



**PUBLIC HEALTH ASSOCIATION**  
of Australia Inc

## **PERICONCEPTIONAL FOLATE AND THE PREVENTION OF NEURAL TUBE DEFECTS**

*The Public Health Association of Australia notes that:*

1. Neural tube defects (spina bifida, anencephaly, and encephalocele) result from incomplete closure of the neural tube early in pregnancy. This leads to damage to the brain or spinal cord during development.
2. Evidence from international randomised control trials shows that daily maternal use of supplements containing folate prior to and during early pregnancy can reduce both the recurrence<sup>i</sup>, as well as first occurrence of neural tube defects<sup>ii</sup>. A meta-analysis of the trials estimated a 70% reduction in neural tube defects with peri-conceptional supplementation with folic acid. A summary of all related findings has been published in the Cochrane library<sup>iii</sup>.
3. Although the mechanism by which folate produces this effect is not known, it has been recommended that all women planning, or likely, to become pregnant should have an increased intake of folate daily for at least one month prior to pregnancy and during the first trimester.
4. The limitations of public education alone in reducing the rate of NTD's and the potential of public education campaigns to increase further inequalities in the rates of NTD's amongst disadvantaged populations.
5. Increased folate levels can be achieved by:
  - taking a daily supplement containing folic acid
  - selecting foods rich in folate, including foods fortified with folate.
6. The NHMRC recommended daily dose of folic acid is
  - for women with no family history of NTD, a supplement of 0.5mg folic acid daily
  - for women with a family history of NTD, a supplement of 5mg folic acid daily<sup>iv</sup>.
7. Fortification of food provides an extra source of folate to women periconceptionally. This is important because many pregnancies are unplanned (approx 40%)<sup>v</sup>. Moreover, despite active health promotion campaigns in SA, Vic and WA, many women in these States are unaware of the importance of folate (up to 70%) and many women do not take folic acid supplements periconceptionally (up to 70%)<sup>vi, vii, viii</sup>. There has been neither a co-ordinated nor sustained national approach to improving folate awareness.
8. Voluntary fortification of certain foods was allowed for the prevention of neural tube defects in Australia and New Zealand in 1995. Since then, over 100 foods (mainly breakfast cereals) have been fortified with folic acid<sup>ix</sup>. However, there remain no

conclusive data that this method will ensure an adequate folate supply to all women at risk.

9. A pilot permitting a health claim on Folate and Neural Tube Defects (NTDs) was approved by the Australia New Zealand Food Authority (now Food Standards Australia New Zealand - FSANZ) in November 1998.

10. Using data from Birth Defect Registries in SA, Vic and WA, the overall birth prevalence of NTDs (including terminations, still births and live births) has been estimated. In SA it has decreased from 1.9 per 1000 (1986-1996) to 1.5 per 1000 (1997-2001), and in WA from 1.9 per 1000 (1980-1995) to 1.4 per 1000 (1996-2002). In Victoria, the prevalence decreased from 1.8 per 1000 (1992-1996) to 1.2 per 1000 (2001-2002). These recent declines reflect the impact of periconceptional folic acid intake from voluntary food fortification and supplementation.

11. Mandatory fortification of flour with folic acid has been introduced in a number of countries and declining prevalence of NTDs has been reported<sup>x, xi</sup>. Principles and policy guidelines related to mandatory fortification of the food supply in Australia are under consideration. Folate fortification may be reviewed separately because of the immediate opportunity for further reduction in prevalence of NTDs.

12. Mandatory fortification raises concerns because it results in everyone in the population being exposed to increased levels of folate. Therefore, as NTDs are not very common, the benefit for a few needs to be balanced against the potential risk of harm for many. Potential risks raised are:

i) that high doses of folic acid may mask the diagnosis of vitamin B12 deficiency<sup>xi</sup>. However, there are now data from the US which demonstrate that rates of B12 deficiency, without anaemia, have not increased since fortification was mandated in 1998<sup>xii</sup>.

ii) that high folate levels may impair anticonvulsant therapies<sup>iv)</sup>. This must be taken into account in clinical management. In addition, twinning rates may be greater in women with increased folic acid intake, however, this has not been confirmed in two recent studies<sup>xiii) xiv)</sup>.

13. Efforts to reduce NTDs are done with the full understanding that not all NTDs will be prevented by folic acid and that there are many people with NTDs living in the community. Therefore appropriate services and support for those with NTDs and their families should be readily available.

14. Given that the majority of home-based care-giving to a person with a birth defect may be full time and preclude pursuit of personal further education, employment, social and recreational activities, promoting an adequate intake of folate to prevent NTDs and so prevent care-givers' exclusion from full community participation is important.

***The Public Health Association of Australia endorses:***

15. The current (June 1993) NHMRC guidelines, which recommend that:

- All women planning a pregnancy or likely to become pregnant be offered appropriate advice about folate for the prevention of NTD, and offered genetic counselling where applicable.
- There is provision of health promotion programs targeted to both the public and health professionals.
- Further research is conducted and monitoring of NTDs is continued

***The Public Health Association of Australia resolves that:***

16. The Board, Branches and Special Interest Groups will actively encourage relevant state and national bodies to appropriately fund sustainable health promotion and education programs for women of child bearing age and school-aged children and adolescents with specific recognition that different strategies are required for specific subgroups, especially high risk groups.

