeks to define how to implement and make better use of the existing knowledge, leading, in the case of Sprinkles, to a

public health impact on the burden of disease in children. Now is the time for action.

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