



It is Time to Fortify Basic Foods in Israel According to the Canadian Model*

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In the January 8, 2004 edition of the *New England Journal of Medicine*, Wald discusses “Folic acid and prevention of neural-tube defects” [1], based on the now decade-old information that pre-pregnancy folic acid supplementation prevents over 60% of neural tube defects. He goes on to point out that in the United States, which along with Canada mandated folic acid fortification of flour in 1998, the cost is about 1 cent per person per year or \$1,000 per NTD prevented, but the cost benefit ratio is higher in high prevalence countries such as Mexico. He also points out that 38 countries have already introduced or agreed to introduce folic acid fortification of flour, although no countries in the European Union are among them. The revolutionary findings of the effectiveness of folic acid in preventing NTDs and abortions due to NTDs, and the effect of folic acid in lowering homocysteine with a contribution to lowering stroke and coronary heart disease mortality, have raised once again the long-standing issue of the fortification of basic foods with micronutrients (vitamins and minerals) important for individual and population health.

This topic was reviewed in *IMAJ* by Kaluski, Tulchinsky and colleagues for prevention of micronutrient deficiency conditions in Israel [2], who recommended a population-based preventive approach of mandatory food fortification, such as that implemented in Canada since 1979. This issue has been under debate in the Ministry of Health for many years [3], and there are recent signs of gradual progress in partial salt iodization and in flour fortification among specific manufacturers reaching the middle-class population, but not among the bakeries that reach the majority of the population, and especially the poor who buy the subsidized breads.

The case for fortifying flour with folic acid grows in strength with the rapidly growing body of evidence and flood of publications in the scientific peer-reviewed literature demonstrating the prevention of neural tube defects, as well as the increasing evidence that raising population folic intake reduces homocysteine levels, thereby

lowering the risk of coronary heart disease and strokes [4]. A 2002 editorial in the *British Medical Journal* [4] calls on the British government to fortify flour with folic acid to prevent neural tube defects and to benefit from its effects in reducing coronary heart disease and stroke. The editorial concludes: “Rare is the opportunity to implement a sustainable, inexpensive, and effective intervention to prevent major human diseases. Folic acid fortification of flour is one of those rare opportunities. The available evidence argues that governments that do not ensure that flour is fortified with sufficient folic acid are committing public health malpractice.”

The USA adopted food fortification in enriching flour to eliminate pellagra in the southern states in the 1920s and 1930s after the pioneering investigations, by Joseph Goldberger of the U.S. Public Health Service, of a widespread epidemic of pellagra in the southern U.S. between 1914 and 1928 [5]. Salt has been iodized since the 1920s, resulting in the elimination of goiter and sub-clinical iodine deficiency in the U.S. Rickets, which affected 75% of children in New York City in 1921, was eliminated first by widespread use of cod-liver oil and then by vitamin D fortification of milk. President Roosevelt adopted a program to enrich flour with vitamins and iron in 1942 as part of the war effort to protect the health of the population [6].

Canada adopted mandatory fortification in 1979 after many years of voluntary fortification, because of the limitations in voluntary implementation and recurrent signs of micronutrient deficiencies – even in one of the wealthiest nations in the world [7].

In 1996, the World Health Organization renewed its call for the universal iodization of salt, stating:

“Iodine deficiency remains the single greatest cause of preventable brain damage and mental retardation worldwide. WHO estimated in 1990 that 1570 million people, or about 30% of the world’s population, were at risk of Iodine Deficiency Disorders (IDD). In 1995, WHO estimated that the number of people with goiter was 750 million.”

“Insufficient intakes of iodine in pregnancy and early childhood result in impaired mental development of young

* This report expresses the opinions of the authors themselves and not of the agencies employing them.

NTD = neural tube defect

children. Even marginal deficiency may reduce a child's mental development by about 10%."

"The goal for the year 2000 is that at least 90% of edible salt consumed should be adequately iodized, including salt used for animals and salt used in preparation of commonly eaten staple foods such as bread" [8].

Despite the decline in clinical reports of iodine deficiency goiter in Israel since the 1950s, we still have pockets of iodine deficiency showing up in schoolchildren and pregnant women in some parts of the country [9].