17. Full consideration to policy related to mandatory food fortification with folic acid will be given by PHAA in a timely manner, and in consultation with relevant key stakeholders.

***The Public Health Association of Australia recommends that:***

18. Food fortification, health promotion and education policies and programs are evaluated to determine their effectiveness and public health impact, including the incidence, prevalence and presentation of unfavourable outcomes.

19. Policy in this area should be reviewed regularly to take into account changes in the understanding of all outcomes, as relevant, reliable data become available.

20. State and national governments identify ways in which folate supplementation can be funded so that women are not financially disadvantaged.

21. Information be made available in plain English and other commonly used languages at all primary care services, particularly general practice on: the NHMRC recommendations for folate intake in the format of tablets, the natural dietary sources of folate, or fortified food sources. Appropriate foodstuff preparation advice should also be available.

22. Information should be made available at all primary care services, particularly general practice, on the availability of and access to genetic counselling services.

**ADOPTED 1996**

***First adopted at the 1996 Annual General Meeting of the Public Health Association of Australia, amended at the AGM 1998,, revised 2004 and 2006***

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<sup>i</sup> Medical Research Council Vitamin Study Research Group (1991) 'Prevention of neural tube defects: results of the Medical Research Council Vitamin Study Research Group, *Lancet*, 338, 131-137.

<sup>ii</sup> Czeizel & Dudas (1992) 'Prevention of the first occurrence of neural-tube defects by periconceptional vitamin supplementation, *New England Journal of Medicine*, 327(26), 1832-1835.

<sup>iii</sup> Lumley, J., Watson, L., Watson, M. & Bower, C. (2001) 'Periconceptional supplementation with folate and/or multivitamins for preventing neural tube defects. *Cochrane Database Systemic Review*, 3: CDOO1056.

<sup>iv</sup> National Health and Medical Research Council (1993) NHMRC Revised statement on the relationship between dietary folic acid and neural tube defects such as spina bifida.

<sup>v</sup> Marsack, C.R., Alsop, C.L., Kurinczuk, J.J. and Bower, C. (1995) 'Pre-pregnancy counselling for the primary prevention of birth defects: rubella vaccination and folate intake', *Medical Journal of Australia*, 162:403-406.

<sup>vi</sup> Chan, A, Pickering, J., Haan, E.A., Netting, M., Burford, A., Johnson, A., et al. (2001) "'Folate before pregnancy": the impact on women and health professionals of a population-based health promotion campaign in South Australia', *Med J Aust*, 174, 631-636.

<sup>vii</sup> Watson, M., Watson, L., Bell, R. and Halliday, J. (2001) 'The increasing knowledge of the role of periconceptional folate in Victorian women of child-bearing age: follow-up of a randomised community intervention trial, *Aust NZ J Public Health*, 25, 389-95.

<sup>viii</sup> Bower, C., Blum, L., O'Daly, K., Higgins, C., Loutsky, F. and Kosky, C. (1998) 'Promotion of folate for the prevention of neural tube defects: knowledge and use of periconceptional folic acid supplements in Western Australia, 1992-1995', *Aust NZ J Public Health* 1997, 21, 716-721. Erratum: *Aust NZ J Public Health* 1998, 22, 72.

<sup>ix</sup> Abraham, B. and Webb, K (2001) Interim evaluation of the voluntary folate fortification policy. Canberra: Australian Food and Nutrition Monitoring Unit.

<sup>x</sup> Waller, D.K., Tita, A.T.N., and Annegers, J.F. (2003) 'Rates of twinning before and after fortification of foods in the US with folic acid, Texas, 1996 to 1998", *Paediatr Perinat Epidemiol*, 17, 378-383.

<sup>xi</sup> Honein, M.A., Paulozzi, L.J., Mathews, T.J., Erickson, J.D. and Wong, L.Y. (2001), 'Impact of folic acid fortification of the US food supply on the occurrence of neural tube defects, *JAMA*, 285, 2981-6.

<sup>xii</sup> Folic acid safety and toxicity; a brief review (1989) *American Journal of Clinical Nutrition*, 50: 353-358.

<sup>xiii</sup> Mills, J.L., Von Kohorn, I., Conley, M.R., Zeller, J.A., Cox, C., Williamson, R.E. and Defour, D.R. (2003) 'Low vitamin B-12 concentrations in patients without anaemia: the effect of folic acid fortification of grain' *Am J Clin Nutr*, 77, 1474-1477.

<sup>xiv</sup> Li, Z., Ginder, J., Wang, H., Berry, R.J., Li, S., Correa, A., Zheng, J.C., Erickson, J.D., and Wang, Y. (2003) 'Folic acid supplements during early pregnancy and likelihood of multiple births: a population-based cohort study', *Lancet*, 361, 380-384.