

## In this Issue

# Interpreting success and failure in food fortification

The articles highlighted in this issue of *Public Health Nutrition* describe the successes or failures of fortification programmes in the USA, Brazil and South Africa. The idea of using fortification to combat micronutrient deficiencies rests on the recognition that individuals may lack the resources to achieve a nutrient-rich diet on their own. As an alternative, fortifying well-selected items in the food supply can have a potentially large public health impact. After a lengthy process of justifying the need for fortification, then designing and planning its implementation, a fortification programme goes into effect. Then we hope for the best, and we look for evidence of its success (or failure).

A folate fortification programme was implemented in the USA to reduce the incidence of neural tube defects and appears to have been very successful in doing this. But how does it affect people other than women of reproductive age and their infants, who were the originally targeted population? As emphasized in a letter to our journal by Mark Lawrence, in the case of folate, measuring success is not as clear as it may seem<sup>(1)</sup>. In their cost-effectiveness analysis of the folic acid fortification programme in the USA, Bentley *et al.* determined that the greatest benefit from fortification was in preventing myocardial infarctions, not neural tube defects<sup>(2)</sup> – although the estimate assumes a causal link between synthetic folic acid and myocardial infarction. In this issue, Enquobahrie *et al.* measure the impact of folic acid fortification on serum folate and homocysteine concentrations in a cohort of adolescents in the USA<sup>(3)</sup>. While they saw an improvement in folate status with fortification, there was, however, no improvement in homocysteine levels, arguably the risk factor more directly related to CVD risk. Thus, the long-term consequences of folic acid fortification on CVD risk remain to be seen. Success is not so easily measured when there are different health outcomes to evaluate.

Even when the outcome is straightforward, evaluating the impact of fortification programmes can produce conflicting findings. In the case of iron fortification in Brazil, da Silva *et al.* report that women pregnant after the programme was fully in effect were less likely to have anaemia than pregnant women who were tested pre-fortification<sup>(4)</sup>. Yet over roughly the same period of time, Assunção *et al.* found no effect of iron fortification on anaemia in children under 6 years of age<sup>(5)</sup>. Reconciling this difference in findings is difficult but could be due to their different locations in Brazil, different populations or even residual confounding.

Fortification programmes can also produce mixed results. Papatthakis and Pearson describe the effects on a

sample of breast-feeding women of the fortification programme in South Africa, where national legislation mandated fortification with vitamin A, thiamin, riboflavin, niacin, vitamin B<sub>6</sub>, folic acid, Fe and Zn<sup>(6)</sup>. They report success in improving folate and zinc status in their sample, but no effect on iron deficiency, measured using serum ferritin<sup>(7)</sup>.

Successes are cause for satisfaction; the greater the success, the greater the satisfaction. But the invited commentary by Harvey and Dary<sup>(7)</sup> provides a clear-eyed look at what to take away from a failure. One lesson is the importance of designing an evaluation that can provide usable information not only on a programme's success or failure, but also on why the programme failed, if it did. Related to this lesson is the importance of learning from failure. Implementation of a fortification programme is, after all, only a means to an end and not an end itself. If it does not achieve that end, the next step is not to scrap the programme, but to figure out why. To their credit, both Assunção *et al.*<sup>(5)</sup> and Papatthakis and Pearson<sup>(6)</sup> offer useful ideas on why Fe fortification did not reduce anaemia in their respective samples.

A final lesson stressed by Harvey and Dary<sup>(7)</sup> is the need for government and academic researchers to remain engaged in the process of designing, implementing and evaluating fortification programmes. Thus, the authors of these articles should be applauded for their efforts! The success of a fortification programme, to paraphrase the WHO, depends not only on its public health impact but also on its sustainability<sup>(8)</sup>. Fortification programmes can be sustained only with continued evidence of their success and evidence-based plans to overcome failure.

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