Cost-effectiveness of a folic acid fortification program in Chile

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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 determined the cost-effectiveness of wheat flour fortified with folic acid, compared with standard wheat flour, in the periconceptional period to reduce neural tube defects (NTDs) in all births weighing more than 499 g in Chile. The authors concluded that the programme was a cost-effective intervention for the prevention of NTDs in Chile. The quality of the study methodology was satisfactory, with good reporting of the methods and results. The authors' conclusions are likely to be valid and robust.

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

Study objective
The objective of the study was to determine the cost-effectiveness of wheat flour fortified with folic acid, compared with standard wheat flour, in the periconceptional period. The intervention aimed to reduce neural tube defects (NTDs) in all births with a birth weight greater than 499 g in Chile.

Interventions
The study examined a wheat flour folic acid fortification programme aimed at reducing the risk of NTDs, such as spina bifida and anencephaly, with consequent reductions in foetal morbidity and mortality. This programme was compared with the current pattern of care, namely no fortification.

Location/setting
Chile/primary care.

Methods
Analytical approach:
This economic evaluation was based on primary data derived from national sources. The time horizon of the analysis appears to have been lifetime. The perspective of the analysis was not explicitly stated.

Effectiveness data:
The clinical data were derived from a selection of known relevant studies. Most epidemiological and clinical data were derived from a national registry, which covered the period 1999 to 2000 for the pre-fortification era (120,636 newborns) and the period 2001 to 2002 for the post-fortification era (117,101 newborns). These data were supplemented with information from other published sources, such as a study on a birth cohort from the USA, to estimate the survival rate in children with spina bifida. The key estimate was the incidence of NTDs in the two periods.

Monetary benefit and utility valuations:
Disability weights associated with cases of spina bifida and anencephaly were estimated using an approach found in an Australian burden of disease study, in which different weights were related to the severity of the lesion.

Measure of benefit:
The summary benefit measures were the number of disability-adjusted life-years (DALYs), cases averted and infant deaths averted. In the calculation of DALYs, an annual discount rate of 3% was applied.

Cost data:
The analysis of the costs considered two main categories. These were the costs associated with the fortification...
programme and the disease costs averted (surgical, medical and rehabilitation care). Health service costs were derived from public hospitals and rehabilitation centres, whose reimbursement fees were based on those established by the National Health Fund of Chile, which is the government health insurance provider. For example, surgical costs came from the Neurosurgical Institute of Santiago. Details of the other sources were also given. Programme costs included the costs of adding folic acid and undertaking tests to confirm appropriate folic acid levels. Data on resource use were based on published evidence and authors’ experience. The costs were not discounted given that only 1-year costs were estimated. The costs were in International dollars (INT $) using the purchasing power parity conversion factor taken from World Development Indicators. The costs were adjusted to the year 2001 using the Consumer Price Index reported by the Central Bank of Chile.

Analysis of uncertainty:
A deterministic sensitivity analysis was undertaken to determine the robustness of the cost-utility ratios to variations in key clinical estimates. The ranges of values for clinical estimates were derived from 95% confidence intervals (CIs). Other data, such as the discount rate, were varied using alternative estimates defined by the authors. The cost estimates were not varied.

Results
For all NTDs, the number of cases averted with the fortification programme was 174 (95% CI: 157 to 202). The incremental cost per NTD case averted was INT $1,200 (95% CI: 1,000 to 1,300).

The number of infant deaths averted with the fortification programme was 20 (95% CI: 17 to 22). The incremental cost per infant death averted was INT $11,000 (95% CI: 9,300 to 12,000).

The DALYs averted with the fortification programme were 2,300 (95% CI: 2,000 to 2,500). The incremental cost per DALY averted with the fortification programme was INT $89 (95% CI: 79 to 101), which represents 0.8% of Chile's gross domestic product (GDP) per capita.

These figures were based on a cost calculation in which only programme costs (1 year of fortification) were included. When averted costs of care were considered, the fortification programme was dominant as it was both more effective and less expensive than no fortification, with net cost-savings of INT $2.3 million (95% CI: 2.0 million to 2.6 million).

The sensitivity analysis corroborated the base-case results.

Authors’ conclusions
The authors concluded that a programme of fortifying wheat flour with folic acid was a cost-effective intervention for the prevention of NTDs in Chile. It was noted that these findings might serve as important evidence for policy makers from other developing countries.

CRD commentary
Interventions:
The authors provided a clear justification for their selection of the comparators. Furthermore, it was stated that other alternatives intended to increase folic acid intake, such as promoting consumption of supplements, were not considered because they were not in place during the period of evaluation. The wheat flour folic acid fortification programme might be a relevant option in other middle-income countries with similar GDP per capita.

Effectiveness/benefits:
The clinical data were obtained from a selection of known sources. The bulk of the evidence came from a national registry, which collected data on incidence of disease, the key clinical estimate. This represents a valid source of data for the authors’ setting and was based on a very large sample of newborns. These estimates were supplemented with data from other published studies, the methodology of which was not reported. The use of ranges of values in the sensitivity analysis enhances the robustness of the clinical estimates. The authors provided a clear description of the derivation of the benefit measures, which were both valid and comparable with the benefits of other health care interventions. In addition, the calculation of DALYs was based on validated methodology.
Costs:
The analysis of the costs appears to have been carried out from the perspective of the national payer, given the types of costs included and the sources used, although it was not explicitly stated. These cost estimates reflect the national setting and may not be relevant for other settings, especially given that sensitivity analyses were not performed on the cost data. Details of the methods used to calculate the costs associated with the different disabilities were reported and appear to have been appropriate. The price year was reported, which will assist if replicating the analysis in other time periods.

Analysis and results:
The synthesis of the costs and benefits was appropriate and the results were presented clearly. The ranges of final values were reported for benefits and cost-effectiveness or cost-utility ratios. The issue of uncertainty was only partially addressed as economic estimates were not varied in the sensitivity analysis. In terms of the generalisability of the study results to other settings, the authors noted that their findings could be transferred to similar middle-income countries.

Concluding remarks:
The quality of the study methodology was satisfactory, with good reporting of the methods and results. The authors provided clear information on the sources used and the approaches used to derive the costs and benefits of the programme. The authors’ conclusions are likely to be valid and robust.

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Bibliographic details

Other publications of related interest


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MeSH
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