Cost-effectiveness of mandatory folate fortification v. other options for the prevention of neural tube defects: results from Australia and New Zealand

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Record Status
This is a critical abstract of an economic evaluation that meets the criteria for inclusion on NHS EED. Each abstract contains a brief summary of the methods, the results and conclusions followed by a detailed critical assessment on the reliability of the study and the conclusions drawn.

CRD summary
This study examined the cost-effectiveness of interventions for promoting folate or folic acid consumption, in women capable of or planning a pregnancy, to prevent neural tube defects. Extended voluntary fortification of food and the promotion of supplements were cost-effective in Australia and New Zealand. Mandatory fortification was not cost-effective in New Zealand and there was high variability in Australia. The cost-effectiveness framework was conventional and more details were published in a separate technical report. The conclusions appear to be valid.

Type of economic evaluation
Cost-effectiveness analysis, cost-utility analysis

Study objective
This study examined the cost-effectiveness of interventions to promote folate or folic acid consumption in women, who were capable of having or planning to have a child, to prevent neural tube defects in their children. Population-wide and targeted interventions were considered.

Interventions
Four types of intervention were considered: promotion of supplements, voluntary food fortification, promotion of natural consumption, and mandatory food fortification.

Promotion of supplements encouraged the taking of folic acid supplements at least one month prior to and three months following conception. This was achieved by a multifaceted general population campaign; a targeted campaign to disadvantaged women; or brief clinician advice to women aged 18 to 48 years, during a visit to an obstetrician or gynaecologist.

Voluntary fortification involved extending and maintaining the fortification of the food supply, with folic acid, by extending the selection of foods to include bread, wholemeal flour, pasta, low-fat milk, etc.

Natural consumption promoted naturally folate-rich foods and fortified foods, through a population-wide marketing campaign or a targeted approach delivered in a clinical setting.

Mandatory fortification was of wheat flour for bread-making, with 200 micrograms of folic acid added to 100g of flour in Australia and 135 micrograms of folic acid in 100g of bread in New Zealand.

Location/setting
Australia and New Zealand/primary care and community.

Methods
Analytical approach:
The analysis was based on the synthesis of data from published sources and a published model. A 10-year horizon was considered in the cost-effectiveness analysis and a lifetime horizon in the cost-utility analysis. The authors did not explicitly state the perspective adopted.

Effectiveness data:
The clinical data were identified through a literature review and by consultation with government authorities. The review was undertaken in MEDLINE, CINAHL, and the Cochrane Library databases. The key information on sample size, characteristics of the population, and type of intervention was provided for each main source of data. These sources were studies of campaigns to promote folate or folic acid consumption in the USA, UK, Australia, and New Zealand. The efficacy of folic acid in reducing neural tube defects was the key clinical input.

**Monetary benefit and utility valuations:**
The utility values were from published sources that reported Dutch disability weights, from panels of medical experts, and statistical estimation was used for some states.

**Measure of benefit:**
The number of children with neural tube defects and the disability-adjusted life-years (DALYs) were the summary benefit measures. A 5% annual discount rate was applied.

**Cost data:**
The economic analysis included the costs of programme implementation (administrators, health professionals, materials, and folic acid supplementation) and cost offsets (terminations, maternal care, hospital presentations and admissions, pathology, imaging, pharmaceuticals, and visits to specialists and allied health professionals). The resource use data were from the main studies, other published reports, and expert opinion. The unit costs were from Australian sources, such as the Medicare Benefits Schedule, a sample of pharmacies, and the Australian Institute of Health and Welfare. The budget estimates for the national campaign were based on data for a similar national campaign. Some costs were from food companies. The costs were reported in Australian dollars (AUD) and New Zealand dollars (NZD). The price year was 2006 and the costs were discounted at an annual rate of 5%.

**Analysis of uncertainty:**
One-way sensitivity analyses were carried out on the key parameters and assumptions. Alternative values were either from published evidence or based on authors’ opinions.

**Results**
In Australia, mandatory fortification was the most expensive strategy and one of the most effective, together with supplement promotion by a general population campaign. The cost per DALY averted was below AUD 12,300 for supplement promotion interventions, below AUD 3,800 for voluntary fortification, and higher for natural consumption interventions and mandatory fortification.

In the sensitivity analysis, the cost per DALY averted for mandatory fortification ranged from AUD 9,500 to AUD 177,200 using low cost estimates and from AUD 95,700 to AUD 296,600 using high cost estimates. There was considerable uncertainty in all the findings due to the influential effects of some assumptions, such as the cost of the intervention.

Similar results were observed in the New Zealand setting, where mandatory fortification resulted in a cost per DALY averted of NZD 138,500, which was higher than all other strategies, except a targeted natural consumption campaign.

**Authors’ conclusions**
The authors concluded that extended voluntary fortification and the promotion of supplements were the most cost-effective strategies in both countries. Mandatory fortification was not cost-effective in New Zealand, while there was high variability in Australia. All estimates were subject to considerable uncertainty possibly due to interactions between interventions.

**CRD commentary**
**Interventions:**
The selection of the comparators was appropriate as the strategy in place in Australia and New Zealand (voluntary and mandatory fortification) was compared against alternative strategies that were identified through a literature review and by consultation with health authorities.
Effectiveness/benefits:
The authors performed a literature review to identify the relevant sources of data and the key findings were reported, but more information on the methods of these studies would have been useful. The quality of the main studies was assessed, using the Centre for Reviews and Dissemination (CRD) criteria, but the authors did not report the results of these assessments. They stated that there was a lack of high-quality studies in the published literature and they used efficacy results from campaigns conducted in countries other than Australia and New Zealand. Both benefit measures were appropriately selected and might be interesting for different stakeholders, but few details were given on the methods used to obtain the DALYs.

Costs:
The authors reported limited information on the economic data. The unit costs and resource quantities were not reported, the perspective was not stated, and a list of cost items was not given. The cost estimates were treated deterministically, but alternative assumptions were considered in the sensitivity analyses. The data sources were partly reported. Country-specific currencies were used, but the results were also presented in US dollars and UK pounds sterling.

Analysis and results:
The results were extensively presented. Average cost-effectiveness ratios and cost-utility ratios were calculated to synthesise the costs and benefits of the alternative strategies, which were not directly compared with each other. The uncertainty was assessed by varying single assumptions and estimates individually. Most of the details of the literature review and the quality of the data sources were published in a separate technical report. It was stated that some policies should be considered together and not separately and this was a limitation of this analysis.

Concluding remarks:
The cost-effectiveness framework was conventional and more details of the methods were published in a separate technical report. The authors’ conclusions appear to be valid.

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