

Nutriview 2000/2

Contents in brief:

- *School feeding programs help children learn*2
To fulfil their educational potential, children need good health and appropriate stimulation. Nutrition plays an important role. By providing children with a nutritious breakfast at school, it is possible to improve children's general health and behavior, as well as school attendance and school performance.
- *Vitamin A deficiency in Brazil: A problem of national significance?*5
Data suggest that VAD is a public health problem virtually over the whole country, not just in poor areas.
- *Manila Forum: Malnutrition holds back economic development.*6
This meeting, held in the Philippines on February 21–24, 2000, has put momentum into a multisectoral approach to implementing successful and sustainable food fortification programs throughout Asia.
- *News in brief.*7
Better treatment for diarrhea. Some suggestions for improving oral rehydration solutions.
Blindness caused by B-vitamin deficiency. Strictly vegetarian diets may lack vital micronutrients.
- *Editorial: Setting priorities*8
What is the best way to eliminate malnutrition? By doing something about it!
- *Events: South Africa Congress 2000, IVACG, ICN 2001*8

■ **Nutriview** is a quarterly newsletter on the role of micronutrients in nutrition and health. It is published by Roche Vitamins Europe Ltd, Basel, Switzerland, as a service to health-care professionals and science communicators. The findings, interpretations and conclusions expressed in **Nutriview** are those of the authors, and are not necessarily shared by the Publisher. Contributions and correspondence, as well as requests for additional copies, may be sent to Dr Max Blum at the address shown below. Unless otherwise stated, information in **Nutriview** may be reproduced without permission provided that proper credit is given.

Editor/Design and layout

• Anthony Bowley, ABCcommunications, Hochwaldstrasse 37, CH-4143 Dornach, Switzerland.
Fax: +4161/7030257; Email: a.bowley@bluewin.ch

Scientific advisors

- Dr Alfred Sommer, Dean, School of Hygiene and Public Health, Johns Hopkins University, USA-Baltimore MD 21205
- Dr Ricardo Uauy, Director, Institute of Nutrition and Food Technology, University of Chile, Casilla 138-11, Santiago, Chile
- Dr Aree Valyasevi, Chairman of the Executive Board, National Health Foundation, Bangkok 10900, Thailand
- Dr Lawrence Machlin, President, Nutrition Research and Information, Inc, 18 Locust Place, USA-Livingston NJ 07039
- Dr Ratko Buzina, 21 Sunset Avenue, Cherry Gardens, Kingston 8, Jamaica

Coordinator

• Dr Max Blum, Scientific Expert, Roche Vitamins Europe Ltd, Postfach 3255, CH-4002 Basel, Switzerland

■ Feature:

School feeding programs help children learn

Education is recognized as a key factor for the development of nations. Providing educational services, however, is one thing. Ensuring that children attend school, pay attention in class, and are able to apply what they learn is another matter. To fulfil their educational potential, children need good health and appropriate stimulation.

Hunger impairs performance

Numerous factors influence cognitive development and learning ability. One of them is nutrition. Malnutrition can impair brain function and behavior in many ways. Malnutrition threatens all growing children; poverty and poor eating habits increase the risk. Even in affluent countries such as the United States, some 14 million children under twelve years are at risk for, or have experienced, prolonged periods of hunger (1).

In young children, malnutrition dulls motivation and curiosity, and reduces play and exploratory activities (2). Just missing a single breakfast can have



adverse effects on the school performance of undernourished children (3).

Severe undernourishment, with a lack of protein and calories as well as micronutrients, can have permanent adverse effects on growth, and on physical and intellectual development in general (4). Iron deficiency impairs brain development and working capacity (5). Iodine deficiency causes cretinism as well as other forms of learning disability (6). Deficiencies of essential fatty acids affect intelligence and vision (7).

Even borderline deficiencies of vitamins and minerals can affect learning capacity. An early response to low intakes of vitamin B₁ (thiamin) for example, is an inability to concentrate, confusion of thought, uncertainty of memory, anorexia, irritability and depression (8). Personality changes in adolescents that resulted in aggressive behavior have been successfully treated with thiamin (9). Diets lacking in vitamin B₂ (riboflavin) are associated with changes in personality (10) as are those low in vitamin C (11). People with low vitamin C intakes may also experience poor reaction times and increased fatigue (12). Poor cognitive development has also been linked to deficiencies of zinc (13) and selenium (14).

