

Information for Health Professionals

Summary of
Preconception Health: Folic Acid for the Primary Prevention of Neural Tube Defects
Health Canada, 2002

What are neural tube defects (NTDs)?

NTDs such as spina bifida and anencephaly are congenital anomalies that place the families of infants with these conditions under a considerable burden of care and carry significant monetary costs for society. The national birth prevalence has been decreasing: from 11.6 per 10,000 total births (live and stillbirths) in 1989 to 7.5 per 10,000 in 1997 (260 births per year). Most NTDs are multifactorial in origin, resulting from a combined effect of genetic and environmental factors. During periods of drought, famine and war the rate of NTDs strikingly increases, and during periods of prosperity it declines.

Can NTDs be prevented?

There is clear evidence that periconceptual use of supplements containing folic acid substantially reduces the risk of occurrence and recurrence of this condition, and possibly of other congenital anomalies. Studies have shown that at least half the number of cases of NTDs can be prevented if women consume sufficient amounts of folic acid before conception and during early pregnancy. Although the specific effect of folic acid on the developing fetus is not clear, we do know that this micronutrient is necessary for the synthesis of nucleic acids and amino acids, and for cell division.

What advice should be given to women about folic acid?

It is recommended that daily folic acid supplementation be started at least two (2) to three (3) months before conception and continued throughout the first trimester of pregnancy. Since many pregnancies are unplanned, women who could become pregnant should also take this daily supplement. The following points need to be considered when recommending a supplement:

- Choose a multivitamin supplement that contains 0.4 mg of folic acid in a daily dose.
- The use of products labeled “for therapeutic use only” is unnecessary.
- Avoid supplements that contain herbs and other “non-medicinal ingredients.”
- Try to select a product containing vitamin A as beta-carotene rather than retinol (as high doses of retinol have been found to cause several types of birth defects).
- Women should not take more than one daily dose, as indicated on the product label.

Although white flour, enriched pasta and cornmeal have been fortified with folic acid, the resulting increase in folic acid intake does not reach the levels found to be protective in intervention studies.

Does this advice apply to all women?

Women in high-risk groups may need to take a higher amount of folic acid. Those with close relatives who have an NTD are at greater risk, as are women with a previous child with this condition (3% to

5% risk for another affected pregnancy). Other risk factors include poorly controlled maternal diabetes mellitus, maternal epilepsy and obesity.

Research has shown that among women with a previous NTD-affected pregnancy, 4.0 mg per day of folic acid (only available at this amount through prescription) taken in the periconceptional period reduces the risk of recurrence by 72%. For women with diabetes mellitus, the benefits of higher doses of folic acid (i.e., > 0.4 mg) are unknown; optimal glycemic control is recommended. There is evidence that women with epilepsy may benefit from a dose of 4.0 mg folic acid daily in the periconceptional period, and if they are taking carbamazepine or valproic acid as anticonvulsant medication (both considered to be related to a higher risk of NTDs). These drugs might be replaced with others.

Although low maternal vitamin B12 status is a risk factor for NTDs, this cannot be remedied with folic acid.

How safe is folic acid?

There are few safety concerns; however, folic acid may adversely affect untreated vitamin B12 deficiency. For this reason, physicians need to be on the alert for undiagnosed B12 deficiency arising from particular diets, pernicious anemia, celiac sprue and inflammatory bowel disorder. All women given high doses of folic acid (i.e., > 1.0 mg daily) need to be evaluated for possible vitamin B12 deficiency.