



Dairy Council for Northern Ireland Nutrition Lecture 2013

**'Facing the Future with Folic Acid Fortification:
A Legacy beyond Neural Tube Defects'**

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The finding that folic acid could prevent many neural tube defects ranks as one of the most important discoveries in birth defects research. The initial response of public health authorities to this discovery was to suggest several dietary mechanisms by which the folate status of women of child bearing age could be increased. Of these, the strategy to introduce folic acid food fortification was the most pragmatic and the only successful population-wide approach. Full mandatory fortification was introduced in the USA and Canada in 1998 and to date over 70 countries worldwide have followed with some form of mandatory fortification programme. In countries with such policies, the rates of these debilitating and often lethal birth defects have fallen substantially. Europe is an important exception in terms of mandatory fortification but the presence of liberal voluntary fortification policies in the UK and Ireland has resulted in a considerable improvement in the general folate status of these populations. However, the evidence of benefit in prevention of neural tube defects is not clear, partly due to the absence of appropriate monitoring.

So where are we now? Despite 20 years of research, we still do not know precisely how folic acid prevents neural tube defects or what concentration of serum folate would provide adequate protection for a woman entering pregnancy. These are crucial questions to answer, because not knowing what molecular event during neural tube closure has been protected, or what blood folate status is adequately protective, leaves us unable to accurately assess risk versus benefit. Have we achieved a precise targeted intervention at the molecular level during neural tube closure, or have we introduced a blunderbuss? If the latter, we need to understand what peripheral effects might occur – both positive and negative. Beyond neural tube defects, folic acid and related B-vitamins clearly have a role in embryogenesis, in foetal programming and in ensuring optimal health in the first 1000 days of life. This role is poorly understood. Even beyond development, what long term effects might emerge in sectors of the population who are not among the risk sector but are nevertheless subjected to folic acid fortification in their diet? With folic acid fortification already in place there is now a real urgency to understand the legacy we have put in place for our children.

This lecture will review the current state of knowledge in this area and highlight new directions in seeking to address these challenges.