Micronutrient deficiencies may have independent as well as cumulative, interactive effects on learning and behavior. Cognitive functioning involves countless biochemical pathways and associated enzymes. While a suboptimal level of one micronutrient might only have a

Table 1: Studies showing effect of nutrition on cognitive performance

Study	Study population	Intervention	Results
Benton and Roberts (15)	90 Welsh school children 12–13 years	Vitamin/mineral supplement for 8 months (30 children); placebo (30 children); no treatment (30 children)	Significant increase in nonverbal intelligence in supplemented group
Schoenthaler et al. (16)	615 US American school children	Vitamin/mineral supplements with 50, 100 or 200% RDA for 13 weeks compared with placebo	Major improvement in nonverbal intelligence by children on 100% RDA supplements
Sandstead et al (17)	740 Chinese school children 6–9 years from urban, low-income families	Supplements with 20 mg zinc, micronutrients or both, 6 days per week for 10 weeks	Micronutrient supplementation+ zinc improved neuropsychological performance and growth significantly
Richter et al. (18)	55 undernourished rural South African children 7–14 years; 53 well-nourished controls 7–10 years	Test children received a school breakfast of fortified cereals with milk and banana for 6 months	The breakfast had a significant beneficial effect on cognitive and behavioural performance
Powell et al. (19)	407 undernourished and 407 well nourished Jamaican school children	Breakfast every school day for 1 year (test group); one-quarter orange and same attention (controls)	Breakfast improved nutritional status, school attendance and achievement
Jacoby and López de Romaña (20)	500'000 school children of Peruvian Andes 5–10 years	School breakfast with 60% RDA of vitamins and minerals, and 100% iron daily for 6 months	Anemia prevalence fell from 66% to 14%; school attendance improved significantly; improvement in vocabulary test.
Van Stuijvenberg et al (21)	115 South African children 6–11 years (test group); 113 controls	Cookies with 60% RDA beta-carotene, iodine and iron, and drink with 90 mg vitamin C on school days for 1 year (test group); placebo snack (controls)	Significant improvement in short-term memory and attention in test group; also fewer illness-related absences from school

minor effect on enzyme activity, marginal deficiencies of several micronutrients could add up to cause a significant impairment of neurone function.

Well-fed children achieve more

There are many problems associated with measuring behavior and mental performance. Most tests are probably insensitive to the subtle changes expected from nutritional deficiencies, and their validity has not been established. Critical researchers are therefore hesitant to accept that there might be a causal relationship between malnutrition and learning. Nevertheless, many studies have shown that improving the nutritional status of toddlers and school children can benefit various aspects of cognitive function.

Interest in the hypothesis was revived in 1988, following publication of the placebo-controlled study by Benton and Roberts (15). They found a significant increase in nonverbal intelligence in Welsh school children who took a multivitamin/mineral supplement for eight months. Schoenthaler et al (16) obtained a similar result in American school children after 13 weeks' supplementation at the 100% US RDA level. Improvement was above average in 45% of the sample, while the rest showed only a limited response. This could be an indication that only children with an initially poor nutrient status may benefit. Nonverbal intelligence reflects basic biological functioning. Improvements in physiological processes resulting from nutritional interventions would therefore be expected to influence nonverbal rather than verbal intelligence, which is a measure of educational achievement.

Sandstead et al (17) demonstrated why it is not enough just to correct deficiencies of individual micronutrients. They compared the effects of 10 weeks' supplementation with zinc, micronutrients or both in Chinese school children, most of whom had marginal zinc status. Improvement in neuropsychological performance and growth was greatest in those who took both zinc and other micronutrients. Zinc alone had the least effect.

Various authors (Table 1; 18–21) have shown that, by providing children with a nutritious breakfast at school, it is possible to improve children's general

health and behavior, as well as school attendance and school performance.

Existing programs confirm benefits

School feeding programs have been in operation in the USA and Peru for many years; the South African government implemented a program in 1994.

In the USA, federally funded school lunches and breakfasts are available in most public schools. More than 25 million children participate in the National School Lunch Program daily (22). In this program, two-thirds of the country's children between 6 and 10 years eat lunch at school. About 7 million children in more than 68 000 schools participate in the US Department of Agriculture's free School Breakfast Program (23).

