

# Fortifying Flour With Folic Acid To Prevent Neural Tube Defects



Food Fortification Initiative  
Enhancing Grains for Healthier Lives

## Opportunity

The majority of neural tube defects (NTDs) can be prevented with the consumption of 400 µg of folic acid daily before conception and during early pregnancy. Wheat flour fortification is an effective way to reduce the occurrence of NTDs at a national level.

## What are Neural Tube Defects (NTDs)?

A neural tube defect is a type of birth defect affecting the brain and spinal cord. The neural tube forms within 28 days after conception and develops into the brain and spine. NTDs occur when the neural tube fails to close properly, which can result in neural tissue being exposed and susceptible to damage.

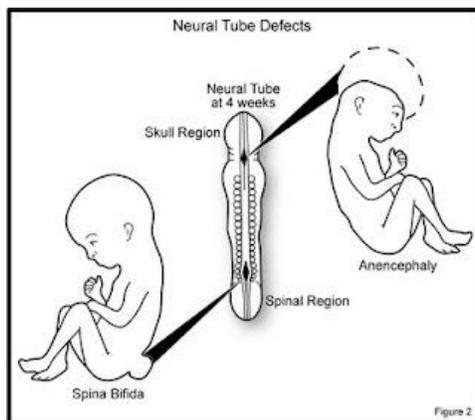
Types of NTDs include spina bifida and encephalocele which can lead to permanent disability and anencephaly which always causes death [1]. In 1998 approximately 300,000 births were affected by NTDs worldwide [2].

Adequate folic acid consumption has been shown to decrease the risk of neural tube defects [3].

## Why Fortify?

The neural tube closes before a woman usually knows she is pregnant. To prevent NTDs for all pregnancies, planned and unplanned, the World Health Organization recommends that women capable of becoming pregnant consume 400 µg of folic acid each day [4].

Encouraging individuals to take daily supplements has limitations since it requires behavior change. Also, it is difficult to consume the equivalent of 400 µg of folic acid daily through an unfortified diet [5-7]. Increasing levels of folic acid in staple foods through fortification increases the likelihood that the target population will receive adequate amounts of folic acid needed to prevent NTDs [8].



<http://www.thescienceofpregnancy.id.au>

## Public Health Impact

Flour fortification is mandatory in more than 70 countries worldwide. These countries experienced between 31 and 58% reductions in NTDs [8]. Evidence has shown no significant effect on increased risk of cancer, cognitive decline related to B12 deficiency or childhood asthma [9].

The cost of adding folic acid to flour is minimal, especially when compared to the cost of treating children with spina bifida and the immeasurable impact on their families [10].

## References

- [1] <http://www.mdpi.com/2072-6643/3/3/370>
- [2] <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5931a2.htm#fig1>
- [3] [http://ije.oxfordjournals.org/content/39/suppl\\_1/i1110.abstract](http://ije.oxfordjournals.org/content/39/suppl_1/i1110.abstract)
- [4]

[http://www.searo.who.int/LinkFiles/Nutrition\\_for\\_Health\\_and\\_Development\\_WHO\\_weekly\\_iron\\_folic\\_acid.pdf](http://www.searo.who.int/LinkFiles/Nutrition_for_Health_and_Development_WHO_weekly_iron_folic_acid.pdf)  
[5-7] <http://www.biomedcentral.com/14712393/4/20> <http://www.scielo.org.ar/pdf/aap/v106n6/v106n6a04.pdf>  
<http://www.ncbi.nlm.nih.gov/pubmed/21757892>

[8] Berry RJ, Mulinare J, Hamner HC. Folic acid fortification: neural tube defect risk reduction - a global perspective. In: Bailey LB, eds. Folate in health and disease. 2nd ed., Chapter 8. Boca Raton: CRC Press and Taylor and Francis Group, 2010.

[9] Ministry for Primary Industries. *Scientific evaluation of comments on submissions received on the future of folic acid fortification in New Zealand*. MPI Technical Paper. August 2012 (2012/25).

[10] <http://www.ncbi.nlm.nih.gov/pubmed/21594574>

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