

Forging Effective Strategies to Combat Iron Deficiency

Prevention and Control of Iron Deficiency: Priorities and Action Steps^{1,2,3}

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ABSTRACT The strengthening of global efforts to prevent and control iron deficiency requires priority setting and action steps in several key areas, including research, partnership formation, policy setting and the integration of intervention strategies. Research priorities include the development of improved assessment tools, evaluation of fortification strategies, improvement in interventions for infants, evaluation of combined intervention strategies to address multiple micronutrients and development and testing of interventions using genetically engineered foods with improved nutritional qualities. Policy priorities include the expansion of partnerships, balancing of advocacy, research and program implementation, and improved communications. Priorities in partnership formation include building strong linkages between public sector efforts and the food industry to enhance training, technical expertise and advocacy. Strategies to address iron deficiency should seek to integrate efforts in food fortification, supplementation, dietary improvement and complementary public health measures. *J. Nutr.* 132: 880S–882S, 2002.

KEY WORDS: • *iron deficiency* • *research priorities* • *health policy* • *integrated strategies*

The closing panel of the conference brought together individuals representing diverse perspectives, including research, policy formation, industry and program implementation. The focus of the session was to consider the key priorities and action steps required to strengthen global efforts to prevent and control iron deficiency. This article presents a brief summary of the panelists' remarks.

Research priorities

Dr. Sean R. Lynch, Professor of Medicine at the Eastern Virginia Medical School in Hampton, VA, described five major research priorities.

Better assessment tools. The need exists for better approaches to determine how much of the total burden of anemia encountered in developing countries is the result of iron deficiency. The overall prevalence of anemia is a poor screening tool for iron deficiency and iron deficiency anemia, particularly if mild anemia is included in the estimate. In popu-

lation studies, there is considerable overlap in anemia status between individuals with iron deficiency and those with adequate iron status. Prevalence estimates are also confounded by anemia due to other causes such as malaria and other infectious disorders. The assumption that mild anemia is indicative of iron deficiency in all individuals has led to considerable confusion and likely accounts to some extent for the apparent failure of many intervention programs. Tools for identifying and quantifying iron deficiency in populations in which inflammatory disorders are not a major factor are available, but they require adaptation for field application. More research is required to determine how best to identify iron deficiency in the presence of inflammatory and infectious disorders.

Evaluation of fortification strategies. A second priority is the need for better evaluation of the potential efficacy of the fortification strategies that are currently being implemented or planned at a national level in several regions of the world. The major concern here is the widespread use of elemental iron powders whose bioavailability has not been established. There is an urgent need to determine the bioavailability of these iron powders. A simple laboratory-screening test that correlates closely with bioavailability could then be developed for setting appropriate quality control standards for producers of food-grade elemental iron powders. Furthermore, it will be necessary to evaluate only a few products because there are a limited number of manufacturers of food-grade elemental iron powders.

Iron status in infancy. A third priority is to develop better strategies to ensure adequate iron status in infants and young children. Recent experimental evidence strongly supports a causal relationship between early iron deficiency and problems with later cognitive and emotional development as well as poor academic performance. Studies reported from African countries suggest that the mother's iron status during pregnancy may also have an important effect on infant iron sufficiency during this critical period. This clearly merits further

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³ Based on presentations by Dr. Sean R. Lynch, Eastern Virginia Medical School; Dr. Ray Yip, UNICEF, People's Republic of China; Mr. Jorge David, Chilean Southern Wheat Millers Association, Chile; and Dr. Nevin Scrimshaw, United Nations University.

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evaluation. Improved low cost methods are needed to deliver iron to infants in the form of fortified foods or iron supplements added to meals just before consumption. Also needed are ways to ensure better bioavailability in complementary food vehicles and the development of a simple, inexpensive method to reduce phytate content.

Combined strategies. A fourth priority is the design and evaluation of combined strategies for the elimination of anemia. In addition to the provision of absorbable iron, strategies should include control of malaria and helminth as well as attention to other potential nutritional deficiencies including vitamin A, vitamin B-12 and folic acid. There is little doubt that such strategies must be tailored to particular countries or regions, but there is an urgent need for a much more systematic approach to the problem.

Genetically engineered foods. A final priority is the development of genetically engineered foods with improved nutritional qualities. This is particularly important for many populations that rely on subsistence farming and do not have access to commercially processed foods. Fortification cannot be targeted to these people and delivery systems for supplemental iron are often least effective in such settings.

Policy directions

Dr. Ray Yip, Chief of the Health and Nutrition Section of UNICEF in the People's Republic of China, described key issues in policy formation relating to iron deficiency.

Partnerships and common goals. Dr. Yip highlighted the need for people working in different areas, such as research and development, communications and program operations to form partnerships and work together toward common goals. There is a critical need for a clear, well-defined, global goal that expresses the need for a substantial reduction of iron deficiency in children and women by 2010. Having a goal is crucial, both to support policy development and to secure adequate resources. Not only is a clear goal required, but we must also make sure that the goal is on the global agenda. We have heard about the concerted effort to include an iron deficiency goal as part of the outcome of the upcoming Special Session of the United Nations General Assembly. Having such a goal is critical because it will provide a focal point to stimulate actions and generate support at both the global and national levels.