In Peru, the government provides a free school breakfast daily to more than half a million children in rural Andean regions. A daily ration of a fortified cake and a milk-like instant beverage contains 30% of a child's energy requirement, 60% of the mineral and vitamin requirement, and 100% of the iron requirement. The total cost per breakfast

is about US\$0.22; the micronutrient component accounts for less than 2% of the total. Encouraged by the success of this program, the government of Peru has extended its food assistance programs to reach nearly 2.5 million children (20).

The Primary School Nutrition Programme in South Africa reaches around 5 million primary school children in geographic areas with high levels of poverty. The aim is to give an early morning nutritious food supplement (providing 20–25% of the energy requirements and a balanced intake of vitamins and minerals) together with nutrition education and other health promotion measures (personal communication, Nutrition Directorate, Pretoria).

Food choices

The choice of foods for inclusion in a school feeding program should be based on the following criteria:

- High nutritional value (rich in energy, proteins and micronutrients, moderate in fats and sugar). To achieve the required amounts of vitamins and minerals (25–50% of

Table 2: Examples of nutritious foods for schools

Food	Varieties	Protein source	Preparation
Enriched cereal bars, cakes, biscuits	Sweet or savory	Soya and/or milk powder	Direct from the packet
Ready-to-eat enriched breakfast cereals	Many	Milk	Add liquid just before eating
Dry soup mixes	Clear or creamy	Bean or pea flour, soya	Add water and boil for a few minutes
Instant meals	Precooked and dried rice or noodles with textured soya, dried vegetables and sauce powder	Soya, milk, cereals	Add boiling water and stir
Milk beverage powders	Fruit, vanilla, chocolate, caramel	Soya and/or milk powder	Add cold water and stir
"Long-life" enriched milk and yoghurt	Plain, fruit, vanilla, chocolate, caramel	Milk	Individual servings (200–300ml)
Enriched juices and nectars	All types of fruits and vegetables	None	Individual servings (200–300ml)
Fruit-flavored drink mixes	All types of fruits	None	Add cold water and stir

the daily requirement per portion) food enrichment may be necessary;

- Practical (long shelf life, easy to store, administer and serve, minimal waste);
- Acceptable to children (attractive appearance and taste, variety of flavors);
- Affordable (local raw materials).

Some examples of suitable foods, all of which can be enriched to provide vitamins (A/ β -carotene, D, E, C, B₁, B₂, B₆, niacin, folic acid) and minerals (iron, calcium, phosphorus, zinc) are shown in Table 2. While all of these products are highly nutritious, some of them (soup mixes and instant meals) may be criticized in that they oppose basic nutrition education messages, and could undermine household food security. Foods that require reconstitution with water are less suitable for areas with limited access to safe drinking water.

A worthwhile investment

Better nutrition contributes to the attainment of two key developmental goals of nations: growth in productivity, and distribution of benefits among members of society (24). Investing in nutrition is therefore worthwhile. Returns in improved health, education and productivity greatly outweigh the costs (25).

School is a good place to begin health education. Young children's bodies and minds are still forming, and trained educators are available to implement activities. Nutrition education is a key part of health education. Improving the micronutrient status of children will improve the cost-effectiveness of other investments. In most poor regions, a modest investment in the nutrition and health of school children will increase their ability to learn more than will a comparable investment in teacher training, textbooks or improvements to school facilities (26). – A. Bowley

