New Zealand should have mandatory fortification of bread with folic acid

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YES

Of course New Zealand should proceed with mandatory fortification of the food supply with folic acid—it is a no-brainer, as I will demonstrate. There are proven benefits and no documented disadvantages to a diet high in dietary folate.

The best documented benefit is in the prevention of neural tube defects (NTDs).[1,2] Dietary folate intakes of 400 micrograms daily will prevent up to 70% of NTDs. Voluntary fortification has been shown to be ineffective in many countries.[3] It has been argued that all we need to do is to advise pregnant women to take folic acid supplements. Primary health care providers know that very few women consult their provider before they become pregnant. Closure of the neural tube is complete by the beginning of the sixth week of embryonic development—around the time when the woman is just realising that she may be pregnant. To be effective, high folate intake needs to begin at least a month prior to conception and to continue for the whole of the first trimester. How many of your patients are this compliant? In addition, many pregnancies in New Zealand are unplanned.

There are other benefits. Since mandatory folate fortification was introduced in Canada in 1998, the incidence of congenital heart defects has fallen by about 5%.[4] Studies in adults have found a lower incidence of both colorectal cancer and prostate cancer in individuals who have high dietary folate intakes. It has also been hypothesised that high dietary folate is protective against cardiovascular disease and stroke, but this is yet to be proven.

But how can we be sure that high folate intakes are safe? Opponents of mandatory fortification with folic acid have made much of potential health risks. Careful evaluation of the evidence leads to the conclusion that there is no clear evidence of risk. This view was endorsed by the UK Scientific Advisory Committee on Nutrition in October 2009 reporting on their review of the evidence relating to folic acid supplementation and cancer risk to the Chief Medical Officer.[5] They concluded that mandatory fortification should proceed in the UK, with advice on the use of supplements.

BACK TO BACK this issue:


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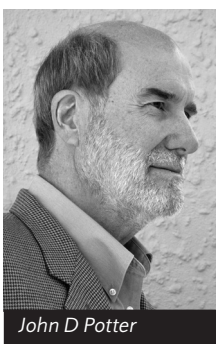
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While evidence can help inform best practice, it needs to be placed in context. There may be no evidence available or applicable for a specific patient with his or her own set of conditions, capabilities, beliefs, expectations and social circumstances. There are areas of uncertainty, ethics and aspects of care for which there is no one right answer. General practice is an art as well as a science. Quality of care also lies with the nature of the clinical relationship, with communication and with truly informed decision-making. The **BACK TO BACK** section stimulates debate, with two professionals presenting their opposing views regarding a clinical, ethical or political issue.

Epidemiological studies have demonstrated an inverse relationship between higher dietary folate intakes and the incidence of colorectal cancer. However, there is also evidence that suggests that adults with very high folate/folic acid intakes, particularly those who take high dose folic acid supplements, may be predisposed to increased growth of early cancerous or precancerous lesions.

Information on the incidence of colorectal cancer from the USA shows a steady decline from the mid-1980s until 1995 when there was a modest reversal of this decline. From March 1996, voluntary fortification with folic acid was permitted. In 1998, fortification with folic acid became mandatory. At this point the incidence started to decline again, resuming the previous trajectory seen prior to 1995. This mid-1990s' blip probably resulted from increased diagnosis as a result of screening for colorectal cancer and increased rates of colonoscopy. The changes in colorectal cancer incidence in the USA cannot be explained by folic acid fortification of food and do not support the hypothesis that mandatory fortification with folic acid causes colorectal cancer.[6]

Much has been made by some prominent media personalities of the risks of prostate cancer. The American Cancer Society Prevention Study II Nutrition Cohort did not demonstrate any significant association between folate intake and subsequent prostate cancer.[7] Those with the highest folate intake had a decreased risk of advanced prostate cancer, but this was not statistically significant.

Figueiredo found non-significant associations with an inverse relationship between dietary folate intake and risk of prostate cancer. However, men who took high dose folic acid supplements had more prostate cancers than those who took placebo.

Concerns about breast cancer have also been shown to be unfounded.

Yang analysed all cancer mortality in a large cohort of people whose dietary folate intake was known.[8] There was no association between high dietary folate intakes and mortality from cancer. Mortality was highest in the quintile with the lowest folate intakes, suggesting that folate may be protective against at least some cancers.

A further objection is that mandatory fortification with folic acid could mask vitamin B_{12} deficiency, and lead to delays in treatment. This should not be a problem if clinicians are alert to the symptoms and signs of B_{12} deficiency in vulnerable populations.

In summary, there is good evidence that high intake of dietary folate (including fortified foods) is protective against cancer. However, high dose folic acid supplements may promote the growth of some cancers. These supplements are not needed by healthy adults, and should be avoided.