A 2003 editorial in the *Bulletin of the World Health Organization* addressed "Micronutrient deficiency conditions – an underlying cause of morbidity and mortality" [10], concluding that: "Public health interventions that can prevent or correct these micronutrient deficiency deficiencies merit the highest priority for national programs and donor investment."

In January 2002, an Israeli-Palestinian Conference on Micronutrient Deficiency Conditions held in Jerusalem concluded as follows:

1. Solving the problem of Micronutrient Deficiency Conditions is critical to public health in Israel and the Palestinian Authority if they are to achieve optimal health and well-being.
2. Fortification of food is the most cost-effective method of primary prevention, with adaptation to local conditions, in keeping with experience in countries such as the United States and Canada.
3. Increased monitoring activities are needed to maintain surveillance of nutrition status and the effectiveness of interventions, including safety and efficacy.
4. Joint and regional planning and cooperative activities to promote public education and professional and public support should be undertaken.
5. Monitoring of compliance with food fortification is also part of the process [11].

Older Israelis still remember that as children in the 1930s and 1940s their mothers forced them to take daily doses of cod-liver oil. This practice went out of fashion with medical teaching that Israel had good nutrition and that there was enough sunlight to provide vitamin D for all. However, although rickets declined in the country, pockets still appear, primarily among Bedouin and immigrant Ethiopian children. Concern regarding vitamin D deficiency has also risen with regard to low levels of vitamin D in various population groups and its effects on bone metabolism in adolescence, middle age and the elderly (osteoporosis), especially as sun exposure is actively discouraged because of lifestyle changes and concern about skin cancer [12]. In 2003, the American Academy of Pediatrics reiterated the importance of milk fortification with vitamin D, and called for additional vitamin D supplements throughout childhood and adolescence because of widespread evidence of vitamin D deficiency at sub-clinical levels in many population groups [13].

In Israel, a substantial part of the population lives below the poverty line. Iron deficiency and anemia are common among women and children and, although declining in frequency, are still much higher than acceptable, due to inadequate dietary iron [4].

Reports of goiter in northern Israel in the 1950s to 1980s have not been followed up by recent studies, but sub-clinical iodine deficiency was demonstrated by Sack et al. [9] to be present among pregnant women in the Western Galilee and among schoolchildren in the Hebron highlands. Some iodized salt has become available in Israel in recent years, yet most salt sold to the Israeli public is still un-iodized, leaving Israel among the few developed and even developing countries in the world still not iodizing its salt for the majority of the population.

Reports of vitamin D deficiency among the elderly in Israel [12] and the seasonality of vitamin D levels, coupled with current advice to avoid sunlight exposure for fear of skin cancer, make a population approach with vitamin D fortification of milk products a necessity. Long-standing legislation in Israel requires vitamin A and D fortification of 1% milk and margarine, but not 3% milk, on the erroneous assumption that there is vitamin D in "whole" milk. The major milk producers are aware of this anomaly, but thus far have failed to respond to requests by the Ministry of Health to fortify whole milk and other milk products.

Recent reports by Kark and others have shown high homocysteine levels among Israelis, and despite vast reductions in mortality rates our rates of coronary heart disease prevalence are still very high [15]. Vitamin B12 levels are low. Folic acid as an antagonist to homocysteine is increasingly accepted as a major preventive factor in coronary heart disease [16].

What needs to be done?

The case for action, as spelled out by Kaluski, Tulchinsky and colleagues, is powerful. Evidence-based public health demands action and failure to do so constitutes negligence. Society accepts the fortification of breakfast cereals and some milk products, but we need to reach the wider population with folic acid, B-vitamins and iron. It is partly an issue of restoring the food values of the pre-processing stage and micronutrients difficult to acquire in the usual diets of adolescents, the poor, the elderly, those veiled from the sun, and other risk groups. The Canadians have led the way in mandating food fortification for public health. The Israel Ministry of Health is now preparing regulations to mandate fortification of basic foods in Israel to protect the weaker elements of society – at marginal cost and with no demonstrated ill effects. This is a key part of health promotion, and the sooner implemented the better.

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