References

1. Kleinman RE, Murphy M, Little M et al. Hunger in children in the United States: Potential behavioral and emotional correlates. *Pediatrics* 1998; 101: 1–6.
2. UNICEF. *The State of the World's Children* 1998; p.11.
3. Simeon DT, Grantham-McGregor SM. Nutritional deficiencies and children's behaviour and mental development. *Nutr Res* 1990; 3: 1–24.
4. Scrimshaw NS. Malnutrition, brain development, learning and behaviour. *Nutr Res* 1998; 18: 351–379.
5. Pollitt EP. Iron deficiency and cognitive function. *Annu Rev Nutr* 1993; 13: 521–537.
6. Tiwari BD, Godbole MM, Chattopadhyay N, et al. Learning disabilities and poor motivation to achieve due to prolonged iodine deficiency. *Am J Clin Nutr* 1996; 63: 782–786.
7. Kretchmer N, Beard JL, Carson S. The role of nutrition in the development of normal cognition. *Am J Clin Nutr* 1996; 63: 997S–1001S.
8. Williams RD, Mason HL, Smith BF, Wilder RM. Induced thiamin (vitamin B₁) deficiency and the thiamin requirement of man. Further observations. *Arch Int Med* 1942; 69: 721–738.
9. Lonsdale D, Shamburger RJ. Red cell transketolase as an indicator of nutritional deficiency. *Am J Clin Nutr* 1980; 33: 205–211.
10. Sterner RT, Price RW. Restricted riboflavin: within subject behavioral effects in humans. *Am J Clin Nutr* 1973; 25: 150–160.
11. Kinsman RH, Hood J. Some behavioral effects of ascorbic acid deficiency. *Am J Clin Nutr* 1971; 24: 455–464.
12. Farmer CJ. Some aspects of vitamin C metabolism. *Fed Proc* 1944; 3: 179.
13. Black MB. Zinc deficiency and child development. *Am J Clin Nutr* 1998; 68: 464S–469S.
14. Arthur JR, Beckett GJ. New metabolic roles for selenium. *Proc Nutr Soc* 1994; 53: 616–624.
15. Benton D, Roberts G. Effect of vitamin and mineral supplementation on intelligence of a sample of schoolchildren. *Lancet* 1988; i: 140–143.
16. Schoenthaler SJ, Amos SP, Eysenck HJ et al. Controlled trial of vitamin-mineral supplementation: Effects on intelligence and performance. *Person Individ Diff* 1991; 12: 351–362.
17. Sandstead HH, Penland JG, Alcock NW et al. Effects of repletion with zinc and other micronutrients on neuropsychological performance and growth of Chinese children. *Am J Clin Nutr* 1998; 68: 470S–475S.
18. Richter LM, Rose C, Dev Griesel R. Cognitive and behavioural effects of a school breakfast. *S Afr J Med* 1997; 87: 93–100.
19. Powell CA, Walker SP, Chang SM, Grantham-McGregor SM. Nutrition and education: a randomized trial of the effects of breakfast in rural primary school children. *Am J Clin Nutr* 1998; 68: 873–879.
20. Jacoby ER, López de Romaña G. Evaluation of a fortified school breakfast program in the Andes of Peru. In: *Food Fortification to End Micronutrient Malnutrition: State of the Art. The Micronutrient Initiative*. 1998; pp50–52.
21. Van Stuijvenberg ME, Kvalsvig JD, Faber M et al. Effect of iron- and β -carotene-fortified biscuits on the micronutrient status of primary school children: a randomized controlled trial. *Am J Clin Nutr* 1999; 69: 497–503.
22. Nicklas TA, Johnson CC, Webber LS, Berenson GS. School-based programs for health-risk reduction. *Ann N Y Acad Sci* 1997; 17: 208–224.
23. Anon. Studies show school breakfast can help learning. *Milling and Baking News* 1998; March 10: 30.

Promoting health through schools

This report by a WHO Expert Committee (Technical Report Series, No. 870; 1997; ISBN 92 4 129870 8; Order no. 1100870) considers the wide range of issues surrounding efforts to use schools as a setting for health promotion. Addressed to educational and health professionals, the report takes its focus from the great potential of school health programs to improve both the health of students and their academic performance. With this potential in mind, the report draws on experiences from around the world to demonstrate the feasibility of school health programs and illustrate strategies for their implementation.

The report has four sections. The first introduces the rationale for school health promotion, noting that schools provide an ideal, though largely under-used, setting for tackling the priority health problems of students, their families, and communities. Common threats to the health of children and adolescents, appropriate for inclusion in school health programs, are also identified and discussed.

Section two reviews the status of school health promotion around the world and describes a framework that can be used for strategic planning. It also identifies three areas where activities within the school setting can have an impact on health: the provision of health services, the inclusion of health education in curricula, and the creation of a healthy environment. Health problems addressed include HIV/AIDS, nutrition and food safety, tobacco use, psychological problems, malaria, and helminth infections.

Section three provides advice on how to strengthen school health programs at all levels. Examples from around the world illustrate the success of specific strategies for tackling priority health problems. The final section looks at existing research on school health programs and discusses the lines of further investigation needed to improve current strategies and validate their impact on the health of students and their academic performance.

