Folate Deficiency Is an “Imminent Health Hazard”
Causing a Worldwide Birth Defects Epidemic

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A continuing, massive, global epidemic of folic acid-preventable spina bifida and anencephaly affects more than 200,000 children and their families each year (Botto et al., 1999). This unnecessary epidemic is the result of a tragic failure of global public policy. Health and food authorities around the world have either not required any folic acid fortification programs (as in Europe, Australia, and New Zealand), or they have implemented fortification programs that do not require enough folic acid to be added to flour (as in the United States and Canada). The article by De Wals and colleagues in this issue of the journal (see p. 919) provides data from Quebec that help us to understand why the folic acid concentration in enriched flour in the United States and Canada needs to be increased and why folic acid fortification should be rapidly implemented in countries not currently requiring fortification.

In a carefully researched and analyzed study, De Wals and colleagues find that before folic acid flour fortification, the rate of neural tube defects was about 2.0 per 1000; after fortification, the rate dropped to about 1.25 per 1000. The rapid reduction in the rate of neural tube defects in Canada has also been documented by other studies in North America (Honein et al., 2001; Persad et al., 2002; Ray et al. 2002; Williams et al., 2002). The folic acid fortification program required in 1998 by the health and food authorities in the United States and Canada has improved the lives of hundreds of children who were born without neural tube defects they might have otherwise had. Not only have these North American programs been shown to be effective in preventing neural tube defects, but also they have been shown to increase serum folate levels enough to virtually eliminate folate deficiency anemia—a substantial benefit not anticipated in pre-fortification discussions (Lawrence et al., 1999). In addition, fortification reduced concentrations of homocysteine in the adult population (Jacques et al., 1999). Although we have yet to learn the effect of such reductions, reasonable projections by Wald and colleagues suggest that fortification may have prevented up to 25% of heart attacks and strokes (Wald et al., 2002). If the reductions in homocysteine prevent even 10% of heart attacks and strokes, mandatory folic acid fortification of flour and other grain products has prevented 10 times as many adults from dying from cardiovascular disease as it has prevented babies from having birth defects. There have been no adverse effects reported for millions of Canadians and Americans who have been eating folic acid-fortified products.

We can conclude that the current fortification in Canada and the United States is safe and has been good for both adults and children. The data in the DeWals et al. article and data from the China study (Berry et al., 1999) suggest that increasing the concentration of folic acid in enriched grain products will produce even greater benefits.

There is no general agreement on the prevalence of non-folic acid-preventable neural tube defects. The data from the China study (Berry et al., 1999) showed that the prevalence of neural tube defects was 0.6 per 1000 pregnancies for women who consumed 400 μg of synthetic folic acid in a vitamin pill. It is reasonable to assume that the prevalence of non-folic acid-preventable neural tube defects is no more than 0.5 per 1000 pregnancies. Wald and colleagues use the available evidence to describe a dose-response curve between increased folic acid consumption and decreases in neural tube defects that suggests the rate of the non-folic acid-preventable neural tube defects is less than 0.5 per 1000 pregnancies (Wald et al., 2001). The post-fortification prevalence observed in Quebec is about 1.25 per 1000, which the China data suggest can be lowered to 0.5 per 1000. The data from China and Quebec thus suggest that the post-fortification prevalence rate of neural tube defects in North America remains about twice what it should be. Yes, we have reduced the size of the epidemic, but there is still an epidemic that needs to be fully controlled.

No one should be surprised that the decrease in neural tube defects after fortification was not larger. There was general agreement before fortification that the concentration selected would likely fail to accomplish as much prevention as a greater concentration could have. The pre-
fortification models predicted that the median woman would increase consumption by 100 μg of synthetic folic acid a day rather than the 400 μg that the United States Public Health Service recommended to prevent birth defects (Centers for Disease Control and Prevention, 1992; U.S. Food and Drug Administration, 1996).

Each year, hundreds of families in North America continue to have children with serious birth defects or a termination of pregnancy that would not have happened had the authorities required a higher concentration of folic acid in enriched grains. There is an urgent need to increase the concentration of folic acid required for grains in North America.

For countries that do not require fortification of grain products with folic acid, there is extreme urgency and a great opportunity for prevention. There have been enough policy reviews and there are sufficient data from North America to show convincingly that all governments should immediately require folic acid fortification (Committee on Medical Aspects of Food and Nutrition Policy, 2000). A single day’s delay in requiring fortification in any country means that women will unnecessarily have abortions, that babies will unnecessarily have serious birth defects, and that many more adults are likely to die unnecessarily from heart attacks and strokes. Blood folates and population-wide folate consumption in countries that do not require fortification are sufficiently low to classify folate deficiency as an “imminent health hazard.” This imminent health hazard should be handled by imminent health hazard regulations and processes rather than by the slow and ineffective nutritional regulatory procedures that have for more than a decade failed to protect the public health in so many countries. By the end of 2004, all countries should have implemented regulations requiring that cereal grains be fortified with sufficient folic acid. Given that the 1.4 and 1.5 ppm implemented in North America have been shown to be insufficient, regulations should require at least 2.5 ppm in enriched/fortified grains.

Fortification occurred in the United States because the birth defects community marshaled the scientific arguments and applied sufficient political pressure to create the environment that led to fortification. In Canada, it was industry that created the political pressure that led to fortification. On December 29, 1993, S. W. Gunner, Ph. D., Director General of the Food Directorate of the Health Protection Branch of Health Canada, wrote the U.S. Food and Drug Administration (FDA) arguing against the FDA’s proposal to require folic acid fortification. Canadian flour millers produce flour for both the Canadian and United States markets. For economic reasons, they did not want to produce both fortified and unfortified flour. After the FDA issued regulations in 1996 requiring folic acid fortification, it was the Canadian millers that provided the political pressure that led Health Canada to require folic acid fortification.

It is an urgent responsibility for all who want children to be born healthy, especially for professionals in birth defects research and clinical care, to build the political pressure for folic acid fortification. In the meantime, we should be working to get as many women as possible to consume 400 μg of synthetic folic acid a day from drugs or vitamin supplements, or from foods voluntarily fortified with folic acid.

REFERENCES