Advocacy, research and program action. Effective mechanisms to achieve our goals in addressing iron deficiency include sound advocacy, balanced research and effective program action. Sound advocacy is needed to obtain political commitment and resource support. Balanced research that addresses not just what to do, but also how to do it well is also needed, suggesting a need for investment in program evaluation. Of course, progress in preventing and controlling iron deficiency will depend on effective action programs. Effective programming requires being sensitive to the local situation in defining the strategy mix and priorities. Also, we must show evidence that programs work by building in and maintaining adequate monitoring and evaluation.

Communications. The key to effective advocacy is communication. We may look back to see this meeting as the event that marked the mainstreaming of communications in our fight against iron deficiency. To have effective advocacy, we require clear and consistent messages. We must emphasize not only that the burden of iron deficiency is costly and unacceptable, but also that the solution is feasible and cost effective. To keep a focus, advocacy strategy should be based

on carefully selected issues and proposed actions; messages must demonstrate the conviction that we can do it.

Future directions. Moving forward requires that we use the knowledge and skills we now have for the design and implementation of action programs. Of course, ongoing research and development that is linked effectively to communications and that also supports program operations is warranted. Finally, we must emphasize the importance of effective communications that are linked to an overall strategy, understand and cater to demand, are precise, focused and convincing and that support advocacy efforts and behavioral change.

Building partnerships

Mr. Jorge David, General Manager of the Chilean Southern Wheat Millers Association based in Santiago, Chile, described the efforts of Latin American wheat millers to promote iron fortification of flour.

The Lima Declaration. Mr. David described an initiative that illustrates the potential for building partnerships among industry, governments and the academic community. A meeting in Lima, Peru, provided an opportunity to enlist the Latin American Millers Association in the fight against anemia. A declaration was proposed and adopted recognizing the need to intensify the campaign for wheat and corn fortification in Latin America and the Caribbean. The declaration urged each country in the region to ensure that the problem of iron deficiency anemia and diseases caused by deficiencies of other micronutrients be recognized at all levels of society. Member companies of the association committed themselves to collaborate to determine the feasibility of iron and vitamin fortification in their countries. If fortification was determined to be feasible and effective, government authorities, the milling industry, flour importers and distributors were urged to work together to issue legislation making flour fortification with iron and micronutrients compulsory, based on international standards and control measures.

Advocacy and training. As a result of the commitments made in the Lima Declaration, the leaders of the milling industry advocated approval of legislation for flour fortification to their governments. A further result was the support by the United States Agency for International Development of a 3-wk long course at the American Baking Institute to train technical personnel from Latin American milling companies in techniques of quality assurance and quality control of fortified products. To receive the training, trainees had to have considerable experience as employees of the milling industry in Latin America. Also, the trainees had to agree to be willing to serve as trainers of other technical staff.

Limitations to progress. Several factors have limited progress in achieving fortification goals. One limiting factor has been concerns about the fairness and adequacy of government regulation and monitoring to ensure compliance with fortification laws. Another factor limiting progress arises from increasing market globalization and the smuggling of flour from countries that do not fortify and do not pay tariffs. The Latin American Millers Association was instrumental in bringing these practices to the attention of government authorities, resulting in implementation of better controls.

Conclusions. The milling industry has the human resources to provide technical support for training and for improved monitoring of fortification efforts, but training opportunities must be reactivated and continued. Institutions of higher learning should participate in this effort, as well as international agencies, which should provide technical as well as financial support. To achieve greater commitment on the

part of industrial millers, the advantages of fortification must be continuously emphasized, highlighting the point that fortification increases sales by improving competition against nonfortified products from other countries.

Integrating strategies

Dr. Nevin Scrimshaw, Advisor to the Food and Nutrition Program of the United Nations University, discussed the value of integrated strategies in addressing iron deficiency, including a combination of fortification, supplementation, dietary improvement and other public health measures.

Fortification. Fortification of cereals can improve iron status and reduce anemia but does not eliminate it, and must therefore be complemented by other measures. Populations with iron deficiency are likely to have other micronutrient deficiencies. Once iron fortification is implemented, the additional cost for multiple fortifications is very low compared with benefits, including enhanced development and cognition and reduced morbidity, and anemia, for example. B vitamins and zinc should be added to mixtures for iron and folate fortification and supplementation. Vitamin A deficiency can also be prevented by some combination of dietary improvement, fortification and supplementation. Positive factors favoring fortification with vitamin A include its lipid solubility, which promotes blending with fats and oils. However, vitamin A is also more expensive than many other nutrients when added to a cereal mix, and there is a high loss in baked cereal products.

Supplementation. Supplementation should address high risk groups including infants and young children, school-aged children, adolescent girls, women of childbearing age, and pregnant women. When breast milk is no longer sufficient, iron deficiency in infancy can be addressed using low cost complementary foods and supplementation with capsules or syrups. Iron supplementation during pregnancy can prevent anemia during pregnancy and improve iron stores at birth.

Other health measures. Other measures to improve iron status include improved sanitation and hygiene, treatment of parasitic diseases, immunization and other infection control, better primary health care, and improved child spacing. Strategic information, education, and communication (IEC) activities are crucial to generating demand, supporting compliance and promoting sustained behaviors that improve iron nutrition. Also, well-planned and implemented monitoring and evaluation are absolute necessities for building and sustaining national programs to prevent and control iron deficiency.

CONCLUSION

Iron deficiency is a multifactorial problem that requires multisectorial and multidisciplinary approaches and interaction. It is essential to integrate the efforts of various stakeholders, including persons and institutions in academia, industry, government, nongovernmental organizations, and civil society. Integrated efforts can effectively and economically address iron deficiency, and other micronutrient deficiencies, throughout the life cycle.