24. Behrmann JR. The economic rationale for investing in nutrition in developing countries. USAID/VITAL, 1992.
25. Sanghvi TG. Economic rationale for investing in micronutrient programs. Monograph. USAID/VITAL, 1993.
26. FAO/ILSI, 1997: Preventing micronutrient malnutrition: a guide to food-based approaches, p.82.

■ Feature:

Vitamin A deficiency in Brazil: A problem of national significance?

The World Health Organization has included Brazil in the list of countries where vitamin A deficiency (VAD) is a serious public health problem at the sub-clinical level. For a long time, VAD was simply seen as another of the myriad components of protein-energy malnutrition, and restricted to the poor areas of the country, in the north and the northeast. Indeed, most biochemical data do come from these poor areas, suggesting that the more developed south would be free of endemic nutrition problems.

A National Nutrition Survey (ENDEF) conducted in Brazil in the 1970's showed that vitamin A intake from natural sources was very low in practically all areas of the country (1). These dietary data have been confirmed by other studies performed in individual states. In all places where clinical and biochemical surveys have been conducted (Amazonas, Ceara, Bahia, Minas Gerais, Pernambuco, Paraiba, Para, Sao Paulo) the prevalence of VAD is high. In a recent study by our Vitamin A Research Group (GPVA, Grupo de Pesquisa em Vitamina A) in Rio de Janeiro, 34.6% of preschool children had levels of circulating retinol below 1.05 $\mu\text{mol/L}$, regardless of anthropometric status (2). In umbilical cord blood of newborn infants, the prevalence of low retinol levels was 55.7% (3). A strong association between low retinol levels in the umbilical cord and low birth weight in full-term newborns suggests that VAD might play an important role in their morbidity. In all cases, there was a significant correlation between maternal and umbilical cord retinol levels.

The lack of an association between anthropometric parameters (other than birth weight) and VAD has also been observed in Pernambuco. In this north-eastern state, VAD was equally distrib-

uted among children with normal and low body weights (Flores, unpublished). Evidence suggests that the low consumption of vitamin-A rich foods in Pernambuco is not related to the nutrition knowledge of the mothers nor to differences in socioeconomic status within the narrow range permitted by deprived families (4).

These data imply that a situation similar to that seen in the areas traditionally considered poor is spread virtually over the whole country. A "geographical analysis of distribution" (Figure 1) would be a strong basis for considering VAD as a public health problem at the national level. It is worth noting that none of the surveys conducted in Brazil have identified an area with a low VAD prevalence. Given that VAD increases mortality and morbidity in risk groups (notably young children, pregnant and lactating women and, as we saw in Rio, newborns), it would be a reasonable public health attitude to initiate preventive intervention programs. Because the vitamin A status of the newborn depends strongly on that of the mother, as shown by our study, women of reproductive age should be a new preferential target for preventive programs.

Intervention programs should be considered in all countries where there is strong evidence for suspecting that VAD may have a major impact on public health, as in Brazil. The effects of VAD are devastating, while intervention programs are easy to implement and affordable. Food-based programs already exist for the more affluent layers of soci-

ety, and it would be easy to extend these programs to include foods affordable to the poor communities. – *Rejane Andréa Ramalho, Instituto de Nutrição Josué de Castro, Universidade Federal do Rio de Janeiro, Centro de Ciências da Saúde Bloco J 2º Andar Ilha do Fundão - 21944-970 (aramalho@rionet.com.br); Luiz Antonio dos Anjos, Universidade Federal Fluminense; Hernando Flores, Universidade Federal de Pernambuco.* ■

References

1. Fundação Instituto Brasileiro de Geografia e Estatística. Estudo Nacional da Despesa Familiar (ENDEF). Brasília: FIBGE, 1974.
2. Ramalho RA, Anjos LA, Flores H. Níveis séricos de vitamina A e teste terapêutico em pré-escolares no Rio de Janeiro. *Revista de Nutrição da PUC-Camp* 2000.
3. Ramalho RA, Anjos LA, Flores H. Níveis de retinol no sangue materno e no cordão umbilical de seus recém-nascidos no Rio de Janeiro. *Archivos Latinoamericanos de Nutrición* 1999.
4. Brunken GS, Flores H. Why do diets lack vitamin A? *Nutriview* 1994;3:1-3.