What about the costs? There is a huge emotional and economic burden for those families affected by neural tube defects. Each episode of hospital care carries emotional and financial costs to the family. Even those who are 'fortunate' enough to receive financial assistance with travel costs will still incur other costs: childcare for siblings; lost time from work. For families who have a child with meningomyelocoele there are many care episodes. These include primary closure of the defect, shunt insertion and revisions, orthopaedic interventions, treatment of injuries relating to sensory loss and pressure sores, to name but a few. Each child with meningomyelocoele will require an average of five shunt revisions (personal communication, A. Law, Clinical Director, Paediatric Neurosurgery, Starship Children's Hospital, Auckland). A patient of mine suffered a deep burn to his legs from sitting on a black rubber doormat hot from the summer sun. And then there is the ever present anxiety about latex sensitivity, which may prevent the child from going to their friend's birthday party.

Add to this the costs of termination of pregnancy to women who choose this option following antenatal diagnosis of an NTD, and consider the impact on their psychological and future reproductive health.

The costs to an already strained health system are considerable. And if the initial evidence that suggests that the incidence of some congenital

heart defects, and some cancers may be reduced by high dietary folate, is confirmed, what further avoidable costs will be incurred while we delay this important public health measure?

Our current health system is unsustainable. Costs are increasing and this is exacerbated by an ageing population, with high needs for health care and supportive care. We must contain costs. As well as constantly looking for innovative ways to deliver health services effectively, we must take every opportunity to prevent disease. Folic acid fortification of the food supply offers one such opportunity.

The government has a responsibility, on behalf of the whole community, to spend taxpayer dollars wisely. Proceeding with the implementation of New Zealand (Mandatory Fortification of Bread with Folic Acid) Food Standard 2007, originally gazetted for implementation on 27 September 2009, is one wise way of ensuring that health care costs are reduced, and that as we age there will be healthy young people to contribute to the economy and support our care.

References

1. Trends in spina bifida by race/ethnicity: United States 1995–2005. Centers for Disease Control and Prevention. National Center for Health Statistics http://www.cdc.gov/features/dsSpinaBifidaTrends/
2. Folic acid and prevention of spina bifida and anencephaly. Centers for Disease Control and Prevention. MMWR 2002;51 (No. RR-13)
3. Botto LD, Lisi A, Robert-Gnansia E, Erickson JD, Vollset SE, Mastroiacovo P et al. International retrospective cohort study of neural tube defects in relation to folic acid recommendations: Are the recommendations working? Br Med J. 330(7491):571;2005.
4. Ionescu-Ittu R, Marelli AJ, Mackie AS, Pilote L. Prevalence of severe congenital heart disease after folic acid fortification of grain products: time trend analysis in Quebec, Canada. Br Med J. 2009;338:b1673.
5. Scientific Advisory Committee on Nutrition. Summary of Report to CMO on folic acid and colorectal cancer risk—October 2009 http://www.sacn.gov.uk/reports_position_statements/reports/summary_of_report_to_cmo_on_folic_acid_and_colorectal_cancer_risk_-_october_2009.html
6. Mason JB. Dickstein A. Jacques PF. Haggarty P. Selhub J. Dallal G. Rosenberg IH. A temporal association between folic acid fortification and an increase in colorectal cancer rates may be illuminating important biological principles: A hypothesis. Cancer Epidemiol Biomarkers Prev. 2007;16(7):1325–1329
7. Stevens VL. Rodriguez C. Pavluck AL. McCullough ML. Thun MJ. Calle EE. Folate nutrition and prostate cancer incidence in a large cohort of US men. Am J Epidemiol. 2006;163(11):989–96.
8. Yang Q, Bostick RM, Friedman JM, Flanders WD. Serum folate and cancer mortality among U.S. adults: Findings from the third national health and nutritional examination survey linked mortality file. Cancer Epidemiol Biomarkers Prev. 2009;18(5):1439–47.

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NO

Despite some benefits, folic acid fortification of the food supply is likely, overall, to be deleterious to the health of New Zealanders. There is clear epidemiologic evidence that folate is associated with a reduced risk of colorectal neoplasia.[1] Furthermore, there are plausible mechanisms that involve folate, both in the provision of bases essential to DNA synthesis and repair and in the synthesis of *S*-adenosylmethionine, the universal methyl donor.[2] Although the centrality of the first mechanism is established in practice (antifolates are effective chemotherapeutic agents[3]), the role of folate in DNA methylation[4] (normal and abnormal) remains to be clarified.

Folate is essential in early embryonic development, particularly neural tube closure: higher folate levels and folate supplements are beneficial.[5] Higher folate intake reduces plasma homocysteine levels, plausibly lowering risk of coronary heart disease (CHD).

This constellation of established and predicted benefits informed the call for fortification of food with folate, so that the benefits can be universally and passively achieved. However, data suggest that fortification may be harmful to the population overall, even in the face of specific benefit to some groups.

Higher intake of folate prevents neural tube defects (NTDs): both clinical trials and subsequent implementation of fortification produced substantial reductions. For example, a British trial reported a greater than 70% decline in NTDs in the active arm compared with placebo;[5] other comparable data exist. Fortification of the US food supply produced a decline in NTDs of almost 20%, showing that, even in a free-living population, the benefits are detectable.[6]

Because of the substantial observational epidemiologic evidence of beneficial consequences of