

Abstract

Predicting the Impact of Mandatory Folic Acid Fortification on Neural Tube Defects in New Zealand [†]

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Background: There is compelling evidence that mandatory fortification of food with folic acid reduces the prevalence of neural tube defects (NTDs). New Zealand has had voluntary fortification in place since 1996. The NTD prevalence (~10.6 per 10,000 births) in New Zealand is higher than in countries with mandatory fortification. Furthermore, Māori women are disproportionately affected by a higher rate of NTD live births than other population groups.

Objective: To determine if reductions in NTDs could be achieved with additional folic acid fortification without exposing sub-groups of the population to excessive intakes. Five fortification scenarios were assessed: status quo, enhanced voluntary (80% of packaged sliced bread) and mandatory fortification of: all bread, all bread-making wheat flour, and all wheat flour.

Design: Folic acid intakes and the proportion of the population with intakes in excess of the upper level of intake (UL) were calculated using the dietary intake assessment program, Harvest. We estimated the effect of the scenarios on risk of an NTD in a simulated population of pregnant women using a stochastic model. Firstly, increases in folate status (serum folate and red blood cell folate) were calculated from the predicted increase in folic acid intake. Established models between folate status and NTD risk were used to predict NTD prevalence.

Results: Enhanced voluntary fortification reduced NTDs by ~3–10%. Mandatory fortification of all bread and all bread making-flour reduced NTDs by ~10–20%; and all wheat flour by ~15–30%. Less than 1% of adults exceeded the UL in the scenarios assessed. However, 36% of children aged 5–8 years exceeded the UL in one scenario: all wheat flour (36%).

Conclusion: Mandatory fortification options were the most successful at reducing NTDs. Mandatory fortification of bread or all bread-making flour could reduce NTDs and would not expose the population to excessive intakes of folic acid.



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