Fig 1: Map of Brazil showing regions (■) with biochemical evidence of VAD



■ Conference report:

Manila Forum: Malnutrition holds back economic development

The Manila Forum (Manila, Philippines, February 21–24, 2000) took a new look at regional policies on food fortification, and reviewed the potential of appropriate programs for protecting populations in Asia and the Pacific from micronutrient deficiencies. The aim of the symposium, sponsored by Asian Development Bank (ADB), Micronutrient Initiative (MI) and International Life Sciences Institute (ILSI), was to enhance public–private–civic collaboration. It was attended by leading personalities from Indonesia, Thailand, Vietnam, China, India, Fiji, Kyrgyz Republic and the Philippines, as well as representatives of the food industry, and trade, investment and development organizations.

More than a health problem

In 1994, the World Bank estimated that the cost of micronutrient malnutrition to developing economies is at least 5% of GDP. According to experts at this year's Manila Forum, just correcting deficiencies of iodine, vitamin A and iron could improve IQ by 10–15 points, reduce maternal deaths by one third, decrease infant and childhood mortality by 40% and increase strength and work capacity by almost half. In spite of increased awareness of the problem following the 1990 World Summit for Children and the 1992 Conference on Nutrition in Rome, progress toward elimination of micronutrient malnutrition in Asia has been limited. Efforts were driven mainly by the public sector. One of the main objectives of the Manila Forum was therefore to find ways to fully engage the private sector, particularly the food industry, as well as civic organizations in selected Asian countries to collaborate with the public sector.

To encourage a new momentum, participants defined appropriate actions to expand the impact of food fortification through multisectoral collaboration. They looked for consensus on how the public sector can strengthen its capacity to protect public health and improve nutrition, while creating an environment for the private sector that allows commercial profitability. They also considered how to integrate the

World Trade Organization, consumer movements and the donor community into the dialogue. The results of this strategic planning will feed directly into a Regional Technical Assistant (RETA) to facilitate the development of detailed national plans.

Industry leaders show the way

Leading national and international food companies showed what can be done.

In Indonesia, a unique example of private sector commitment, public willpower and invaluable support by USAID as well as endorsements by organizations such as UNICEF helped the leading flour miller, Bogasari Flour Mills, to fortify flour with iron, zinc, vitamin B₁, B₂ and folates for nationwide distribution. The Indonesian environment (flour is the second most popular staple food, and there are only 5 major flour millers nationwide) makes flour fortification a sustainable strategy.

Strong collaboration between Thai President Food and experts from the Ministry of Health clearly helped in the successful national implementation of instant noodle fortification. The partners are currently working to improve the fortificant formulation. After the government reduced taxes on imported fortificants from 33% to 1%, all major instant noodle makers are committed to the national effort to eliminate micronutrient deficiencies.

Champfleur Miller Association, representing flour millers in the Philippines, supported the National Action Plan for Nutrition by fortifying wheat flour with vitamin A (in addition to B vitamins and iron). The pioneering company PUREFOOD looks for further government collaboration to liberalize the wheat flour trade, to reduce the cost of fortification, and participate in the government nutrition promotion (Pan de Bida) program at village level. It is hoped that the government will legislate mandatory flour fortification soon.

Also in the Philippines, Procter & Gamble launched NutriDelight, a fortified beverage powder with 8 vitamins and 3 minerals. The product was tested in Chile, Tanzania and the Philippines in

collaboration with UNICEF, MI, Cornell University and national nutrition institutes. The company also started a nutrition education program (together with the Philippines Departments of Education and Health, and the Nutrition Center of the Philippines, NCP, and with funding by ADB and USAID) to train aid workers and teachers using materials developed by the NCP. The aim is to reach 42,000 villages covering 9 million households. This is the type of multisectoral collaboration needed to eliminate micronutrient malnutrition.

The representative from the China National Salt Industry Corp shared his experience that a successful program requires a champion, good collaboration from aid agencies (a World Bank loan of US\$30 million to help state-owned and poorly funded salt factories to upgrade their facilities) and a good nationwide surveillance system to ensure compliance. The success of salt fortification can be seen by the 93.8% coverage nationwide in 1999 (compared to 54% in 1995), and a fall in total goiter rate amongst children from 20.4% in 1995 to 8.8% in 1999. All sectors (the State Council, NGOs, industry and government, as well as foreign aid) have played a major role in this success.

