Cost-effectiveness analysis of a proposed public health legislative/educational strategy to reduce tap water scald injuries in children

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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
The study was intended to determine the clinical and economic impact of introducing a public health legislative/educational programme to reduce tap water scald injuries in children under 10 years of age in the setting of Ontario, Canada. The authors concluded that the intervention led to fewer scald injuries and lower costs than the status quo. The quality of the study was good in terms of methodology and the presentation of the results. Thus, the authors' conclusions are robust and valid.

Type of economic evaluation
Cost-effectiveness analysis

Study objective
The objective of the study was to determine the clinical and economic impact of introducing a public health legislative/educational programme to reduce tap water scald injuries in children younger than 10 years in the setting of Ontario, Canada.

Interventions
The intervention consisted of a legislation to set thermostat settings on new domestic water heaters to lower temperatures (maximum 49 °C) plus annual educational notices to utility customers. The programme was compared with the status quo in the authors' setting (no intervention).

Location/setting
Canada/community.

Methods
Analytical approach:
A decision analytic model was developed to assess the costs and benefits of the two strategies on the basis of epidemiological and clinical published sources. The time horizon of the analysis was 10 years. The authors stated that the perspective of the provincial government was adopted.

Effectiveness data:
Most of the epidemiological and baseline clinical data came from the National Ambulatory Care Reporting System (NACRS) and from patient charts at the Hospital for Sick Children (HSC). The NACRS collects data on all ambulatory care visits in Ontario, and data from April 2002 to March 2003 were gathered. The database of the HSC contains records of tap water scald injuries over the period 1995 to 2000. The reduction in the rate of scald injuries due to the legislative/educational programme, which was the key clinical outcome of the analysis, was taken from the only published study that had measured the impact of this type of programme in US children.

Monetary benefit and utility valuations:
None.

Measure of benefit:
The summary benefit measure was the reduction in tap water scald injuries (scald cases prevented). The benefits were discounted at an annual rate of 3%.
Cost data:
The health service costs included in the analysis were emergency services, hospital services and physicians’ visits. Inpatient costs covered personnel salaries and benefits, purchased services, medical and surgical supplies, medications, building and equipment costs, administration and miscellaneous supplies. Resource use was based on inpatient and outpatient data derived from a chart review of HSC patients. The cost of the programme was also considered; this included the cost of lowering scald temperature and that of printing and distributing annual notices to utility customers. These costs were derived through consultation with safety advocacy groups and industry experts. Other costs were based on the Ontario Ministry of Health, the HSC and Ontario Health Insurance Plan Schedule of Benefits. Costs incurred after the first year were discounted at an annual rate of 3%. The costs were in Canadian dollars (CAD). The price year was 2002.

Analysis of uncertainty:
A deterministic univariate sensitivity analysis was performed to assess the impact of variations in economic and clinical assumptions on the results of the analysis. All parameters were varied by +/- 30%, and the threshold value at which the costs of the two strategies were equal was determined.

Results
Over 10 years, the proposed intervention would result in total costs of CAD 1.17 million and 704 scald injuries, while the status quo would lead to CAD 1.65 million and 1,599 scald injuries. Thus, the proposed intervention was both more effective (i.e. fewer scald injuries) and less expensive than the current standard of care, mainly due to the reduction in hospitalisation costs.

The sensitivity analysis basically corroborated the base-case findings and the intervention was dominant in all cases. The threshold analysis showed that unrealistic variations in the model parameters would be required to produce equal cost between the two options.

Authors’ conclusions
The authors concluded that legislation to lower thermostat settings on domestic water heaters, plus an annual educational notice to utility customers, led to cost-savings from the perspective of the provincial government in Canada and reduced the morbidity associated with tap water scalds in children. Future studies should investigate the cost-effectiveness of the proposed intervention in other populations at risk, such as the elderly and disabled.

CRD commentary
Interventions:
The relevance of the comparators was clear as the proposed intervention was compared with the status quo in the authors’ context. They are also likely to be relevant in other settings.

Effectiveness/benefits:
The clinical data were derived from a selection of known, relevant sources. Data based on large populations were used to derive key estimates, which are likely to have a high validity since they reflect the experience of a large sample of children. The authors noted some limitations related to the published study used to determine the effectiveness of the proposed intervention. However, this was the only available published study assessing the impact of a similar intervention. The benefit measure represented the typical outcome of the interventions under examination. As the authors noted, quality-of-life adjustment would have been interesting but it was not possible given the lack of published evidence. The inclusion of quality-of-life adjustments would lead to results even more favourable to the intervention under analysis.

Costs:
The analysis of the costs reflected the viewpoint of the analysis. It appears that all the relevant categories of costs have been included in the study. The authors justified the choice of the provincial perspective and stated that the adoption of a broader viewpoint (i.e. that of society) would have further favoured the cost-savings associated with the proposed intervention. Extensive information on resource use, costs, sources of economic estimates, price year and discount rate was provided, which makes the cost analysis transparent and clear. The issue of variability around some costs was...
addressed in the sensitivity analysis.

Analysis and results:
A synthesis of the costs and benefits was not required (although the authors performed this calculation) given the dominance of the proposed intervention. The issue of uncertainty was addressed in the sensitivity analysis by means of both one-way and threshold analyses. The results of the study (both the base-case and sensitivity analysis) were clearly presented and discussed. The issue of the external validity of the analysis was addressed and the authors stated that their findings might be generalisable to other settings within Canada, and internationally, to countries with comparable social or legislative frameworks.

Concluding remarks:
The study methodology was good and well presented in terms of the methods and results. The sources used appear appropriate and were satisfactorily selected. The authors' conclusion seems appropriate and valid.

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