Cost-effectiveness of interventions to reduce dietary salt intake
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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 reducing salt in the diet through voluntary or mandatory changes by the food industry or dietary advice for those at risk of cardiovascular disease. The authors concluded that food manufacturer action was the preferred strategy to improve health and reduce health spending in the long term, especially when mandatory. The study was well carried out and the authors’ conclusions seem robust, but limited by the uncertainty in some model inputs.

Type of economic evaluation
Cost-utility analysis

Study objective
This study examined the cost-effectiveness of interventions for reducing salt in the diet, including voluntary or mandatory changes by the food industry to reduce salt in processed food and dietary advice for those at risk of cardiovascular disease (CVD).

Interventions
The following four salt reduction interventions were considered: the Tick programme, which provided incentives for voluntary changes by the food manufacturers and was implemented in Australia in 1989; legislation and enforcement of mandatory Tick salt limits for food manufacturers; dietary advice for people who were at an increased risk of CVD, with a systolic blood pressure over 115mmHg; and dietary advice for those at high risk of CVD, with a systolic blood pressure over 140mmHg.

No intervention was the background comparator.

Location/setting
Australia/community and primary care.

Methods
Analytical approach:
The analysis was based on a decision model, with a lifetime horizon. The authors stated that the perspective of the Australian health sector was considered, with three interpretations of this perspective. The base case included government or food industry costs, a second scenario included patient costs as well, and a third scenario also included the costs of health care for unrelated diseases in additional years of life.

Effectiveness data:
The clinical data were from a selection of relevant sources, which included published studies and Australian epidemiological reports. The key details of study designs and sample sizes were reported in an appendix. The efficacy of dietary advice, which was a key input, was from a published meta-analysis of seven randomised controlled trials (RCTs; 2,166 participants) identified by a Cochrane review. The effectiveness of the reduction of salt in food with the Tick programme was from real data in Australia and New Zealand. Most of the data on CVD were from the Burden of Disease and Injury in Australia study, while the association between systolic blood pressure reduction and the risk of CVD disease was from the Prospective Studies Collaboration.

Monetary benefit and utility valuations:
Disability weights for CVD were derived from the Burden of Disease and Injury in Australia study.

Measure of benefit:
Disability-adjusted life-years (DALYs) were the summary benefit measure and were discounted at an annual rate of 3%.

Cost data:
The economic analysis included the costs of the food industry intervention and the dietary advice intervention, as well as the costs of CVD. The resource use and costs of food industry interventions were from reports by the World Health Organization. The costs of dietary advice were from the Trials of Hypertension Prevention (TOHP) II and included mail-outs, individual counselling, and 17 group sessions. The costs to patients for their time and travel were included. The costs of other diseases were from the Australian Institute of Health and Welfare's Disease Costs and Impacts study. The costs were in Australian dollars (AUD) and the price year was 2003. A 3% annual discount rate was applied.

Analysis of uncertainty:
A Monte Carlo simulation was used to estimate the uncertainty in the model findings and 95% confidence intervals were calculated for the model outcomes. Probability distributions were attributed to the model inputs.

Results
With a cohort representing the 2003 Australian population, the DALYs averted were 1,700 with dietary advice for those at increased risk, 2,600 with dietary advice for high risk, 5,300 with the Tick programme, and 110,000 with mandatory limits.

The government costs were AUD 290 million with advice for high risk, AUD 720 million with advice for increased risk, AUD 4.7 million with Tick, and AUD 69 million with mandatory limits. The patient time and travel costs were AUD 130 million with dietary advice for high risk, and 330 million with dietary advice for increased risk (zero for the other two interventions). The costs offset by reduced health care were AUD 22 million with advice for high risk, AUD 34 million with advice for increased risk, AUD 77 million with Tick, and AUD 1,500 million with mandatory limits.

The incremental analysis showed that both the Tick programme and mandatory limits had a 100% probability of being dominant (more effective and less expensive than the other options), in all the modelled scenarios of discounting, costs, and reversal of risk, compared with the dietary advice interventions. Dietary advice had zero probability of being cost-effective at a threshold of AUD 50,000 per DALY averted. Even under favourable assumptions, the lowest incremental cost per DALY averted, compared with no intervention, was AUD 100,000 (95% CI 64,000 to 180,000).

Authors' conclusions
The authors concluded that food manufacturer action was the preferred strategy to improve health and reduce health spending in the long term, especially when mandatory.

CRD commentary
Interventions:
The comparators were appropriately selected to represent the possible interventions to reduce salt intake. The programme of incentives for food manufacturers was that introduced in the Australian setting.

Effectiveness/benefits:
The methods and conduct of a literature review were not reported. The key information on the data sources was given, in the web appendix. Appropriate sources were used and most of them reflected the Australian epidemiological setting. The efficacy of dietary advice was from a meta-analysis of RCTs that should have high internal validity. Alternative scenarios were considered in the sensitivity analyses. Little information was presented for the disability weights, which limits the possibility of judging their validity. In general, DALYs are an appropriate benefit measure and they capture the comprehensive impact of the disease on a patient's health.

Costs:
The economic analysis considered several perspectives, but the findings were similar, regardless of the payer. Some of
the unit costs and resource quantities were available in the online appendix, with a description of their sources. In general, they seem to have appropriately reflected the Australian context. The costs were varied in the probabilistic sensitivity analysis, using standard distributions. The price year and the use of discounting were reported.

**Analysis and results:**
The costs and benefits were appropriately synthesised in an incremental analysis. The results were extensively presented for various scenarios and assumptions on discounting and risk reversal. The uncertainty was satisfactorily investigated and provided expected ranges of values, which might be applicable to other settings. An appropriate probabilistic sensitivity analysis was used to investigate the overall uncertainty. Details of the distributions assigned to the model inputs were presented in the appendix. The authors acknowledged that the main limitation of their study was the uncertainty around the real effectiveness of voluntary and mandatory national programmes of incentives for the food industries.

**Concluding remarks:**
The study was well carried out and the authors’ conclusions seem robust, but limited by the uncertainty in some model inputs.

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