In Vietnam, the pioneering initiative of the Bien Hoa Sugar Mills to fortify sugar with vitamin A is encouraging. Through multisectoral collaboration (UNICEF, National Institute of Nutrition of Vietnam, Bien Hoa and Roche) it has been possible to introduce a test product. Funding by agencies such as World Bank or ADB would help create a sustainable program.

Sugar millers in India are committed to sharing their sugar fortification experience with Asian neighbors. This exemplifies another sort of regional collaboration that could lead to success in the fight against hidden hunger.

NGOs committed to helping

The commitment of the participating nongovernmental organizations (NGOs) to share their wealth of expertise clearly augurs well for the region, where malnutrition is responsible for the

deaths of 2.8 million children and 65,000 mothers annually.

Dr Venkatesh Mannar (MI) illustrated emerging opportunities for adding nutrients to food driven by rapidly changing trends in food processing and distribution, and the beneficial impact of food fortification on micronutrient malnutrition. Food fortification could also allow the private sector to expand markets. The expertise gained globally in fortifying staple foods is well established, and costs are negligible (vitamin A in sugar: US\$8 per ton, vitamin A in cooking oil: US\$4, multiple vitamins and iron in flour: US\$1).

Dr Ray Yip (UNICEF Advisor for China & Mongolia) promoted wheat flour as a suitable and proven carrier for iron and B vitamins. Considering the high burden of iron deficiency anemia in Asia Pacific he asked: "Do we need a 100% solution before we act (i.e. implement wheat flour fortification in Asian countries)?"

Dr Alex Malaspina (ILSI) shared his vision of the future, in which all staple

foods are enriched with vitamin A. He urged fortificant suppliers to develop forms more suitable for less developed countries. He also advocated joint marketing and public education campaigns, in which partners pool their respective strengths and resources. Together, he said, we can build a greater awareness of micronutrient malnutrition and create demand for fortified products.

Dr Glen Maberly (Program Against Micronutrient Malnutrition: PAMM) stressed the important role of the private sector and the need to open all channels of communication. We need to recognize and respect the need of the private sector to promote their business in any initiative (including public health). To ensure success for all sectors a "merging of investment interests" will be essential.

Based on his wide experience with staple food fortification programs in Latin America, Dr Herbert Weinstein confirmed that communication with all sectors is critical for successful program implementation. To make any headway, mutual trust is needed.

Taking the lead

After four days of deliberation, the participants drafted a consensus statement identifying the principles, strategies and actions for food fortification initiatives in the region.

This meeting has put momentum into a multisectoral approach to implementing successful and sustainable food fortification programs throughout the region. The Asian Development Bank is prepared to take the lead and build on the momentum. In the closing session, the message from Dr Joseph Hunt and Christine Wallich (ADB) was that "malnutrition holds back economic development in the Asia Pacific region in a major way, and that is inexcusable in a region that is anxious to rejoin the World's leaders in sustained growth ... Asian children of the millennium can be full of potential for life-long learning and productivity, but not if they are afflicted with what we call Hidden Hunger". – *Kenny Koh, Ph.D., Technical Manager, Human Nutrition and Health, Roche (China) Ltd.* ■

■ News in brief:

Better treatment for diarrhea

Oral rehydration therapy is one of the cornerstones of treatment in cholera and other forms of severe diarrhea. A drawback of the usual, glucose-based, solutions is that they do not reduce the amount or duration of the diarrhea. Researchers therefore look for ways to improve the efficacy and acceptability of the therapy.

Rabbiani (1) describes the merits of various modifications to the formulation. A widely used alternative replaces glucose with cooked rice. This tastes better, provides more calories, and reduces diarrhea considerably. The formulation

has recently been improved by incorporating precooked, hydrolyzed rice starch in a solution packaged ready for use. Further improvement could be achieved by adding micronutrients such as vitamin A, zinc, magnesium and selenium, which have antioxidant properties. ■

1. Rabbiani GH. The search for a better oral rehydration solution for cholera. *N Engl J Med* 2000; 342: 345–347.

Blindness caused by B-vitamin deficiency

In a letter to the Editor, Milea et al. (1) report a case of optic neuropathy resulting in permanent blindness in a strict

vegan. After consuming a diet free of foods from animal sources for 13 years, the 33-year-old man had deficient levels of vitamin B₁, B₁₂, folate, vitamins A, C, D and E, zinc and selenium. Levels of vitamin B₆, nicotinamide and iron were normal. The patient had no disorder of the stomach or intestines that would result in malabsorption.

The neuropathy disappeared after treatment with intramuscular B₁₂ and an oral multivitamin supplement, but vision was not restored. ■

1. Milea D, Cassoux N, LeHoang P. Blindness in a strict vegan. *N Engl J Med* 2000; 342: 897.

■ Editorial: Setting priorities

Before setting off on a trip, you have to know where you want to go and how to get there. It is also important to decide why you want to go there, if it is worth the time and effort, and if there aren't other places you would rather visit first. Similarly, it is necessary to go through the same process before starting out on a nutrition project. On top of that, like someone organizing a trip for a group of people, you have to accommodate a wide variety of special wishes from all the parties involved. If you try to make everybody happy from A to Z, your group will

probably never leave the starting post. Without some degree of compromise, nothing can be achieved. That means you have to set priorities.

But what are the priorities in nutrition? From a scientific point of view, we should first combat those deficiencies that have proven bad effects on health. The public health specialist might prefer to deal first with the problems that cause most suffering. The economist will certainly want to concentrate on measures to cut healthcare costs and improve productivity. And so on.

Equally perplexing is the choice of target group. Faced with limited funds, is it better to target newborn babies, small children, adolescents, mothers or some other group first? There are plenty of arguments in favor of all of them.

In my view, the most important thing is to decide on these matters as quickly as possible, so the journey can begin. People who travel to unexplored places have to be ready to deal with unexpected developments anyway! – *A. Bowley* ■

■ Events:

South African Nutrition Congress 2000, Durban, South Africa, August 15–18, 2000.

Theme: "From Lab to Land". This biennial conference (the 18th for the Nutrition Society of South Africa and the 6th for the Association of Dietetics) emphasizes the growing awareness that research in the laboratory must be relevant for application in real life.

Besides lectures by invited international speakers, there will be open sessions, symposia and workshops addressing various aspects of nutrition relevant to South Africa as well as other African countries. The draft/final program can be found on the web site (www.turners.co.za/nutri) after April 30/June 15.

Information: Turner Conferences and Conventions, Nutrition Congress 2000, PO Box 1935, Durban 4000, South Africa. Tel: +27 31 332 1451; Fax: +27 31 368 6623; email: turner13@galileosa.co.za

20th IVACG Meeting, Hanoi, Vietnam, February 11–17, 2001.

Theme: "Twenty-five years of progress: Looking to the Future". While commem-

orating IVACG's founding in 1975, participants will have the opportunity to share expertise from many countries.

The meeting agenda will include invited presentations as well as up-to-date guidance on identifying vitamin A deficiency, implementing appropriate interventions, and monitoring and evaluating progress in controlling and preventing vitamin A deficiency. More than 400 policy makers, program managers, planners, and scientists from international agencies, national ministries, educational institutions, industry and nongovernmental organizations are expected to attend the meeting.

Information: IVACG Secretariat, ILSI Research Foundation, 1126 Sixteenth Street, N. W. USA – Washington DC 20036-3617. Tel: +1202 659-9024; Fax: +1202 659-3617; email: hni@ilsi.org

17 th International Congress of Nutrition, Vienna, Austria, August 27–31, 2001.

Continuing the tradition of earlier International Congresses on Nutrition, the goal of the meeting is to provide an update on issues in nutrition and food

sciences and to establish how this new knowledge impacts on:

- goals for nutrition education;
- setting of nutrition policy and programs;
- providing for food security and safety;
- implementing recommendations for nutrition practices that will optimize global health through the prevention and treatment of disease.

In addition to plenary lectures and traditional theme-specific symposia, the program will include debate sessions on controversies in nutrition. A focus symposium, designed to deliver in-depth information on a specific "hot" topic, will be dedicated to nutritional problems in Africa.

Scientific secretariat: Vienna Academy of Postgraduate Medical Education and Research, Alser Strasse 4, A-1090 Vienna. Tel.: +43 1 405 13 83 14; Fax: +43 1 405 13 83 23; email: medacad@via.at

Further details and a copy of the Second Announcement (as PDF file) can be found at: <http://www.univie.ac.at/iuns2001/index.html>